

DevOps Implementation Methodology

21/02/2017

Tata Tele Services Limited

Tanushree Dubey

Telecom Domain/Oracle Enterprise Business Suite /TTSL

tanu.dubey@tcs.com



Confidentiality Statement

Confidentiality and Non-Disclosure Notice

The information contained in this document is confidential and proprietary to TATA Consultancy Services. This information may not be disclosed, duplicated or used for any other purposes. The information contained in this document may not be released in whole or in part outside TCS for any purpose without the express written permission of TATA Consultancy Services.

Tata Code of Conduct

We, in our dealings, are self-regulated by a Code of Conduct as enshrined in the Tata Code of Conduct. We request your support in helping us adhere to the Code in letter and spirit. We request that any violation or potential violation of the Code by any person be promptly brought to the notice of the Local Ethics Counsellor or the Principal Ethics Counsellor or the CEO of TCS. All communication received in this regard will be treated and kept as confidential.

Table of Content

1. Introduction 4

2. Overview 4

3. Key Challenges 4

4. DevOps Implementation 5

 4.1 Continuous Planning 5

 4.2Continuous Integration 6

 4.3Continuous Testing 6

 4.4Continuous Deployment 6

 4.5Continuous Monitoring and Feedback..... 6

5. DevOps Tools 7

6. Business Benefits 7

7. References 8

1. Introduction

DevOps refers to the emerging professional movement that advocates a collaborative working relationship between Development and IT Operations, resulting in the fast flow of planned work (that is, high deploy rates), while simultaneously increasing the reliability, stability, resilience of the production environment.

2. Overview

In traditional functionally separated organisations, there is rarely a cross-departmental integration of these functions with IT operations. DevOps promotes a set of processes and methods for thinking about communication and collaboration between development, Quality Assurance, and IT operations.

To practice DevOps effectively, software applications have to meet a set of Architecturally Significant Requirements (ASRs) such as deploy ability, modifiability, testability, and monitor ability. These ASRs require a high priority and cannot be traded off lightly.

Although in principle it is possible to practice DevOps with any architectural style, the micro services architectural style is becoming the standard for building continuously deployed systems. Because the size of each service is small, it allows the architecture of an individual service to emerge through continuous refactoring, hence reducing the need for a big up front design and allows for releasing the software early and continuously. **DevOps is the solution, not the problem!**

3. Key Challenges

DevOps and operations teams are under increasing pressure from tech-savvy, app-centric business users to collaboratively solve complex business problems with IT. Adding to the battle, the pursuit for the perfect synchrony between software development and IT operations is still ongoing, and striking the balance won't happen any time soon. New tools, technologies and processes change and grow at a problematic pace – leaving us with no option, but to accept and address all upcoming challenges. Teams must keep up the pace to succeed, but operations teams cannot handle it solo and must work closely with DevOps. The operations group is responsible to drive flawless, organisation-wide execution – this was a straightforward request when the systems were configured and maintained by operations. However, recently, development became more collaborative, with involved users demanding more, using the newest tools and making the process harder to manage.

4. DevOps Implementation

DevOps implementation follows a process of continuous planning, continuous integration, continuous testing, continuous deployment, continuous monitoring and feedback.

