DevOps Writeup

# 1.0 Introduction

## 1.1 Lifecyclus

The lifecycle of an application:

* First we build the application
* What if the developer is done with development?
* What if the application runs in production
* What is in between, before and after?

Diagram

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Flow of an application = From planning the building to planning for when the application is live

* What steps are in between?
* What has to happen during these steps

Diagram

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## 1.2 Application flow

The flow of an application goes as followed:

* ~~Business requirement~~
* ~~Making of user stories~~
* ~~Creating wireframes and prototypes~~
* Development – creating new feature
* Development – Create Unit tests for new code
* Development – Install dependencies
* Ops - running test environment

QA – Responsible for tests

Ops – responsible for deploying application environment

Developer – Responsible for creating the application

Take feedback to new cycle

Wall of confused: A scenario in which development and Devops have fundamentally different thoughts

Developers wanting change while Devops want stability

Difference between functional and non-functional requirements:

* Functional requirements are:
  + Specification features
  + Prioritization of features
* Use automatic tests:
  + Automated functional tests
  + Integrated build process
* Aimed at business usage:
  + Bugs
  + evolution
* Non functional requirements are
  + Useful troubleshooting logs
  + Deployment
  + Undo-redo operations
* Non functional tests:
  + Automatic technical tests
  + Integrated build process
  + Continuous development
* Technical operation
  + performance and technical problems

Functional requirements describe what the system should do

Non functional requirements describe how the system works

# 2.0 Agile & Devops, The three ways

## 2.1 Agile & Devops

There are different concepts to take note of:

* Agile: Agile is that there is no one way to do something
* Waterfall: Maps out a project into distinct phases with each a beginning phase and an end phase
* Devops: Increases the organizations ability to deliver applications and services at high velocity
* Pipeline: Set of automated processes and tools used by developers s and Devops
* Flow: An end-to-end manufacturing chan of software to run lines of code in production
* Feedback: Modification or control of a process or system
* Swarming: When many team members as possible work on the same priority item
* Technical debt: The accumulation of sub optimal technical decision making made over the lifetime of an application

Why is Agile and Devops not the same:

* Devops is a practice bringing development and operations teams together
* Agile focusses on collaboration, customer feedback and small rapid release
* Devops focuses on constant testing and delivery
* Agile focusses on constant changes

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Different focus points within Devops for:

* developers: end user performance, analytics, code quality and code errors
* operations engineers: Availability, performance, user complains and performance analytics

## 2.2 The Three ways

The three ways:

* The first way: identify the component and make business idea a reality – Principles of flow
* The second way: Continuing to monitor, test and handle feedback  
  - Principles of feedback
* The third way: Continuous improvement, seeking to improve every process – Principles of continuous improvement

Principals of flow:

* work flowing from left to right
* Passing work through the different teams
* Each phase in Devops focusses on closing the loop between development and operations

Principals of feedback:

* Goes from right to left
* Providing feedback in a fast consistent way
* Quickly address and identify problems

Principals of continuous learning:

* Using the feedback to improve the process
* Implementing changes might be challenging in the organizational culture we work

A testing pyramid is a concept that groups software tests into three different categories:

* UI/exploratory tests
* Integration tests
* Unit tests

A positive is that you will have a nice way to test a negative is that it will take a lot of time

# 3.0 Source control

General concept:

* Source control: Practice of tracking and managing changes to code
* Git: Freely distributed source control system
* GitHub: Web based version-control platform for developers
* Flow: End to end manufacturing chan of software
* (Feature) Branch: Unique set of code changes with an unique name
* Merge: A way of putting a forked history back together again
* Merge conflict: When different changes are made on the same lines of a file
* Pull request: Lets you tell others about your changes you’ve pushed
* Commit: An individual change to a file
* Deploy: This is when you launch the code stored on a server of your own
* Main: The one where all changes eventually go back to
* Markdown (md): Plaintext format of writing structured documents
* Single source of truth: Storing all code, configuration and other digital assets where everyone can access them

Why is source control important and for what is it used:

* To maintain a single source of truth
* To facilitate collaboration
* To accelerate release velocity
* It allows multiple developers at once
* It stores your data so when a drive failure occurs your code isn’t gone

Basic GIT commands:

