Membuat Project Website dengan Gitlab, Jenkins, DockerHub dan Kubernetes

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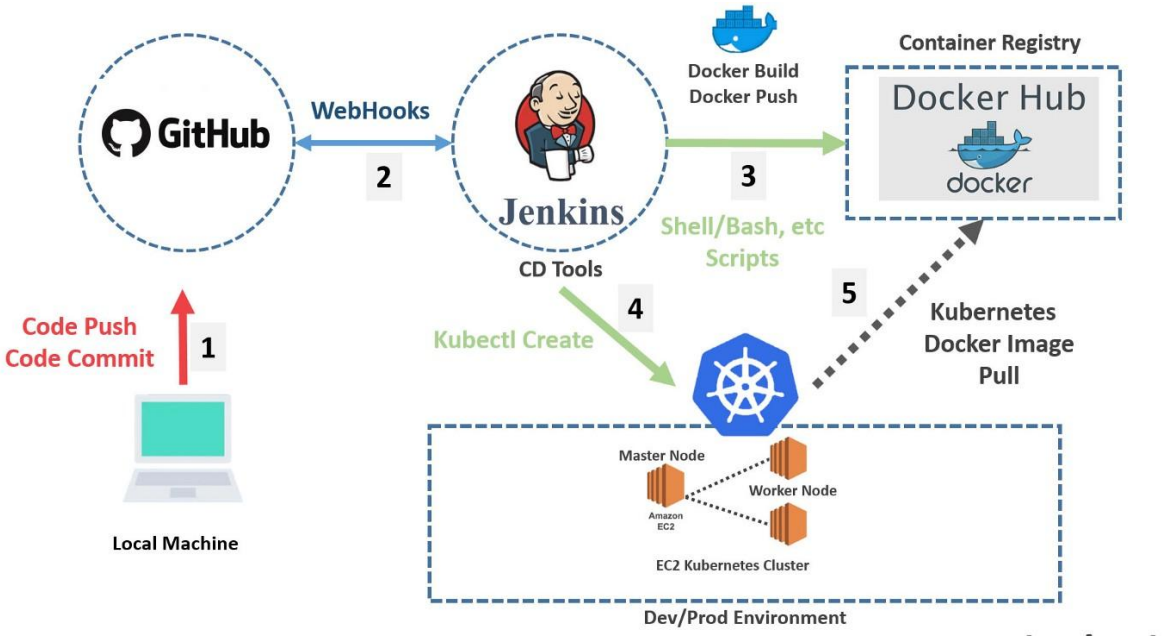


Environtment List:

1. Gitlab
2. Dockerhub
3. Jenkins
4. Kubernetes

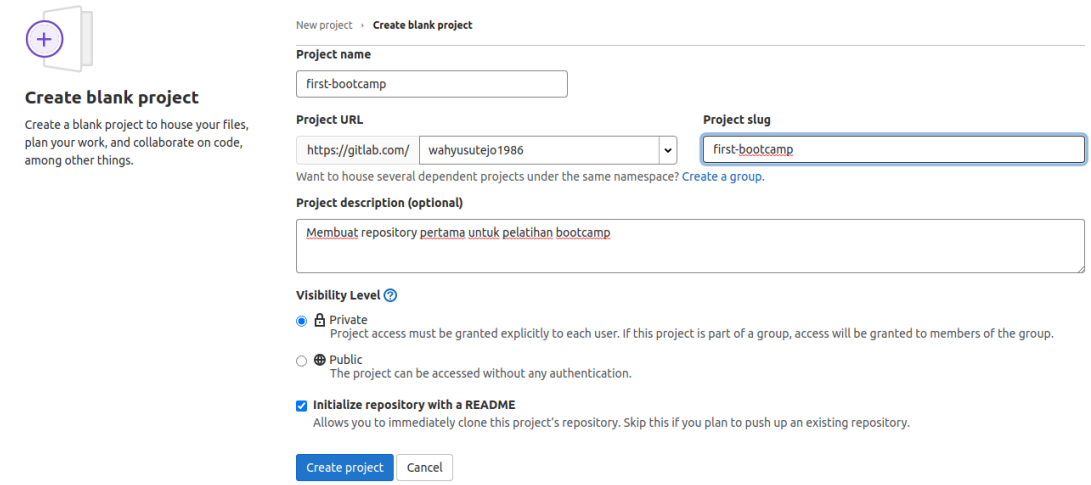
==========

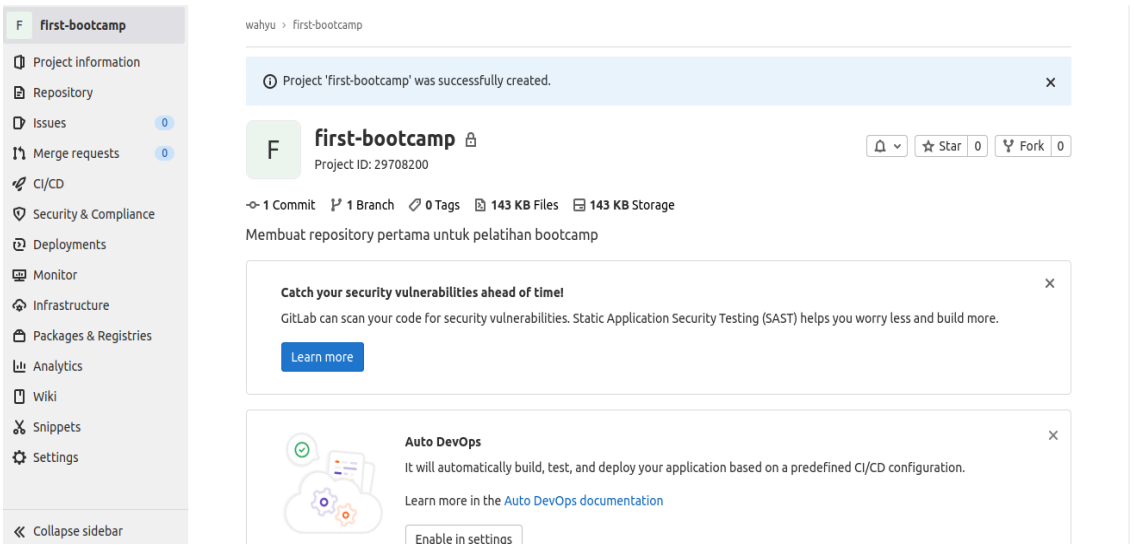
Part - 1 Gitlab

==========

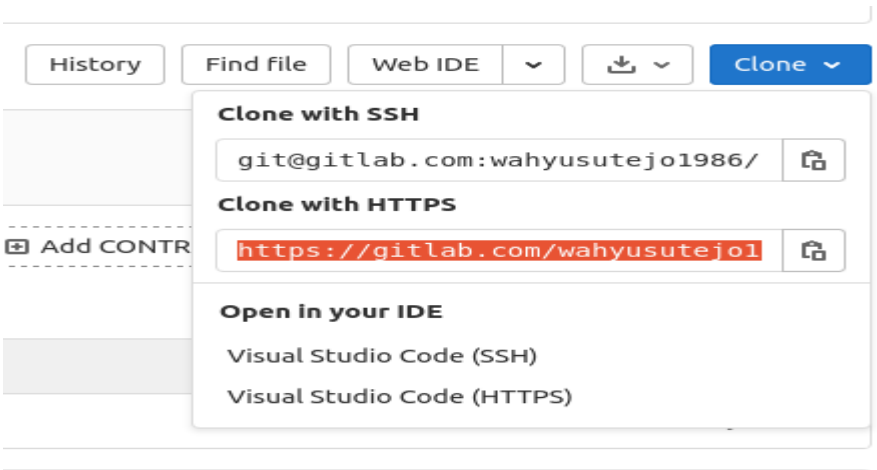
1. Login gitlab
2. **Project - > New Project -> Create blank project**
3. Jika semua field dibawah sudah diisi, klik **Create project**

Project Name (sesuai kebutuhan anda)	first-bootcamp
Project URL (automatic)	automatic by gitlab
Project Slug (automatic)	automatic by gitlab
Project description (optional)	Membuat repository pertama untuk pelatihan bootcamp
Visibility Checklist	Private
Initialize repository with a README	checklist





4. Clone project first-bootcamp ke laptop atau local environtment, copy url **Clone with HTTPS**



```
gamuza@gamuza:~$
gamuza@gamuza:~$
gamuza@gamuza:~$ git clone https://gitlab.com/wahyusutejo1986/first-bootcamp.git
Cloning into 'first-bootcamp'...
Username for 'https://gitlab.com': wahyusutejo1986@gmail.com
Password for 'https://wahyusutejo1986@gmail.com@gitlab.com':
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
Unpacking objects: 100% (3/3), 2.83 KiB | 2.83 MiB/s, done.
gamuza@gamuza:~$
```

