CI CD Project

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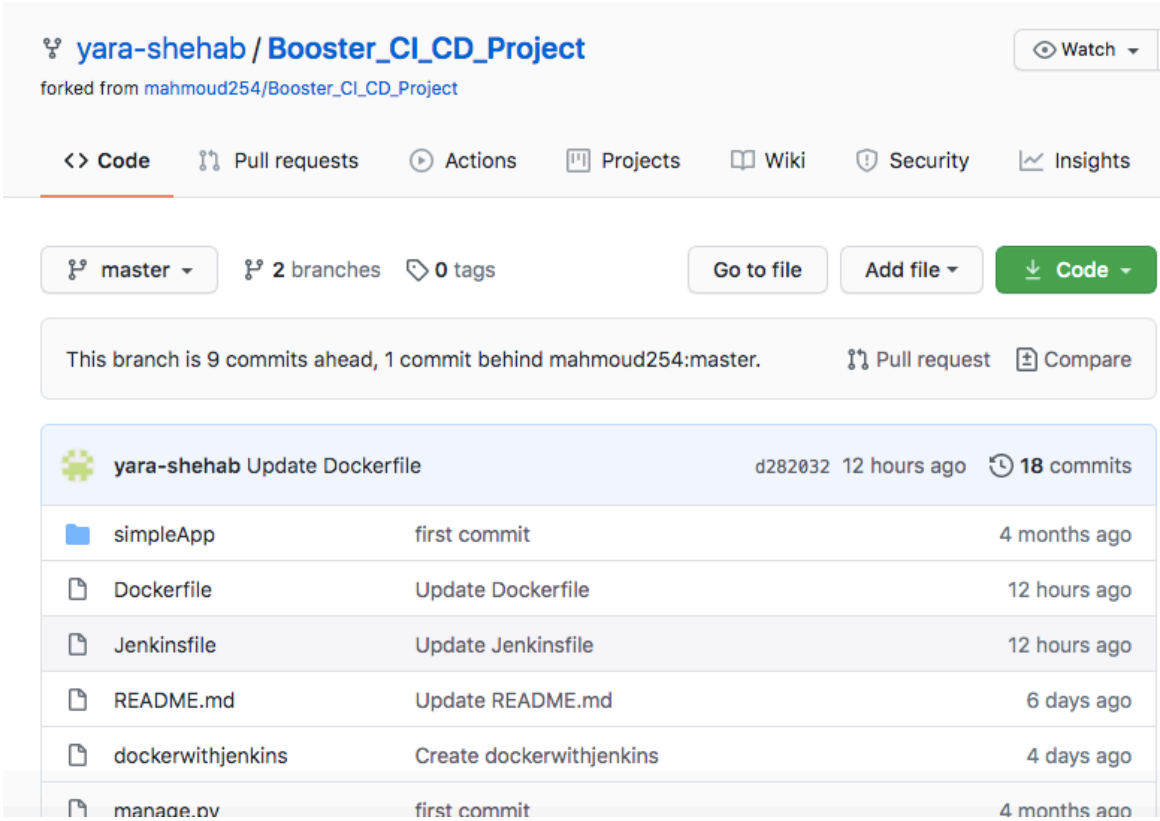
https://github.com/yara-shehab/Booster_CI_CD_Project

Introduction:

Create CI/CD pipeline using jenkinsfile to deploy simple django web app as a microservice running on docker container locally

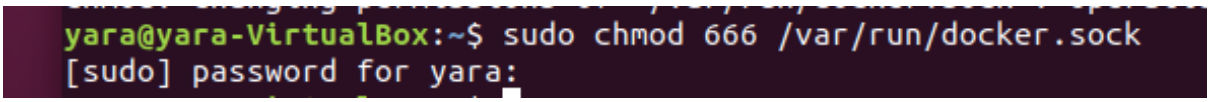
Steps:

1. Fork the given repo to my account on github



And create 2 branches: master, dev

2. Write dockerfile inside my repo to create new image with required installation to start the server

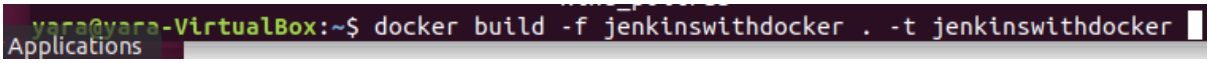


The docker file used to build the image for the master "jenkinswithdocker" is

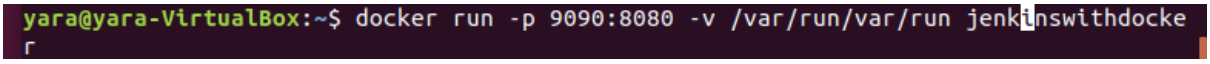
```
FROM
jenkins/jenkins:lts
```

```
USER root
#install docker client
RUN apt-get update -qq
RUN apt-get install -qqy apt-transport-https ca-
certificates curl gnupg2 software-properties-common
RUN curl -fsSL
https://download.docker.com/linux/debian/gpg | apt-key
add -
RUN add-apt-repository \
       "deb [arch=amd64]
https://download.docker.com/linux/debian \
       $(lsb_release -cs) \
       stable"
RUN apt-get update -qq \
       && apt-get install docker-ce=17.12.1~ce-0~debian
-y
RUN usermod -aG docker jenkins
```

Use this command to build the master image



Use this command to run the master image



The docker file used to build the image for the slave is name “slave_dockerfile” is:

```
yara@yara-VirtualBox:~$ cat slave_dockerfile
FROM ubuntu
USER root
RUN apt-get update -qq
RUN mkdir -p jenkins_home
RUN  chmod 777 jenkins_home
RUN useradd -ms /bin/bash jenkins

#install docker client


RUN apt-get install -qqy apt-transport-https ca-certificates curl gnupg2 software-pr
operties-common
RUN curl -fsSL https://download.docker.com/linux/debian/gpg | apt-key add -
RUN add-apt-repository \
        "deb [arch=amd64] https://download.docker.com/linux/ubuntu \
        focal\
        stable"
RUN apt-get update -qq
RUN apt-get install -y docker-ce docker-ce-cli containerd.io
RUN usermod -aG docker jenkins
RUN apt-get install openjdk-8-jdk -qq
RUN apt-get install openssh-server -qq


USER jenkins
WORKDIR jenkins_home
```

Use this command to build the image of the slave container

```
yara@yara-VirtualBox:~$ docker build -f slave_dockerfile . -t slave
```

Use this command for the run of the slave container

```
file or directory : unknown.
yara@yara-VirtualBox:/$ docker run -dit --privileged=true -v /var/run/docker.sock:/v
ar/run/docker.sock slave
72dc1d78cf9ec8012f5ad1fc340848045b05ac325845a3fb62f3f605817a6b1f
yara@yara-VirtualBox:/$ docker ps
CONTAINER ID        IMAGE               COMMAND                  CREATED
 STATUS              PORTS                                NAMES
72dc1d78cf9e        slave               "/bin/bash"              44 seconds ago
 Up 3 seconds                                             exciting_robinson
6dfc35b1d757        jenkinswithdocker   "/sbin/tini -- /usr/…"   3 hours ago
 Up 3 hours          50000/tcp, 0.0.0.0:9090->8080/tcp    funny_austin
yara@yara-VirtualBox:/$
```