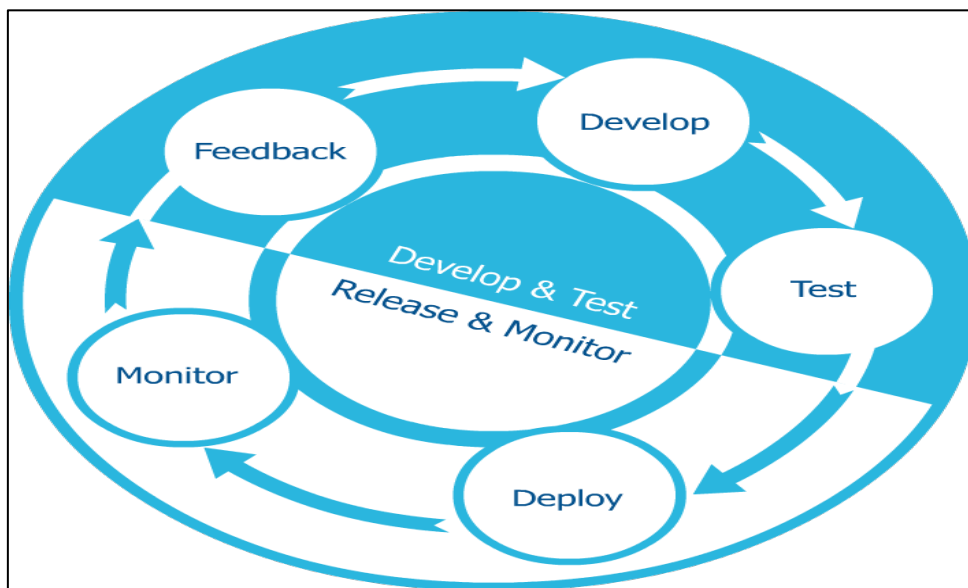


Figure 1: DevOps Life Cycle

4.1 Continuous Planning

The first step towards the adaptation of the DevOps philosophy is continuous planning. Continuous planning is done so that all stakeholders such as the developers, business analyst, testers, and operations team are brought into one common platform in the preparation of a release plan. Control on what gets into the pipeline translates to much better integration among the stockholders for better traceability in downstream development activities, including testing. Successful demand management ensures every aspect of IT management, be it resource allocation, budgeting (release on release with strict timelines and meeting the release dates on time) or meeting market demand, are handled smoothly.

4.2Continuous Integration

Continuous integration (CI) offers a real-time window into the actual state of the software system and associated quality measurements, allowing immediate and constant engagement of all team members, including operations and Quality Assurance, throughout the project lifecycle. CI is a form of extreme transparency that makes sure that all project stakeholders can monitor, engage, and positively contribute to the evolving software project without disrupting the team with constant status meetings or refocusing efforts.

4.3Continuous Testing

Continuous testing is the process of executing automated tests as part of the software delivery pipeline to obtain immediate feedback on the business risks associated with a software release candidate. The goal of continuous testing is to apply 'extreme automation' to a stable, production-like test environments. Automation is essential for continuous testing. But automated testing is not the same as continuous testing. Automated testing involves automated, CI-driven execution of whatever set of tests the team has accumulated. Moving from automated testing to continuous testing involves executing a set of tests that is specifically designed to assess the business risks associated with a release candidate, and to regularly execute these tests in the context of stable, production-like test environments.

4.4Continuous Deployment

Continuous deployment can be thought of as an extension of continuous integration, aiming at minimising lead time, the time elapsed between development writing one new line of code and this new code being used by live users, in production. To achieve continuous deployment, the team relies on infrastructure that automates and instruments the various steps leading up to deployment, so that after each integration successfully meeting these release criteria, the live application is updated with new code. Instrumentation is needed to ensure that any suggestion of lowered quality results in aborting the deployment process, or rolling back the new features, and triggers human intervention.

4.5Continuous Monitoring and Feedback

Continuous monitoring and feedback is proactively seeking information about the applications behaviour and perception by users. Behavioural feedback is attained through instrumentation of the application by DevOps teams and monitoring of the DevOps continuous feedback application in the production environment.

5. DevOps Tools

The DevOps landscape is quite expansive. The depth and breadth of tooling differs from company to company and according to their process. DevOps tools fit into one or more of these categories, which is reflective of the software development and delivery process. Following figure shows the list of tools in form of periodic table.

