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Continuous Delivery

Continuous Integration

Marco Ghisellini – Assago, 19/04/2019

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Summary

- What “Continuous Integration” and “Continuous Delivery” mean?
- What’s wrong with the common way of delivery?
- Which tools are used for automating the process?
- Sample pipeline
- Demo
- Releasing strategy

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What “Continuous Integration” and “Continuous Delivery” mean?

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Il numero uno dei portali italiani

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Continuous Integration (CI)

…Continuous Integration (CI) is the process of automatically building software

after new bits of code are integrated into a shared repository.

This yields “builds” of the code base that are in a working state at all times….

From Pivotal

Continuous Delivery (CD)

…Continuous Delivery (CD) is the process of automatically deploying the artifacts created with CI. [Tools]...are used to provide a consistent method of deploying software and configuration changes into an environment. The consistency CD provides means production deployments become a non-event….

From Pivotal

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What’s wrong with the common way of delivery ?

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Il primo portale internet nato in Italia

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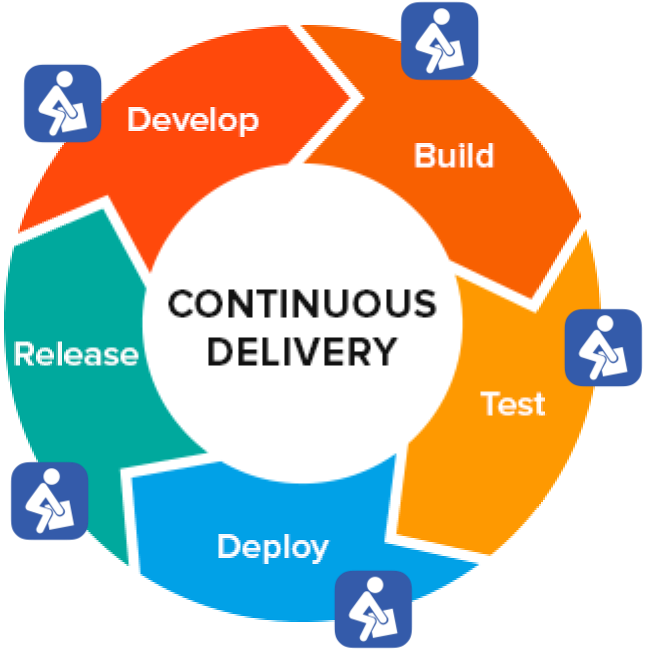
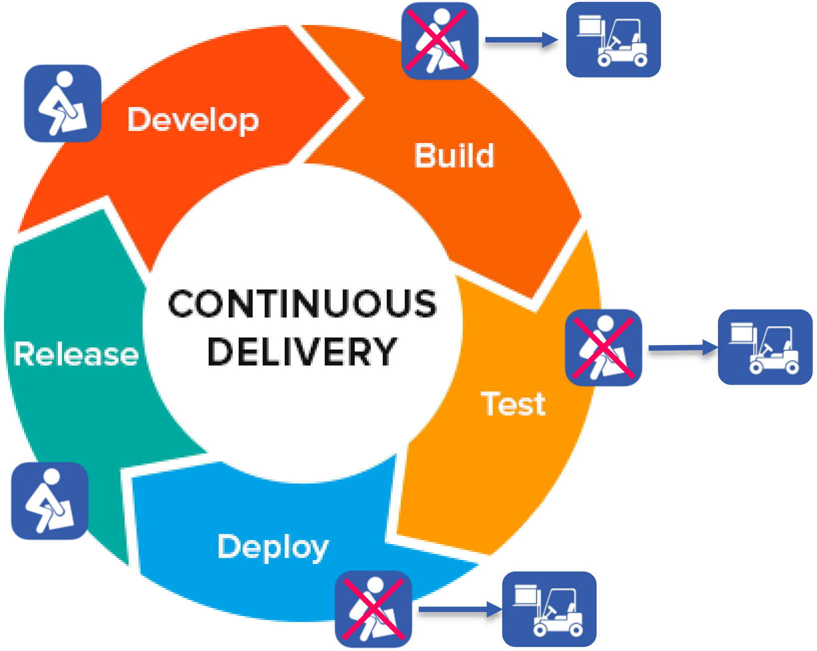
Code lifecycle - Handmade



Code lifecycle - Automatic



Issues with Team collaboration

- Produce a release without including all the files pushed;
- Repository’s push which breaks the solution integrity;
- Produce a release which does not satisfy all the suit tests (unit and integration);
- Difficult to reproduce the test environment on local machine;
- Keep the test environment up & running and time consistency;
- …Generally, execute all these steps manually!!

