

1 Changing Scenario of Testing Paradigms Using DevOps -A 2 Comparative Study with Classical Models

3 Surendra Naidu Mullaguru

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6 **Abstract**

7 Many organizations come across themselves in a challenging conditions with the increase of
8 web applications which depend on cloud. As cloud applications are supportive for rapid
9 releases with respect to the queries requested by the user community. Most of the software
10 organizations expects to release the product in time as required by the end user hence, it
11 pressurize functional teams of the organization to do the needful. As perfection is rare to
12 achieve , it is obvious to commit more and more defects and consequent annoyance to the
13 team. This paper discusses about a new paradigm i.e DevOps which tries to address the
14 identified problem by integrating Development and Operations teams. In this model, the
15 development team would take care of operational requirements like deploying scripts,
16 debugging and performance testing from the scratch and the operations team take care of
17 well-informed support and feedback before, during, and after deployment.

18

19 **Index terms—**

20 **1 Introduction**

21 ost of the software development teams are moving towards a new trend of testing domain i.e DevOps.
22 Organizations are given pressures to produce higher-quality code faster giving less time for Quality Assurance
23 (QA). As it is emerging as prominent domain, the developers need to adjust themselves to gain more benefits. We
24 cannot release the product quickly with timelines as persisting in compact and separated work teams. The DevOps
25 promises to achieve this. With DevOps, team's participating skills are equally important as technical skills. This
26 paper focus on how DevOps paradigm can change the testing set-up of conventional testing by integrating the
27 development process and the QA with the operations functioning together to speed up development during
28 problem resolution. The paper also focuses on the areas of application, its suitability wherein the conventional
29 system fail to deliver testing inferences [7]. DevOps is a rising methodology from two popular methods of
30 software development. i.e the agile system administration or agile operations and the later is the integration of
31 development and operations teams in all the phases of the development lifecycle for creating and using a service.
32 The definition of DevOps according to Jez Humble is "DevOps is a cross-disciplinary community of practice
33 dedicated to the learn building, evolving and operating rapidly-changing resilient systems at scale". DevOps is
34 an effort to enable operations engineers and development engineers together in total service lifecycle, from design
35 through the development process to production phase and support. DevOps is also characterized by operations by
36 team making use of many of the techniques as developers to carry out systems work in a routine pattern. Those
37 techniques can range from using source control to testing to participate in an agile development process. In the
38 industry the tag DevOps is referred as the relationship between development and operations. The reason for this
39 is to get the advantage of both development team and operations team together for the growth of the business.
40 The DevOps improves the organization potential for nonstop software release that can facilitate organizations to
41 capture market opportunities. It also helps in evaluating customer feedback, cost, quality and risk. As DevOps
42 analyzes the code systematically and assist in reducing the coding errors. According to the present market trend
43 in the near future Devops is expected to emerge as a vital tool for rapid process develop. In the past development
44 employees are considered as "makers" and the "Ops" employees are considered as "people who deal with the

45 creation after its birth. In this way, DevOps can be implemented as a outcome of Agile Computing. Agile
46 software development stipulates close association of customers, product management, developers, and QA to fill
47 in the space and rapidly iterate towards an improved product. But the aim of DevOps is not only increasing the
48 rate of change but also to deploy the features successfully into production without causing disorder and trouble
49 to other services, while rapidly detecting and correcting incidents when they occur. DevOps is a simple extension
50 to agile principles beyond the boundaries of "the code" to the entire delivered service. DevOps is especially
51 complementary to the agile software development process, as it extends and completes the continuous integration
52 and release process by ensuring the code production and provide value to the customer [6] [1].

53 The testing tool must ensure to provide some basic provision to carry out testing facilities which are being
54 considered by DevOps as a vital aid . Following are the some basic capabilities extend by Devops [4].

55 ? Testing early pieces of code often.

56 2 Comparison of DevOps with Agile

57 The origin for the development of DevOps is emerging technologies. The DevOps is derived from the Agile
58 System Administration movement and Enterprise Systems Management (ESM) movement. The characteristic of
59 agile process is that it shows us how to create adaptive software development for quick feedback cycles through
60 early customer participation. The primary characteristic of DevOps is that it contemplates on business results
61 rather than technical details. DevOps acquires lot of lean principles like deploying in smaller batches aiming at
62 enhancing the communication between developers and operations teams[3] [2].