PERIODIC TABLE OF DEVOPS TOOLS																			
Legend: Os: Open Source Fr: Free Fm: Freemium Pd: Paid En: Enterprise																			
Categories: Database, SCM, Build, CI, Repo Mgmt, Testing, Deployment, Config / Provisioning, Containerization, Cloud / IaaS / PaaS, Release Mgmt, Collaboration, BI / Monitoring, Logging, Security																			
1 O 12c MySQL	2 En Gt Git	3 Os Mq MySQL	4 Os Sv Subversion	5 En Ch Chef	6 En Pu Puppet	7 Os An Ansible	8 En Sl Salt	9 Os Dk Docker	10 Pd Az Azure	11 En Ssh SSH	12 Fr Bl BlastLogic	13 Pd Va Vagrant	14 En Tf Terraform	15 Os Rk Rkt	16 Os Hk Heroku	17 En Rs Rspace	18 En Bx Bluebox	19 En Ad Adaptive	20 Os Cf CloudFoundry
21 Os Pq PostgreSQL	22 Fr Mc Mercurial	23 Fr Mv Maven	24 Os Gr Gradle	25 En Mr Master	26 Os Jn Jenkins	27 Pd Bb Bamboo	28 Os Tr Travis CI	29 Fr Ar Archiva	30 Fr Fn FitNesse	31 Fr Se Selenium	32 Fr Gn Gatling	33 Pd Gd Deployment Manager	34 Fr Sf SmartFrog	35 Fr Cb Cobbler	36 Os Bc Bcfg2	37 En Kb Kubernetes	38 En Rs Rspace	39 En Bx Bluebox	40 En Ad Adaptive
41 Os Mg MongoDB	42 Fr Gh Github	43 Fr Br Buildr	44 Os At ANT	45 Fm Bm BuildMaster	46 Fm Cs Codestyle	47 Fm Sn Snap CI	48 Fm Cr CircleCI	49 Os Nx Nexus	50 Fr Cu Cucumber	51 Fr Cj Cucumber.js	52 Fr Qu Quint	53 Fr Cp Capistrano	54 Fr Ju Juju	55 Fr Rd Rundeck	56 Os Cf CFEngine	57 En Pk Packer	58 En Bx Bluebox	59 En Ad Adaptive	60 Os Cf CloudFoundry
61 En Db DB2	62 Fr Bb Bitbucket	63 Fr Qb QuickBuild	64 En Ub UrbanCode Build	65 En Ta TeamCity	66 Pd Tc TeamCity	67 Fm Sh Shippable	68 Os Cc CruiseControl	69 Os Ay Artifactory	70 Fr Ju JUnit	71 Fr Jm JMeter	72 Fr Tn TestNG	73 Fr Rd RapidDeploy	74 En Cy CodeDeploy	75 En Oc Octopus Deploy	76 En No CA Nello	77 En Eb ElasticBox	78 En Ad Adaptive	79 En Bx Bluebox	80 Os Cf CloudFoundry
81 Fr Cs Cassandra	82 Fr Hx Haxe	83 En Ms MSBuild	84 Os Rk Rake	85 Os Lb LunrBuild	86 Os Cu CruiseControl	87 Os Ca CruiseControl	88 Os Gu Gump	89 Os Ng NuGet	90 Fr Ap Appium	91 En Xltv XL TestView	92 En Tc TestComplete	93 En Go Go	94 En Ef ElectricFlow	95 En Xld XL Deploy	96 En Ud UrbanCode Deploy	97 En Mo Mesos	98 En Cf CloudFoundry	99 En Ad Adaptive	100 Os Cf CloudFoundry
101 En Xlr XL Release	102 En Ur UrbanCode Release	103 En Ls CA Service Virtualization	104 En Bm BMC Release Process	105 En Hp HP Code	106 En Ex Excel	107 En Pl Plutora Release	108 En Sr Serena Release	109 En Tr Trellis	110 En Jr Jira	111 En Rf HipChat	112 En Sl Slack	113 En Fd Flowdock	114 En Pv Pivotal Tracker	115 En Sn ServiceNow	116 En Sv ServiceNow	117 En Cf CloudFoundry	118 En Ad Adaptive	119 En Bx Bluebox	120 Os Cf CloudFoundry
121 En Sp Splunk	122 En Ki Kibana	123 En Nr New Relic	124 En Ni Nagios	125 En Gg Ganglia	126 En Ct Cacti	127 En Gr Graphite	128 En Ic icinga	129 En Sl Sumo Logic	130 En Ls Logstash	131 En Lg Loggly	132 En Gr Graylog	133 En Sn Snort	134 En Tr Tripwire	135 En Cy CyberArk	136 En Ad Adaptive	137 En Bx Bluebox	138 En Cf CloudFoundry	139 En Ad Adaptive	140 Os Cf CloudFoundry

Figure 2: List of DevOps Tools

6. Business Benefits

Business benefits of DevOps are as follows:

- DevOps creates operational and business values by improving and accelerating delivery.
- DevOps is key enabler to provide the much needed industrialisation.
- DevOps is also key enabler for agile software development.
- DevOps establishes rigorous processes to help deliver predictable, agile, efficient and high quality outcomes at every stage of software development lifecycle.
- DevOps facilitates metric-driven feedback-loops to improve productivity.
- Automated tests execution (key requirement of DevOps principle) results into reduction of regression defects.
- DevOps leads to identification of security vulnerabilities at build time resulting in more robust and secure end product.

7. References

Internet references were used for making this document. Following are the references used:

<https://devops.com>

<https://devops.profitbricks.com/>

<https://www.devopsguys.com/blog/>

[Wikipedia](#)

Thank You

Contact

For more information, contact tanu.dubey@tcs.com, india.km@tcs.com

About Tata Consultancy Services (TCS)

Tata Consultancy Services is an IT services, consulting and business solutions organization that delivers real results to global business, ensuring a level of certainty no other firm can match. TCS offers a consulting-led, integrated portfolio of IT and IT-enabled infrastructure, engineering and assurance services. This is delivered through its unique Global Network Delivery Model™, recognized as the benchmark of excellence in software development. A part of the Tata Group, India's largest industrial conglomerate, TCS has a global footprint and is listed on the National Stock Exchange and Bombay Stock Exchange in India.

For more information, visit us at www.tcs.com.

IT Services

Business Solutions

Consulting

All content / information present here is the exclusive property of Tata Consultancy Services Limited (TCS). The content / information contained here is correct at the time of publishing. No material from here may be copied, modified, reproduced, republished, uploaded, transmitted, posted or distributed in any form without prior written permission from TCS. Unauthorized use of the content / information appearing here may violate copyright, trademark and other applicable laws, and could result in criminal or civil penalties.
Copyright © 2017 Tata Consultancy Services Limited