3. Configure ubuntu slave to use it for the pipeline

   Use the public and private key generated by the sshgen-key function for both of the master and the slave

```
yara@yara-VirtualBox:~$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/yara/.ssh/id_rsa):
/home/yara/.ssh/id_rsa already exists.
Overwrite (y/n)?
yara@yara-VirtualBox:~$ cd ~/.ssh
yara@yara-VirtualBox:~/.ssh$ ls
id_rsa  id_rsa.pub  y  y.pub
yara@yara-VirtualBox:~/.ssh$ cat id_rsa.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQDBtICLErhVTIrDqdgWgPs8snyk6uCJQGCBQAveCs751WSDhfypruj/V1On9IkGnmoc
x1JhrsmVk3Nj4sWJZqcwWdX13ByOZKPuMqYxWVmMroJHRye/XDV/UvfZiaUzGHbKUtRHPUg6JIGFDDEeEb3ZOO1+CmluQi2q8yY8XwTz
pfPEqzCj8qZ1P4XZ+JSmKUSTLyipQnj+reRalT8LmgpCgzlN0eN8gPDMzdZwFCHRM1SY+zsOk1O208I/cHPRAEq4SfrqTETV/dzXfAi9
inhr/jYwdnGLcu1uw+wIAQ0IRhd1IPZkWdCUis9wZPaNrEMxJgxLf3tijzX8nKtd7A3b yara@yara-VirtualBox
yara@yara-VirtualBox:~/.ssh$ cat id_rsa
-----BEGIN RSA PRIVATE KEY-----
MIIEpQIBAAKCAQEAwbSAixK4VUyKw6nYFoD7PLJ8pOrgiUBggUAL3grO+dVkg4X8
qa7o/1dTp/SJBp5qHMdSYa7JlZNzY+LFiWanMFnV9dwcjmSj7jKmMVlZjK6CR0cn
v1w1f1L32YmlMxh2ylLURz1IOiSBhQwxHhG92TjtfgppbkItqvMmPF8E86XzxKsw
o/KmdT+F2fiUpilEky8oqUJ4/q3kWpU/C5oKQoM5TdHjfIDwzM3WcBQh0TNUmPs7
DpNTttPCP3Bz0QBKuEn66kxE1f3c13wIvYp4a/42MHZxi3LtbsPsCAENCEYXdSD2
ZFnQlIrPcGT2jaxDMSYMS397Yo81/JyrXewN2wIDAQABAoIBAQCtvhhaJcVfBROm
Is6miLRQogu45M/Xa/3jkK3UUL+LSYMpkWGqVS+57/siN+08GZU2EPZslZlMZ4Bl
hH8IGiI19S47o12dvtlnCtkUhH8U92X1RvZ45t05QhL7dUHPDc9m9FphN690L1BZ
JTFdNi6iCzTCC9a7RfKuVf/iwJuxaYMWphYxUCVC1RTeiACsmeF76W4LfD+uv4AH
AXvjq7ZxGkTp6cqiFNFsTFDoXb2UArrOZDDosaEWmkZBg6iBe6EwwrAMGMm7FOVr
6pP56F/+Tcf9GYWsZ1Law0voMMLlLqoa/hgNaWD8FbfLcR9zNvdnaqlVrM0MtpFg
```

```
yara@yara-VirtualBox:~$ docker exec -it ddaffa350607 bash
jenkins@ddaffa350607:/jenkins_home$ cd ~
jenkins@ddaffa350607:~$ mkdir .ssh
jenkins@ddaffa350607:~$ cd .ssh/
jenkins@ddaffa350607:~/.ssh$ echo "ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQDBtICLErhVTIrDqdgWgPs8snyk6uCJQ
GCBQAveCs751WSDhfypruj/V1On9IkGnmocx1JhrsmVk3Nj4sWJZqcwWdX13ByOZKPuMqYxWVmMroJHRye/XDV/UvfZiaUzGHbKUtRHP
Ug6JIGFDDEeEb3ZOO1+CmluQi2q8yY8XwTzpfPEqzCj8qZ1P4XZ+JSmKUSTLyipQnj+reRalT8LmgpCgzlN0eN8gPDMzdZwFCHRM1SY+
zsOk1O208I/cHPRAEq4SfrqTETV/dzXfAi9inhr/jYwdnGLcu1uw+wIAQ0IRhd1IPZkWdCUis9wZPaNrEMxJgxLf3tijzX8nKtd7A3b
mbox a@yara-VirtualBox
> "> authorized_keys
jenkins@ddaffa350607:~/.ssh$ ls
authorized_keys
jenkins@ddaffa350607:~/.ssh$ cat authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQDBtICLErhVTIrDqdgWgPs8snyk6uCJQGCBQAveCs751WSDhfypruj/V1On9IkGnmoc
x1JhrsmVk3Nj4sWJZqcwWdX13ByOZKPuMqYxWVmMroJHRye/XDV/UvfZiaUzGHbKUtRHPUg6JIGFDDEeEb3ZOO1+CmluQi2q8yY8XwTz
pfPEqzCj8qZ1P4XZ+JSmKUSTLyipQnj+reRalT8LmgpCgzlN0eN8gPDMzdZwFCHRM1SY+zsOk1O208I/cHPRAEq4SfrqTETV/dzXfAi9
inhr/jYwdnGLcu1uw+wIAQ0IRhd1IPZkWdCUis9wZPaNrEMxJgxLf3tijzX8nKtd7A3b yara@yara-VirtualBox
```

Get the value of the environment variable: JAVA_HOME

```
jenkins@ddaffa350607:~/.ssh$ cd /usr/lib
jenkins@ddaffa350607:/usr/lib$ cd jvm
jenkins@ddaffa350607:/usr/lib/jvm$ ls
java-1.8.0-openjdk-amd64  java-8-openjdk-amd64
jenkins@ddaffa350607:/usr/lib/jvm$ pwd
/usr/lib/jvm
```

To get the IP of the host for the slave I have used this command:

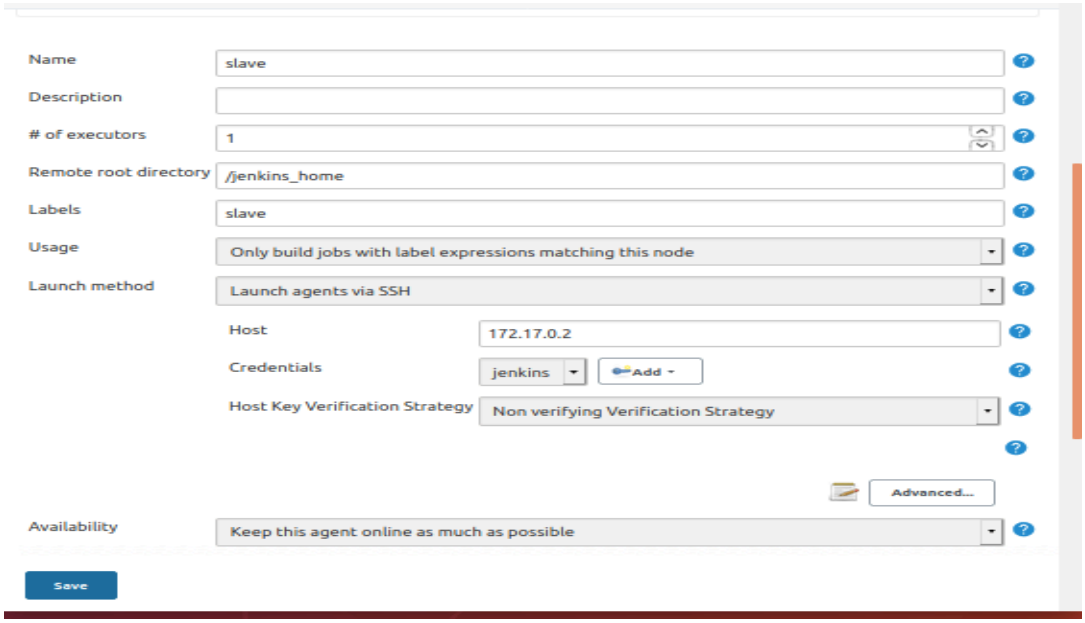
```
yara@yara-VirtualBox:~/.ssh$ docker inspect bridge
[
    {
        "Name": "bridge",
        "Id": "4ec3e0d630b76b21f591fb444ead0a2bbbdc43cabfa7b6aca5756b1d321706fe",
        "Created": "2020-09-04T13:39:16.588068507+02:00",
        "Scope": "local",
        "Driver": "bridge",
        "EnableIPv6": false,
        "IPAM": {
            "Driver": "default",
            "Options": null,
            "Config": [
                {
                    "Subnet": "172.17.0.0/16",
                    "Gateway": "172.17.0.1"
                }
            ]
        },
        "Internal": false,
        "Attachable": false,
        "Ingress": false,
        "ConfigFrom": {
```

