

RESEARCH PROPOSAL

COURSE CODE: PA2537

Version ONE- April 3, 2016

Thesis	Tentative title	An Empirical study on Continuous Delivery process
	Classification	Continuous Delivery, Customer involvement, Reliability, Software engineering
Student 1	Name	Avutu Neeraj Reddy
	e-Mail	neav16@student.bth.se
	Social security nr	9411053375
	Visa expiration date	30/01/2017
Student 2	Name	Vinay Kumar Vennu
	e-Mail	vive16@student.bth.se
	Social security nr	9408042910
	Visa expiration date	30/01/2017
Academic Advisor	Name and title	Nauman Ali
	e-Mail	nal@bth.se
	Department	Department of Software Engineering

1. Introduction

Continuous Delivery (CD) is pulling in expanding consideration and acknowledgment as a result of its promising advantages and ability to deliver software continuously to the customers[1]. Continuous delivery is a software engineering field in which the software is developed in an augmented manner in short durations so that it can be released any time into the market[2]. It has motivated a wide range of software organizations to lead the competition by successfully bringing upgrades to the software [3]. "Configuration management problems" and less "communication between the development and deployment teams" are certain software post-development problems that affect software delivery in these days. So continuous delivery or "agile delivery" is a vital approach addressing the above problems and makes sure that the system behaves as required[3]. Out of different models that are designed to enhance CD process like intense team collaboration, configuration management, deployment automation and good team culture, our focus is mainly on test automation[2], [4]. Reliability is one characteristic of CD that concerns about an application deployment to the environment[1]. Ensuring reliability is very important in Continuous delivery of software as it has a direct effect on the loss of funds.

Another aspect we focus in our research concerns the architecture of CD. "Deploy ability, security loggability, modifiability and testability" are certain requirements also known as ASRs that stand as

“implication of CD to architecture of software applications”[1]. We face challenges in effectively using CD when these ASRs are not met by different applications. Continuous delivery (CD) of software requires a clear understanding of the customer’s needs so that the changes in short durations satisfy them. This can be achieved through customer involvement in CD so that we can reduce research and development costs (R & D)[5]. Customer involvement also refers to the unintentional participation of the customers or users in some part of software development[5]. There are a few potential challenges regarding customer involvement in CD regarding customer related data collection, “customer perception” and behavior transparency, customer profile” etc.[5] vol. The implementation of Continuous delivery process in agile environments has revolutionized the software delivery process[6].

Related works

Lianping Chen from Paddy power (technology department) addresses the context of his own organization to describe about architecting for CD and the challenges faced in it[1]. Apart from Bass et al[7] discussions on architecture related to CD, not a lot of research has been done in this context. Yaman et al[5] summarizes the state-of-art on customer involvement in CD. Chen also addresses the organizational, technical and process challenges in implementing CD[2]. Krusche et al.[8] focuses on obtaining quick feedback to deliver software efficiently through a customized CD workflow.

2. Aim and Objectives

Besides attaining a clear knowledge on the topic, the main aim of this research is to analyze and identify the impact on architecting the continuous delivery (CD) process. We focus on the architectural issues that have salient implication on CD. We also focus on improving certain factors like reliability by automating the deployment process.

The objective of the research is to:

- To identify the need for architecting CD
- To identify the architectural issues in CD
- To ensure reliability in Continuous Delivery process
- To maintain customer involvement in CD

3. Research Questions

RQ.1) What are the challenges faced in implementing Continuous Delivery (CD) process?

RQ.2) What are the architectural issues in Continuous Delivery (CD) of software that are confronted in the present literature?

RQ.3) What are the challenges faced in ensuring reliability in CD?

RQ.4) How can we enhance the coordination and management of customer involvement in CD?

4. Method

After conducting a systematic research to collect information about Continuous Delivery of software, a total of 19 research papers were found. A study on the architecture of continuous delivery and its limitations helped us to address RQ-1 and RQ-2. On conducting further study, we found a few challenges

in ensuring reliability and management of customer involvement in continuous delivery of software. This led to the formulation of research questions RQ-3 and RQ-4 which can be addressed by selecting a proper research method.

Empirical survey is the research method used to answer these questions. When compared to other empirical research methods though survey provides a shallow knowledge to the researcher but the generality of outcomes ranges between broad and specific. Questionnaires and interviews stood as the main motivation for our survey. After planning a sample size and selecting professionals, working in different organizations as target population, the survey was conducted using non-probabilistic sampling. Following this process, we opted for convenience sampling to randomize the target population.