Masukan username dan password gitlab

5. Masuk ke directory project **first-bootcamp**
   Download contoh template berikut ini :
   https://drive.google.com/file/d/14x1goPSqPcDWyQmHSTN8Vmm1evKetPTL/view?usp=sharing

   atau download melalui repository
   https://gitlab.com/wahyusutejo1986/firstbootcamp

6. Extract, kemudian copy kan hasil extract (folder assets dan index.html) tersebut kedalam folder first-bootcamp

```
gamuza@gamuza:~$ cd first-bootcamp/
gamuza@gamuza:~/first-bootcamp$
gamuza@gamuza:~/first-bootcamp$
gamuza@gamuza:~/first-bootcamp$
gamuza@gamuza:~/first-bootcamp$ ls
assets  index.html  README.md
gamuza@gamuza:~/first-bootcamp$
```

7. kemudian push atau upload file-file tersebut ke gitlab dengan cara seperti berikut :

   1) **git init**
   2) **git add .**
   3) **git commit -m “inital commit”**

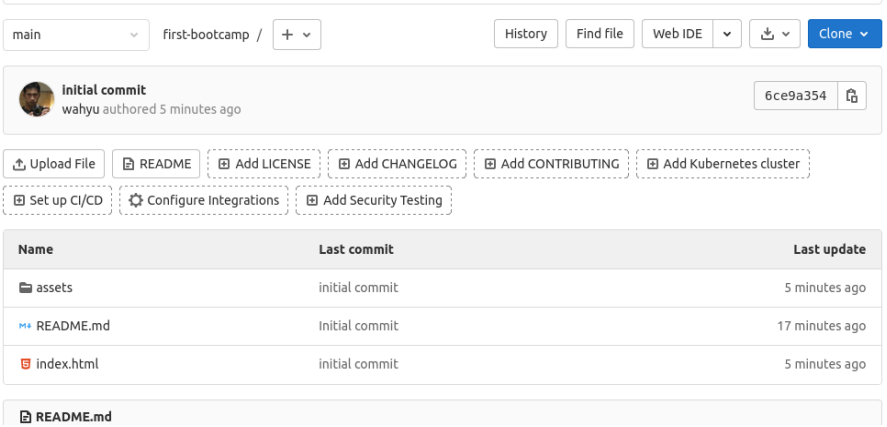
```
gamuza@gamuza:~/first-bootcamp$ git init
Reinitialized existing Git repository in /home/gamuza/first-bootcamp/.git/
gamuza@gamuza:~/first-bootcamp$ git add .
gamuza@gamuza:~/first-bootcamp$ git commit -m "initial commit"
[main 6ce9a35] initial commit
 40 files changed, 11490 insertions(+)
 create mode 100644 assets/css/bootstrap.min.css
 create mode 100644 assets/css/flex-slider.css
 create mode 100644 assets/css/font-awesome.css
 create mode 100644 assets/css/owl-carousel.css
 create mode 100644 assets/css/templatemo-art-factory.css
 create mode 100644 assets/fonts/Flaticon.woff
 create mode 100644 assets/fonts/FontAwesome.otf
 create mode 100644 assets/fonts/flexslider-icon.eot
 create mode 100644 assets/fonts/flexslider-icon.svg
 create mode 100644 assets/fonts/flexslider-icon.ttf
 create mode 100644 assets/fonts/flexslider-icon.woff
 create mode 100644 assets/fonts/fontawesome-webfont.eot
 create mode 100644 assets/fonts/fontawesome-webfont.svg
 create mode 100644 assets/fonts/fontawesome-webfont.ttf
 create mode 100644 assets/fonts/fontawesome-webfont.woff
 create mode 100644 assets/fonts/fontawesome-webfont.woff2
 create mode 100644 assets/fonts/slick.eot
 create mode 100644 assets/fonts/slick.svg
 create mode 100644 assets/fonts/slick.ttf
 create mode 100644 assets/fonts/slick.woff
 create mode 100644 assets/images/about-icon-01.png
 create mode 100644 assets/images/about-icon-02.png
```

   4) **git push**

```
gamuza@gamuza:~/first-bootcamp$ git push
Username for 'https://gitlab.com': wahyusutejo1986@gmail.com
Password for 'https://wahyusutejo1986@gmail.com@gitlab.com':
Enumerating objects: 48, done.
Counting objects: 100% (48/48), done.
Delta compression using up to 4 threads
Compressing objects: 100% (47/47), done.
Writing objects: 100% (47/47), 981.40 KiB | 10.55 MiB/s, done.
Total 47 (delta 0), reused 0 (delta 0)
To https://gitlab.com/wahyusutejo1986/first-bootcamp.git
   d115fbe..6ce9a35  main -> main
gamuza@gamuza:~/first-bootcamp$
```

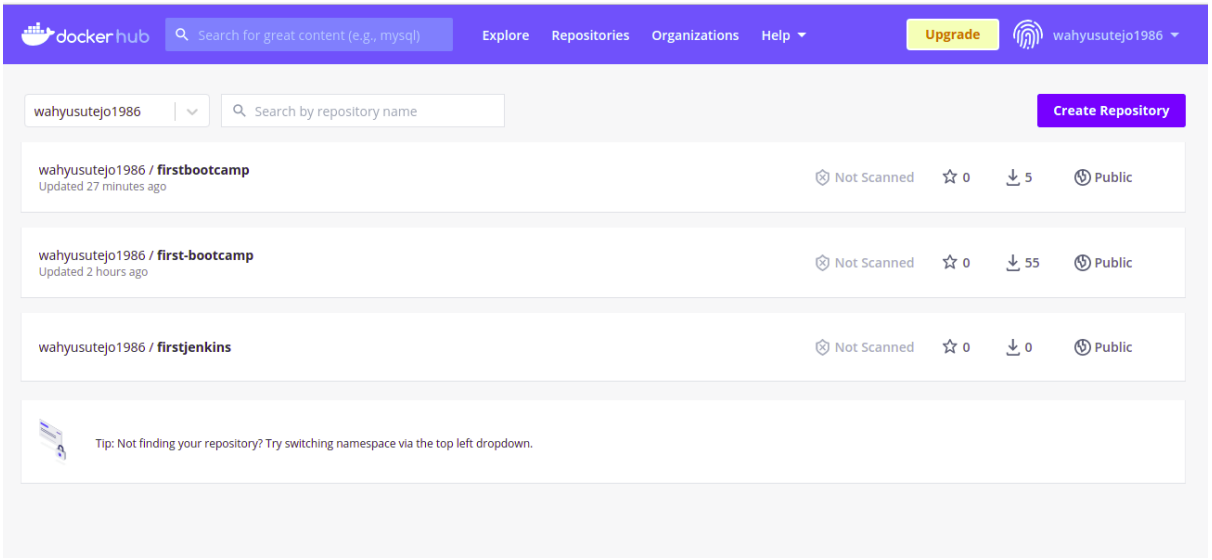
Masukan username dan password gitlab
(anda dapat melakukan konfigurasi username dan password agar tidak perlu lagi memasukan username dan password untuk setiap aksi)

5) files berhasil di upload ke repository gitlab untuk project **first-bootcamp**



Part - 2 Dockerhub
==========

1. Register akun gratis di https://hub.docker.com/
2. Jika proses image docker sudah terintegrasi dengan jenkins, maka image akan otomatis tercreate seperti gambar di bawah ini



3. Jika image container sudah tersedia di dockerhub maka kita akan lebih mudah untuk melakukan deployment di kubernetes ataupun platform lainya yang support docker machine.

Part - 3 Jenkins

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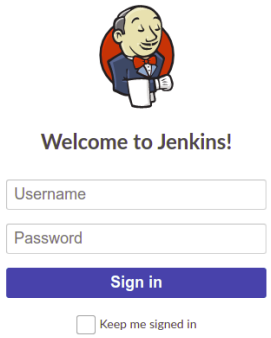
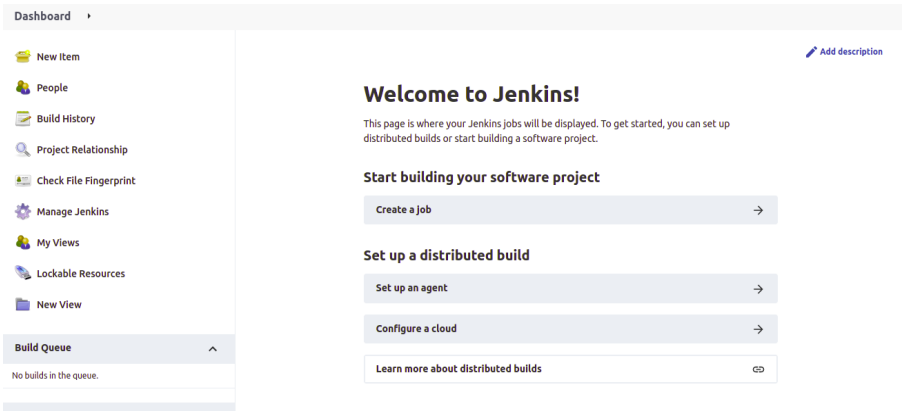
1. **Login ke Jenkins**
   http://jenkins-{namateam}.bootcampdevops.id:8080/