Antipattern: Deploying Software Manually

- The production of extensive, detailed documentation that describes the steps to be taken and the ways in which the steps may go wrong;
- Reliance on manual testing to confirm that the application is running correctly;
- Frequent corrections to the release process during the course of a release;
- When the deployment process is not automated, it is not repeatable or reliable, leading to time wasted on debugging deployment errors;
- Manual deployments depend on the deployment expert;
- Performing manual deployments is boring and repetitive and yet needs significant degree of expertise;
- The only way to test a manual deployment process is to do it.

From “Continuous Delivery - Reliable Software Releases Through Build, Test And Deployment Automation”

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Which tools are used for automating the process?

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Lavori da fare in casa?

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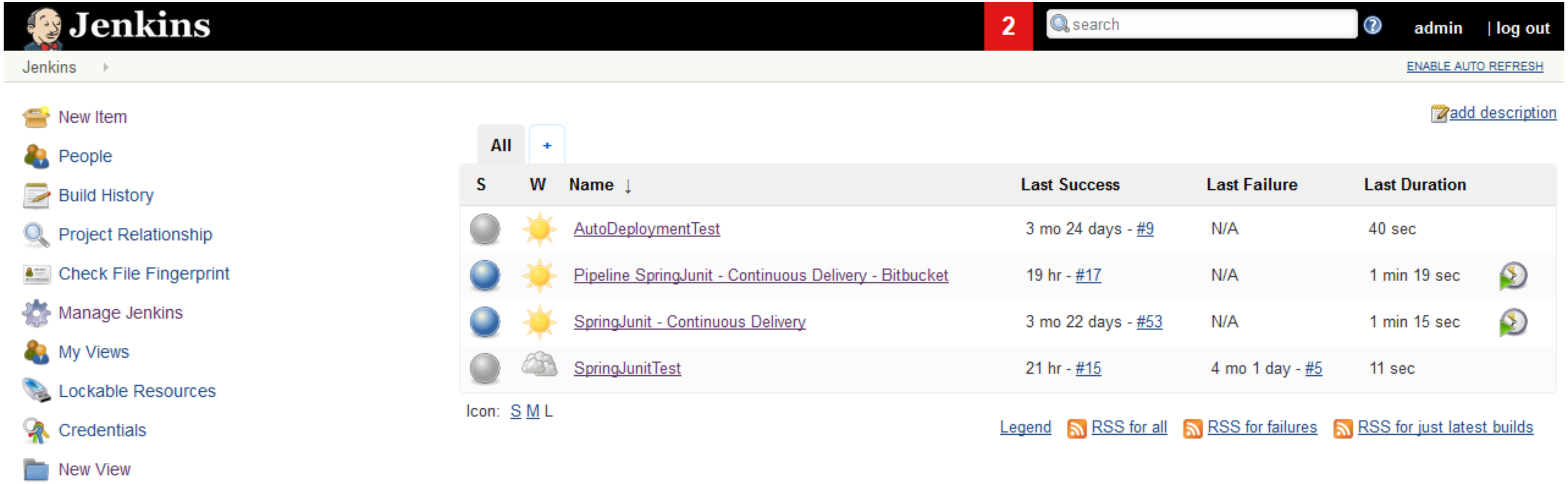
Tools

