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Value Stream Management through an Integration model of Agile and DevOps

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Abstract:

The software Companies are transforming the way they operate to increase the probability of success of the project and delight their customers. The delivery estimates must use a realistic solution scoping with all functional and non-functional requirements. The best approach is demonstrating reduced costs, improving the speed, implementing the workflow and automating the internal processes to increase customer satisfaction. With a well-supported model, the organization will reach the level of maturity on which each successful project will be built with experience and credibility. The model will deliver a value by addressing a complex process that involves multiple teams with long workflows to complete the project within the estimated schedule and budget. There is a need for the projects to embrace DevOps and agile methodologies to drive innovation, speed and adaptability to provide a greater value to their customers for uplifting their level of gratification. This paper attempts to highlight the reasons due to which projects can fail and the strategies that can be adopted to prevent such failures.

Index Terms—Agile, DevOps, Value Stream, DevOps Metrics, DevOps Optimization.

Introduction

Setting unrealistic goals are the primary reason for the failure of the projects. The secondary important reason is, the project managers fail to assess the realistic risk. We need to avoid creating arbitrary schedules to avoid project failure and define quality objectives and measure against those objectives throughout the project lifecycle. The companies must first define the people and processes involved along with the expected end state goal. In most cases, failure occurs due to the inability of people to change and learn. The Project Managers know the myriad benefits of process improvement, but many miss the mark due to ineffective feedback loops from the frequent changes

and failures. Through the effective feedback system will encourage them to participate in process improvement efforts, increase efficiency, reduce cost, reduce risk, and drive continuous service improvement.

COMMON CAUSES FOR PROJECT FAILURES

The study of failed projects provides the rich context within which underlying root causes and these studies indicate that serious problems exist across the industry as a whole [1][2][3][4]. Time to market competition in software industry is forcing the software industry to look for new ways and means for improving their processes to improve product and service quality and thereby meeting customer satisfaction. As various sectors today are becoming more complex, there are chances and opportunities for defects to creep in the software product. The only way to reduce the defects and to move towards excellence, the industries need to breakdown the traditional boundaries that separate customer, project managers, developers, designers and end users by shifting towards working together to systematically design effective and efficient systems.

In the present scenario, the software industry must strive for perfection by reducing variability and waste, translating to fewer defects, provide better processes, improve customer satisfaction with greater satisfaction rate, and improve both employee satisfaction and productivity. There is a need of a methodology to continue improvement in everything and establishing the belief of 'doing things right, first time and every time'. IT organizations now-a-days are facing challenges to deliver its services more dynamically, improve the efficiency and cost effectiveness despite implementing advanced levels of automation and the advanced IT analytics.

A. Causes for Instability

The following are the problems faced by the projects causing instability in the value-stream system [5][6].

1) *Failure of Project Monitoring*
2) *Lengthy Documentation*
3) *Extended Testing*
4) *Code-related Activities*
5) *Escalation of the Cost due to delay*
6) *Decline of Quality*
7) *Lack of Proper Change Management*

A company should have an effective change management system in order to evaluate, approve and implement changes. As, the change is inevitable, many software companies strategize the change, but only very few companies take efforts to manage change. Changes should enhance workflows for all stakeholders

involved and address any bottlenecks, gaps, inefficiencies, or vulnerabilities in the current processes and be made to achieve a strategic goal, whether that goal is operational effectiveness, improving customer satisfaction or simply cost management.

B. Common pitfalls of the Project Management

The underperformance of software projects have proved that planning and risk management have not been significant and further work has to be carried out to reduce the number of project failures, and bring more projects in on-time and on-budget. According to PMI, only 23% of organizations use standardized project management practices across the entire organization. According to various studies, it is evident that the Project Managers have not responded to the early warning signals [3][4]. The other important factors for the failure of the projects are inadequate or poor communication, delegating tasks, visualizing the plans and organize workflows and poor resource planning. Emergence of new technologies, increasing competitors and changing business models, and also fast changes in customer needs and preferences, the project management should focus on the above factors and ensure that everyone is on the same page, the project must be

transparent, and its workflow is at an optimum level.