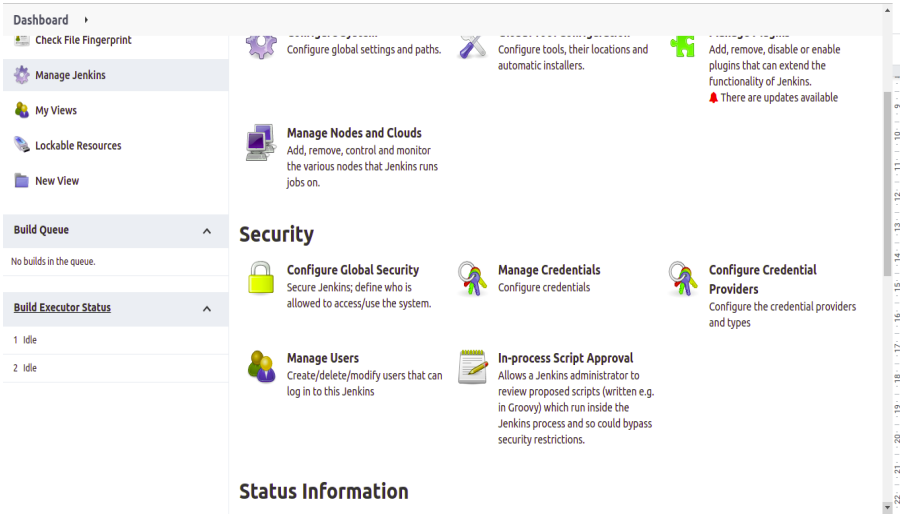


masukan username dan password

2. **Tampilan dashboard jenkins**

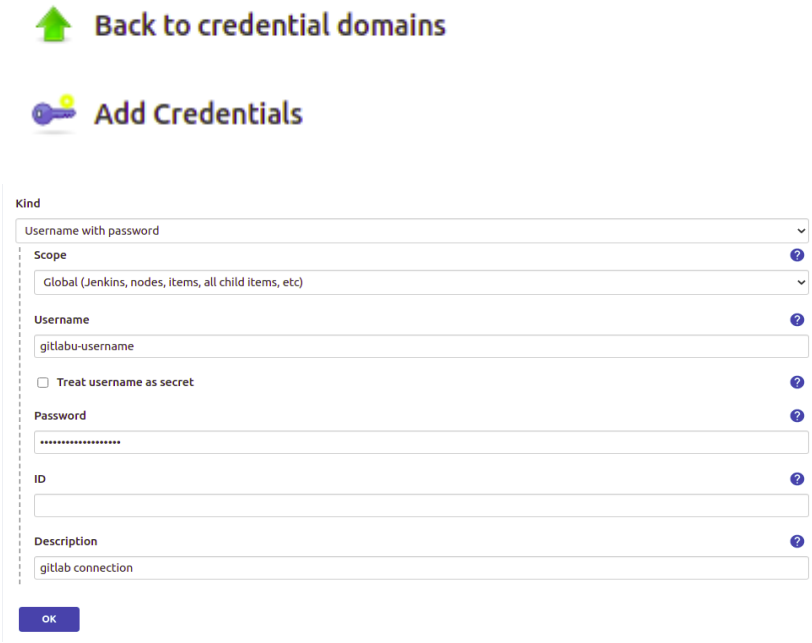


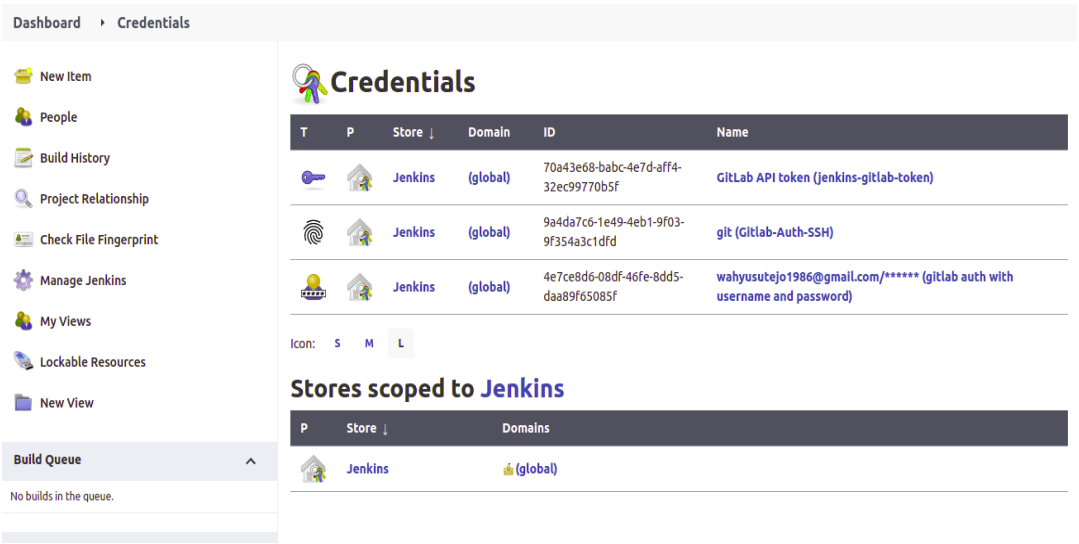
3. Create credential untuk autentikasi dengan gitlab klik **Manage Credentials**



4. Scroll dan Klik **global**

5. Klik **Add Credentials** (masukan gitlab username dan password)





6. ssh remote ke jenkins untuk membuat private keys dan public keys dengan perintah

   ssh root@jenkins-{namateam}.bootcampdevops.id

ssh-keygen -f id_rsa_gitlab

```
root@jenkins-server:~# ls
id_rsa_gitlab  id_rsa_gitlab.pub  local-certs  snap
root@jenkins-server:~#
```