- Jenkins
- BitBucket
- Git
- Docker
- Maven

Jenkins

Jenkins is an open source automation server …

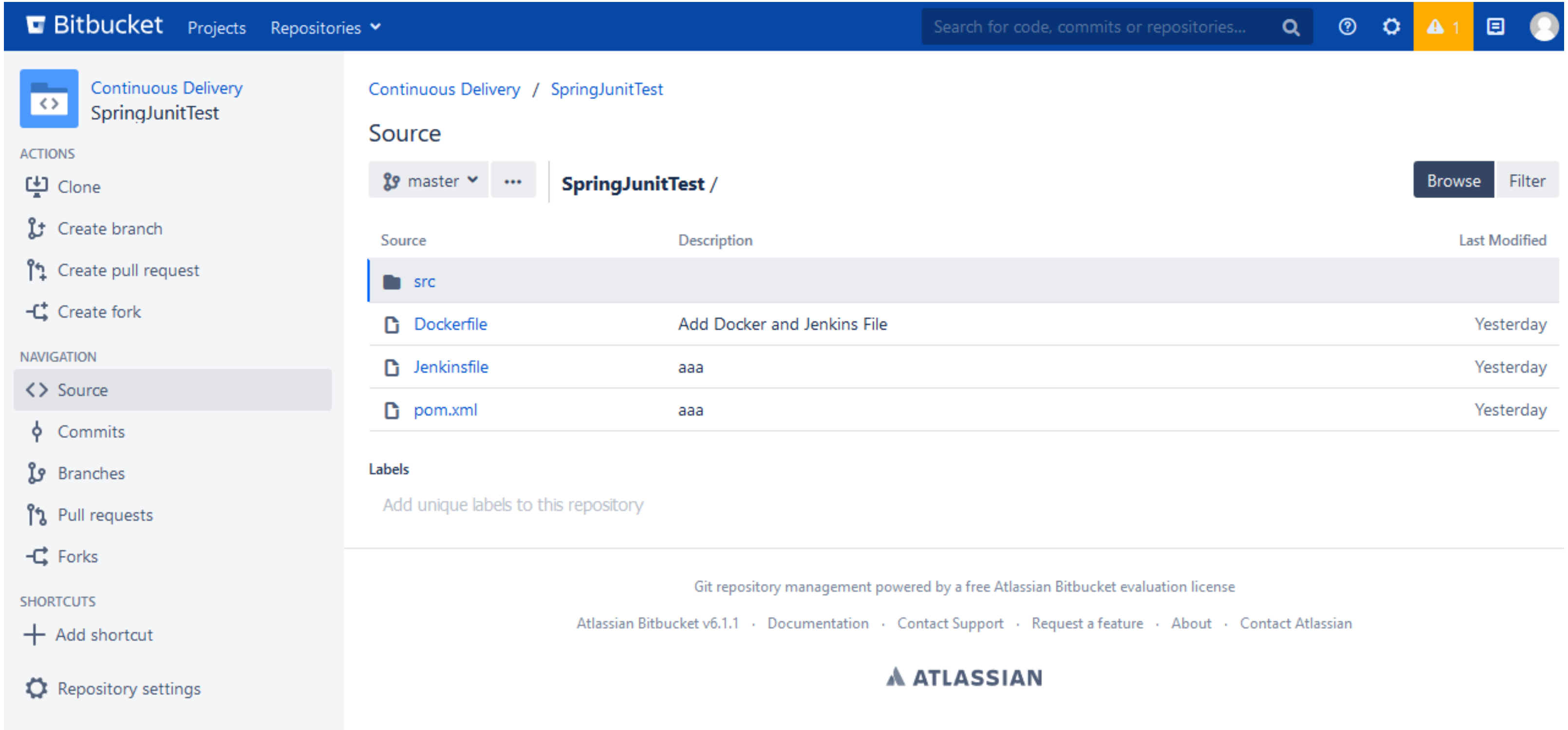
from Wikipedia



S	W	Name ↓	Last Success	Last Failure	Last Duration
●	☀	AutoDeploymentTest	3 mo 24 days - #9	N/A	40 sec
●	☀	Pipeline SpringJunit - Continuous Delivery - Bitbucket	19 hr - #17	N/A	1 min 19 sec
●	☀	SpringJunit - Continuous Delivery	3 mo 22 days - #53	N/A	1 min 15 sec
●	☁	SpringJunitTest	21 hr - #15	4 mo 1 day - #5	11 sec

Bitbucket

A git-based repository server.



Continuous Delivery / SpringJunitTest

Source

SpringJunitTest /

Source	Description	Last Modified
src		
Dockerfile	Add Docker and Jenkins File	Yesterday
Jenkinsfile	aaa	Yesterday
pom.xml	aaa	Yesterday

Labels

Add unique labels to this repository

Git repository management powered by a free Atlassian Bitbucket evaluation license

Atlassian Bitbucket v6.1.1 · Documentation · Contact Support · Request a feature · About · Contact Atlassian