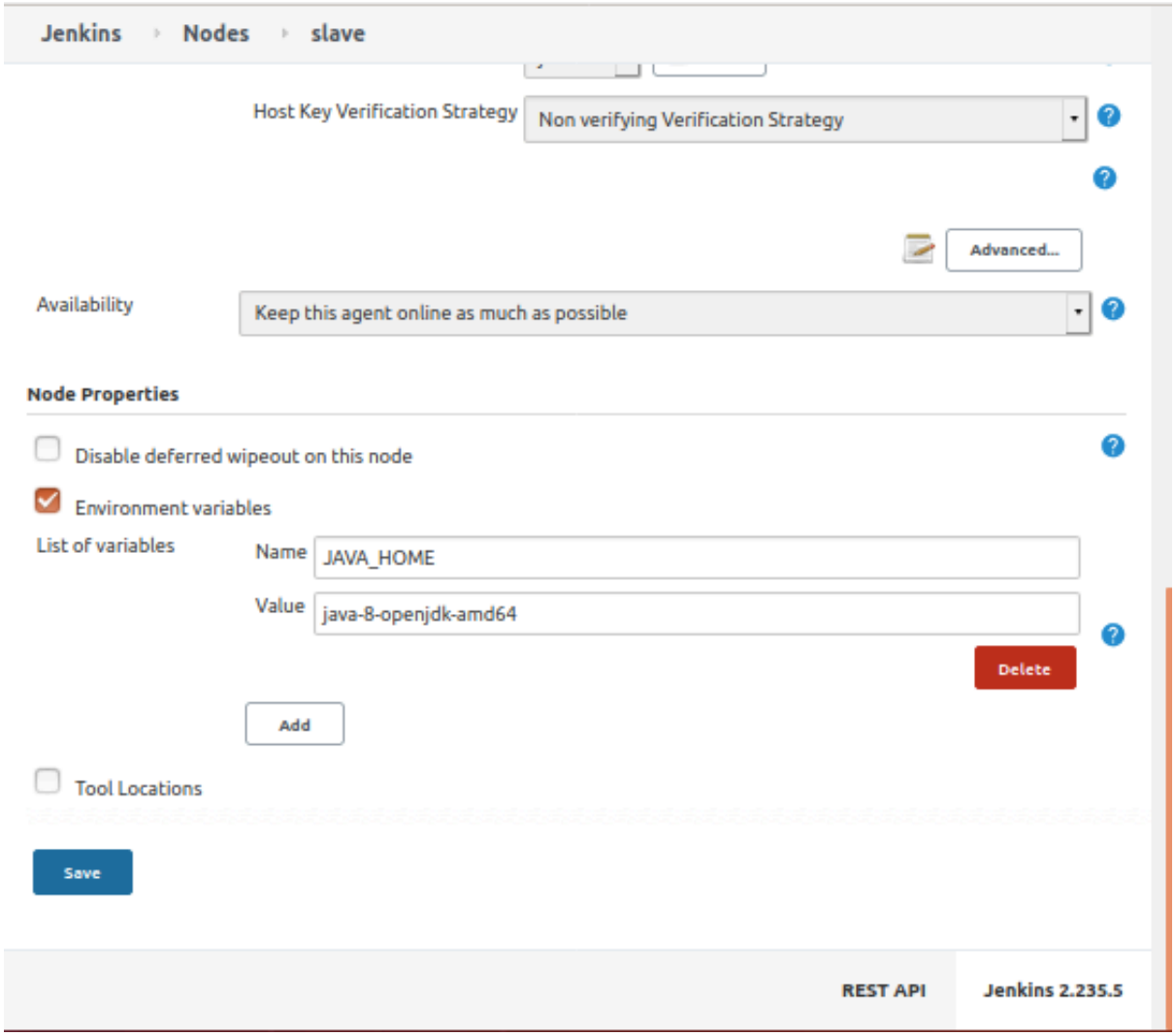
```
        },
        "ddaffa3506074924e038a6c316fda0c8824c93c692ccf581fb6c94fe2f58bc95": {
            "Name": "kind_poitras",
            "EndpointID": "a37b2c96f4c8ac15de9d7d47d07dfaec4829b656017197237b68b20f9d9472e9",
            "MacAddress": "02:42:ac:11:00:02",
            "IPv4Address": "172.17.0.2/16",
            "IPv6Address": ""
        }
    },
```

Start the ssh service from the root user of the slave container

```
exit
yara@yara-VirtualBox:~$ docker exec -it -u root c6a1d4f72218 bash
root@c6a1d4f72218:/jenkins_home# service ssh start
```