menampilkan private key dengan perintah **cat id_rsa_gitlab**

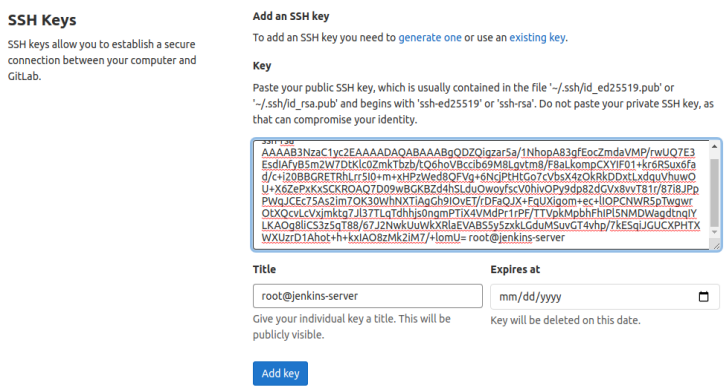
```
root@jenkins-server:~# cat id_rsa_gitlab
-----BEGIN OPENSSH PRIVATE KEY-----
b3BlbnNzaC1rZXktdjEAAAAABG5vbmUAAAAEbm9uZQAAAAAAAAABAAABlwAAAAdzc2gtcn
NhAAAAAwEAAQAAAYEA2uIoM2q+Wv9TYaKQPN4HxKHGZnWlTD/68FEOxNxLHSAH8geZtluw
/SpXNGZpE282/7UOoaFQXHIm+vTPC4L7ZvPxfGlSKJqQl2CBdNfpK+kUrsen2nf3PottAQ
RkRE0YS66+sNPpvsR281nnfEBVYPujXIz7R7RqO3FW7F+MzpEZAwBbS8XarlYbsDlPl+mX
j8SsUglkTgEOw9PcARlgWXeIU13b3sKMn7HFdIYrzj8VXafNnRlcfL76/Na/O4vCT6T1q
iQhHO+QLNopuzlt9FoTV04gIBofSDrxE/6wxWkCV/halF4oKJvnnPpSDjwjVkeaU8IMKzr
V0HLy3FcY5pLYOyZd+0y6k3YYY7NJ4Jj04l+FTHT69azxfB01aZDKW4RYSD5eTTA1moHbZ
6lGCygDoPJYgkt8+ak/PP+uydjcJFLlpFOZWhFQAUucuc8ZCxnbjErrxk+L4af+5BEqoLR
LAlzx011l1M6w9QIaLfofpMSADvMzJNoJO//paJlAAAFlLGKP5Kx1j+SAAAAB3NzaC1yc2
EAAAGBANlCKDNqvlr/U2GikDzeB8ShxmZ1pUw/+vBRDsTcSx0gB/IHmbZbsO0qVzRmaRNv
Nv+1DqGhUFxyJvr0zwuC+2bz8XxouSlakJdggXTX6SvpFK7Hp9p39z6LbQEEZERNGEuuvk
jT6b7Ec/NZ53xAVWD7o1yM+0e0ajtxVuxfjM6RGQMPG0vF2q5WG7A5TSfpl4/ErFIIpE4B
OsPT3AEYoFl3LFIt247CjJ+xxXSGK84/L12nzZ0ZXHy+9PzWv/zuLwk+k9aokIRzvkCzaK
Os4rfRaE1dOICAaH0g6BRP+sMVpAlf4WpReKClb55z6Ug48I1ZHmlPCDCs61dBy8txXGOa
52DsmXftMupN2GGOzSeCY9OJfhUx0+vWs8X9NNWmQyluEWEg+Xk0WNZqB22eohgsoA6DyW
I3LfPmpPzz/rsnY3CRSSaRdGVoRUAFLnLnPGQsZ24xK68ZPl+Gn/uQRKqIkZQJc8dNdZdT
OsPUCG136H0tEgA7zMyTaIzv/6WlZQAAAAMBAAEAAAGAQ5m6OIV2RYo8vSx9lPLhJ+XOfg
MNM/SUeEJAfjCtjppw3nZO9dcB7knGaJ+VAl8QlfAYZWJ0Rs+eIWgbJFHVN+ufsD5FnsS5
SODWZyzneKpFrTyile/OFr/7Yt2i9T2n2aS9wJtvl9Q43/eRd6/s4QhrhFl5t04D4AscKO
8yR7QOPE1vCNy/do+EfgjXI0WjyzA/DidyOHNLzNMXGaA48JGUSD0wm/MdHnOKJP+6kapH
arTT3ZYOmSIxyJppkqHpnZskLG15dSGJaTmuXRq4+M3qzAQcBvphTN+Vs2dOSl4tSjrQKT
2kZIVJ25CVgGm2vIhY+1zAQKXolZqkP3PpGtSSFz2XSV4dEOwSiSI1Gyf6VrHXxSqIM0Jz
P1IGxuQwzHMV09BZcHFuMdHCyMfzJMgaUlhIJYEn3JNwKdXG0JkReBdT+z+elMAop9fzjg
TPLHx0MR03VyQfNYVtV5Uifm+XtlGOrb7WmX33Ph1tlmC9YzmF0L4lLXqEurmGekBAAAA
wB1udaxaXCRftJRv80qSlwhlqsGD7crCs6fSvwcYp2nLRgg1lSx4tLu7gqe5S2Kn5kKhDC
3KSKZNQRAytn7njFq5xGyfJJC5tt+qh4Z9b6/O1YxRycL5aGKuZ7wMs/Z0o2Bpl/yM/XgG
2NA0pw9s8UZNHkYT8kKCUn9lkMOq0FtvUH2ZlA/9tfpCIFcc5ujpznuVPBVEsnxaCtqkn+
KaQ8yzSKZgiwB9XAolOBKVd0QcyODi0JKBW1tt5i+tez/u0gAAAMEA/sZbh4WGcv1lcPu6
NHnd1G+c1ANTLsFsY7SFszTw6JpOtuHBkRUS+nJCUwCx77QhBt7Byd3YPXR+H2TRrFAYX
ZT6MD3nnKJWFJlyRJW1KiDds2IfLVy+HMlJmSppK6W+JDqsoPRPZ4GsTGh6rj2E6u0lrqv
QyH6CHdMOAzE+k71SgGFgSU+lZ1V33Qnr2G4FN274JsfyQ2+I42OkXkW1YO/ORiwSEAZea
q3LCzEKmqnQIlsXJDQSDafT+MITfm5AAAAwQDaTZ1ZQoA+J4aXPG/LBCq05WpVG+3RMDIX
kly8O8+uvORVqMecBUM87376dewdD0bTHqLVreXPIr8JwsqewpzeUCVFjpNmhIYG/oSB7h
KHHLHhDO0r/arLr2bUjrmt960v6UZU85ARrDyQrr91mkyMWMIo6gMmUZfG79byBdlcA31N
Hgi8SbWbLrI24TqC8IL86OY8y99Alzlei3YVnzWr0NJHBWdoyZ1KsdhOLf9oNaZJyvlSZn
```

menampilkan private key dengan perintah **cat id_rsa_gitlab.pub**

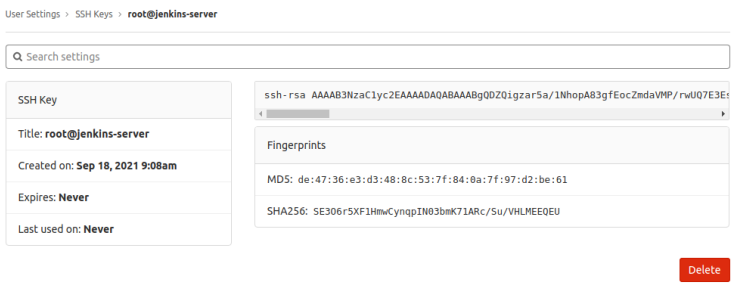
```
root@jenkins-server:~# cat id_rsa_gitlab.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQDZQigzar5a/1NhopA83gfEocZmdaVMP/rwUQ7E3EsdIAfyB5m2W7DtKlc0ZmkTbzb/tQ6hoVBccib69M8Lgvtm8/F8aLkompCXYIF01+kr6
RSux6fad/c+i20BBGRETRhLrr5I0+m+xHPzWed8QFVg+6NcjPtHtGo7cVbsX4zOkRkDDxtLxdquVhuwOU+X6ZePxKxSCKROAQ7D09wBGKBZd4hSLduOwoyfscV0hivOPy9dp82dGVx8vvT81r
/87i8JPpPWqJCEc75As2im7OK30WhNXTiAgGh9IOvET/rDFaQJX+FqUXigom+ec+lIOPCNWR5pTwgwrOtXQcvLcVxjmktg7Jl37TLqTdhhjs0ngmPTiX4VMdPr1rPF/TTVpkMpbhFhIPl5NMD
WagdtnqIYLKAOg8liCS3z5qT88/67J2NwkUuWkXRlaEVABS5y5zxkLGduMSuvGT4vhp/7kESqiJGUCXPHTXWXUzrD1Ahot+h+kxIAO8zMk2iM7/+lomU= root@jenkins-server
root@jenkins-server:~#
```

7. Deploy ssh public keys yang telah dibuat ke gitlab account

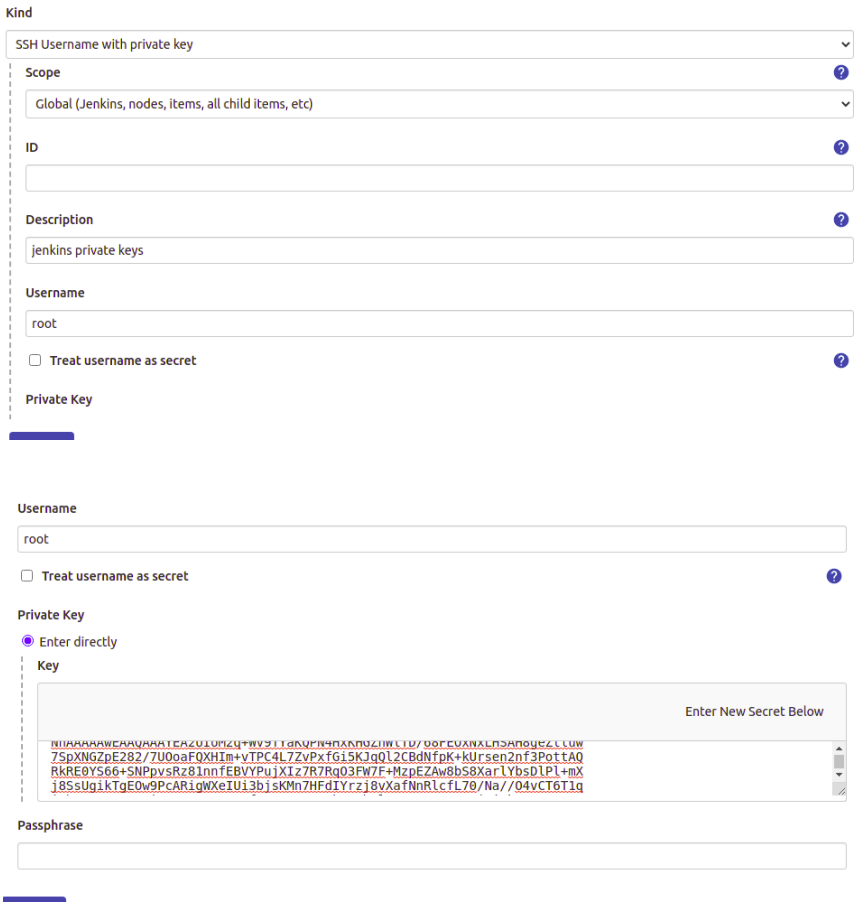
klik gitlab **profile** https://gitlab.com/-/profile
Pilih **SSH Keys**