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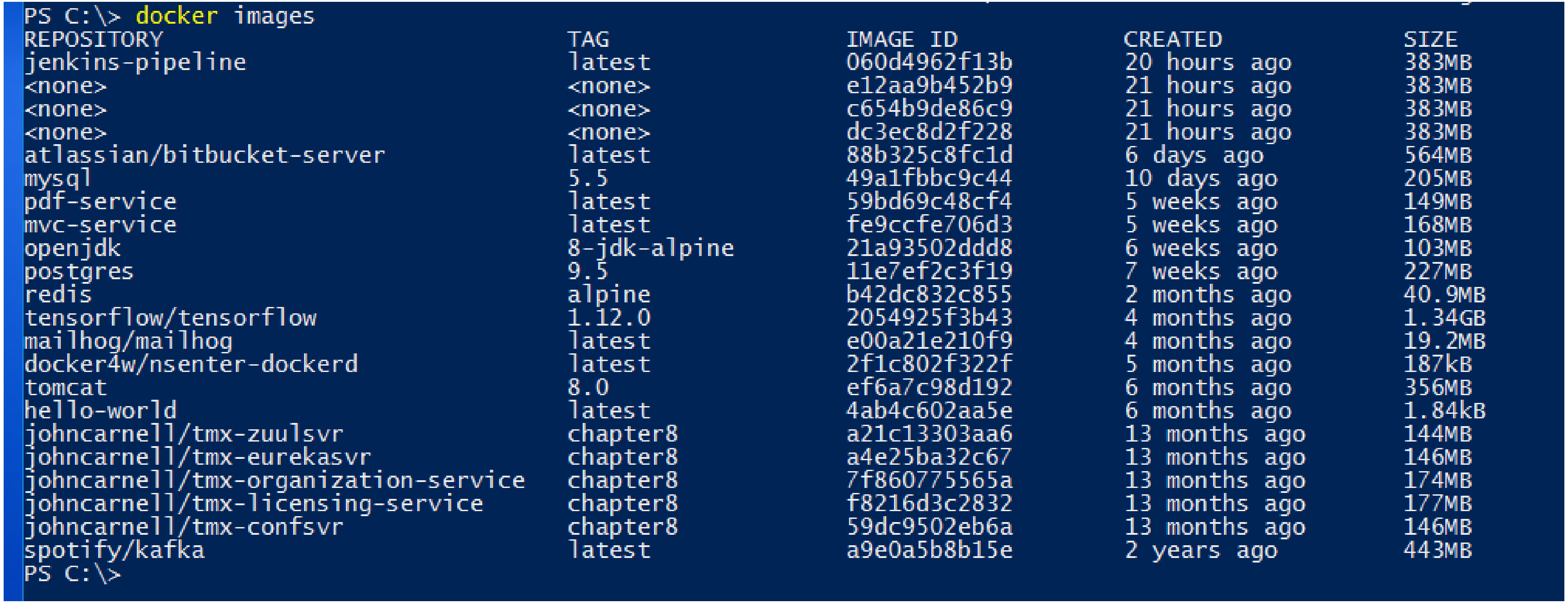
Docker

An virtualiser application container.



```
PS C:\> docker images
REPOSITORY                              TAG                 IMAGE ID            CREATED             SIZE
jenkins-pipeline                        latest              060d4962f13b        20 hours ago        383MB
<none>                                  <none>              e12aa9b452b9        21 hours ago        383MB
<none>                                  <none>              c654b9de86c9        21 hours ago        383MB
<none>                                  <none>              dc3ec8d2f228        21 hours ago        383MB
atlassian/bitbucket-server              latest              88b325c8fc1d        6 days ago          564MB
mysql                                   5.5                 49a1fbbc9c44        10 days ago         205MB
pdf-service                             latest              59bd69c48cf4        5 weeks ago         149MB
mvc-service                             latest              fe9ccfe706d3        5 weeks ago         168MB
openjdk                                 8-jdk-alpine        21a93502ddd8        6 weeks ago         103MB
postgres                                9.5                 11e7ef2c3f19        7 weeks ago         227MB
redis                                   alpine              b42dc832c855        2 months ago        40.9MB
tensorflow/tensorflow                   1.12.0              2054925f3b43        4 months ago        1.34GB
mailhog/mailhog                         latest              e00a21e210f9        4 months ago        19.2MB
docker4w/nsenter-dockerd                latest              2f1c802f322f        5 months ago        187kB
tomcat                                  8.0                 ef6a7c98d192        6 months ago        356MB
hello-world                             latest              4ab4c602aa5e        6 months ago        1.84kB
johncarnell/tmx-zuulsvr                 chapter8            a21c13303aa6        13 months ago       144MB
johncarnell/tmx-eurekasvr               chapter8            a4e25ba32c67        13 months ago       146MB
johncarnell/tmx-organization-service    chapter8            7f860775565a        13 months ago       174MB
johncarnell/tmx-licensing-service       chapter8            f8216d3c2832        13 months ago       177MB
johncarnell/tmx-confsvr                 chapter8            59dc9502eb6a        13 months ago       146MB
spotify/kafka                           latest              a9e0a5b8b15e        2 years ago         443MB
PS C:\>
```