63 3 a) Lean is the basis of Agile

64 Lean signifies optimization from end-to-end process which produces value for your customer -from the original idea
65 to generation of revenue. Lean philosophy focus on stream more than bottlenecks in the process and unproductive
66 activities identification. Creating importance for your customers is all about judgment, validate product ideas,
67 implementing these ideas and managing them to advantage the users. It is evident that many admirable schools
68 of thought are there for structuring the processes such as Lean Startup and Running Lean to hash out product
69 ideas. Scrum, and XP are used for creating features in an pliable manner. The DevOps enables the creation of a
70 tradition of focusing on delivering worth for the customer instead of only concerning for technical issues [1] [4].

71 4 b) Lean Startup or Running Lean

72 Eric Ries and Ash Maurya reviewed about a learning cycle during feature discovery. From authenticating ideas
73 to testing probable solutions, they teach to resolve problems worth solving and keep your solutions more directed.

74 ? Scrum, XP and Kanban: Typical agile processes show how to arrange adaptive software development
75 for speedy feedback cycles through timely customer participation. ? DevOps: It focus on cultural aspects of
76 business results relatively than technical details. DevOps integrate lot of lean principles, focusing on improvement
77 in collaboration between developers and operations folks.

78 Lean principles are the foundation of entire product development course. In order to incorporate path of
79 improvement, one must consider the whole as sub-optimizing element and just one part will hurt the business.
80 The developer circles are emphasizing on DevOps and the entrepreneur circles are focusing at Lean Startup. The
81 term, coined by Eric Ries, is a startup that achieves validated learning through the buildmeasure-learn loop.
82 With a notion of learning what the customer actually need so that a useful product and a profitable business
83 model would emerge [2] [8].

84 It may not appear that the Lean Startup and DevOps are related. Small batches of tasks are the way for
85 cross-functional teams, which work together on the smallest units of work possible while pushing that work to
86 the customer as soon as possible. This way, the product gets to the customer swiftly, allowing the business model
87 or product to be validated.

88 The common model presently is large batches. Instead of a small team working across the modules to push
89 a product towards the customer rapidly. The team specializes, with a range of team members completing their
90 segment of the product before passing it on to the next phase in the chain. If at any point a fault is found, the
91 product has be sent back down to the chain. This leads to speedy feedback and rapid turnaround times, resulting
92 in an improved product. DevOps is about accepting small batches, but the batch in this case is a thin part of the
93 overall process, pushing a product from development to deployment to see it in use. DevOps is about allowing
94 production behavior to quickly fed back to developers so that development can adjust swiftly to the situations
95 in production. With the lean startup, the potential competence of an individual unit such as operations might
96 emerge to weaken. The efficiency of the system as a whole speeds up. When developing a system it is simple
97 to foresee how a system should run, but that is not enough. Often inevitable differences in hardware and traffic
98 escort to differences in how the system actually performs with how it was predicted. DevOps is about tightening
99 the same loop as the Lean Startup. The only difference is the narrower focus of DevOps. With the loop as rigid
100 as possible, knowledge gained from the real system is fed back into the next cycle of the product so the system
101 becomes better in Year 2015

102 5 Global Journal of Computer Science and Technology

103 Volume XV Issue II Version I () C small and tight increments. DevOps is a subset of the Learn Startup. Both
104 are reactions to the today's fast changing world and require to produce a system that can optimize quickly, even
105 if that means undercutting what appears to be the efficient in the entity unit.