Klik **Add key** (jika berhasil akan muncul tampilan seperti ini)

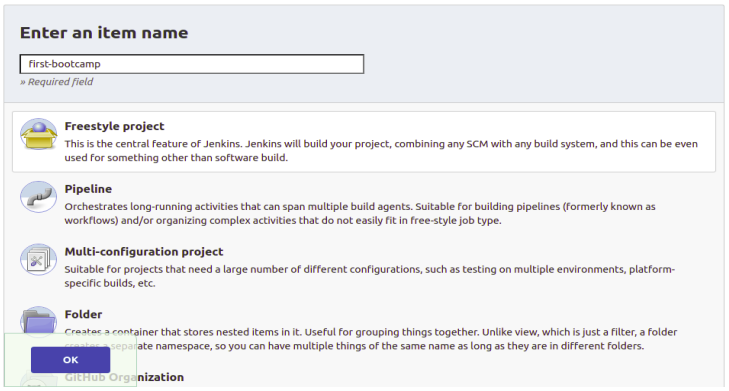


8. Kembali ke Jenkins, untuk membuat credential baru menggunakan private keys yang telah dibuat sebelumnya, pilih **SSH Username with private key** (username sesuaikan dengan private key yang anda buat)



9. Membuat project jenkins dan integrasikan dengan gitlab project

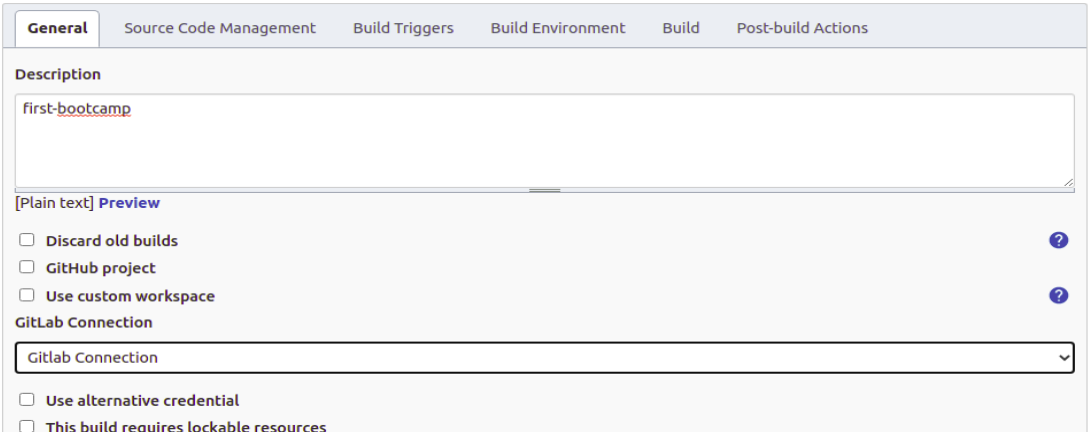
   Klik **New Item**
   Enter an item name “ first-bootcamp ”
   Klik “**Fresstyle project**”



   Klik **OK**

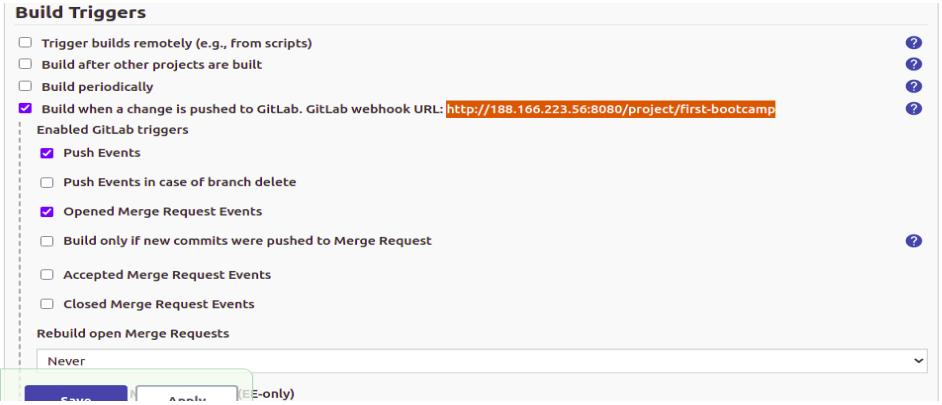
10. Masukan gitlab project yang akan kita integrasikan dengan jenkins

    Isi **Description** sesuaikan dengan kebutuhan anda



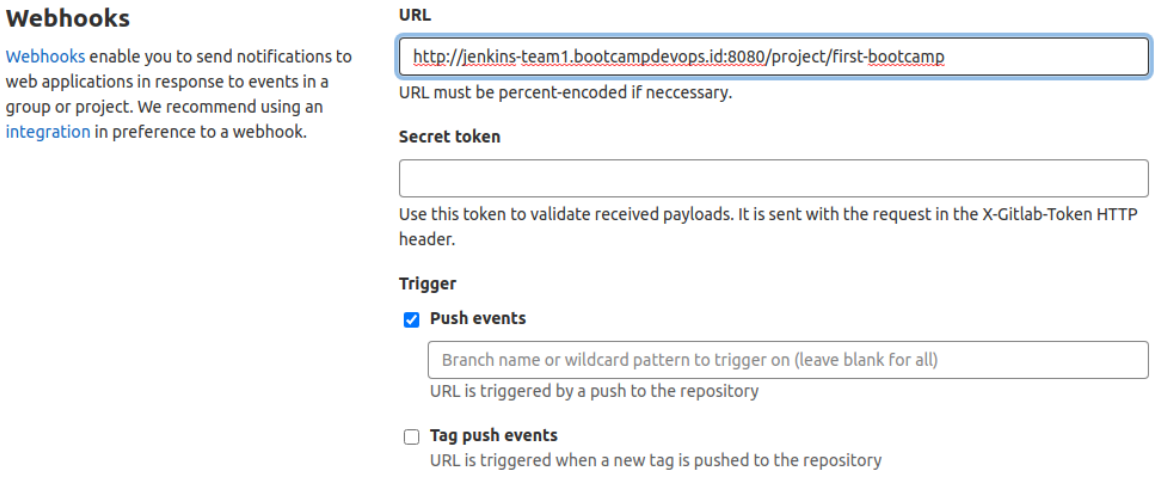
    Klik tab **Source Code Management**

    Pada Bagian Build Trigger klik **Build when a change is pushed to gitlab** kemudian copy webhook url untuk kemudian akan kita gunakan di gitlab

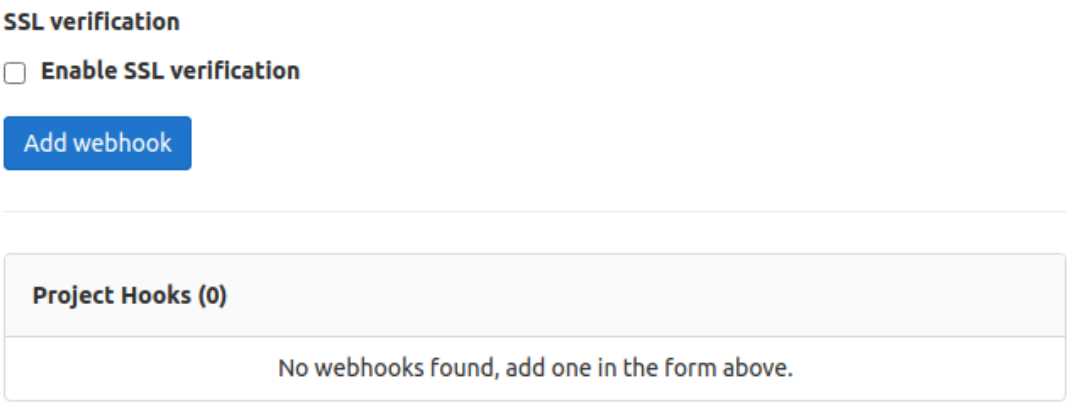


    Klik **Apply** kemudian **Save**

11. Integrasikan webhook jenkins ke gitlab project, pilih project **first-bootcamp**
    Pilih **Settings->Webhook**



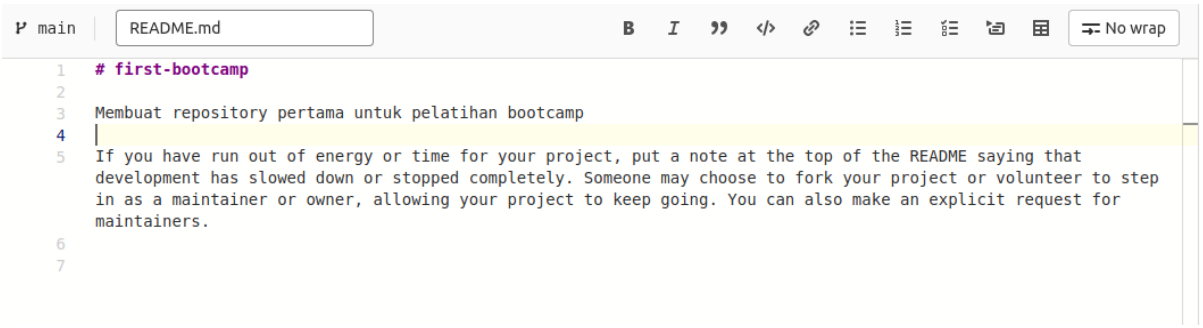
    Karena pada praktikum ini tidak menggunakan SSL, jadi kita akan unchecklist **Enable SSL Verification**



