CSE5121 - DevOps & MLOps

Activity 4

Create a complete CI/CD pipeline using GitHub, Webhooks, Docker, ngrok, and Jenkins

Prerequisites:

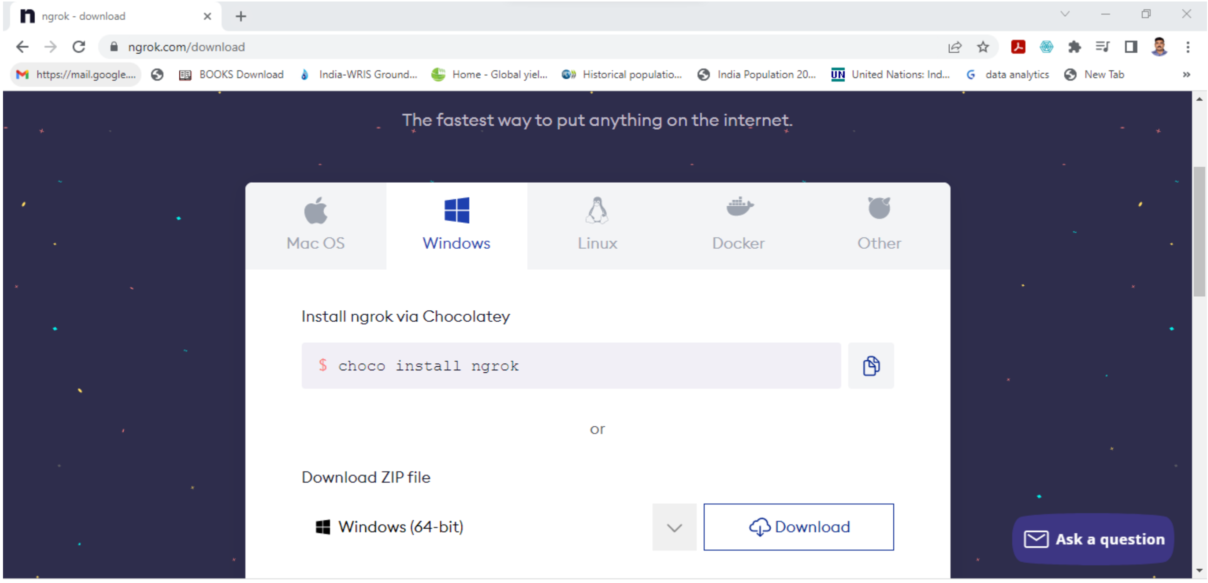
VS Code
VS Code Extension – Python
GitHub
Docker
Jenkins

Step 1 - 5

Follow the same steps (1-5) from activity 3

Step 6

Install ngrok software



The fastest way to put anything on the internet.

Install ngrok via Chocolatey

```
$ choco install ngrok
```

or

Download ZIP file

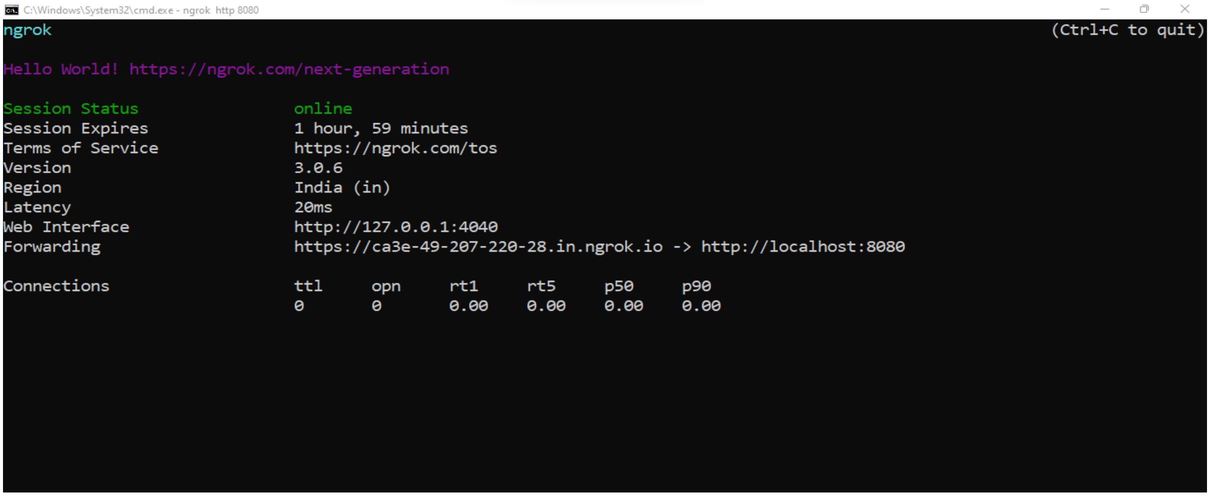
Windows (64-bit)