106 6 c) Jenkins -A DevOps tool

107 Jenkins is a rapid Continuous Integration server. Continuous integration is a procedure in which all development
108 work is integrated at as planned entity with a time constraint or event and the resulting work is routinely tested
109 and built in automated environment as shown in figure 1. The idea is to development a scenario wherein errors are
110 being identified at an early stage in the process. Jenkins is an open source tool to achieve continuous integration.
111 The basic functionality of Jenkins is to perform a definite list of steps supported by a trigger. The trigger might
112 be a change in version control system or a indication for time based trigger, e.g., a build every 15 minutes. To
113 accomplish this the list of steps include:

114 ? Perform a software build with Apache Maven or Gradle ? Run a shell script ? Archive the build results

115 7 ? Start the integration tests

116 Basically Continuous Integration is the mechanism of running tests on a non-developer machine routinely each
117 time someone pushes a fresh code into the source repository. This has remarkable advantage of knowing that all
118 the tests work and attain fast feedback. The fast feedback is vital to know right after breaking the build and
119 based on that one would repair or revert it for improvement. The developer must be alert when running the tests
120 occasionally, as the problem that has emerged due to change in code may have surfaced since the last time. As it
121 is hard to figure out which change has induced such problem. Built on continuous Integration is the platform of
122 continuous deployment/ delivery wherein, after a successful test run the system instantly would release the latest
123 version of the codebase. This makes the deployment a non-issue and helps in pace up development. Jenkins is a
124 one of the DevOps application tool which supervises regularly executed jobs, such as building a software project.
125 Among those things, presently Jenkins focuses on building/testing software projects continuously and supervise
126 executions of externally-run jobs, such as cron jobs and procmail jobs, even though that are run on a remote
127 machine [5].

128 The following section demonstrates the steps of a sample Java application testing using Jenkins tool. The
129 implementation steps are as follows. step1: Deploy Jenkins. war in web server step2: Create a new job. step3:
130 Add build steps in job configuration. step4: From the job home page click on "Build Now" to start the build
131 process. step5: Check the log for build status and then click1 on last run console output.

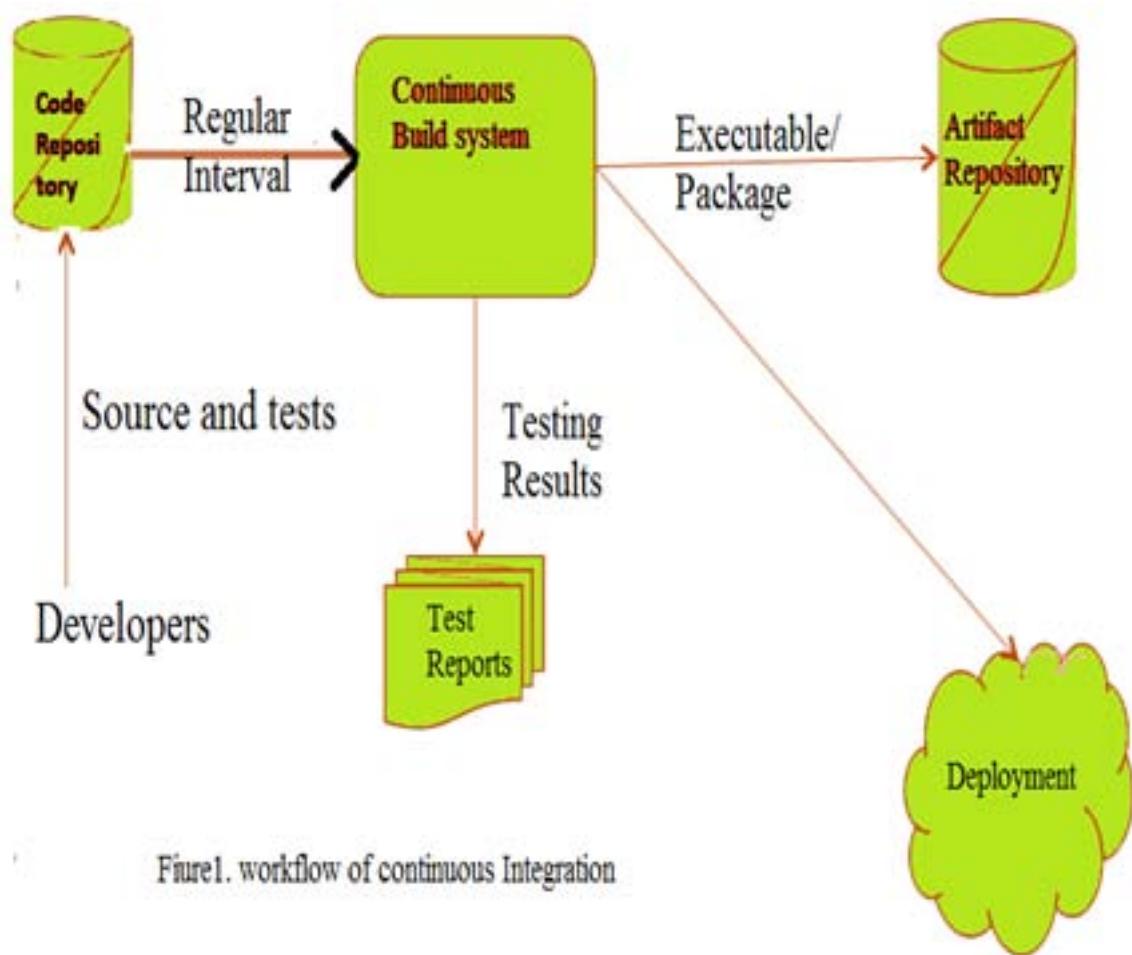
132 The following are the screenshots of a simple java application testing using jenkins tool. After deployng the
133 Jenkins. war in web server we create a new job. Then add build steps in job configuration. Once it is configured,
134 we would get a resultant screen as figure ???. Figure 5 shows the successful execution of the application. In case
135 if the java application is modified then automatically jenkins will trigger error report which is shown in the form
136 of log report as depicted in the figure 6. ^{1 2}

