

DevOps 2TIN Chapter 4

Pipelines



**DE HOGESCHOOL
MET HET NETWERK**

Elfde-Liniestraat 24, 3500 Hasselt, www.pxl.be



Pipelines

Wat is het
stappen
Automatisch gebouwd
Reflectie

Wat is een Pipeline?



Definitie “deployment pipeline”:

(first defined by Jez Humble and David Farley in their book *Continuous Delivery: Reliable Software Releases Through Build, Test, and Deployment Automation*)

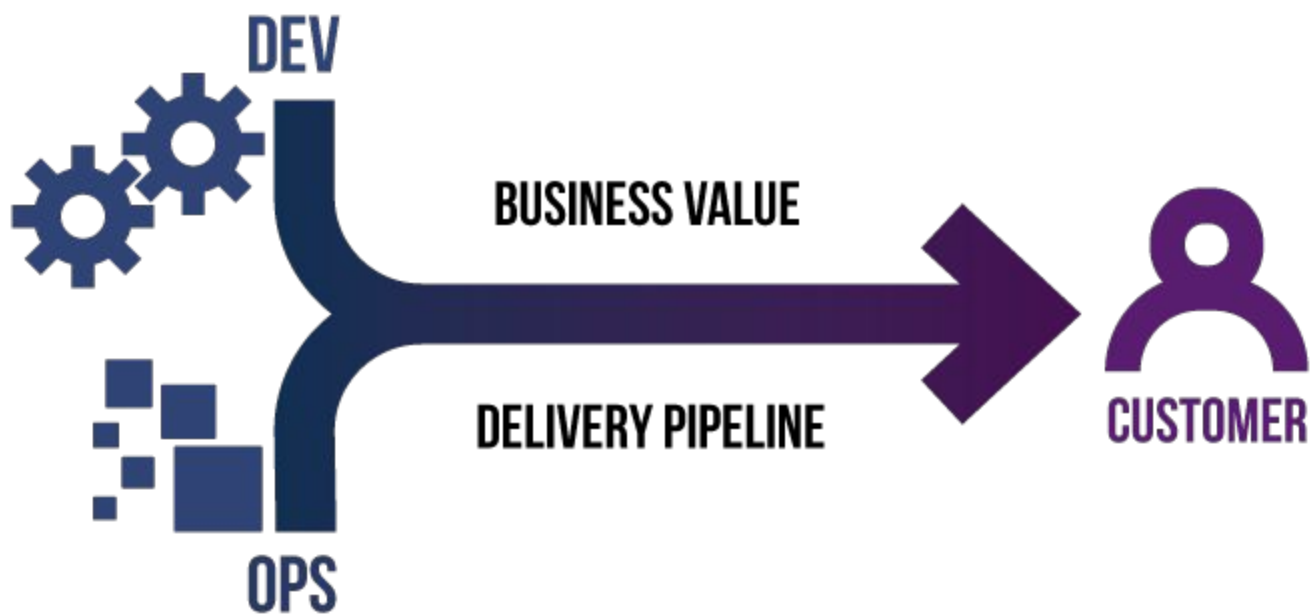
It ensures that all code checked in to version control is automatically built and tested in a production-like environment.

Sleutelwoorden:

- Alle Code
- Versiebeheer
- **Automatisch gebouwd**
- Automatisch getest
- Productie-waardige omgeving

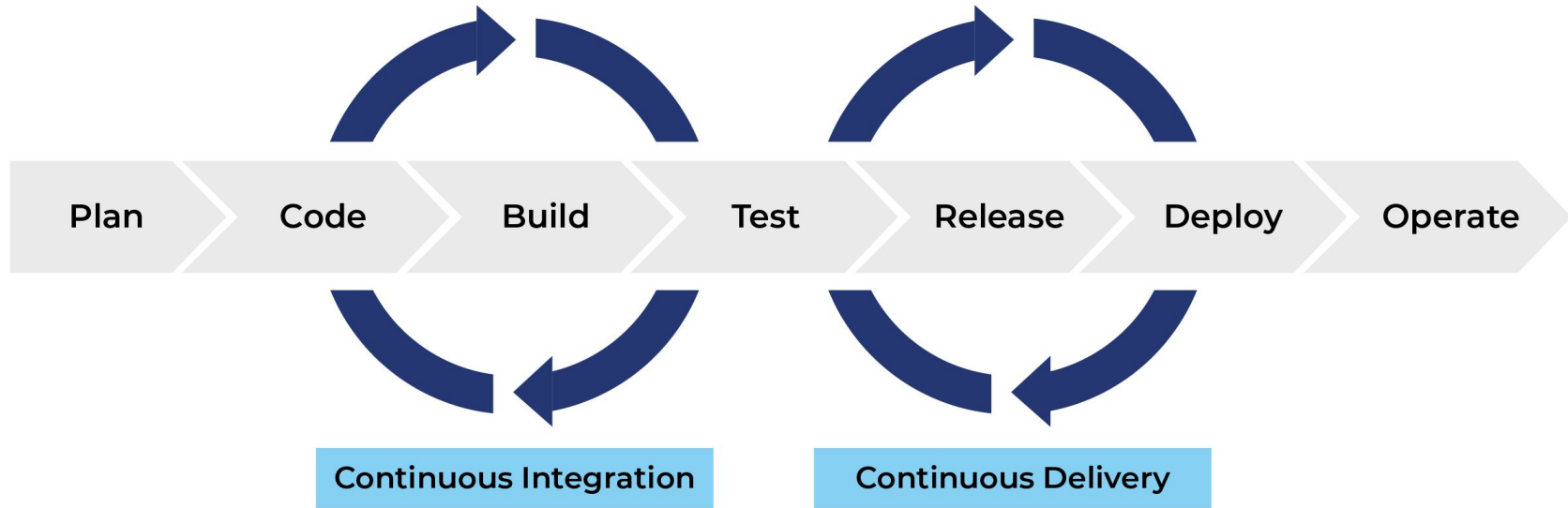
THE FIRST WAY

CREATE A DELIVERY SYSTEM



Developers practicing **continuous integration** merge their changes back to the main branch as often as possible.