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Sample pipeline

SUPEREVA

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sono di tendenza

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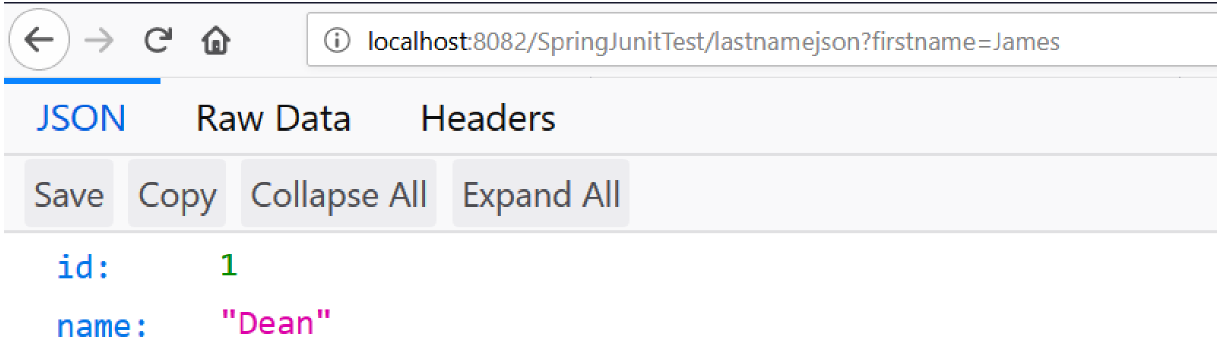
Sample project – User registry

A web application which contains a user registry data (name, surname) and exposes the endpoint /lastnamejson?firstname=<James|Larry>.

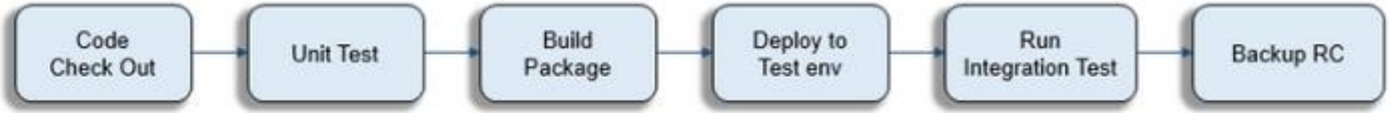


```
id:      1
name:    "Dean"
```

The web application is deployed into Tomcat 8 and the data is stored into a MySql Database.

Continuous delivery - User registry/2

- Every push to repository triggers the execution of the above pipeline on Jenkins;
- The first error raised stopped the pipeline execution.



Jenkins – Pipeline/1

```
def CONTAINER_NAME="jenkins-pipeline"
def CONTAINER_TAG="latest"
def HTTP_PORT="8082"
def TEST_URL="http://localhost:${HTTP_PORT}/SpringJunitTest/lastnamejson?firstname=James"
def TEST_TEXT="{\"id\":1,\"name\":\"Dean\"}"

node {

    stage('Checkout') {
            checkout scm
    }
    stage('Unit Test'){
        bat "mvn -U clean compile"
    }

     stage('Package'){
        bat "mvn package -DskipTests"
    }
```

Jenkins – Pipeline/2

```
stage("Image Clear up"){
        try {
        bat "docker stop mysql"
        bat "docker rm -f mysql"
        bat "docker stop $CONTAINER_NAME"
        bat "docker rm -f $CONTAINER_NAME"
        bat "docker rmi $CONTAINER_NAME:$CONTAINER_TAG"
    } catch(error){}
  }

  stage('Image Build'){
    bat "docker build -t $CONTAINER_NAME:$CONTAINER_TAG  -t $CONTAINER_NAME --pull --no-cache ."
    echo "Image build complete"
  }

  stage('Run App'){
    bat "docker run --name mysql -p 3306:3306 -e MYSQL_ALLOW_EMPTY_PASSWORD=yes -d mysql:5.5"
    sleep(10)
    bat "docker run -d -p $HTTP_PORT:8080 --link mysql:mysql --name $CONTAINER_NAME $CONTAINER_NAME:$CONTAINER_TAG"
    echo "Application started on port: ${HTTP_PORT} (http)"
  }
```