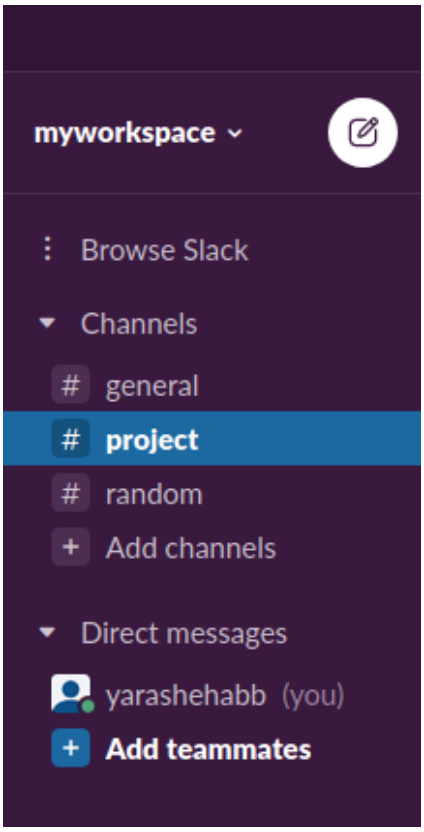
Configure the slave on jenkins

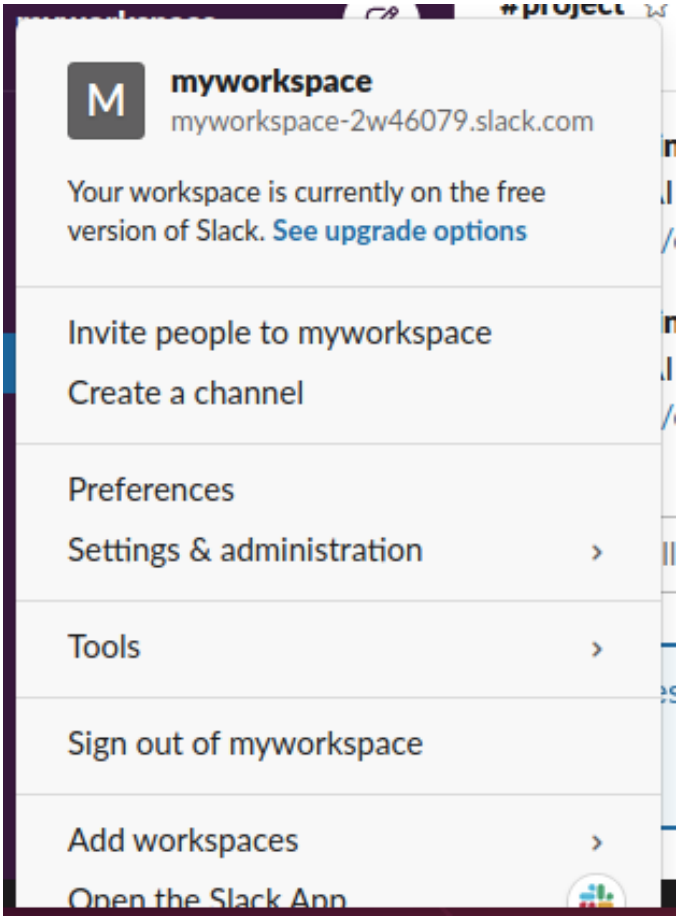


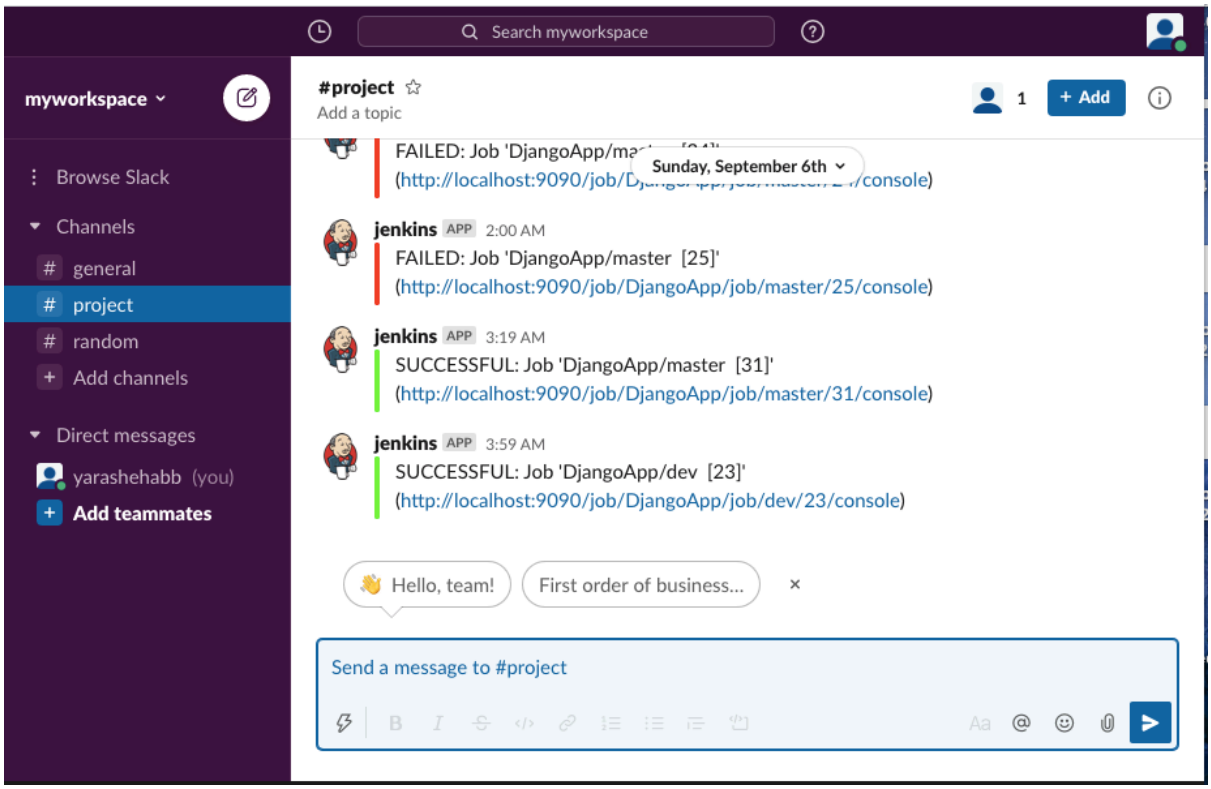

Jenkins
Nodes
slave
Host Key Verification Strategy
Non verifying Verification Strategy
Advanced...
Availability
Keep this agent online as much as possible
Node Properties
Disable deferred wipeout on this node
Environment variables
List of variables
Name
JAVA_HOME
Value
java-8-openjdk-amd64
Delete
Add
Tool Locations
Save
REST API
Jenkins 2.235.5


Build Executor Status
master
1 Idle
2 Idle
slave
1 Idle

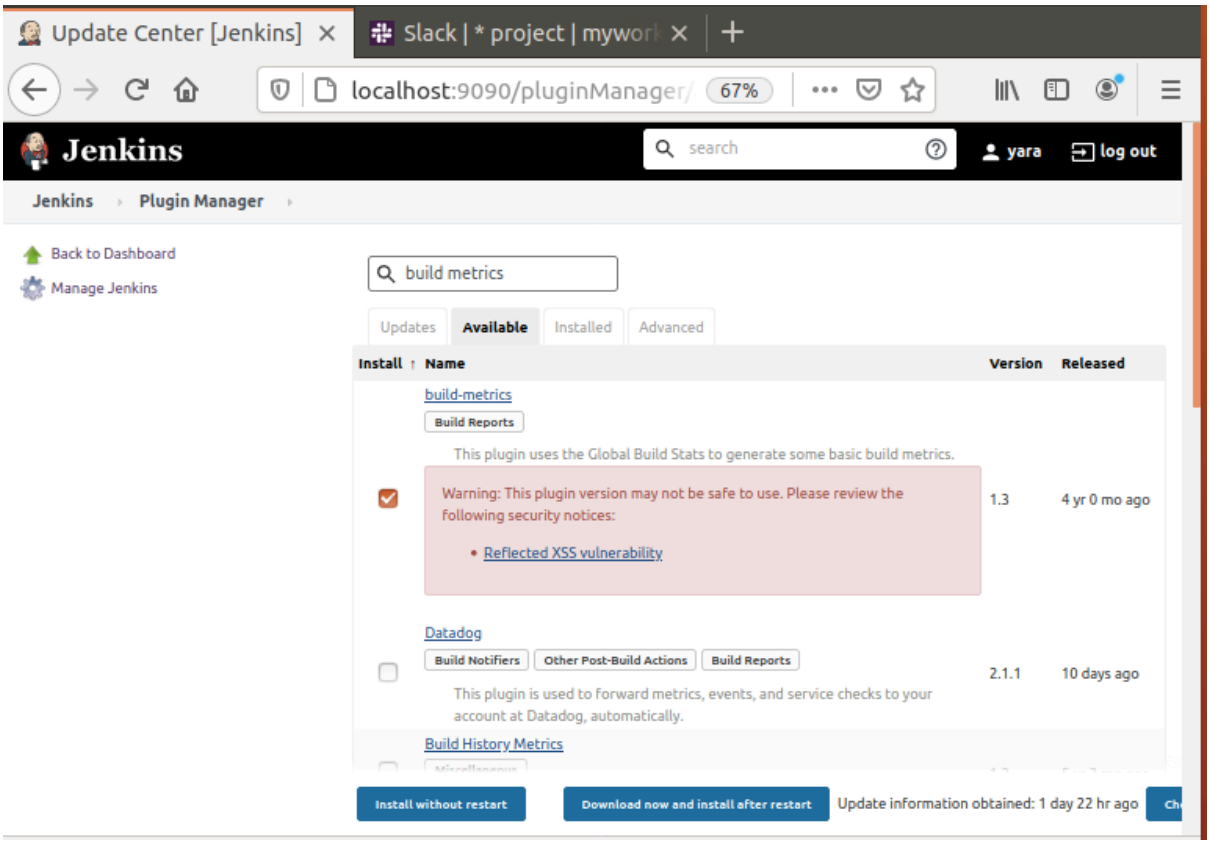
4. Create slack workspace and integrate it with jenkins