CI/CD

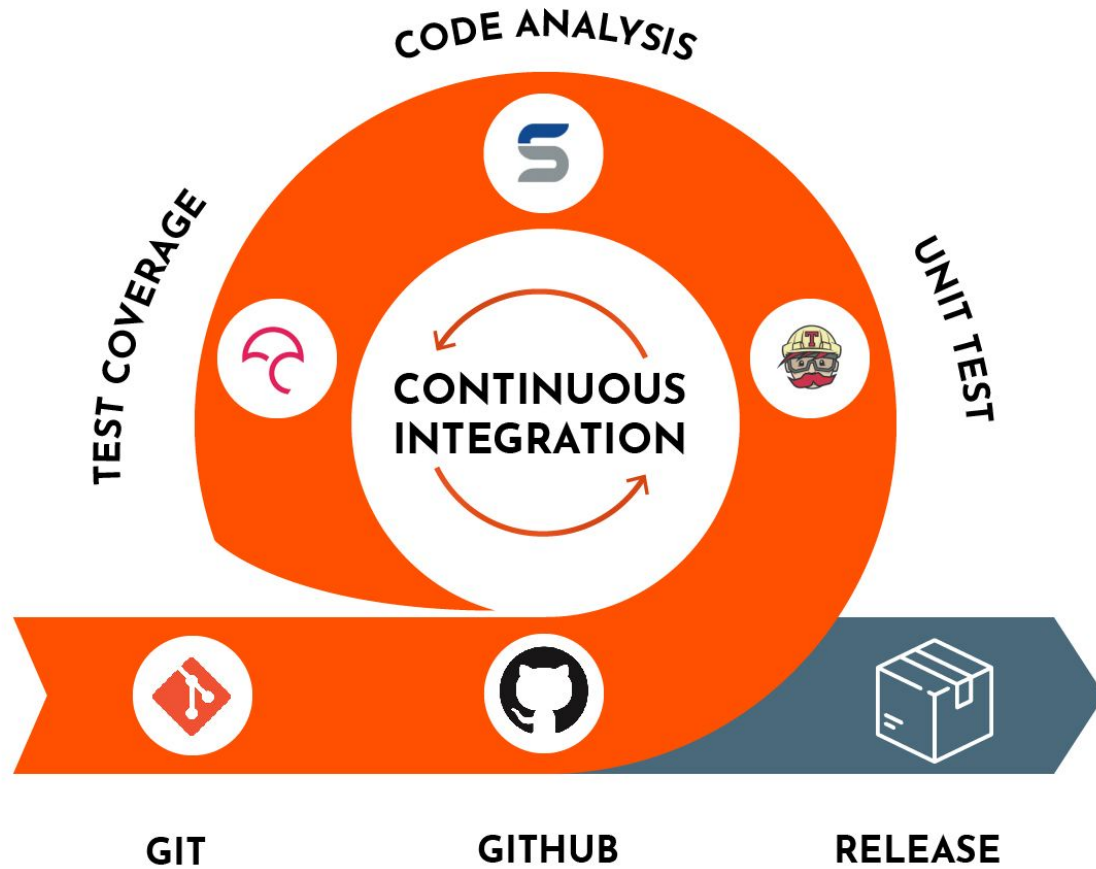


The developer's changes are validated by creating a build and running **automated tests** against the build. By doing so, you avoid the integration hell that usually happens when people wait for release day to merge their changes into the release branch