    Klik **Add Webhook**

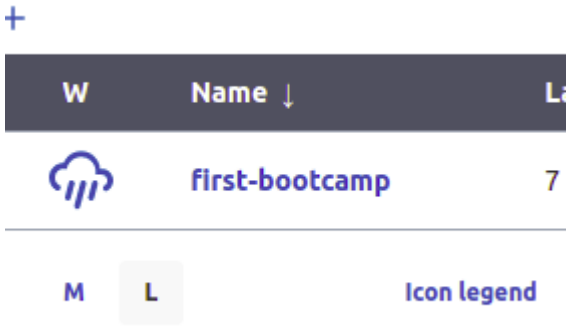
12. Test lakukan perubahan pada project **first-bootcamp**

    Klik **README.md - > Edit -> Hapus beberapa bagian**



Klik **Commit changes**

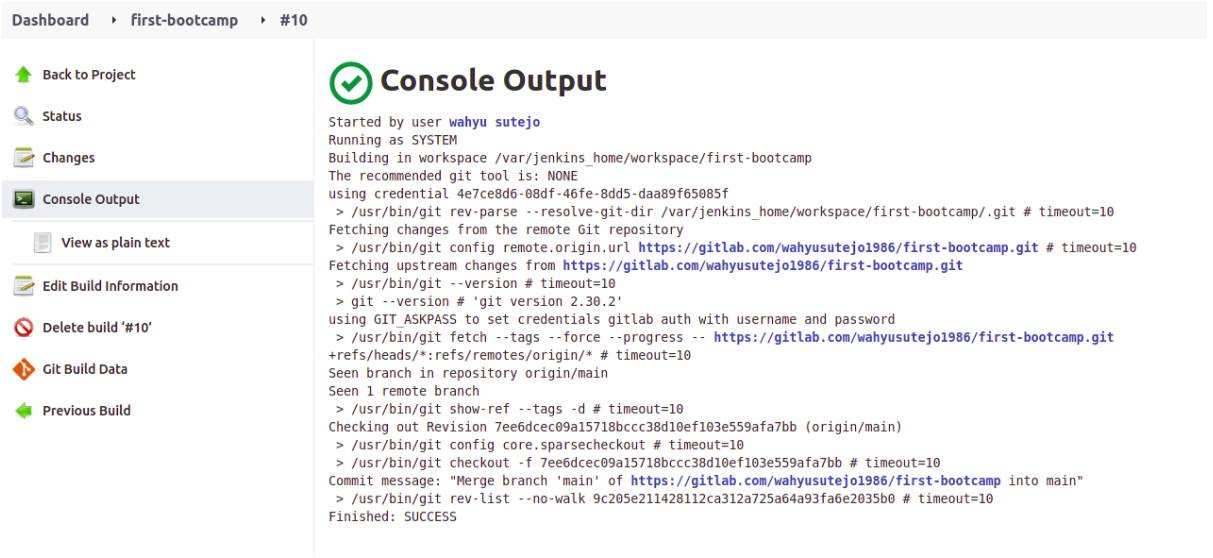
13. Test Build repo dengan jenkins, kembali ke dashboard jenkins
    Klik **first-bootcamp**



14. Klik **Build Now**, maka akan muncul build history pada bagian paling kiri bawah

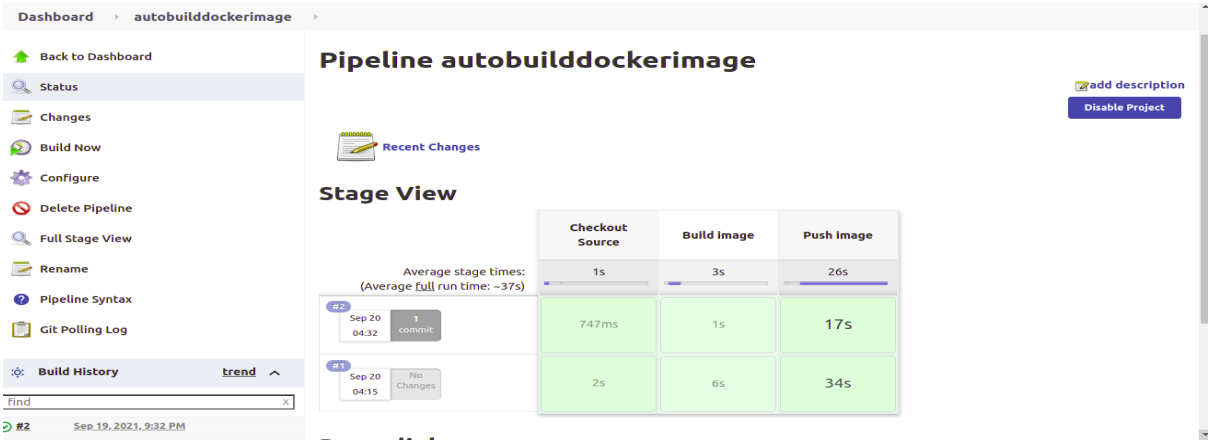
Jika build success akan muncul simbol cheklist warna hijau, kemudian klik untuk melihat seluruh status report.

Klik **Console Output** untuk melihat status processnya



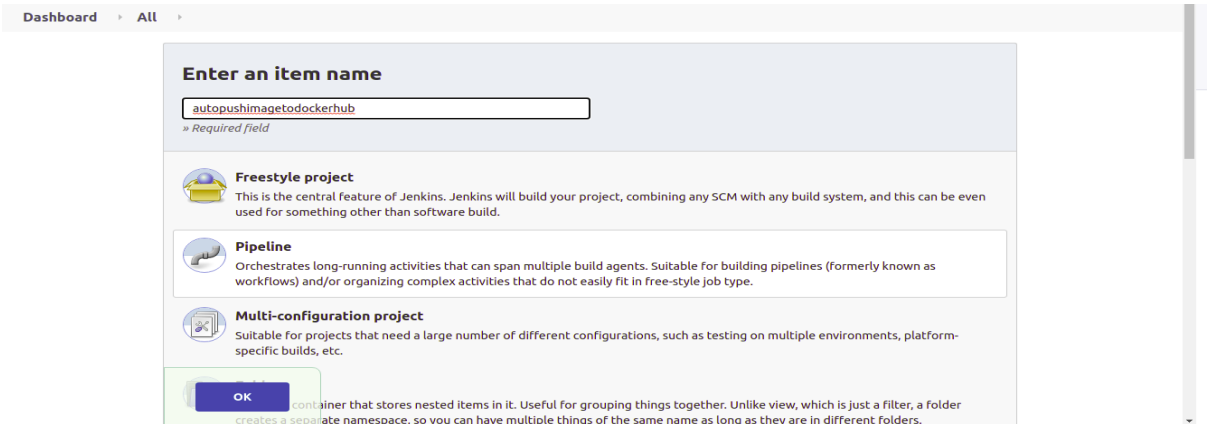
Build Image Docker dan push ke dockerhub melalui jenkins pipeline
==========

Tampilan pipeline jenkins untuk build docker image dan push image ke dockerhub

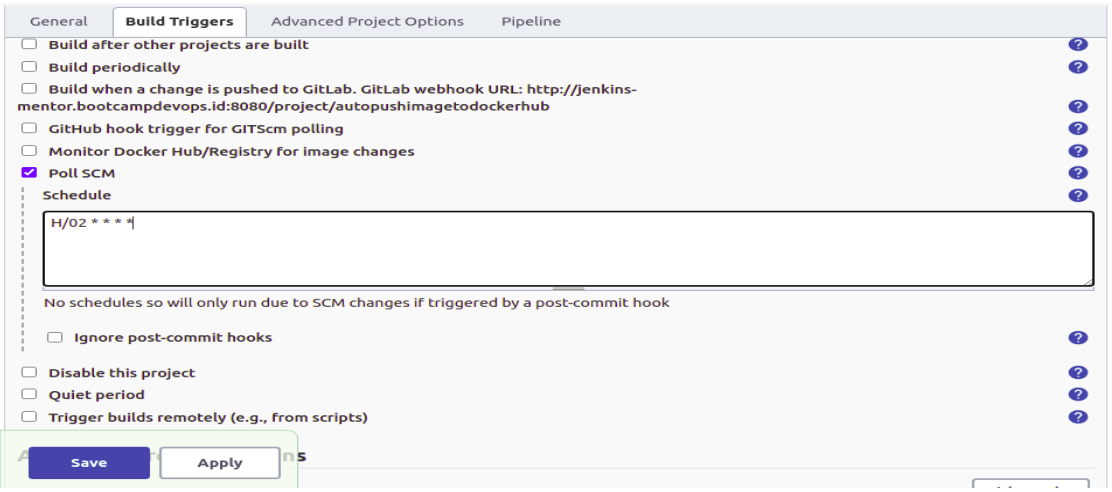


Langkah-langkah membuat jenkins pipeline

1) Klik New Item
2) Masukan nama item, kemudian pilih pipeline seperti gambar dibawah



