A Continuous Integration and Continuous Deployment (CI/CD) pipeline is a critical component of modern software development and deployment processes. It is needed for several important reasons:

Automation: CI/CD pipelines automate various stages of the software development lifecycle, reducing manual and error-prone tasks. Automation saves time and ensures consistency in the process.

Faster Development and Deployment: CI/CD enables rapid development and deployment of software. Developers can continuously integrate and deploy their code changes, allowing for quicker time-to-market and faster delivery of features and updates to end-users.

Early Issue Detection: CI/CD pipelines include automated testing, including unit tests, integration tests, and other checks. This early testing helps detect and address issues and bugs before they reach production, reducing the cost and effort of fixing them later in the development cycle.

Quality Assurance: CI/CD promotes a culture of quality assurance. It enforces testing and quality standards, ensuring that only well-tested and verified code is deployed to production.

https://ieeexplore.ieee.org/abstract/document/8421965

Arachchi, S. A. I. B. S., & Perera, I. (2018, May 1). *Continuous Integration and Continuous Delivery Pipeline Automation for Agile Software Project Management*. IEEE Xplore. https://doi.org/10.1109/MERCon.2018.8421965

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(Arachchi & Perera, 2018)