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Figure 1: Figure 1 :



23

Figure 2: Figure 2 :CFigure 3 :

7 ? START THE INTEGRATION TESTS

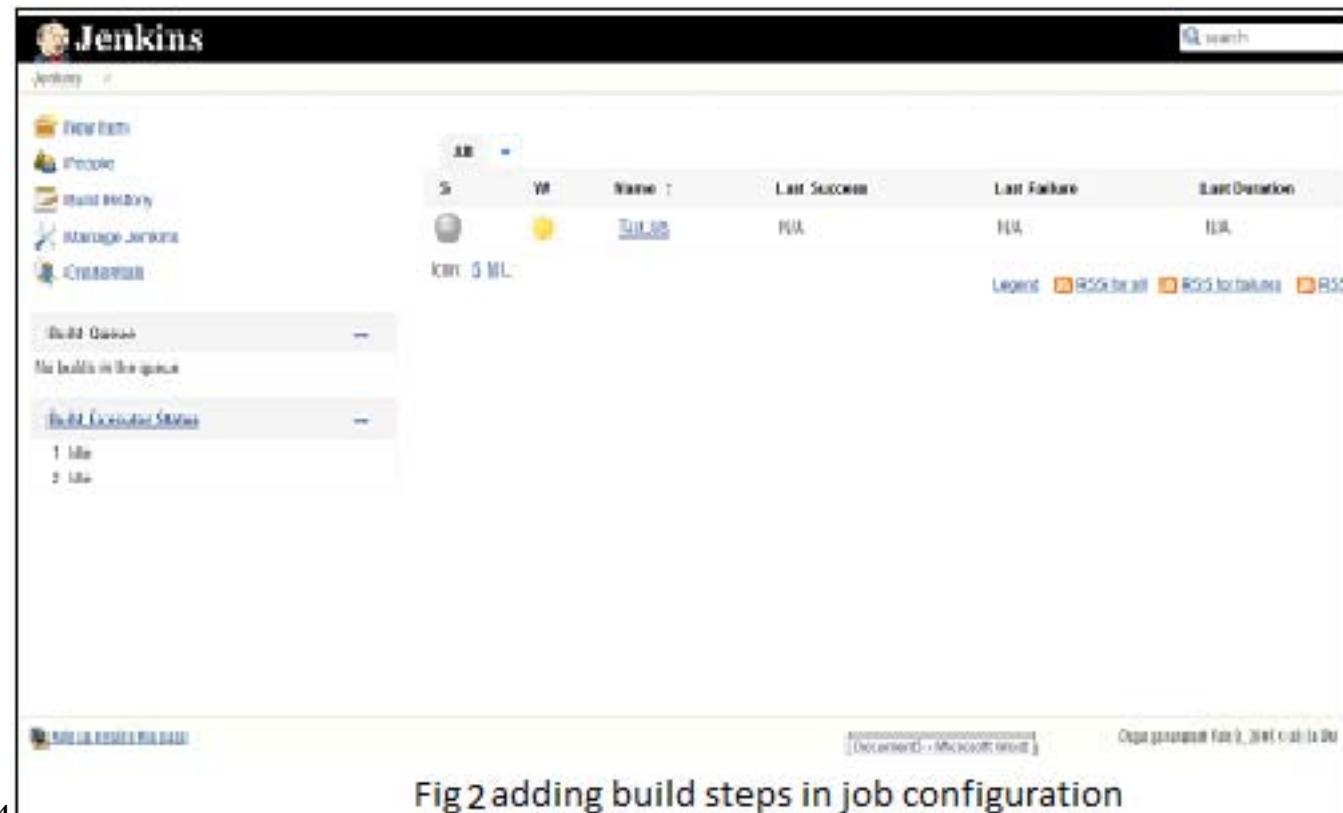


Figure 3: Figure 4 :