3) Klik **OK**
4) Klik tab **Build Triggers**, kemudian masukan H/02 * * * * seperti gambar dibawah

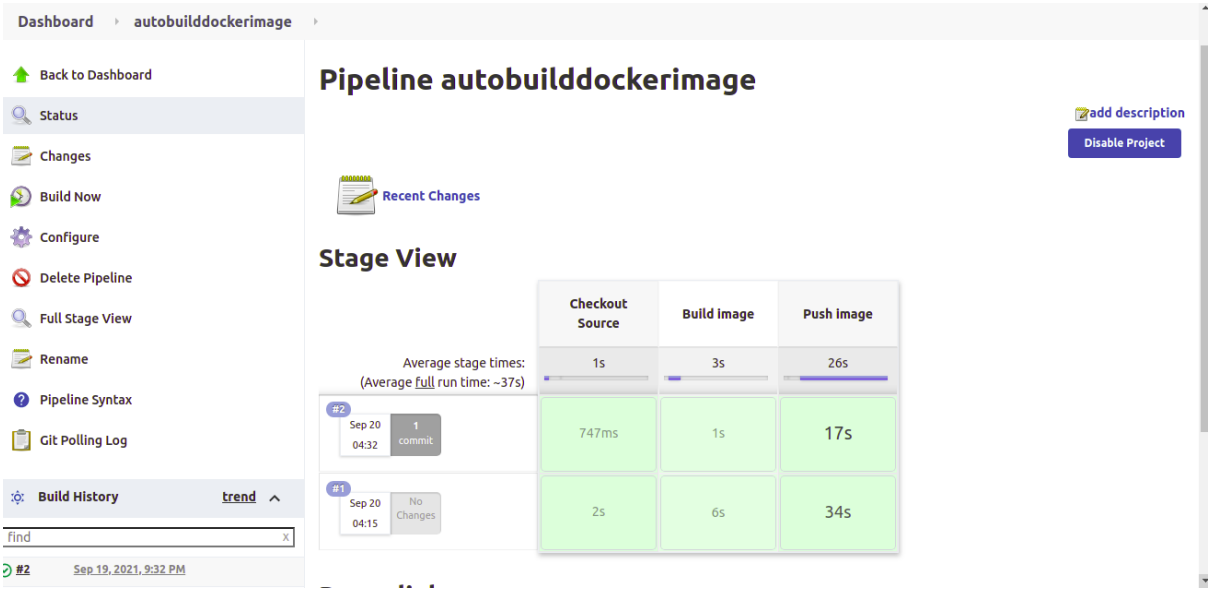


5) Klik Tab **Pipeline**
6) Masukan script berikut

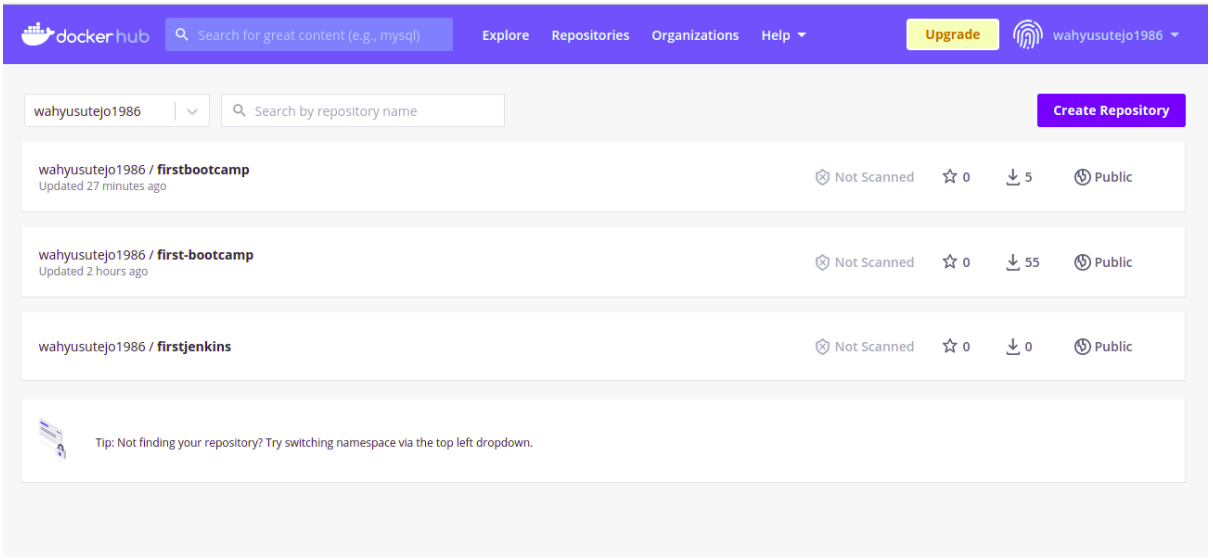
```
pipeline {

  agent any

  stages {

    stage('Checkout Source') {
      steps {
        checkout([$class: 'GitSCM', branches: [[name: '**']], extensions: [],
userRemoteConfigs: [[credentialsId: 'ceaa6a55-d820-4d4f-a68c-d067300b55a1',
url: 'https://gitlab.com/wahyusutejo1986/firstbootcamp.git']]])
      }
    }

      stage("Build image") {
           steps {
              script {
                 myapp =
docker.build("wahyusutejo1986/firstbootcamp:${env.BUILD_ID}")
              }
           }
       }

      stage("Push image") {
           steps {
              script {
                 docker.withRegistry('https://registry.hub.docker.com',
'dockerhub_connection') {
                        myapp.push("latest")
                        myapp.push("${env.BUILD_ID}")
                 }
              }
           }
       }

  }

}
```

Note:
Docker Registry diisi dengan id credential dockerhub anda, kemudian untuk repository url diganti sesuai dengan url project di gitlab anda

7) Selanjutnya kita akan test pipeline yang sudah kita buat dengan cara klik **Build Now**
8) Tampilan proses pipeline jika berhasil akan seperti gambar dibawah ini

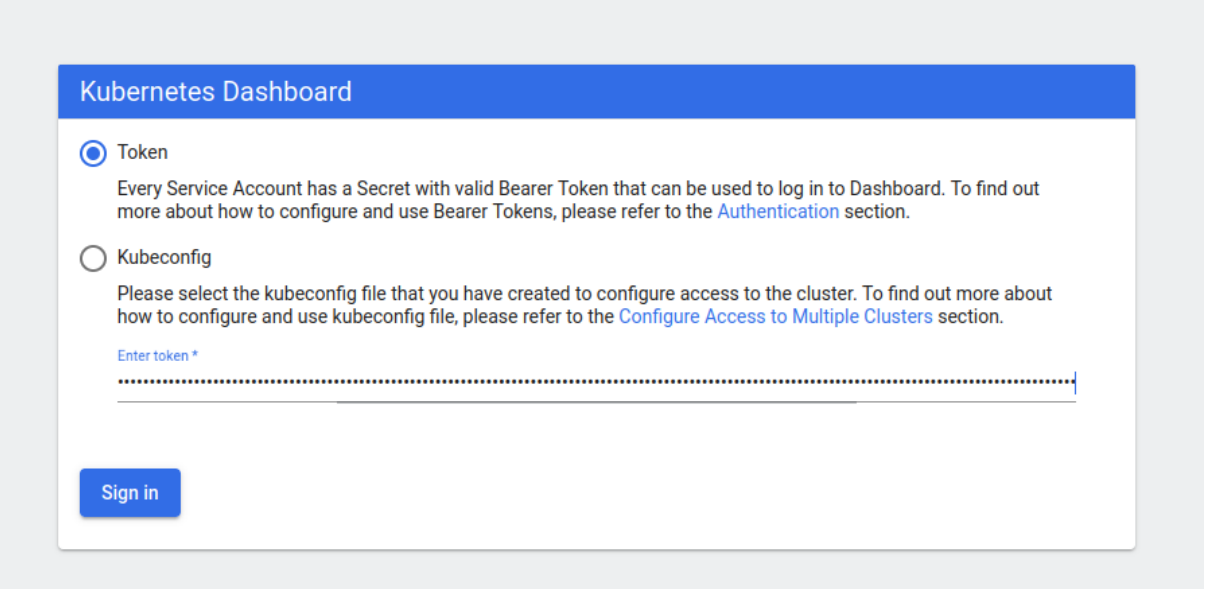


9) Periksa image di akun dockerhub anda, jika berhasil maka akan terdapat image baru sesuai dengan versi pipeline di jenkins, contoh image berhasil seperti gambar dibawah ini.