AGILE METHODOLOGIES

The agile methodology focuses on continuous delivery and continuous integration with shorter development cycles with frequent feedback loops guiding towards quick product delivery that is more aligned with customer needs [7][8]. Use of the right tools and software is always a challenge to plan, track, schedule and manage the projects as efficiently. The project managers have to create a system that provides visibility among the teams with a sense of ownership to produce better quality work and with transparency. Agility builds upon Continuous Integration, driving towards the ability to rapidly put software into production and involves the ongoing integration between testing and development and finally, deploying it in few days or weeks [9].

A. Issues and Challenges

The agile methodology focuses on continuous delivery and continuous integration with shorter development cycles with frequent feedback loops guiding towards quick product delivery that is more aligned with customer needs. Use of the right tools and software is always a challenge to plan, track, schedule

and manage the projects as efficiently [7][8][9]. The project managers have to create a system that provides visibility among the teams with a sense of ownership to produce better quality work and with transparency. Agility builds upon Continuous Integration, driving towards the ability to rapidly put software into production and involves the ongoing integration between testing and development and finally, deploying it in few days or weeks [7][8][9][10].

1) Response and resolve the bugs

Responding to the bugs from time to time is one of the major challenges in the agile methods to overcome the product failures. Difficult to resolve team problems and day-to-day operational problems.

2) Higher risk assessment

Unable to proactively focus on product areas having the higher risk of quality issues.

3) Under Evaluation
Inadequate evaluation of the product at the time of implementation.

4) Replacement of Methodology

See-as-you-go nature of Agile methodology just replacing the old methodology without any gain in efficiency giving more value to delivery over processes and documentation.

5) Meeting span

Instead of conducting a stand-up meeting for 15 minutes, the program manager may be used to conduct an hour-long meeting every day with team members and other stakeholders.

6) Sprint Strategies

The team may take days to create sprint planning strategy and move into construction iterations waiting for the requirements to finalize.

7) Measuring Complexity

Underestimation of complexity resulting in insufficient time and budget to complete the project successfully.

8) *Accuracy in Prediction*

Fail to accurately predict the cost, time, or resources needed at the beginning of a project [11][12].

9) Cross-functional check

Appropriate cross-functional checks along with good project management controls are responsible for delivering the good quality product.

If Agile help project managers with a promising methodology for promoting faster project completion and a more efficient development process, the project managers should empower teams to clarify complexity, align their insights, and better focus their attention on what matters most.

Embracing the practices of Devops and agile methodologies
DevOps is a customer-centric approach and continuously evaluating time delivery of the quality software features using agile

methodologies, operational and change management best practices [13]. The fig.1 shows an integrated approach that considers a holistic mix of people, processes, operational management and behavioral change. Both development (Dev) and Operations (Ops) teams collaborate right from the beginning of the project and people from top to bottom would engage, question the status quo and are empowered to suggest ways to systematic elimination of activities that add little or no value in the processes. Fig.2 shows that the DevOps is a process-driven and a performance-focused methodology that address the challenges of Agile methodology mentioned in the previous section [14][15]. The DevOps combines Agile methodology along with change management and operational management to address the visibility and delivery speed challenges [16][17][18][19].
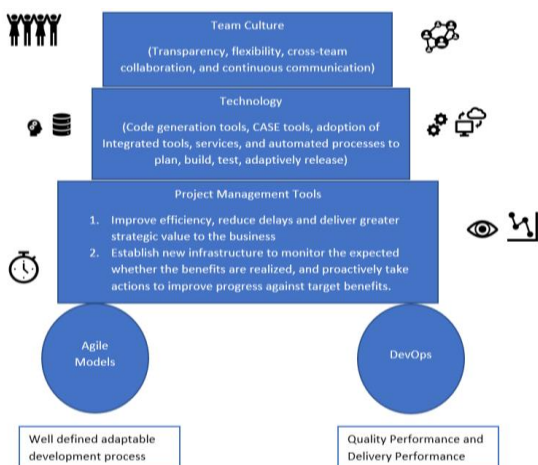

