

Coordination in Digital Transformation Projects using Continuous Integration Continuous Deployment ¹

Chanchal Gupta

Abstract

Coordination plays a vital role in both project development and operation activity, especially in regard to the software development lifecycle of digital projects. Based on my analysis of recent digital transformation projects it's obvious to have continuous improvements and speed to market is the key. Recently, more and more Digital Projects are being executed using DevOps model. DevOps is the practice of operations and development engineers participating together in the entire service lifecycle, from design through the development process to production support. CICD (Continuous Integration / Continuous Deployment) helps the development and operation team to have frequent production changes without downtime using DevOps model. From a project management perspective, PMs need to do more co-ordination jobs to have delivery in sequence from different teams. We will learn the nature of coordination work in continuous integration and continuous deployment of the project lifecycle, where each code package in the development is treated as a separate project to be managed.

Introduction

A precise definition of continuous integration and continuous deployment (CICD) can be difficult to produce. However, continuous integration and continuous deployment is a code management process to move code to multiple environments without production downtime. It plays an important role in digital globalization development projects to minimize the timeline to move to production.

Based on thoughtworks.com, continuous integration (CI) is a development practice that requires developers to integrate code into a shared repository several times a day. Each check-in is then verified by an automated build, allowing teams to detect problems early. By integrating regularly, you can detect errors quickly and locate them more easily. It helps to push code to production in a short period.

¹ How to cite this article: Gupta, C. (2020). Coordination in Digital Transformation Projects using Continuous Integration Continuous Deployment, *PM World Journal*, Vol. IX, Issue VI, June.

The agile development methodology is very useful for these digital transformation projects. We can do various sprints to complete the development. Scrums masters can also help to achieve it by running the shorts scrums by breaking the tasks into multiple sprints.

Continuous integration continuous deployment is more complicated and broken into multiple units for development. We can have multiple teams, vendors working into the same solution to completely build a larger project. It is a very useful tool to help the technical team for quick integration and frequent code release but there are still various stakeholders whose involvement will require before making the final move. A project manager will play a vital role to have coordination among these teams to make sure there is no blockage and dependencies stopping the technical team to make progress.

The normal software development lifecycle

The normal development process is Initiation, Analysis, Requirement gathering, Design and Development get executed in a sequence based on the defined requirement. Deploy it to production and hand it over to the maintenance/operation team for support. This is a simple waterfall model development method. Figure1, source: (qmansys.com).



Figure 1: Normal Software Development Life cycle

Continuous Integration and Continuous Deployment Projects – Modular Approach

According to PMI's definition of projects, the temporary nature of projects indicates that a project has ended when its objectives are achieved (PMI, 2017). In the Digital Transformation projects, we break the projects in multiple modules and different specialty vendors complete the task.

Project management team for a certain client will manage a series of activities of the modules. This series of activities include delivering all code for core components to check-in at the defined time, also meeting the standard quality requirements to meet the standard of the development process. All these activities are not necessarily included at the beginning of project development when managing how the end product will utilize these core components. The good thing is more and more standard development projects are getting automated in terms of technical code review and validation.

Still, there are dependencies in co-ordination to complete a certain task for CICD to utilize the resource in full capacity. It requires a more coordinated effort to make it successful. Figure 2. Source: (dzone.com).

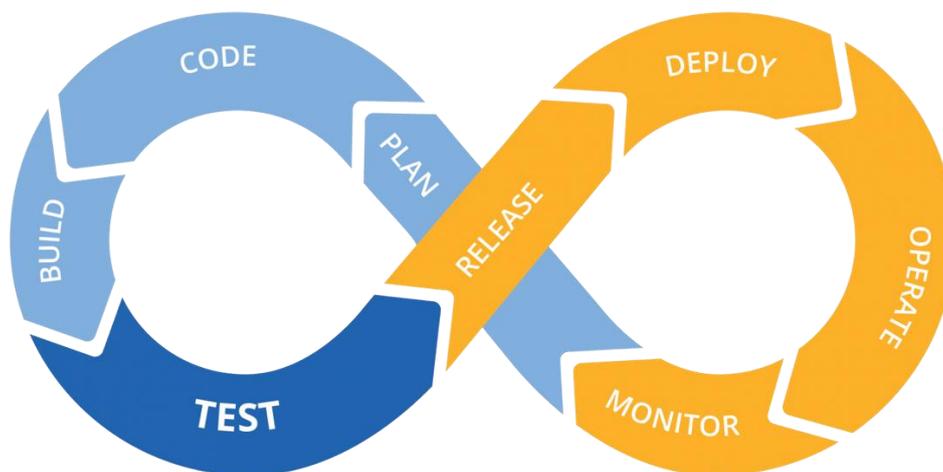


Figure 2: Continuous Integration Continuous Deployment

Risk

One of the major differences in the normal development process and Continuous Integration Continuous Deployment process (CICD) is to run multiple parallel projects to build a larger project with less complexity. The normal development project has defined task and process which has no modularize approach.