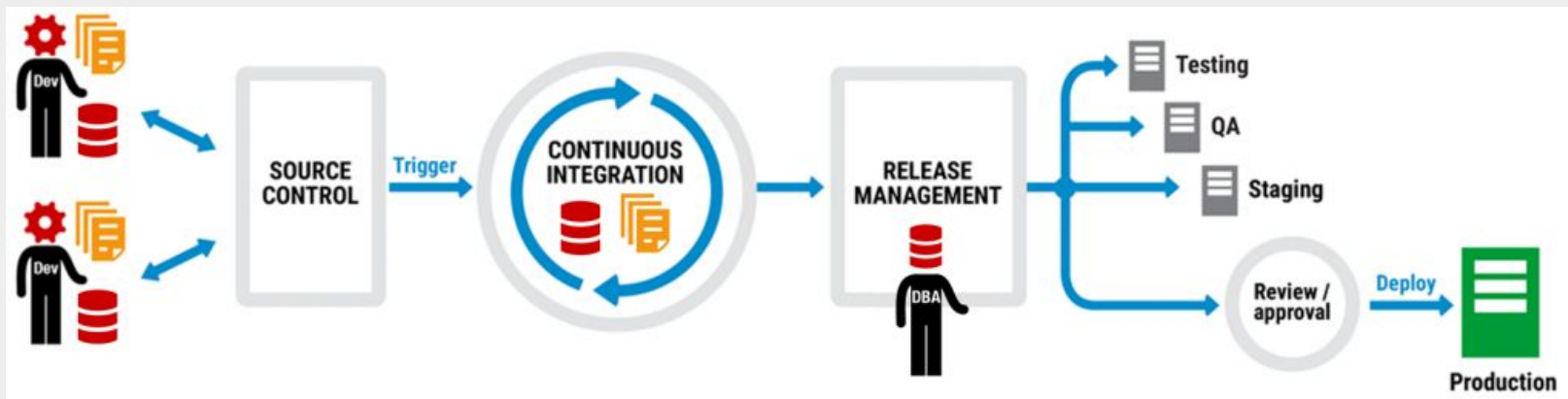
Continuous integration

Code binnenhalen
Dependencies installeren
Builden / Packagen van code
Artifacts / packets beheer



Fetching code

- Binnenhalen van code vanuit source control
 - -> Brengt deze in de pipeline



Code

Dependencies

build

(unit)test

archive
artifact

Deploy to QA

Deploy to
production

CI

CD

Installing dependencies



Bundelen van dependencies in de omgeving

- Afhankelijk van de programmeertaal / omgeving
 - PHP -> Composer install
 - Javascript -> npm install
 - ...

Code

Dependencies

build

(unit)test

archive
artifact

Deploy to QA

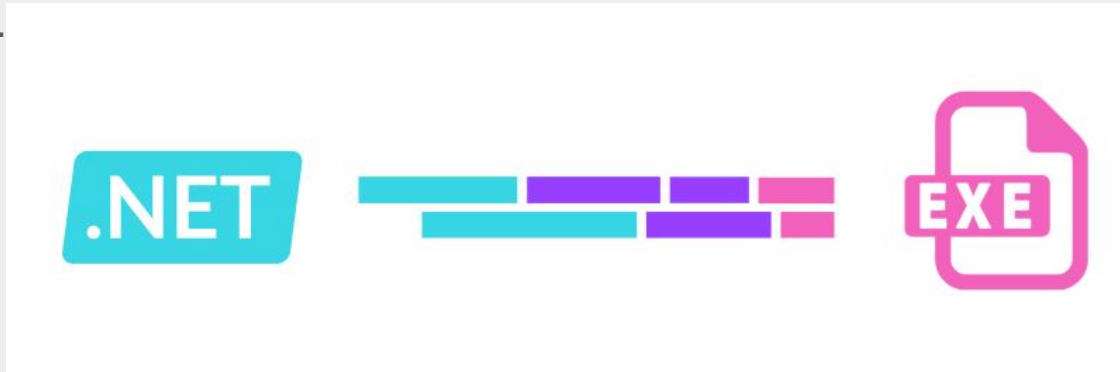
Deploy to
production

CI

CD

Building Software

- Automatiseren van het compileren & builden applicatie
 - Afhankelijk van de programmeertaal / omgeving
 - java -> mvn/ant -> jar
 - .net core -> dotnet publish -> exe
 - ...



Code

Dependencies

build

(unit)test

archive
artifact

Deploy to QA

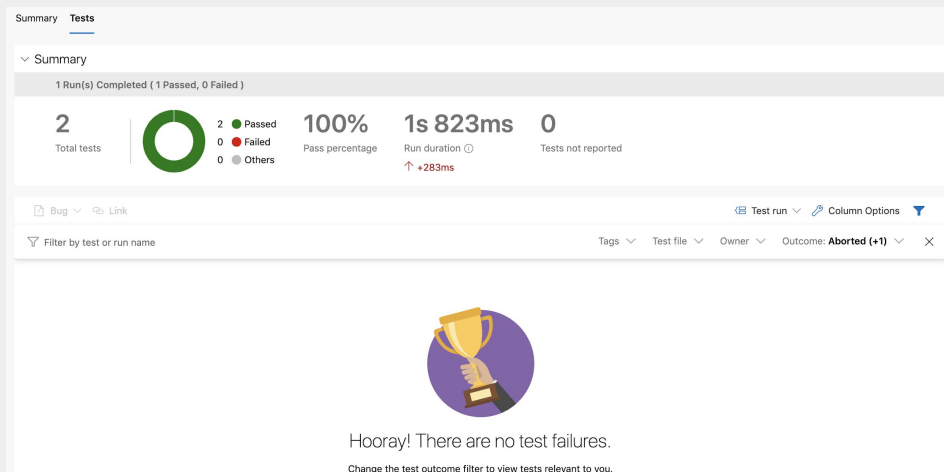
Deploy to
production

CI

CD

Test

- automatisatie van testen m.b.t. code
 - Code quality
 - Linting
 - Unittesten
 - ...
- Geen QA omgeving nodig



Code

Dependencies

build

(unit)test

archive
artifact

Deploy to QA

Deploy to
production

CI

CD

Archiving artifacts / packaging



- Beheer van pakketten
 - Centraal? Verschillende versies/Per Build?
 - Build once, deploy anywhere

App	Development	Quality Assurance	User Acceptance	Production
SCM	 deployment succeeded	 deployment succeeded	 deployment failed	 deployment succeeded
App	 UPack 1.0.7	 UPack 1.0.7	 UPack 1.0.6	 UPack 1.0.4
Sources	 UPack 1.0.7	 UPack 1.0.7	 UPack 1.0.6	 UPack 1.0.4