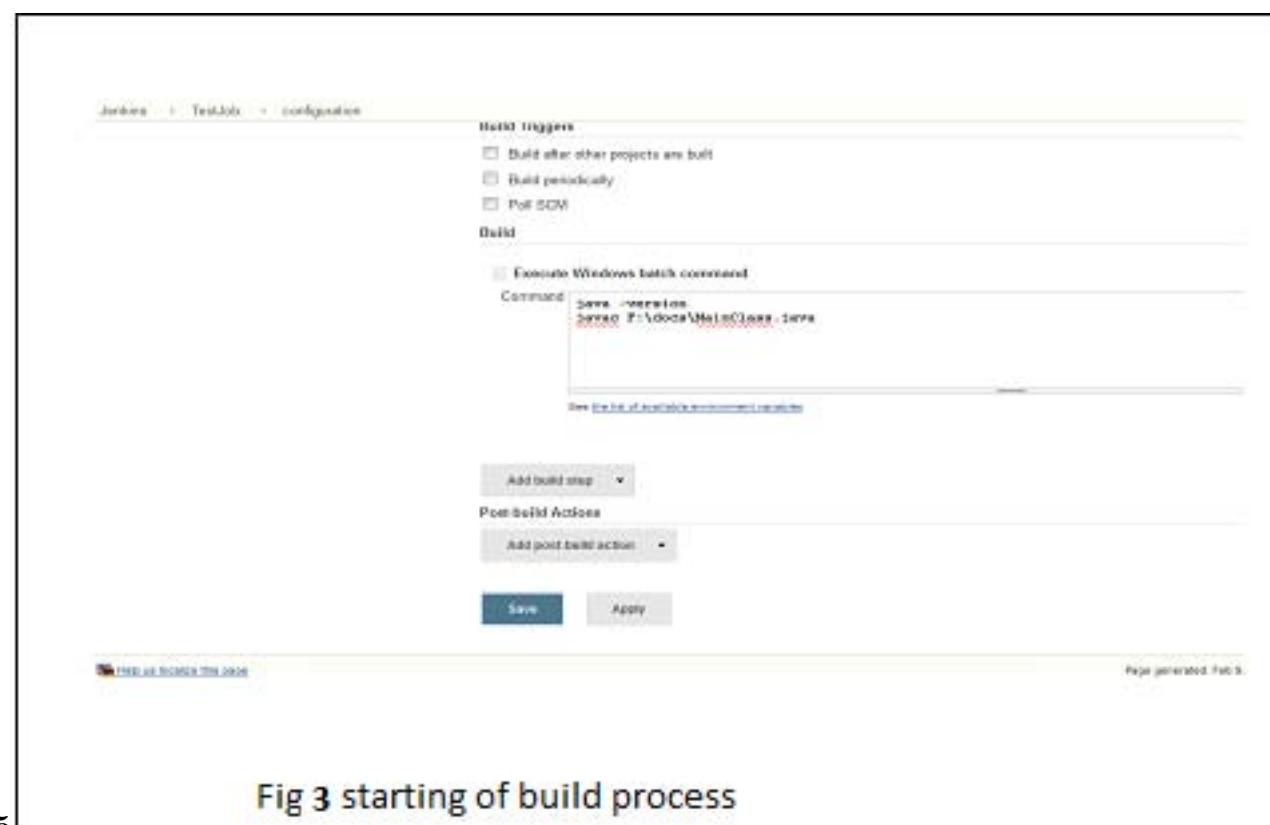
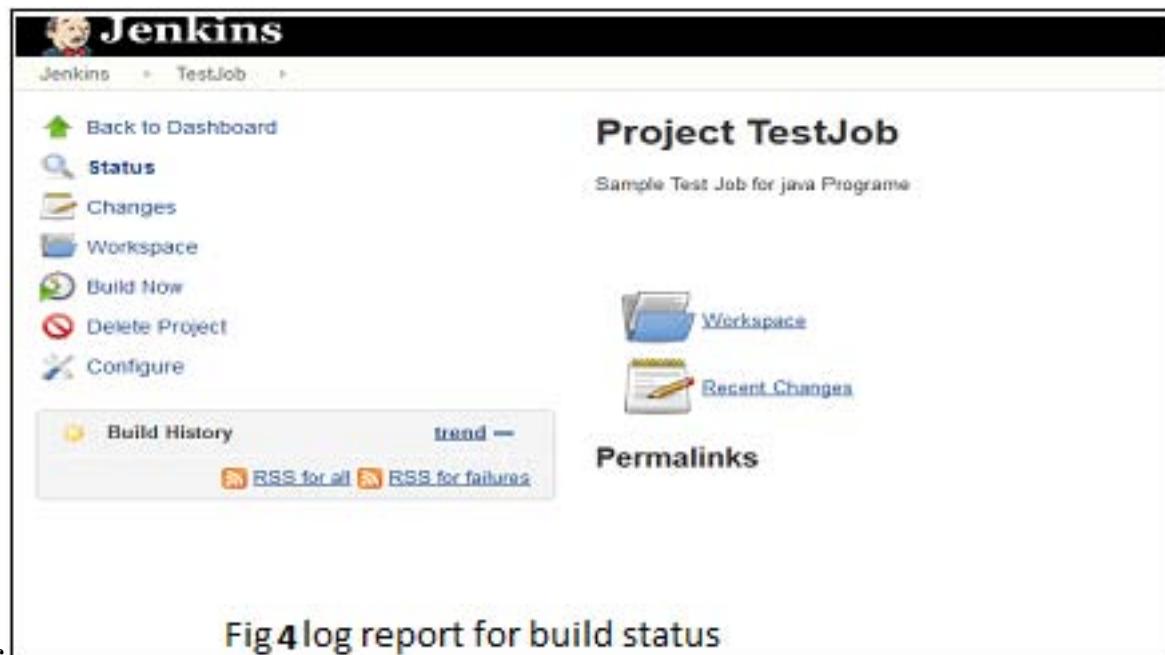


Figure 4: Figure 5 :



6

Figure 5: Figure 6 :

II.

Figure 6: ?

I

Methodologies

Agile Follows
approaches

DevOps System

Amplifying feedback loops
(Gene Kim), "Infrastructure
as code "are commonly
cited DevOps principles.

Methods
strategic

XP, Scrum

thinking, Same as agile but
Scrum with
operations Kanban
with perations and
style change
control

Practices

Standups,
poker, backlogs, CI, all
the specific artifacts a
developer

uses to
perform their work.

Automated
Scrum with
operations Kanban
with perations and
style change
control

Tools

JIRA

Greenhopper

planning

uses to

Testing,

jenkins, travis
puppet, chef,
cfengine,
OpenStack,
docker

Figure 7: Table I :

137 analyzers are utilized To face the today's cloud based environment DevOps is the right choice for better results
138 and to speed up customer query processing. In this paper we addressed the issues related to agile method and
139 how the DevOps resolved the problems of agile.

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