There are project dependencies to complete the whole task and coordination is required to make sure we are making progress and sticking to timeline for delivery. Any unforeseen issues can be addressed and it may or may not have an impact on the project delivery. There are higher chances to put the whole project at risk if anything goes wrong as it is not modularized.

So, the uncertainty is built into the digital transformation projects, especially for overhaul transformation started from research and development, design, software procurement, validation and testing, and delivery. Except for the requirements from the client (comparing them with the complex final product), it is almost a simple conceptual design during the initiation. There is simply a basic design that briefly specifies the major technical scope, performance, functions, integration and systematic working methods to be used when signing the contract with the vendor. Generally, these are individual micro-services that may be integrated with the later part to run the whole digital ecosystem.

We start the project with high-level design and individual vendors/teams are responsible for the detail design of the scope of their module.

The uncertainty and change also come from the related stakeholders as explained below:

- Technical specification change from departments.
- Rule changes caused by related authorities and international organization data privacy.
- Unforeseen modifications caused by the technical team of vendors.
- Technical challenges, Resource limitations and failure to meet the timeline may impact other projects.

Only Coordination Can Treat Complexity and Uncertainty

A lack of coordination leads to the degradation of responsiveness and increase project costs and development timeline. Teamwork can help achieve success through coordination by aligning goals and incentives across different functions.

The most important stage of a complicated digital transformation project is the planning stage, so we need to carry out strategic principles and coordination mechanics during planning. The planning of digital projects using CICD includes resourcing, timeline, tool selection, vendor selection, risk management and maintenance plan. These should be coordinated with planned activities of design, building process, scheduling and production integration. The planning of complicated projects can be achieved by effective coordination of these sub planning processes, aligned with the best performance of cost, scope and timeline. (PMI, 2017).

Coordination in Project Scheduling and execution

The schedule defines the detailed architecture, software selection, procurement, and contracting activities. Normally, we already have a specified delivery date for the final product when we sign the contract with the client for an individual module. So, we should develop the project schedule from the milestone plan and continually refine the plan through the work breakdown structure (WBS) and activity duration needed for each step. In essence, it is important to align the critical path with the milestone plan.

In order to achieve the coordination of the digital transformation project planning, it should be made clear what lead time is requested for the delivery, reach out to the market in advance. It is then important to coordinate the delivery plan of the relative team, tools access and training during the design process. Following the process, detailed training should be carried out to specify all the roles and responsibilities for successful execution in the market.

Coordination in Development

Every complicated digital project consists of many micro-services and multiple software. Individual development vendor partners are responsible for certain services/modules of the project. To make sure everyone is using the same version of the software, following development guidelines and check-in code as per timeline is a must to have a successful sprint.

The final delivery of a complicated digital project cannot be completed by its design or information technology department independently. It also requires the necessary technical inputs from business, legal and corporate compliance.

The design and architecture are very important to implement micro-services. Figure 3. The architecture and major functionalities should meet the requirements of the micro service design. The design and information technology department of the micro-services will approve the design or give comments.