Jenkins – Pipeline/3

```
 stage('Integration Test'){
        sleep(10)
        bat "docker exec -i mysql mysql -e \"create schema junit;use junit;DROP TABLE IF EXISTS Customers;CREATE TABLE Customers (  id INT NOT NULL
AUTO_INCREMENT,  first_name VARCHAR(30),  last_name  VARCHAR(30),  PRIMARY KEY (`id`));INSERT INTO Customers VALUES (1, 'James', 'Dean');INSERT
INTO Customers VALUES (2, 'Larry', 'Bird');\"«

        def response = httpRequest "${TEST_URL}"
        println("Status: "+response.status)
        println("Content: "+response.content)
        if (!response.content.contains("${TEST_TEXT}"))
        {
            echo '[FAILURE] Failed to verify TEST_TEXT'
            currentBuild.result = 'FAILURE'
            return
        }
    }
    stage('Backup Release'){
        fileOperations([fileCopyOperation(excludes: '', flattenFiles: true, includes: 'target/SpringJunitTest.war', targetLocation: 'C:\\deploy')])
        fileOperations([fileRenameOperation(destination: 'C:\\deploy\\SpringJunitTest-$BUILD_TIMESTAMP.war', source: 'C:\\deploy\\SpringJunitTest.war')])
    }
}
```

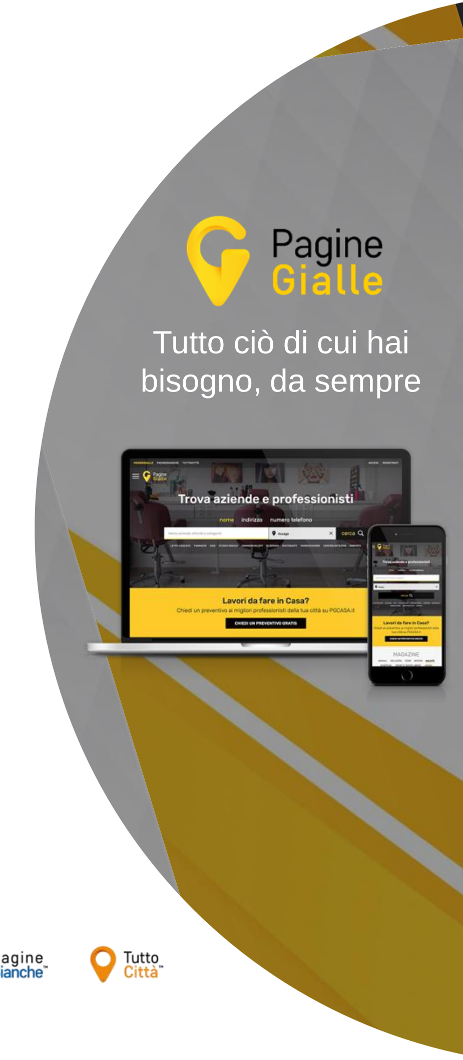
Docker – Containers

```
REPOSITORY          TAG          IMAGE ID          CREATED          SIZE
jenkins-pipeline      latest         060d4962f13b      24 hours ago       383MB
mysql                 5.5          49a1fbbc9c44      10 days ago        205MB

CONTAINER ID    IMAGE                   COMMAND                      CREATED          STATUS            PORTS                        NAMES
2ebaee5881eb    jenkins-pipeline:latest  "catalina.sh run"            24 hours ago     Up 3 seconds      0.0.0.0:8082->8080/tcp       jenkins-pipeline
102680c1bc24   mysql:5.5                "docker-entrypoint.s…"       24 hours ago     Up 33 seconds     0.0.0.0:3306->3306/tcp       mysql
```

Demo!

https://github.com/MarcoGhise/SpringJunitTest/blob/master/ContinuousDelivery.mp4


Pagine Gialle
Tutto ciò di cui hai bisogno, da sempre
Trova aziende e professionisti
Lavori da fare in Casa?
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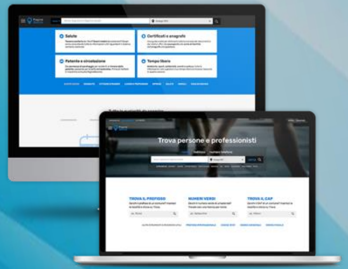
Releasing strategy

Blue-green releasing
Canary releasing (dark launches)
Shadowing Traffic releasing