Code

Dependencies

build

(unit)test

archive
artifact

Deploy to QA

Deploy to
production

CI

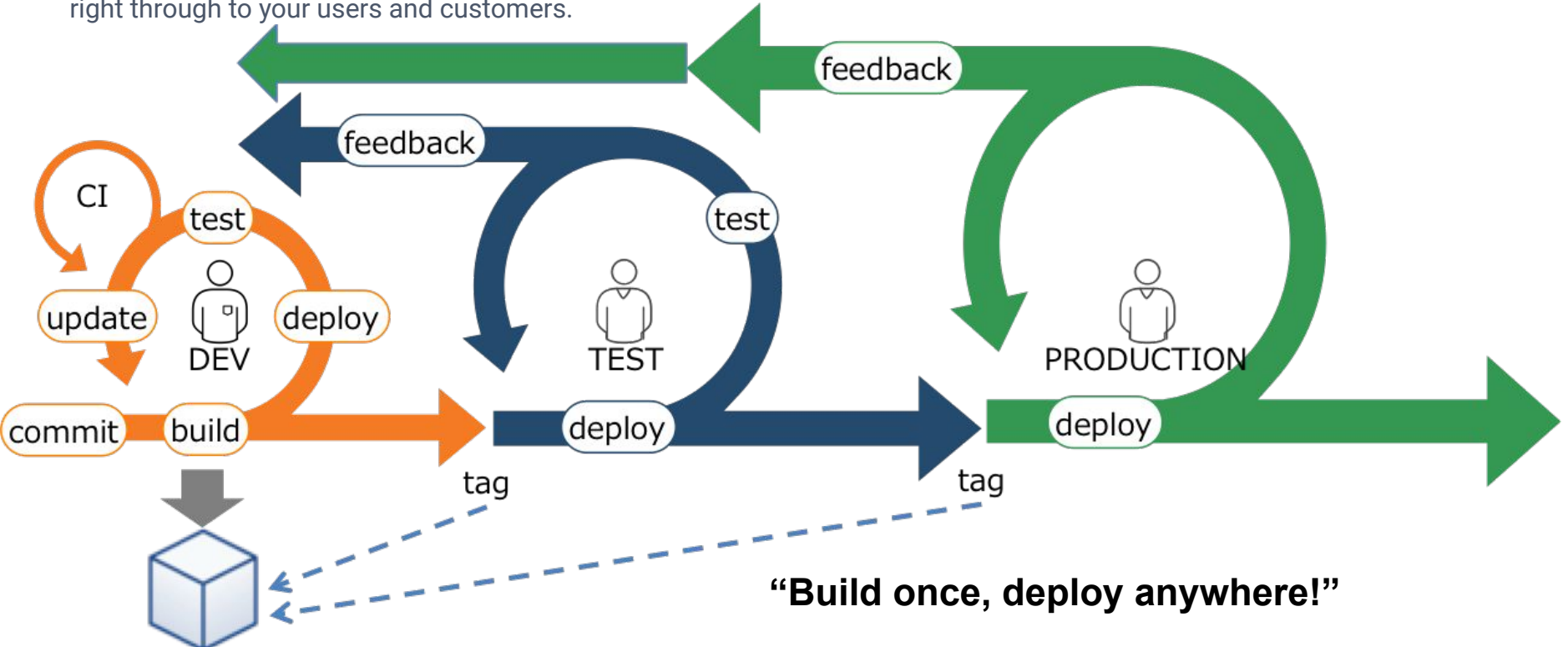
CD



Continuous Delivery / Deployment

CI/CD

A **continuous delivery (CD) pipeline** is an automated expression of your process for getting software from version control right through to your users and customers.



Deploying Software



Wat is er nodig?

- gecompileerde code
- omgeving specifieke parameters
- dependencies
- wat nog?

Code

Dependencies

build

(unit)test

archive
artifact

Deploy to QA

Deploy to
production

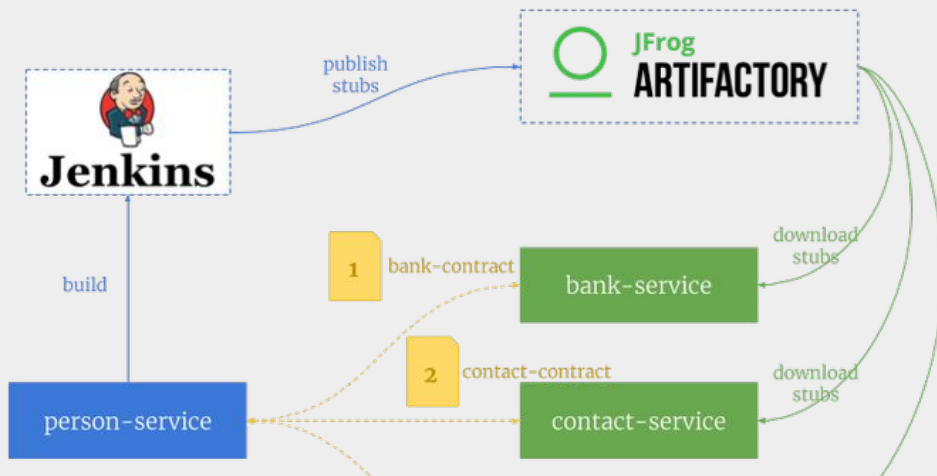
CI

CD

Deploying Software

Automatiseren van de deploy

- Vertrekken vanuit de artifact vanuit onze CI pipeline
 - Centrale repository?