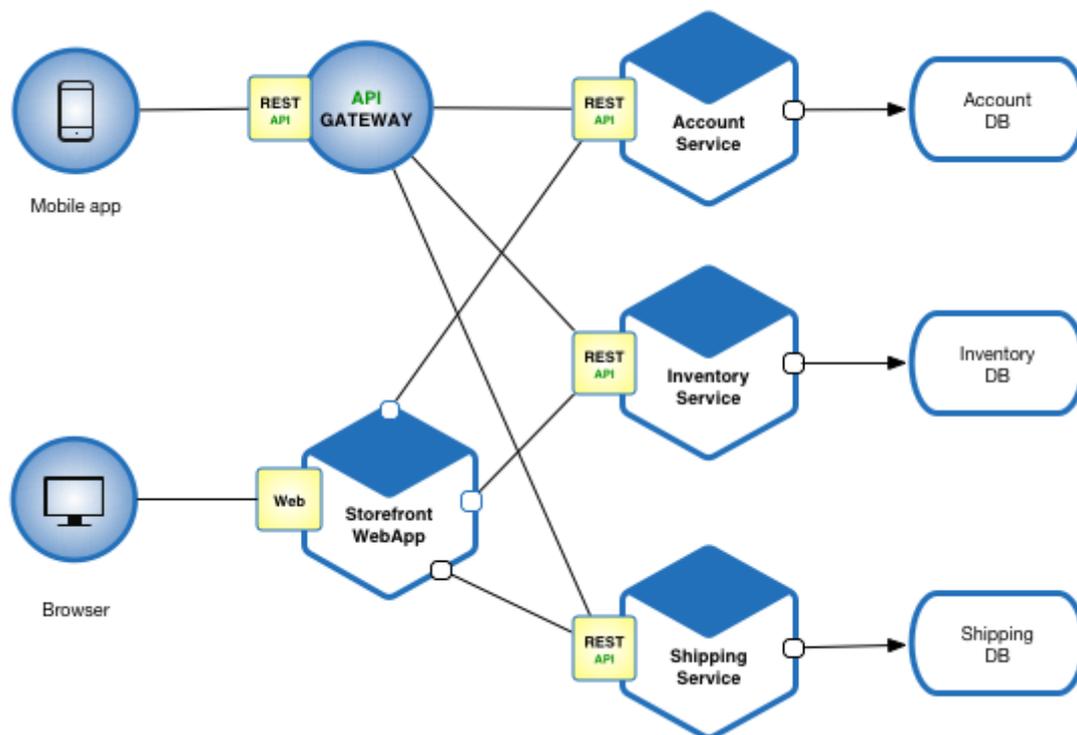


Figure 3: Design workflow

Coordination in Case of Contingency

The contingency, or so-called troubles, cannot be avoided during the processes of complicated projects. The only way to proactively solve problems for all related parties is to work together and communicate to find workable solutions.

For example, a meeting should be called to find a technical solution when a problem is discovered, such as a vendor is not building the project as per guidelines and standards. We may find some security loopholes. There could be some access issues. These kinds of issues keep arising from time to time and if there is no close coordination, there are higher chances of failure of the project which may impact the other parallel running projects.

Coordination to Engage Core Team

The process of commissioning tests and demonstrates that the complete system, subsystems, are safe and secure and operating as per specifications, we need core team member's approval to confirm it.

During these processes, the job is carried out by different teams according to the technical agreement that was approved and signed. The vendor is responsible for any bug fixing and

code update, check-in and integration work. Business users will be responsible for acceptance tests and handover is performed in cooperation. The infrastructure and other related teams should be properly coordinated when the main system is under such commissioning, thus all parties in the project need to work with great coordination.

In the digital projects, we keep the customer's need in the center to drive the project. To have a successful project it is important to have the right content and feature. There are so many regulations around data policy and public content. We need to coordinate and make sure to get approval from all responsible team before any new changes are going live. It's very important to make the core team aware of all the changes coming through the system. The project manager needs to update any major core component change to all stakeholders.

A senior global project manager runs a weekly meeting with different countries project managers to align with the global intake request. He also gets an update from different vendors as Kanban chart to view the current development queue. He uses this data to build a release queue. An agile development process requires daily coordination to be on top of these projects to quickly identify and mitigate risks. These processes and coordination activities have enabled us to move faster using CICD and launch multiple projects in a shorter time. The above process enables us to have all the required input and approval from all the parties on time which enable CICD pipeline to make frequent release without any roadblock.

Conclusion

Coordination is the soul of the global digital projects using continuous integration continuous deployment procedure. It needs all parties to work together to align with the project planning, technical specifications and time schedules, as well as to respond quickly in the case of any deviations. Various automation tools that come handy in terms of code management but still the story and requirements are managed by the core project management team. It is very closely coordinated and monitored.

To build a scalable solution all these teams need to come together which includes, developers, designers, quality assurance, infrastructure and security, procurement team, business, regulation and compliance. Working out with various departments and making sure the right team is involved is a big challenge. Continuous integration and continuous deployment will help us drive technical solution/implementation but still we will require the project manager to coordinate with multiple teams to move faster.

In a nutshell, CICD will help technically to have frequent release cycles without shutting down the production environment. When we are making our technology better we need frequent coordination to make sure there is no wait time for our technical team to continue their work. A project manager will play a vital role to keep the ball rolling in terms of coordination and CICD will allow the technical team to release frequent changes.

References

1. Project management references: Project Management Institute. (2017). *A guide to the project management body of Author*. www.pmi.org/about/learn-about-pmi/what-is-project-management
2. CI definition, www.thoughtworks.com/continuous-integration
3. Standard Project management phases, <https://qmansys.com/project-management-exploring>
4. CICD Image, dzone.com/articles/what-is-cicd
5. DevOps Definition: theagileadmin.com/what-is-devops

About the Author



Chanchal Gupta

Pittsburgh, PA, USA



Chanchal Gupta is a Senior Digital Technical Project Manager who has served as a project management expert and leader in the software development since 2007. He now works as a Manager, Digital deployment and Vendor Management for a Pharmaceutical company and responsible for managing digital projects and operations. Chanchal is highly knowledgeable in software development, requirements analysis, digital transformation projects, cloud computing, architecture, database design, and excel and at creating and implementing technical and operational plans and strategies. Chanchal Gupta can be contacted at chanchalpgupta@gmail.com