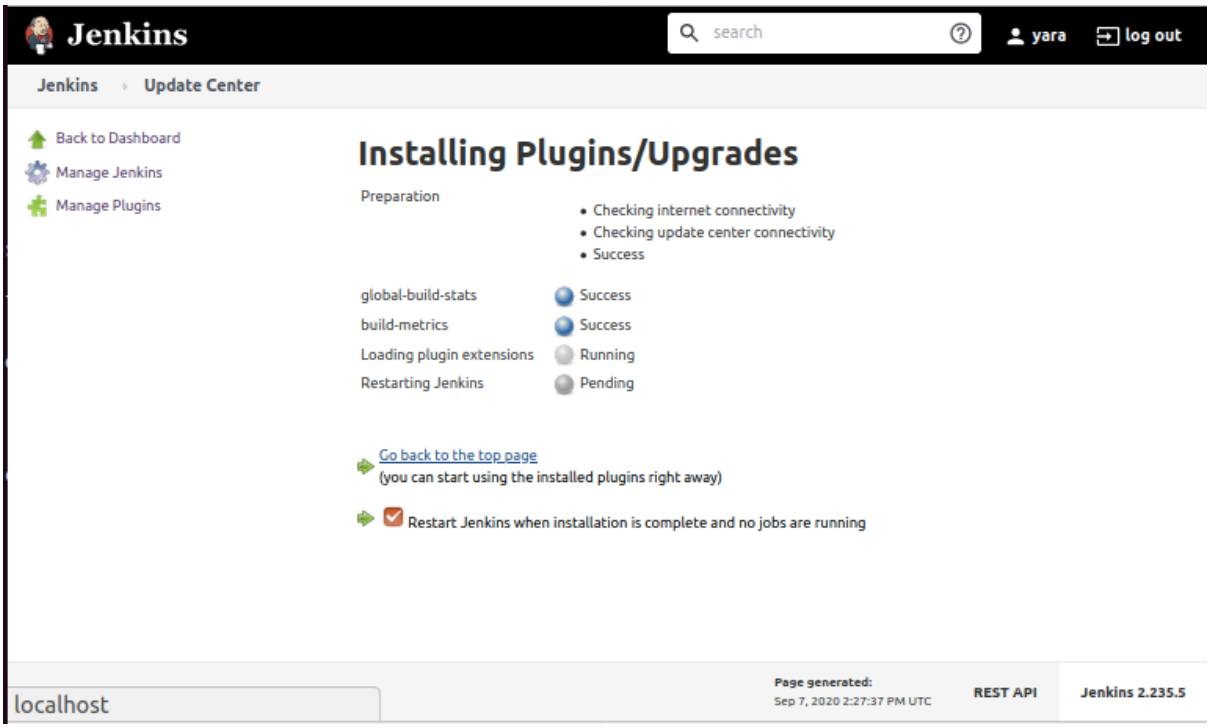





Search myworkspace
myworkspace
#project
Add a topic
1
+ Add
Browse Slack
Channels
general
project
random
Add channels
Direct messages
yarashehabb (you)
Add teammates
Sunday, September 6th
FAILED: Job 'DjangoApp/ma
(http://localhost:9090/job/D
/console)
jenkins APP 2:00 AM
FAILED: Job 'DjangoApp/master [25]'
(http://localhost:9090/job/DjangoApp/job/master/25/console)
jenkins APP 3:19 AM
SUCCESSFUL: Job 'DjangoApp/master [31]'
(http://localhost:9090/job/DjangoApp/job/master/31/console)
jenkins APP 3:59 AM
SUCCESSFUL: Job 'DjangoApp/dev [23]'
(http://localhost:9090/job/DjangoApp/job/dev/23/console)
Hello, team!
First order of business...
Send a message to #project

5. Install any plugin from my choice





6. Write Jenkins file

For the master branch:

```
pipe
line
{
            agent {label 'slave'}
            stages {

                stage('build image') {
                    steps {

                      sh 'docker build -t yarashehab/djangoapp:v1.0 .'
                    }
                    }

                stage('push image') {
                    steps {

        withCredentials([usernamePassword(credentialsId:"docker",usernameVaria
        ble:"USERNAME",passwordVariable:"PASSWORD")]){
                      sh 'docker login --username $USERNAME --password
        $PASSWORD'

                      sh 'docker push yarashehab/djangoapp:v1.0'
                      }
                    }
                }

                stage('deploy') {
                  steps {
                    sh 'docker run -d -p 8000:8000 yarashehab/djangoapp:v1.0'
                }
                }
            }

            post {
              success {
              slackSend (color: '#00FF00', message: "SUCCESSFUL: Job
        '${env.JOB_NAME}  [${env.BUILD_NUMBER}]' (${env.BUILD_URL}console)")
              }

              failure {
              slackSend (color: '#FF0000', message: "FAILED: Job
        '${env.JOB_NAME}  [${env.BUILD_NUMBER}]' (${env.BUILD_URL}console)")
              }
```

```
            aborted {
            slackSend (color: '#000000', message: "ABORTED: Job
        '${env.JOB_NAME}  [${env.BUILD_NUMBER}]' (${env.BUILD_URL}console)")
            }
        }
    }
```

For the dev branch:

```
pipe
line
{
        agent {label 'slave'}
        stages {

            stage('build image') {
                steps {

                  sh 'docker build -t yarashehab/djangoapp:v1.0 .'
                }
                }

            stage('push image') {
                steps {

        withCredentials([usernamePassword(credentialsId:"docker",usernameVaria
        ble:"USERNAME",passwordVariable:"PASSWORD")]){
                  sh 'docker login --username $USERNAME --password
        $PASSWORD'

                  sh 'docker push yarashehab/djangoapp:v1.0'
                  }
                }
            }

            stage('deploy') {
              steps {
                sh 'docker run -d -p 7070:8000 yarashehab/djangoapp:v1.0'
            }
            }
        }

        post {
          success {
```

```
            slackSend (color: '#00FF00', message: "SUCCESSFUL: Job
        '${env.JOB_NAME}  [${env.BUILD_NUMBER}]' (${env.BUILD_URL}console)")
            }

            failure {
            slackSend (color: '#FF0000', message: "FAILED: Job
        '${env.JOB_NAME}  [${env.BUILD_NUMBER}]' (${env.BUILD_URL}console)")
            }

            aborted {
            slackSend (color: '#000000', message: "ABORTED: Job
        '${env.JOB_NAME}  [${env.BUILD_NUMBER}]' (${env.BUILD_URL}console)")
            }
          }
        }
```

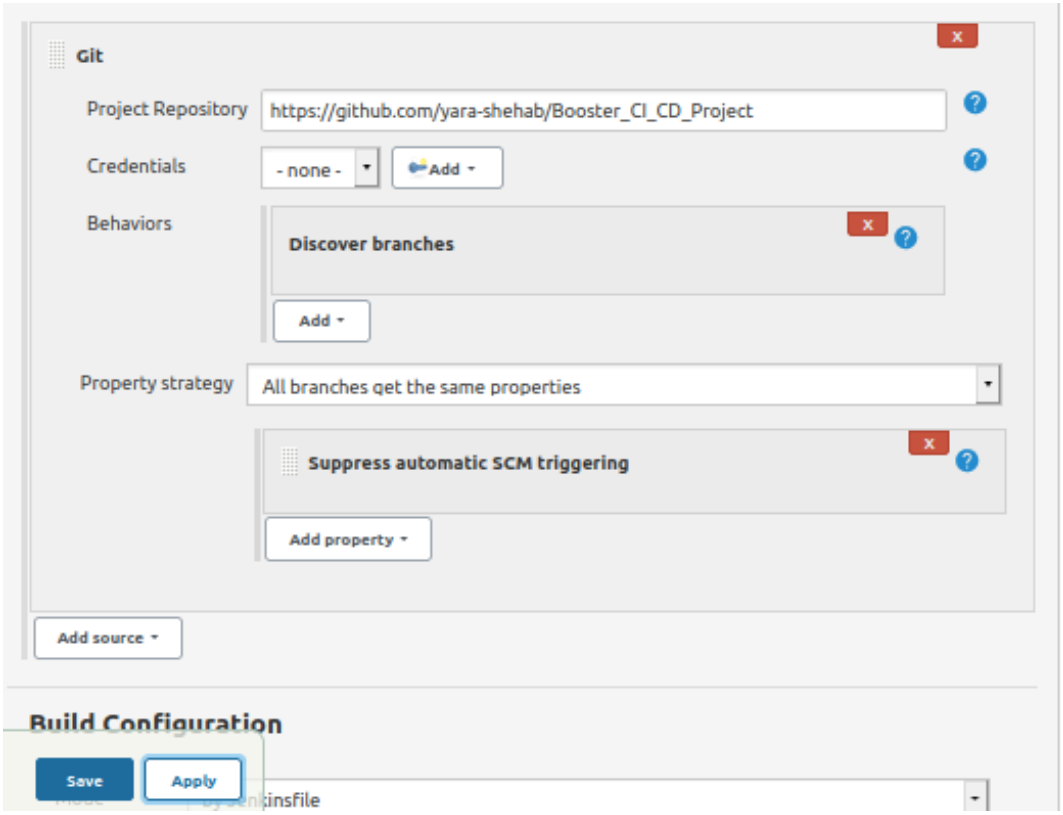
The docker file for the master branch of the repo:

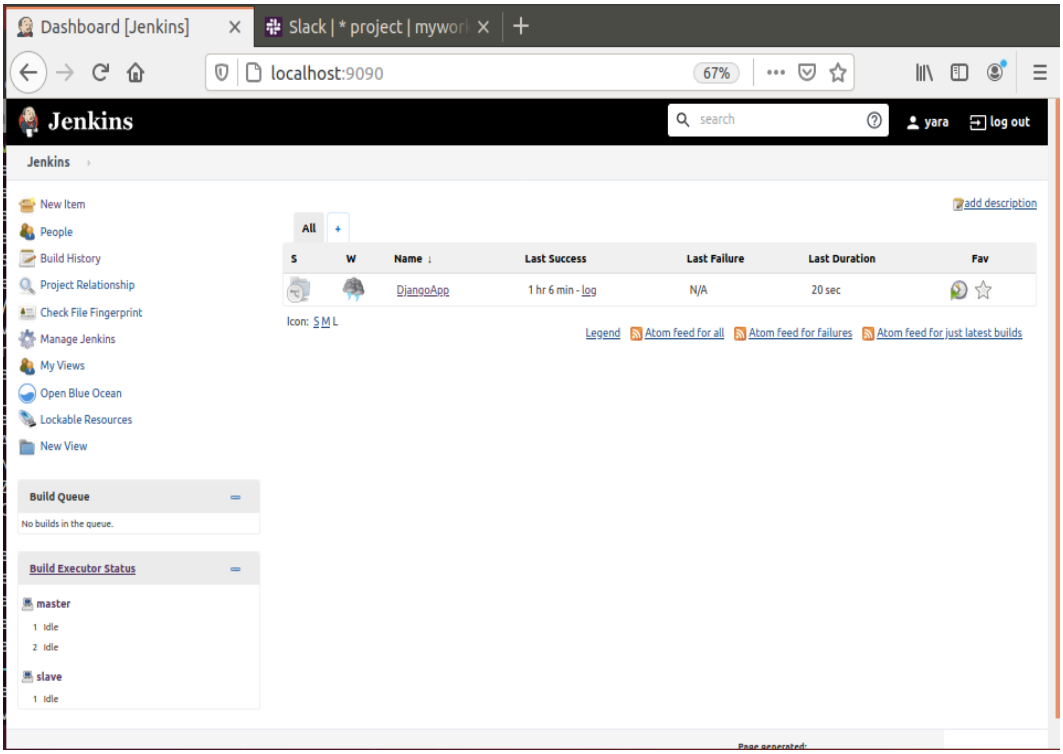
```
FROM
python:3.6-
buster
            ADD . /simpleApp
            WORKDIR /simpleApp
            RUN pip install -r requirements.txt
            RUN python3.6 manage.py makemigrations
            RUN python3.6 manage.py migrate
            EXPOSE 8000
            CMD ["python3.6", "manage.py" ,"runserver" ,"0.0.0.0:8000"]
```

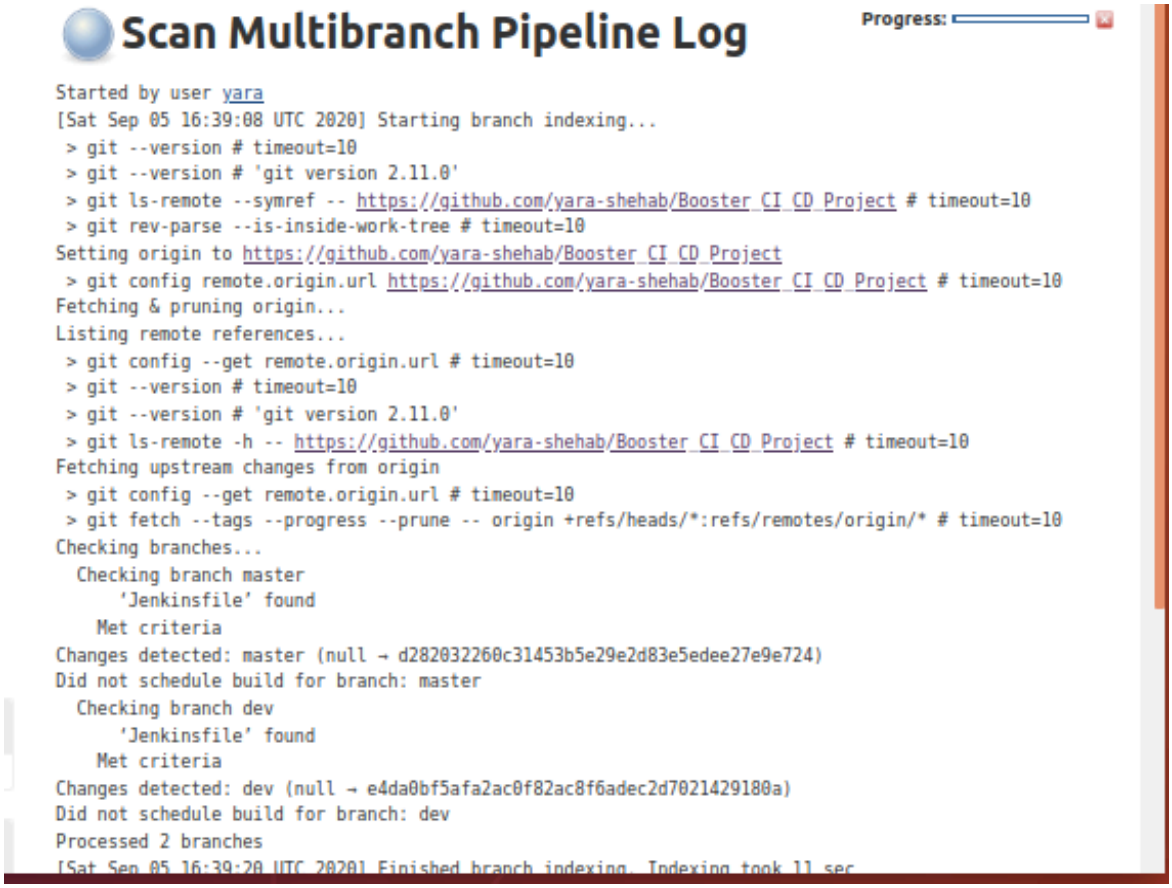
The docker file for the dev branch of the repo:

```
FROM
python:3.6-
buster
            ADD . /simpleApp
            WORKDIR /simpleApp
            RUN pip install -r requirements.txt
            RUN python3.6 manage.py makemigrations
            RUN python3.6 manage.py migrate
            EXPOSE 8000
            CMD ["python3.6", "manage.py" ,"runserver" ,"0.0.0.0:8000"]
```

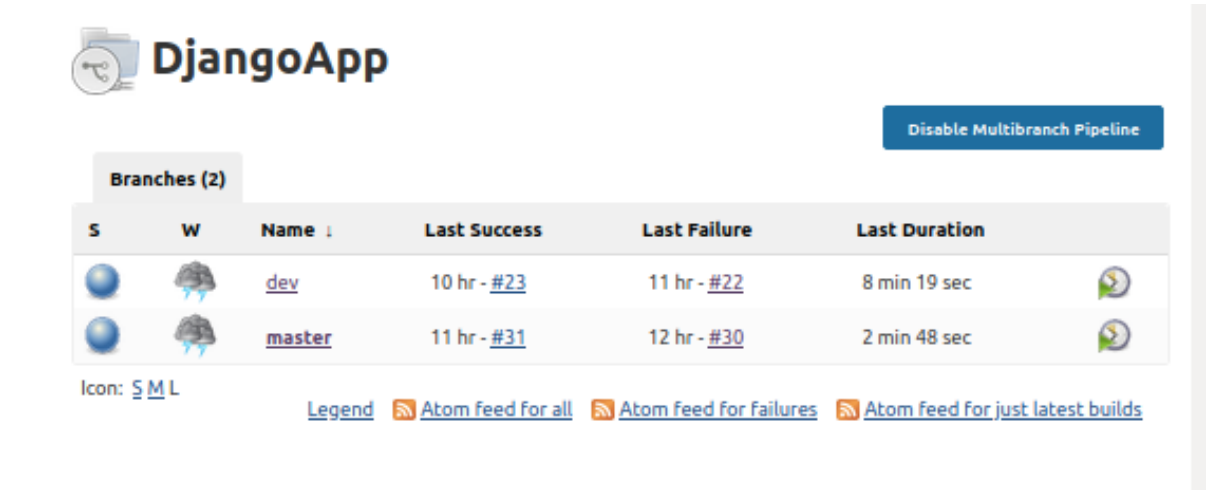
7. Configure multibranch pipeline type with the forked git repo url