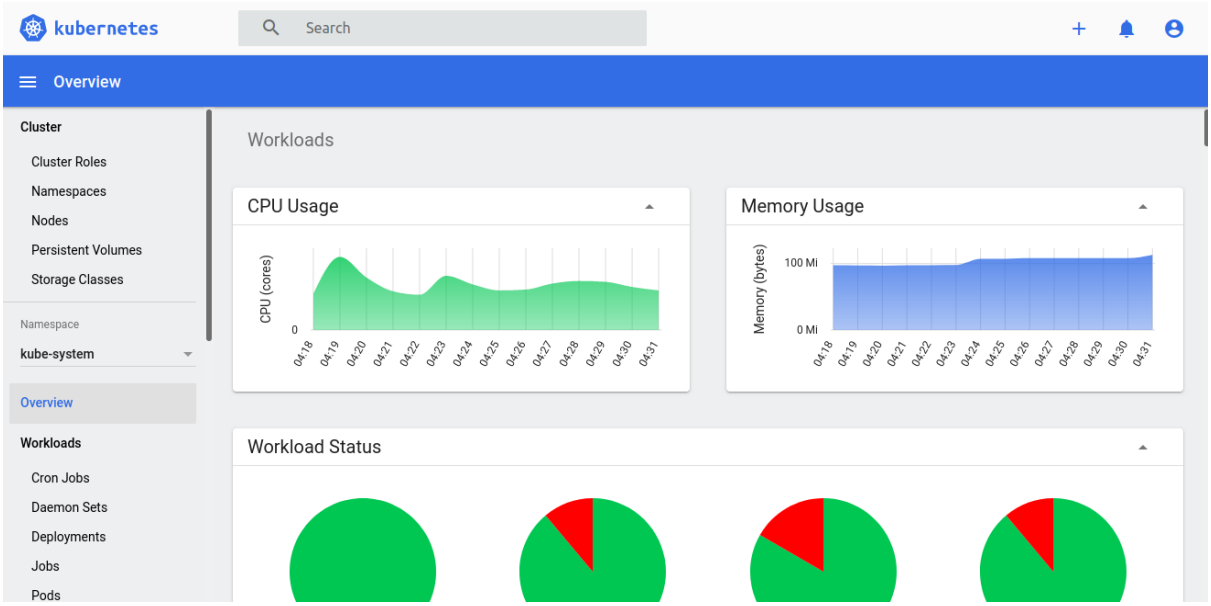


Part - 4 Kubernetes
==========
Automatic Deploy applikasi ke kubernetes jika hasil build dan test success

1. Login kubernetes

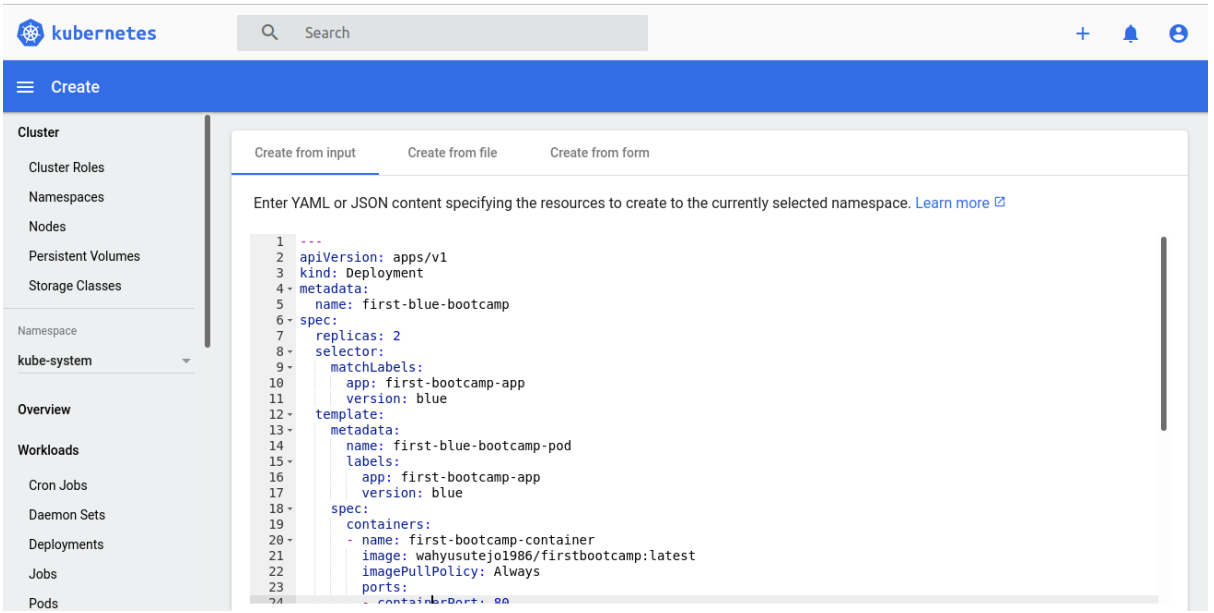


Tampilan jika login kubernetes berhasil

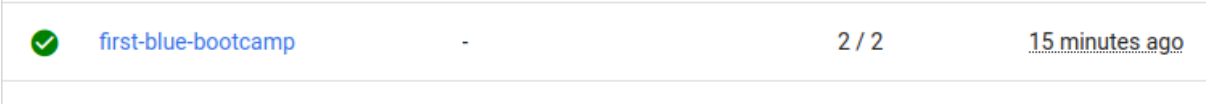


2. Deploy container menggunakan docker image di dockerhub
   copy isi dari file **firstbootcamp.yml** lalu

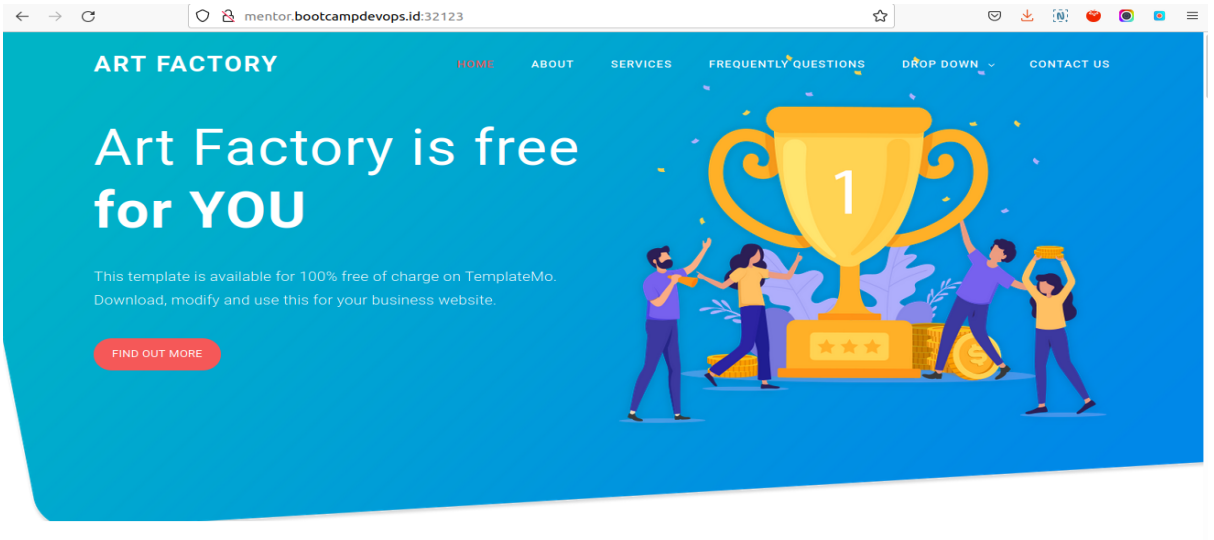
3. Klik tanda **+** di kubernetes, maka akan muncul tampilan seperti ini, kemudian paste seluruh isi dari file **firstbootcamp.yml**



4. Klik **Upload**, tunggu hingga proses selesai
5. Jika deployment berhasil maka akan muncul keterangan seperti gambar dibawah ini



6. Akses aplikasi melalui browser http://namadomain:32123/ maka akan muncul tampilan seperti dibawah ini



Selamat anda telah berhasil proses CI/CD aplikasi menggunakan kubernetes, pekerjaan rumah selanjutnya adalah bagaimana caranya agar keseluruhan proses menjadi automation.