Pagine Bianche

Un tesoro di
10 milioni di abbonati



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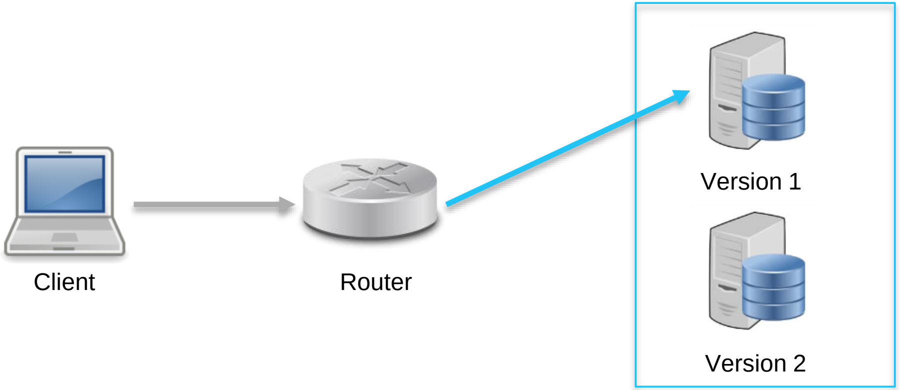
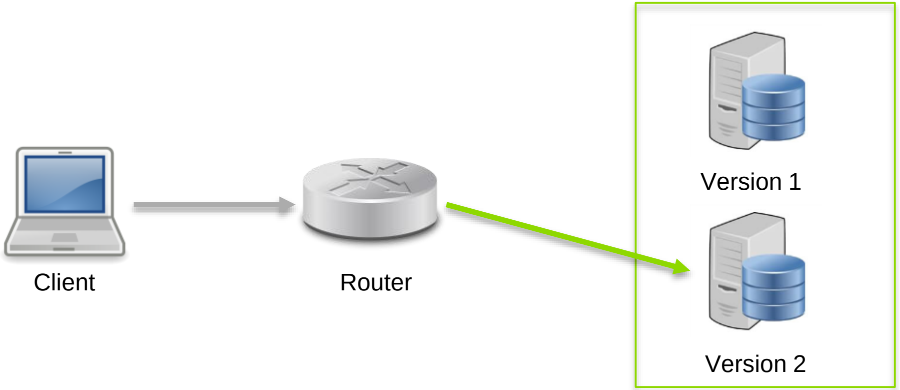
Blue-green releasing



Blue version



Green version

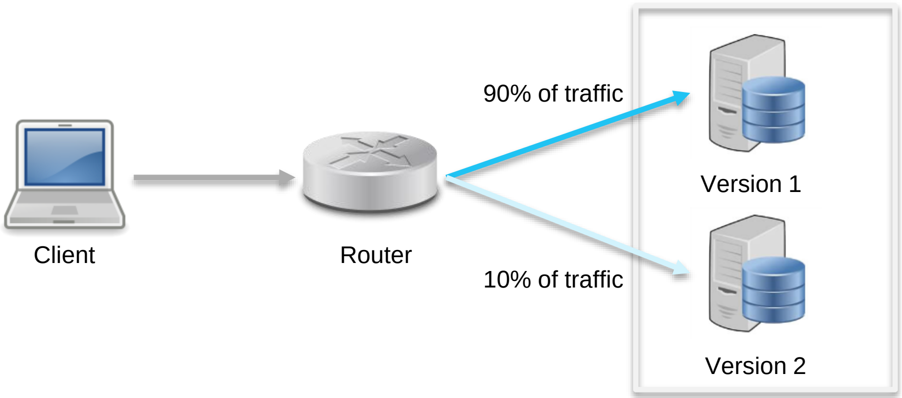
Blue-green releasing – Pros and Cons

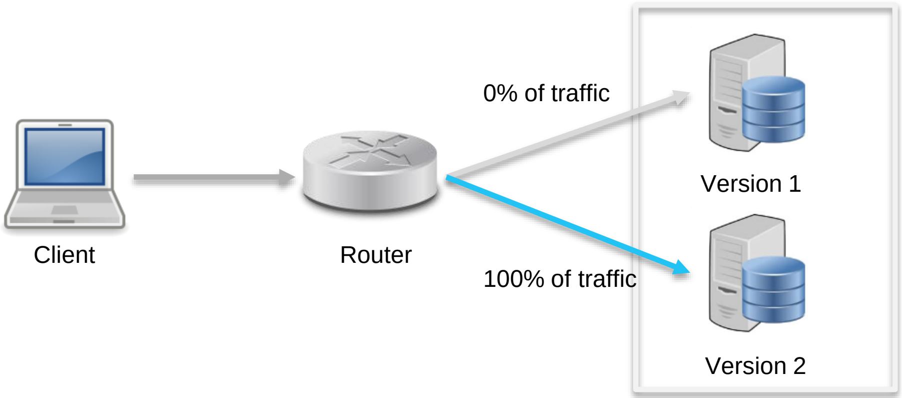
- Deploy a new version in production environment without downtime;
- Rapid switch from one version to other;
- Rapid rollback to the previous version;