The survey questions were simple straight forward and unambiguous. Analysts involved in the release management and software development fields answer the research questions through Google forms. The final report is prepared after analyzing and interpreting the survey results.

5. Expected outcomes

- By conducting our research, we expect to gain knowledge on the topic Continuous Delivery(CD) of a software and the reliability issues faced in it.
- We expect to apprehend various challenges in the existing architecture of CD.
- We expect to propose notable enhancements to the coordination and management of customer involvement in CD.

6. Time and Activity Plan

I.	Systematic Literature Review	(25-01-2016 --- 26-03-2016)
----	------------------------------	------------------------------

S.no	Task	Start date	End date	Duration
1.	Identify Problem issue and formulate RQs	25-01-2016	30-01-2016	5
2.	Search and extraction of data	31-01-2016	02-02-2016	3
3.	Conduct Review	05-02-2016	25-02-2016	21
4.	Evidence Appraisal	01-03-2016	11-03-2016	10
5.	Documenting the SLR	20-03-2016	26-03-2016	6

II.	Research Proposal	(27-03-2016 --- 06-04-2016)
-----	-------------------	-----------------------------

6.	Framing research proposal	27-03-2016	30-03-2016	3
7.	First draft of proposal	02-04-2016	03-04-2016	1
8.	Final draft of proposal	03-04-2016	04-04-2016	1
9.	Documenting and submission of proposal	04-04-2016	06-04-2016	3

III. Research Article	(07-04-2016 --- 04-05-2016)
-----------------------	-----------------------------

10.	Framework analysis for conducting research	07-04-2016	09-04-2016	2
11.	Finding research method(survey)	09-04-2016	12-04-2016	3
12.	Compose survey questions	12-04-2016	13-04-2016	1
13.	Collect answers	13-04-2016	23-04-2016	10
14.	Analyzing and tabulating the results found	25-04-2016	27-04-2016	2
15.	Validation of framework	28-04-2016	1-05-2016	3
16.	Final Article	03-05-2016	04-05-2016	2

7. Risk Management

S.no	RISK	MITIGATION STRATEGY
1.	Time constraint	Remembering the restricted time accessible, proper planning and arrangements must be done, so that we might not miss a few perspectives on the proposed research theme.

2.	Resource Availability	There are a few imperative articles which could not be recovered in full content and have to be prevailed by requesting the BTH-library.
3.	Analyst Bias	Analyze the results from different points of view by considering the guidelines from different researchers working on that particular field so that the impact on outcomes due to experimenters minimizes.
4.	Misconceptions in framework and framing research questions .	Being aware of the experts work schedule, opinions must be taken from them in order to validate the framework and find optimal solutions.

Table 2: Mitigation strategies of risks.

8. References

- [1] L. Chen, "Towards Architecting for Continuous Delivery," in *2015 12th Working IEEE/IFIP Conference on Software Architecture (WICSA)*, 2015, pp. 131–134.
- [2] L. Chen, "Continuous Delivery: Huge Benefits, but Challenges Too," *IEEE Softw.*, vol. 32, no. 2, pp. 50–54, Mar. 2015.
- [3] J. Humble and D. Farley, *Continuous Delivery: Reliable Software Releases through Build, Test, and Deployment Automation (Adobe Reader)*. Pearson Education, 2010.
- [4] "A Practical Approach to Large-scale Agile Development: How HP Transformed LaserJet FutureSmart Firmware by Gary Gruver, Mike Young and Pat Fulghm," *SIGSOFT Softw Eng Notes*, vol. 38, no. 6, pp. 41–42, Nov. 2013.
- [5] S. G. Yaman, T. Sauvola, L. Riungu-Kalliosaari, L. Hokkanen, P. Kuvaja, M. Oivo, and T. Männistö, "Customer Involvement in Continuous Deployment: A Systematic Literature Review," in *Requirements Engineering: Foundation for Software Quality*, M. Daneva and O. Pastor, Eds. Springer International Publishing, 2016, pp. 249–265.
- [6] O. Akerele, M. Ramachandran, and M. Dixon, "System Dynamics Modeling of Agile Continuous Delivery Process," in *Agile Conference (AGILE)*, 2013, 2013, pp. 60–63.
- [7] L. Bass, I. Weber, and L. Zhu, *DevOps: A Software Architect's Perspective*. Addison-Wesley Professional, 2015.

- [8] S. Krusche and L. Alperowitz, "Introduction of Continuous Delivery in Multi-customer Project Courses," in *Companion Proceedings of the 36th International Conference on Software Engineering*, New York, NY, USA, 2014, pp. 335–343.