Step 7

Expose IP and Port

Note :

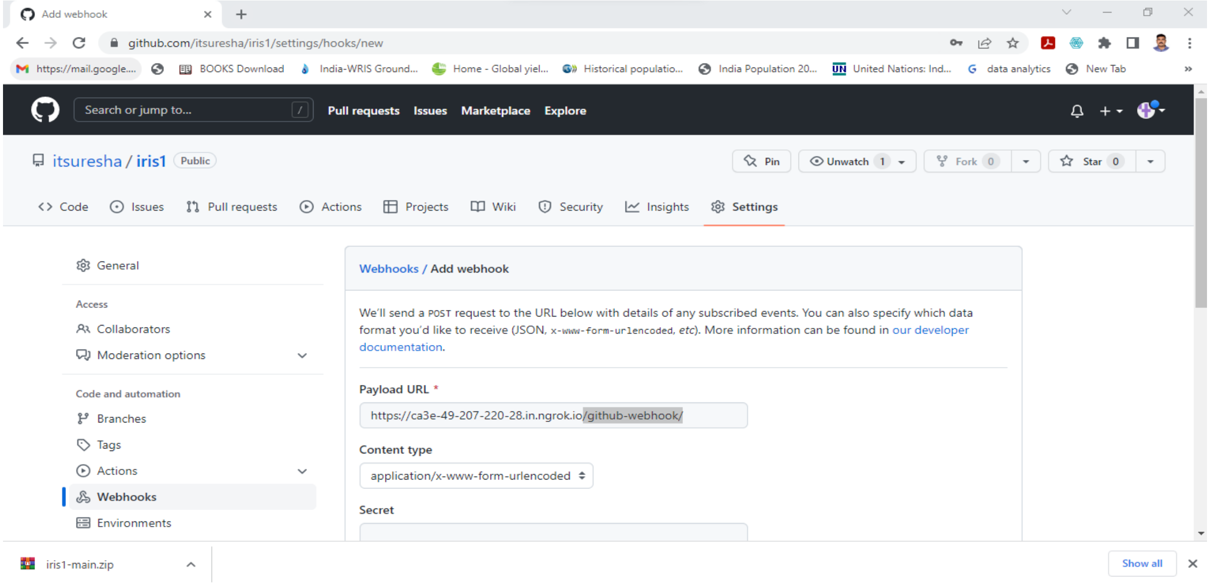
Run : ngrok http 8080 / ngrok http 80



```
ngrok                                                                                 (Ctrl+C to quit)

Hello World! https://ngrok.com/next-generation

Session Status                online
Session Expires               1 hour, 59 minutes
Terms of Service              https://ngrok.com/tos
Version                       3.0.6
Region                        India (in)
Latency                       20ms
Web Interface                 http://127.0.0.1:4040
Forwarding                    https://ca3e-49-207-220-28.in.ngrok.io -> http://localhost:8080

Connections                   ttl     opn     rt1     rt5     p50     p90
                              0       0       0.00    0.00    0.00    0.00
```