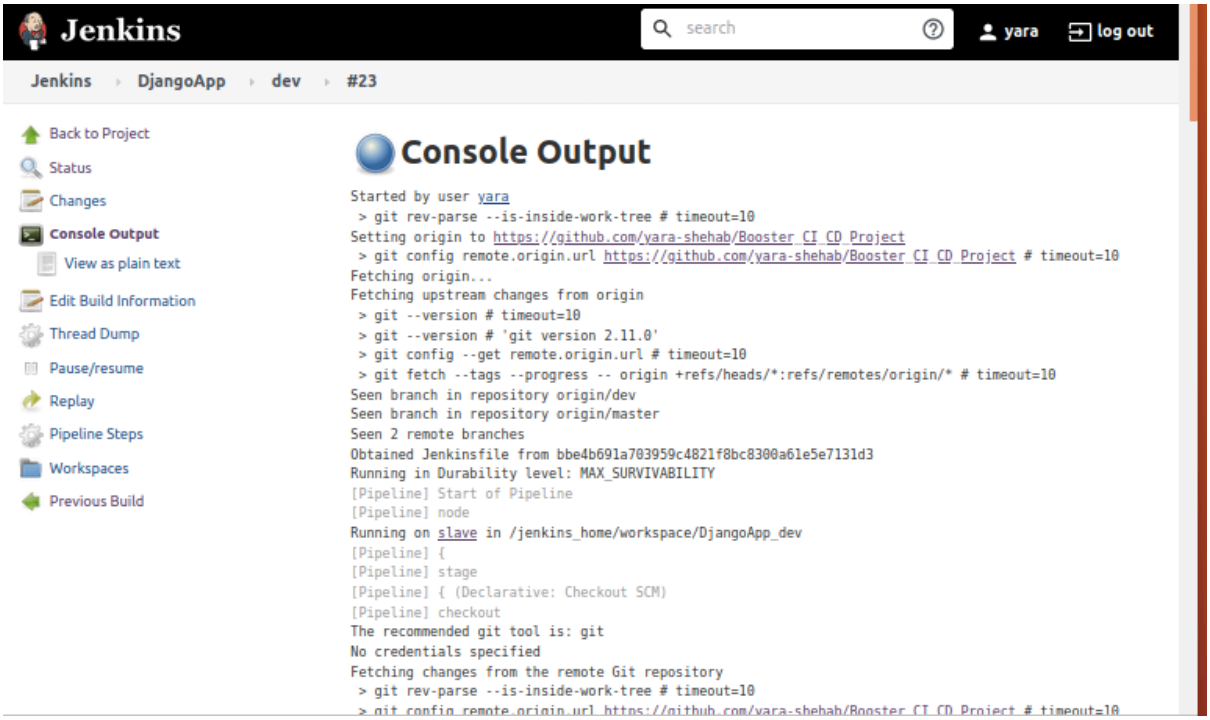


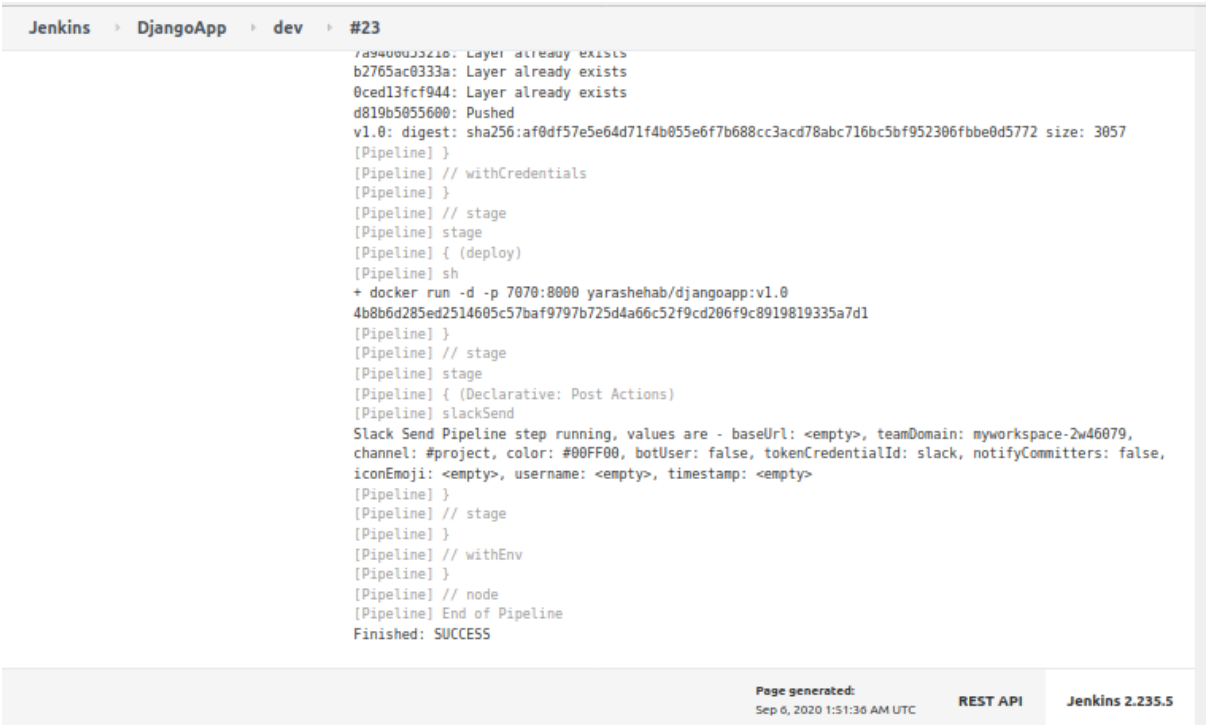




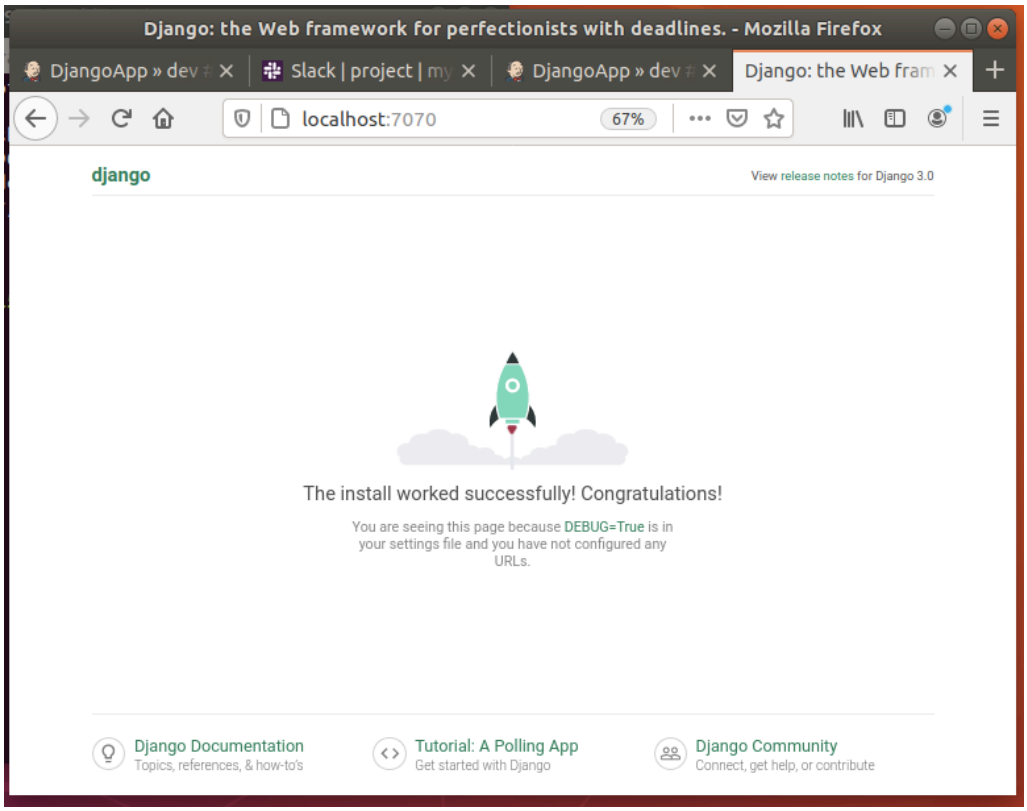
> git rev-parse --is-inside-work-tree # timeout=10
Setting origin to https://github.com/yara-shehab/Booster_CI_CD_Project
> git config remote.origin.url https://github.com/yara-shehab/Booster_CI_CD_Project # timeout=10
Fetching & pruning origin...
Listing remote references...
> git config --get remote.origin.url # timeout=10
> git --version # timeout=10
> git --version # 'git version 2.11.0'
> git ls-remote -h -- https://github.com/yara-shehab/Booster_CI_CD_Project # timeout=10
Fetching upstream changes from origin
> git config --get remote.origin.url # timeout=10
> git fetch --tags --progress --prune -- origin +refs/heads/*:refs/remotes/origin/* # timeout=10
Checking branches...
Checking branch master
'Jenkinsfile' found
Met criteria
Changes detected: master (null → d282032260c31453b5e29e2d83e5edee27e9e724)
Did not schedule build for branch: master
Checking branch dev
'Jenkinsfile' found
Met criteria
Changes detected: dev (null → e4da0bf5afa2ac0f82ac8f6adec2d7021429180a)
Did not schedule build for branch: dev
Processed 2 branches
[Sat Sep 05 16:39:20 UTC 2020] Finished branch indexing. Indexing took 11 sec
Finished: SUCCESS


DjangoApp
Disable Multibranch Pipeline
Branches (2)
S
W
Name ↓
Last Success
Last Failure
Last Duration
dev
10 hr - #23
11 hr - #22
8 min 19 sec
master
11 hr - #31
12 hr - #30
2 min 48 sec
Icon: S M L
Legend
Atom feed for all
Atom feed for failures
Atom feed for just latest builds

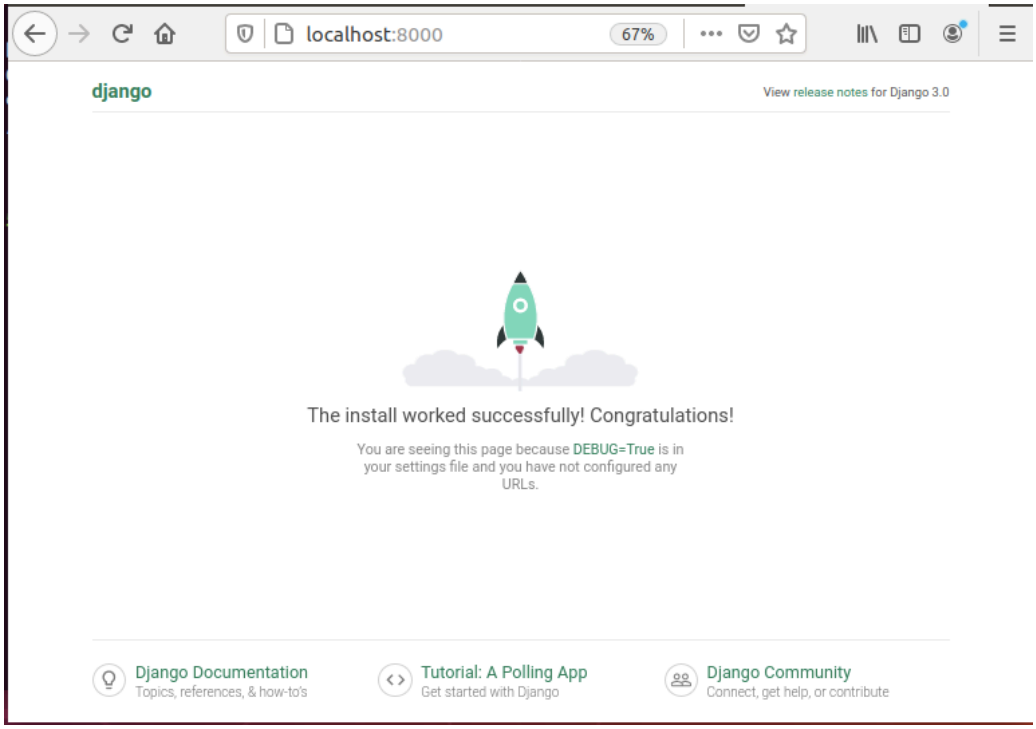

Jenkins
search
yara
log out
Jenkins › DjangoApp › dev › #23
Back to Project
Status
Changes
Console Output
View as plain text
Edit Build Information
Thread Dump
Pause/resume
Replay
Pipeline Steps
Workspaces
Previous Build
Console Output
Started by user yara
> git rev-parse --is-inside-work-tree # timeout=10
Setting origin to https://github.com/yara-shehab/Booster_CI_CD_Project
> git config remote.origin.url https://github.com/yara-shehab/Booster_CI_CD_Project # timeout=10