Code

Dependencies

build

(unit)test

archive
artifact

Deploy to QA

Deploy to
production

CI

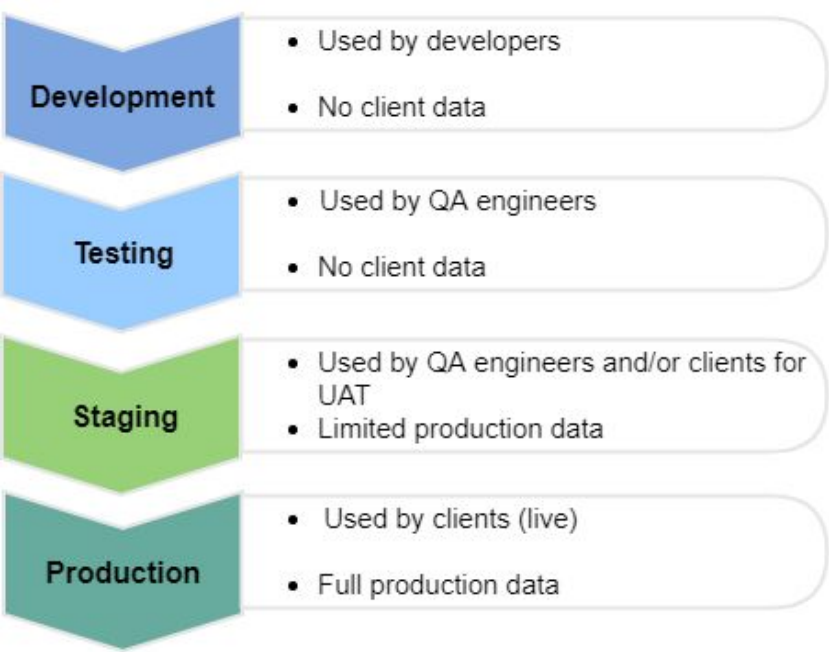
CD

Deploying Software



Automatiseren van de deploy

- Omgeving in orde maken
 - Dependencies
 - omgeving specifieke parameters, credentials, secrets, ...



Code	Dependencies	build	(unit)test	archive artifact	Deploy to QA	Deploy to production
CI					CD	

CI / CD Pipeline



- Structuur ligt niet vast
 - Elk bedrijf / omgeving heeft zijn eigen accenten

Code	Dependencies	build	(unit)test	archive artifact	Deploy to QA	Deploy to production
CI					CD	

Maar Waarom?

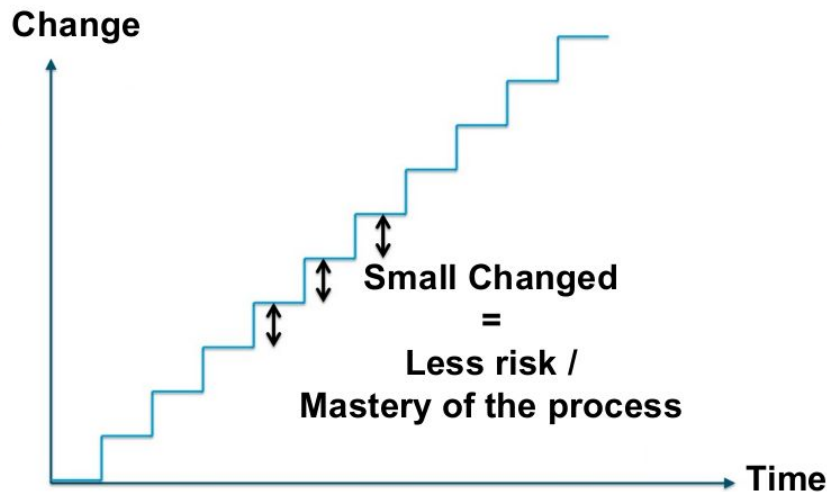
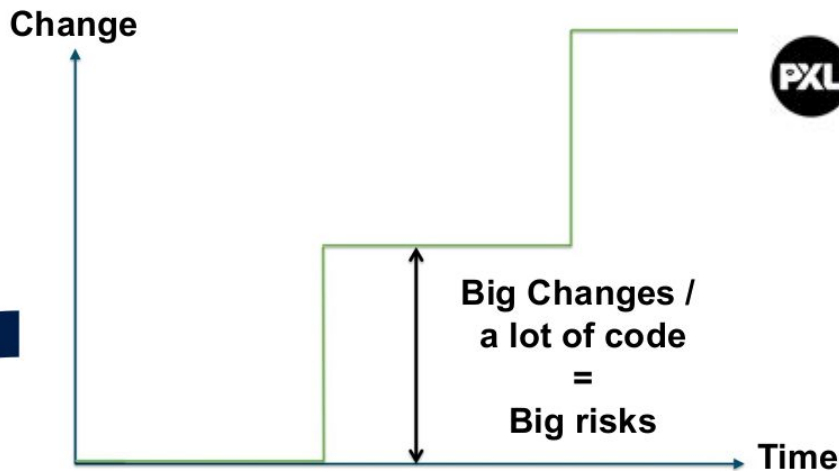