* Create a new branch  
  | git branch new  
  | git checkout -b new
* Move to other branch  
  | git checkout new
* See all branches  
  | git branch -a
* Push new branch to git  
  | git push origin new
* Pull all branches from git  
  | git fetch –all
* Merge a branch named new with the branch you are in (after merging you still need to pull)  
  | git merge new
* Deleting a branch  
  | git branch -d new

A good git commit message contains clear feedback of changes

The git flow goes as followed:

* A developer creates a feature in a separate branch
* Developer pushed the branch to central repo
* Developer creates a pull request via Github
* The rest of the team goes over the code, gives feedback etc
* The responsible of the repo merges the changes to the main branch

A branching strategy defines how a team uses branches to achieve a level of concurrent development

Github flow is how we work with GitHub  
Diagram

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We use main for deployment and develop to merge our changes

# 4.0 Flows -CI & CD concepts

The concepts:

* Pipeline: Ensures all code in version control is built and tested
* Continuous integration: Automating the integration of code changes from multiple contributors
* Continuous delivery: Ability to get changes of all types
* Build: The stage where the application is compiled
* Artifact: A by-product of the software development process
* Compiling code: transform source code to machine code
* build once deploy anywhere: an agile approach to creating new applications
* vendor agnostic: an organization that is open to all viable and established solutions
* vendor centric:
* Jenkins: Used to reliably build, test and deploy software

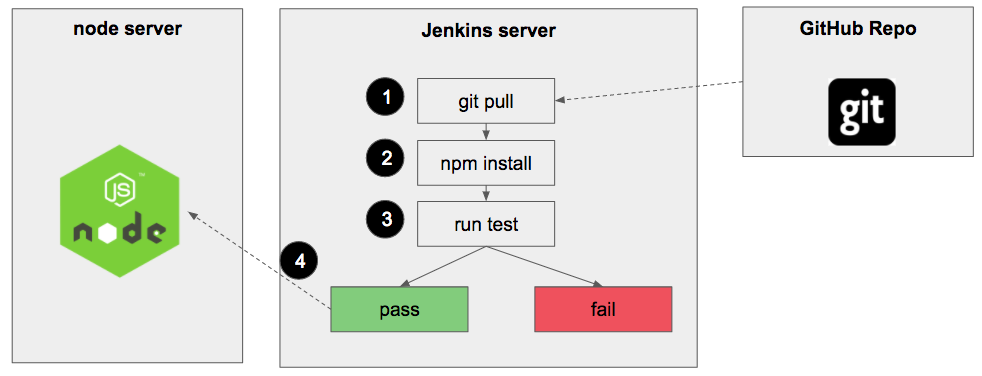
Phases in continuous integration:

* Unit test
* Code analysis
* test coverage

Stages in CI pipeline:

* Build
* Test
* Release
* Deploy

Global view on a CI pipeline in NodeJS



Different code testing:

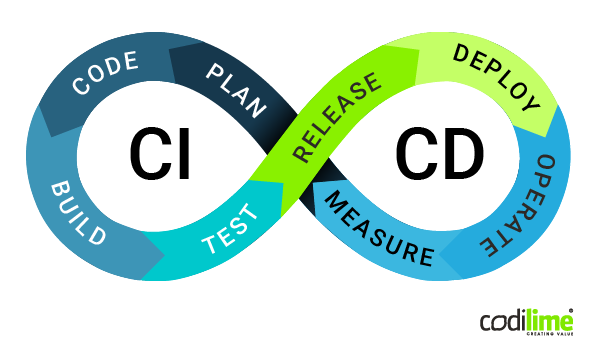
* Unit tests, automized tests

Reusing artifacts is essential for reusing your code and improving the build process

Phases in continuous delivery:

* Build
* Unit test
* Code Quality analysis
* Integration test
* Acceptance test
* Store versioned Binary Artifact

Phases of CD pipeline



Global view on a CD pipeline in NodeJS

Diagram

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CI is simpler, its about using the right tools.  
CD is more complicated and is about processes that have to happen after code is integrated

We use this to integrate code into a mainline code base

**Jenkins helps in automate building and testing systems to the integration work**

# 5.0 CI in Jenkins

# 6.0 DTAP & environments on demand

# 7.0 Flows & feedback – Integrated testing

# 8.0 Flows & feedback – Monitoring and reporting

# 9.0 Integration exercise