Fetching origin...
Fetching upstream changes from origin
> git --version # timeout=10
> git --version # 'git version 2.11.0'
> git config --get remote.origin.url # timeout=10
> git fetch --tags --progress -- origin +refs/heads/*:refs/remotes/origin/* # timeout=10
Seen branch in repository origin/dev
Seen branch in repository origin/master
Seen 2 remote branches
Obtained Jenkinsfile from bbe4b691a703959c4821f8bc8300a61e5e7131d3
Running in Durability level: MAX_SURVIVABILITY
[Pipeline] Start of Pipeline
[Pipeline] node
Running on slave in /jenkins_home/workspace/DjangoApp_dev
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Declarative: Checkout SCM)
[Pipeline] checkout
The recommended git tool is: git
No credentials specified
Fetching changes from the remote Git repository
> git rev-parse --is-inside-work-tree # timeout=10


Jenkins
DjangoApp
dev
#23
b2765ac0333a: Layer already exists
0ced13fcf944: Layer already exists
d819b5055600: Pushed
v1.0: digest: sha256:af0df57e5e64d71f4b055e6f7b688cc3acd78abc716bc5bf952306fbbe0d5772 size: 3057
[Pipeline] }
[Pipeline] // withCredentials
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (deploy)
[Pipeline] sh
+ docker run -d -p 7070:8000 yarashehab/djangoapp:v1.0
4b8b6d285ed2514605c57baf9797b725d4a66c52f9cd206f9c8919819335a7d1
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Declarative: Post Actions)
[Pipeline] slackSend
Slack Send Pipeline step running, values are - baseUrl: <empty>, teamDomain: myworkspace-2w46079, channel: #project, color: #00FF00, botUser: false, tokenCredentialId: slack, notifyCommitters: false, iconEmoji: <empty>, username: <empty>, timestamp: <empty>
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
Page generated:
Sep 6, 2020 1:51:36 AM UTC
REST API
Jenkins 2.235.5

The dev branch localhost: 7070



The master branch localhost: 8000



The images are pushed to the docker registry (docker hub) as it was a step written in the Jenkins file for both the dev and master branch but

Note: they are overridden since they had the same name