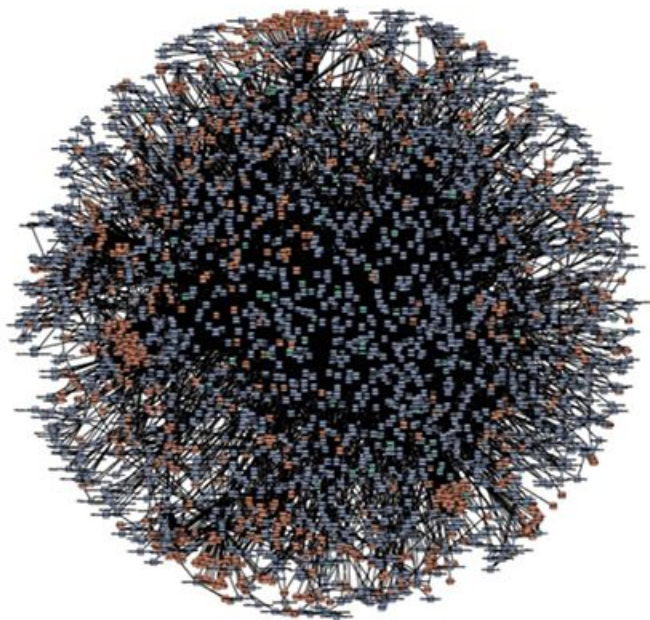
“If it hurts, do it more often”

Vergeet apps!

Welkom:

- (Micro-)Services
- APIs
- Front-end & Back-end
- MDM



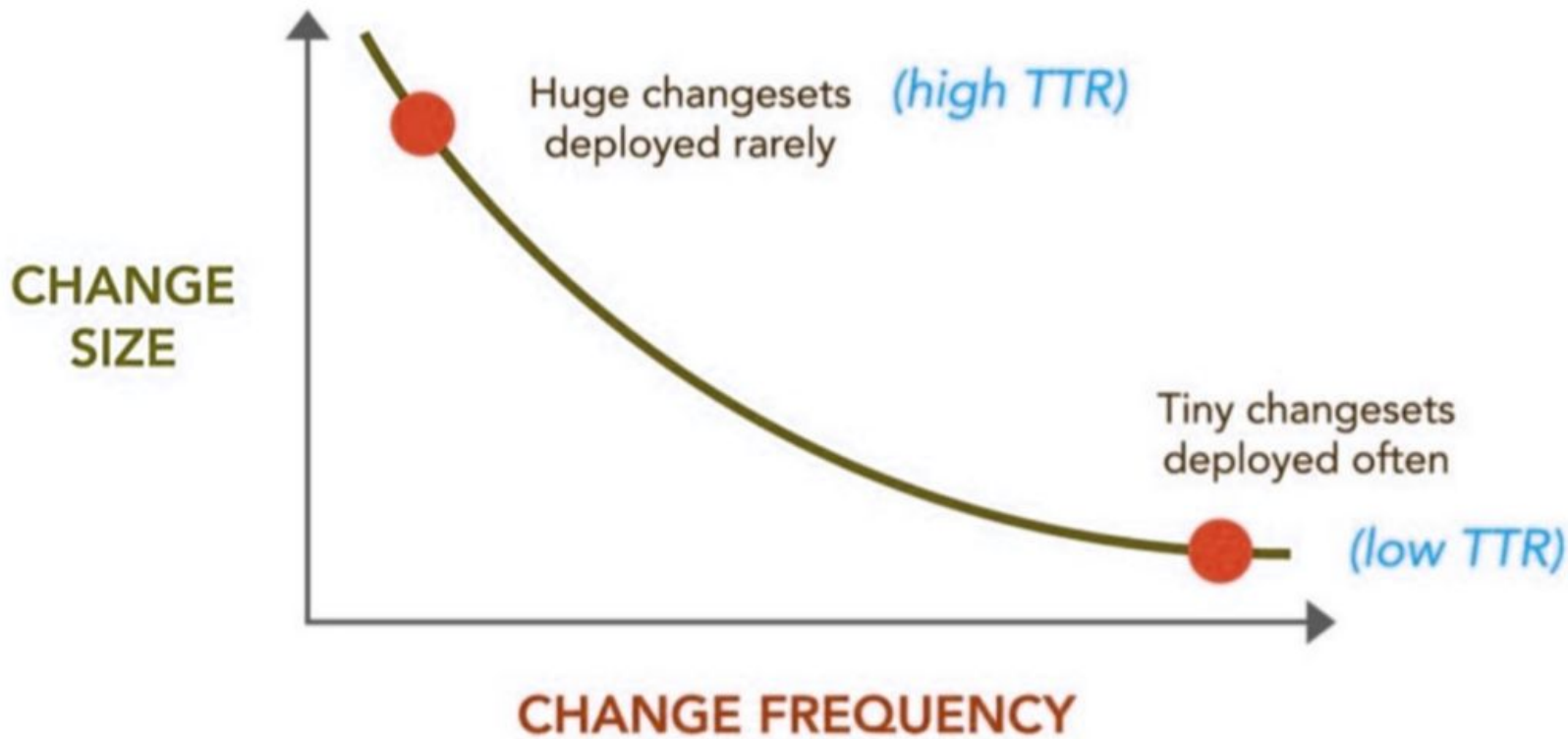


amazon.com



NETFLIX

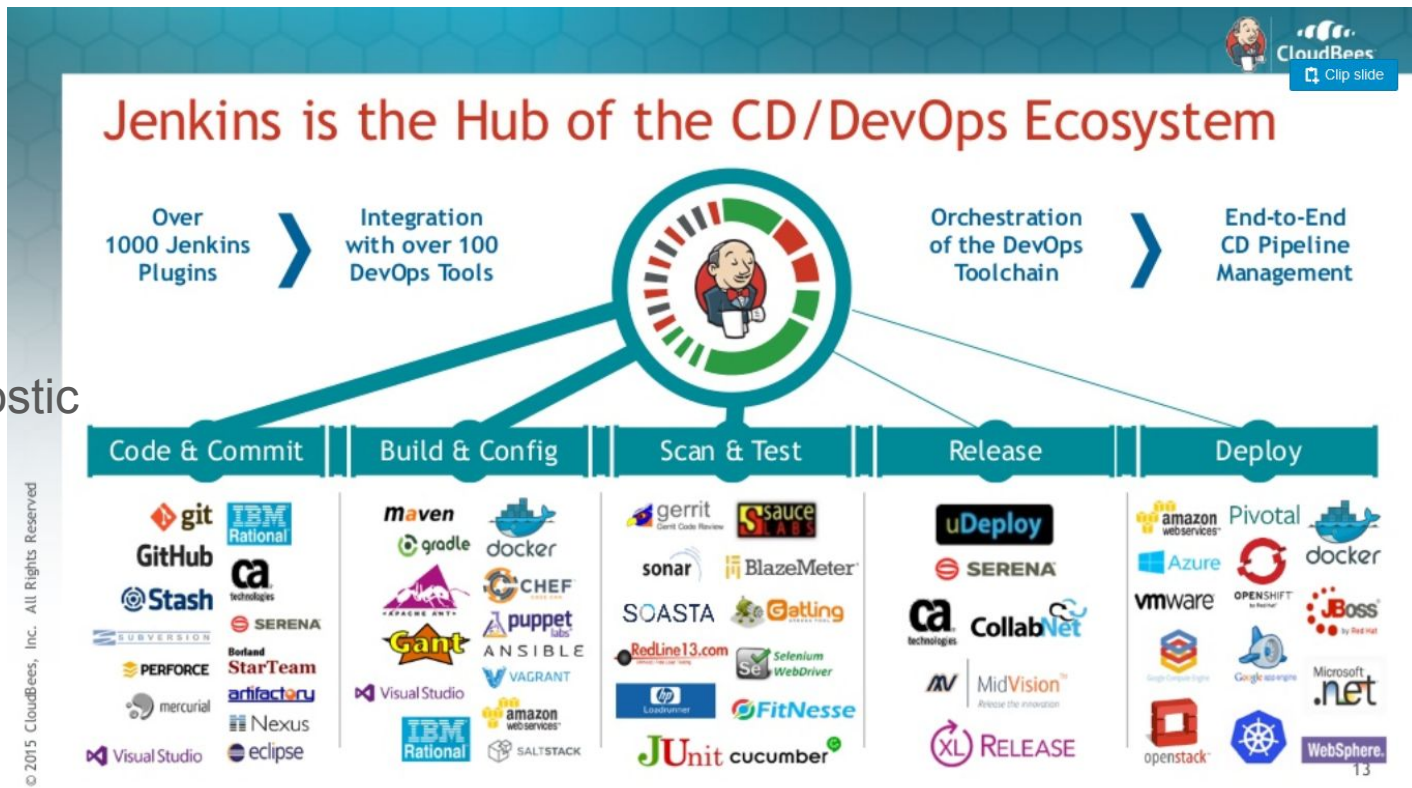
Maar waarom?



Maar hoe?