but…

- All traffic is instantly direct toward the new release when the router switches;
- First time the whole infrastructure (network, remote resource, etc..) is tested with the new solution. Something could crash despite the code quality.

Canary releasing (dark launches)





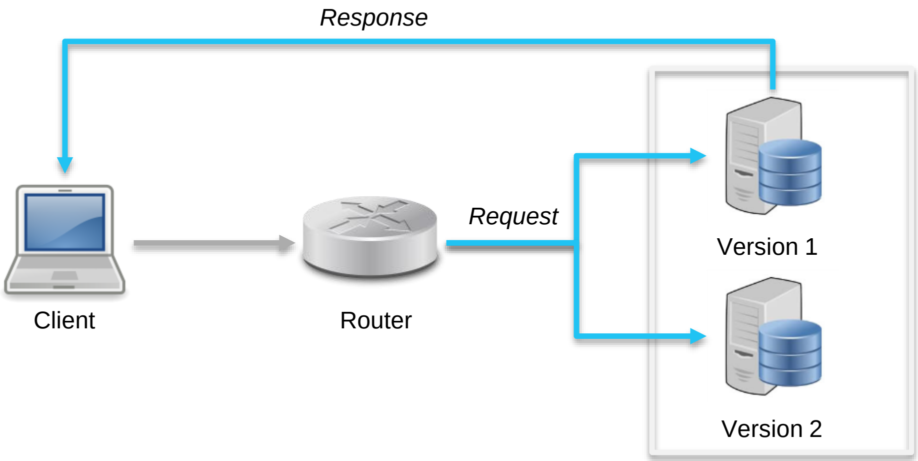
Canary releasing (dark launches) – Pros and Cons

- The same pros of Blue-green releasing;
- Useful for A/B testing;
- Low traffic to the new version which means easier monitor of the resources (network, CPU, database, etc..);

but…

- Longer deployment time;
- New releases blocked while not all traffic is switched to the new one; only bug fixing available.

Shadowing Traffic releasing



- Request sent to both version; only the current release provides the Response.

Shadowing Traffic releasing – Pros and Cons

- Real traffic to the new version without side effects due sudden application failure;
- Turn on/off the new release without knowledge of the client.

but…

- Longer deployment time;
- New releases blocked in this time; only bug fixing available;
- Duplication of traffic from the shared resources (dabatase, …).

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Reference

Tutto Città

Tutte le strade portano qui

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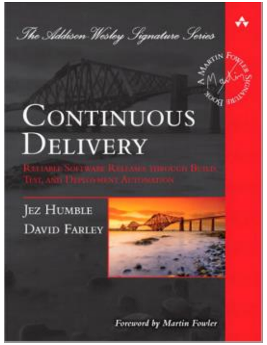
Reference



- Continuous Delivery by Jez Humble e David Farley

- Continuous Delivery with Jenkins + Docker + Git

  https://techannotation.wordpress.com/2018/11/28/continuous-delivery_jenkins_docker_git/

- Avoid stressful deploy of release!

  https://techannotation.wordpress.com/2019/03/20/avoid-stressful-deploy-of-release/

- Continuous Delivery Foundation

  https://cd.foundation/

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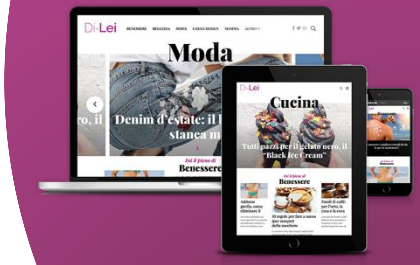
Any Question?

marco.ghisellini@Italiaonline.it

Di·Lei

Digitale, femminile, singolare



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Il Nerd Happy Hour si prende una pausa, ci rivediamo il 10 Maggio con un nuovo interessante webinar.

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