Fig1: Increasing employee efficiency and productivity; operational agility thereby reducing operational costs using Agile and DevOps methodologies.
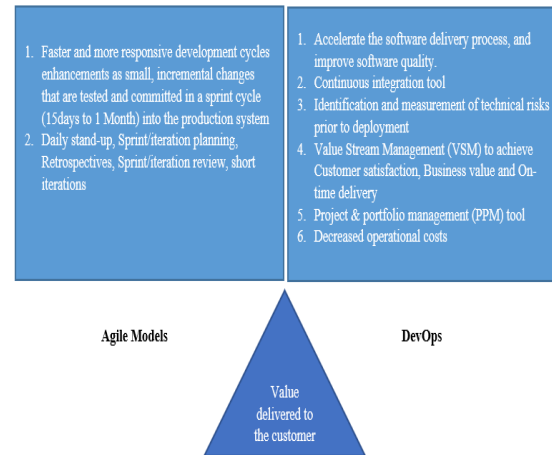

Fig 2. Connecting Agile and DevOps practices - Consistent practices and processes across teams and implementation of a common tool across teams

Some important and effective metrics

The following are important metrics in an effective way to evaluate the progress of a project [20][21].

A. Iteration Length

This metric provides the amount of time between development cycles during the execution of a project and this will make the project manager to understand changes in scope, team velocity and workload and finally, the ability of the team to adapt to changes as a project evolves.

B. Defect detection

This metric provides an amount of time between the start of an issue and the detection of the issue there by to calculate the mean time.

C. Mean Time to Resolve

This metric will provide the mean time to resolve or repair failed bug or component from the moment the failure is detected.

D. Test Cycle

Track the number of the tests that pass or fail during a development cycle.

E. Mean Time to Change

This metric captures the amount of time that passes between the Initiate of project's artifact and the actual deployment of that project's artifact. And provides the information whether the project could deliver an effective solution to address customer requirements.

Improving Productivity Through Devops Optimization

In the most Agile projects, it is challenging to anticipate and predict efforts like cost, time and resources required early in the project and more difficult as the projects get bigger and more complex before they reach the minimum viable product stage. Minimize costs in the development of the product, maximize profits, minimize raw material in the development of a good, or maximize production[22]. Automation is one of the key components of DevOps best practices as it plays an important role to minimize the need for manual checks and reviews[22][23]. According to recent studies on the performance optimization of DevOps is the use of the right tools for the architecture (Smart Designs), resource management, cost monitoring, and security and governance. The use the right resources at the right size and the right time will shorten the systems development life cycle and provide continuous delivery with high software quality. Applying DevOps agile practices and tools makes the entire automated and integrated toolchain reduce the cost of implementing and supporting the overall software delivery lifecycle and support. By implementing DevOps, the studies [22][23][24][25]show that the organizations achieved 95% reduction in release costs and 90% faster deployment times through,

a. Deliver consistent, high-quality services with security, reliability and agility.
b. Decreased deployment risk by automating the build and release process.
c. Accelerated quality software time-to-market
d. Reduce Conflicts between development and operations
e. Improved Mean Time to Recover (MTTR) from production incidents

Conclusion

Agile development promotes continuous iteration of development and testing throughout the software development lifecycle of the project. Though Agile is commonly believed to be a set a practices, processes and tools, but in fact, it is more of a mind-set and culture. Unfortunately, when many organizations adopt, it has not brought about expected improvements

simply because of the way people have adopted it. A combination of DevOps and agile methods truly operate with a different mindset, end up building something that has value by optimizing the development process so that it works as efficient as possible.

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