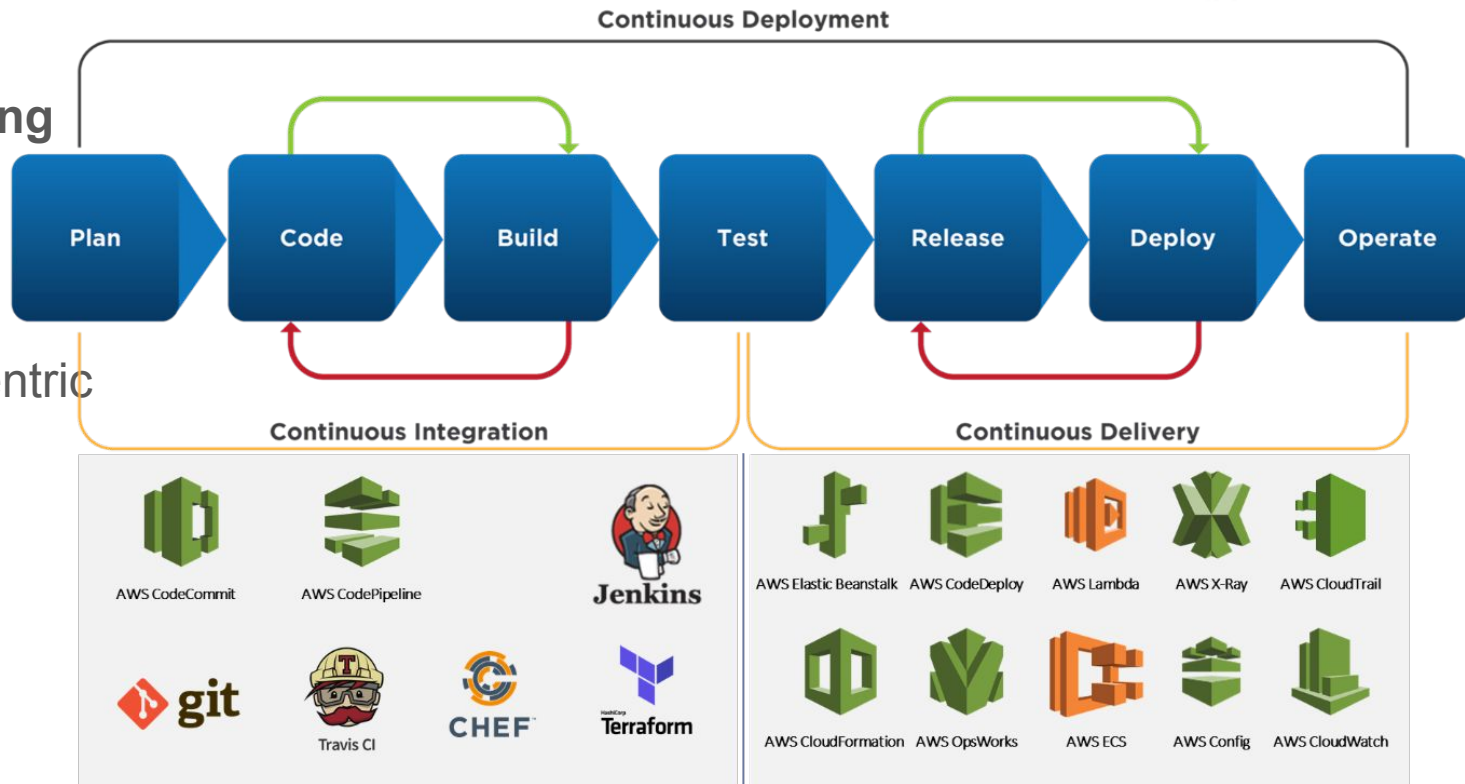
Pipeline tooling

- Oldskool
- Vendor Agnostic



Pipeline Tooling

- Newskool
- Vendor-centric



Dus...Jenkins

- Free & Open Source
- Automation Server
- parts of software development:
 - Building
 - Testing
 - Deploying



Jenkins

Software

Jenkins is a free and open source automation server. It helps automate the parts of software development related to building, testing, and deploying, facilitating continuous integration and continuous delivery. It is a server-based system that runs in servlet containers such as Apache Tomcat. [Wikipedia](#)

License: [MIT License](#)

Initial release: 2 February 2011

Platform: [Java 8](#), [Java 11](#)

Stable release: 2.240 / 8 June 2020; 2 months ago

Written in: [Java](#)

Original author: [Kohsuke Kawaguchi](#)

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Docker



Kubernetes



Ansible



Apache Maven



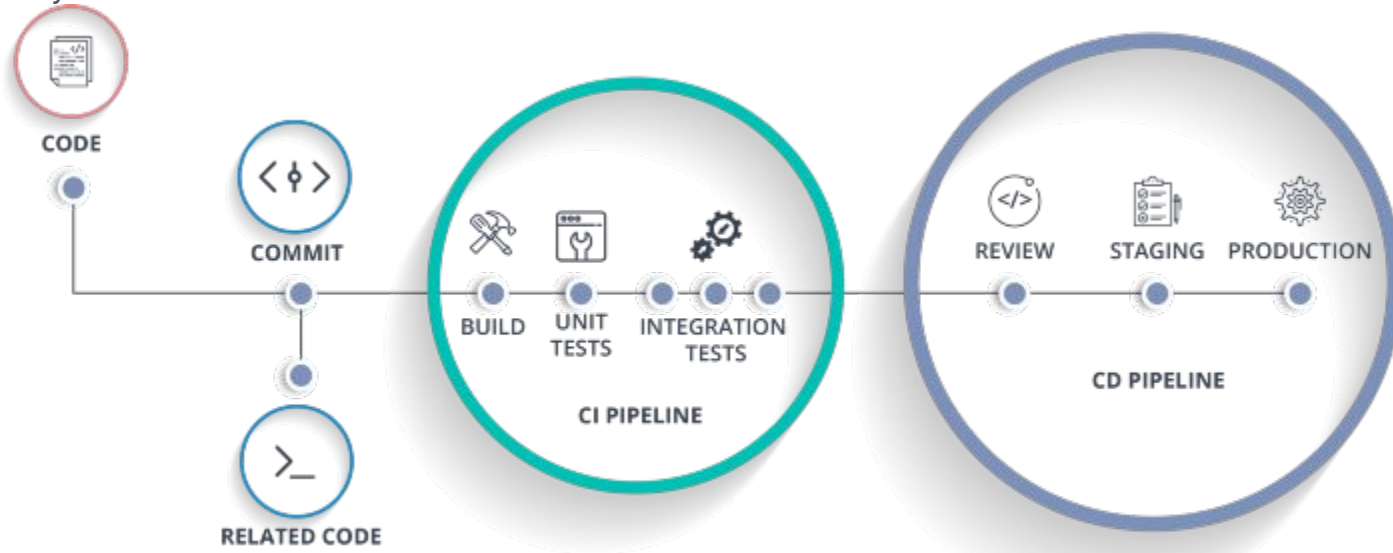
Git



Recap: CI/CD pipeline



A **continuous delivery (CD) pipeline** is an automated expression of your process for getting software from version control right through to your users and customers.



Every change to your software (committed in source control) goes through a complex process on its way to being released. This process involves building the software in a reliable and repeatable manner, as well as progressing the built software (called a "build") through multiple stages of testing and deployment.



Assignments

Pipelines - taak 1