CI/CD Fundamentals and Benefits

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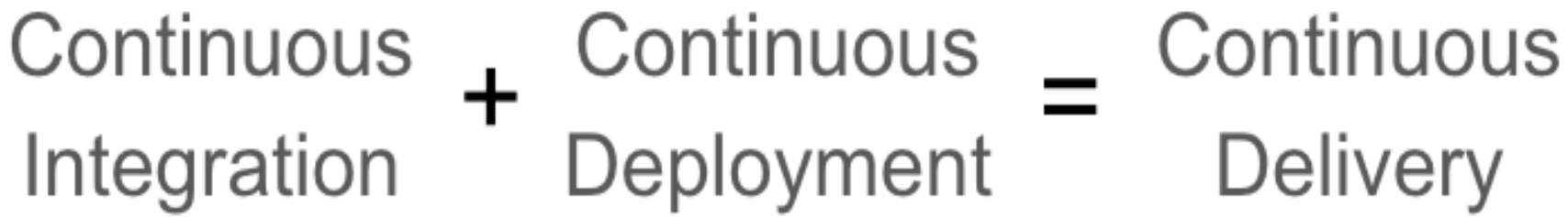
Fundamentals of CI/CD

- **Continuous Integration**: The practice of merging all developers' working copies to a shared mainline several times a day.
- **Continuous Delivery**: An engineering practice in which teams produce and release value in short cycles.
- **Continuous Deployment**: A software engineering approach in which the value is delivered frequently through automated deployments.



Fundamentals of CI/CD

- **Pipeline**: A set of data processing elements connected in series, where the output of one element is the input of the next one.
- **Infrastructure as Code**: The management of infrastructure using code.
- **Provisioning**: The process of setting up IT infrastructure.
- **Artifact**: A product of some process applied to the code repository.
- **DevOps**: A set of practices that works to automate and integrate the processes between software development and IT teams.
- **Testing**: A practice that seeks to ensure the quality of the software.

Benefits of CI/CD

- Less developer time on issues from new developer code
- Less bugs in production and less time in testing
- Prevent embarrassing or costly security holes
- Less human error, Faster deployments
- Less infrastructure costs from unused resources
- New value-generating features released more quickly
- Less time to market
- Reduced downtime from a deploy-related crash or major bug
- Quick undo to return production to working state

Best Practices for CI/CD

- **Fail Fast:** Set up your CI/CD pipeline to find and reveal failures as fast as possible. The faster you can bring your code failures to light, the faster you can fix them.
- **Measure Quality:** Measure your code quality so that you can see the positive effects of your improvement work (or the negative effects of technical debt).
- **Only Road to Production:** Once CI/CD is deploying to production on your behalf, it must be the only way to deploy. Any other person or process that meddles with production after CI/CD is running will inevitably cause CI/CD to become inconsistent and fail.
- **Maximum Automation:** If it can be automated, automate it. This will only improve your process!
- **Config in Code:** All configuration code must be in code and versioned alongside your production code. This includes the CI/CD configuration files!