Step 8

Webhook Configuration in GitHub



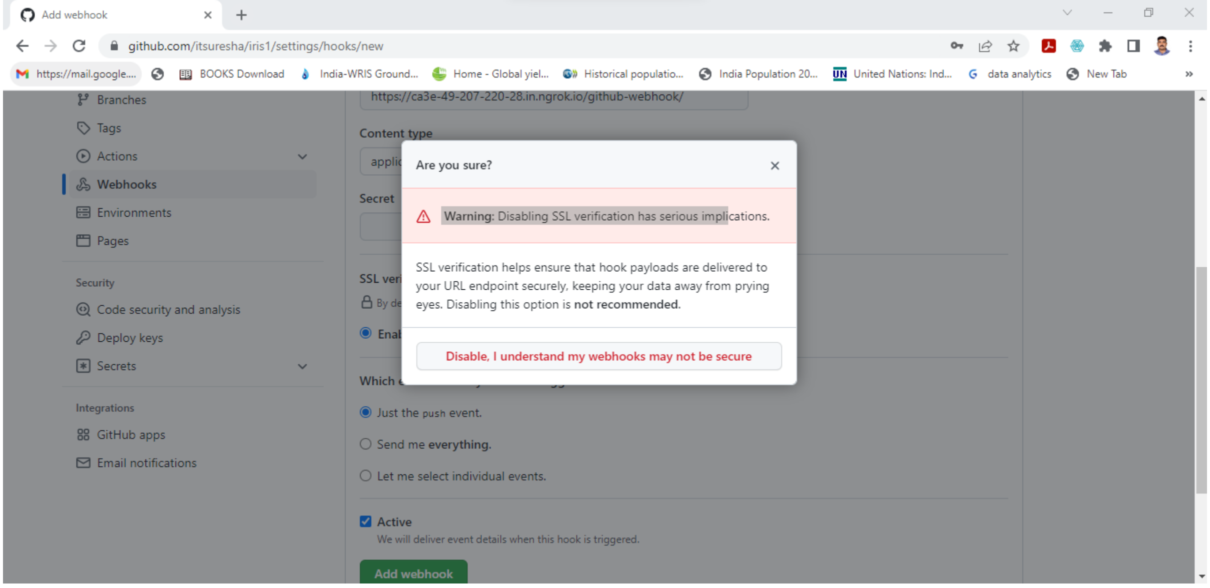
Webhooks / Add webhook

We'll send a POST request to the URL below with details of any subscribed events. You can also specify which data format you'd like to receive (JSON, x-www-form-urlencoded, *etc*). More information can be found in our developer documentation.

Payload URL *: https://ca3e-49-207-220-28.in.ngrok.io/github-webhook/

Content type: application/x-www-form-urlencoded

Secret



github.com/itsuresha/iris1/settings/hooks/new

https://ca3e-49-207-220-28.in.ngrok.io/github-webhook/

Are you sure?

Warning: Disabling SSL verification has serious implications.

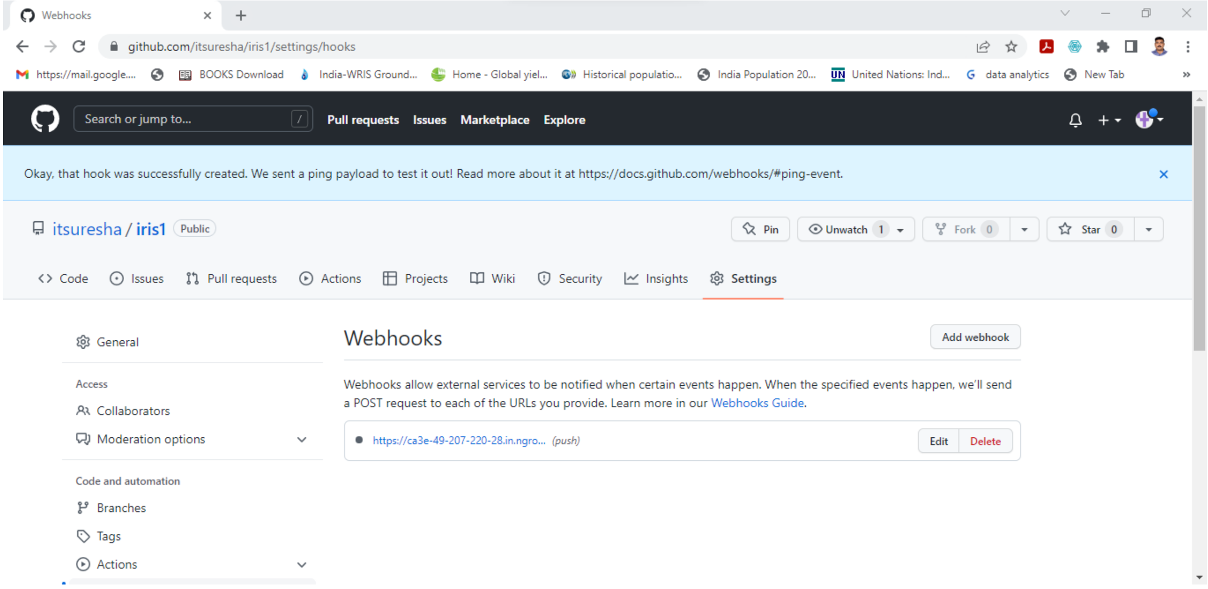
SSL verification helps ensure that hook payloads are delivered to your URL endpoint securely, keeping your data away from prying eyes. Disabling this option is **not recommended.**

Disable, I understand my webhooks may not be secure

● Just the push event.
○ Send me everything.
○ Let me select individual events.

☑ Active
We will deliver event details when this hook is triggered.

Add webhook



github.com/itsuresha/iris1/settings/hooks

Okay, that hook was successfully created. We sent a ping payload to test it out! Read more about it at https://docs.github.com/webhooks/#ping-event.

itsuresha / iris1 Public

Webhooks

Webhooks allow external services to be notified when certain events happen. When the specified events happen, we'll send a POST request to each of the URLs you provide. Learn more in our Webhooks Guide.

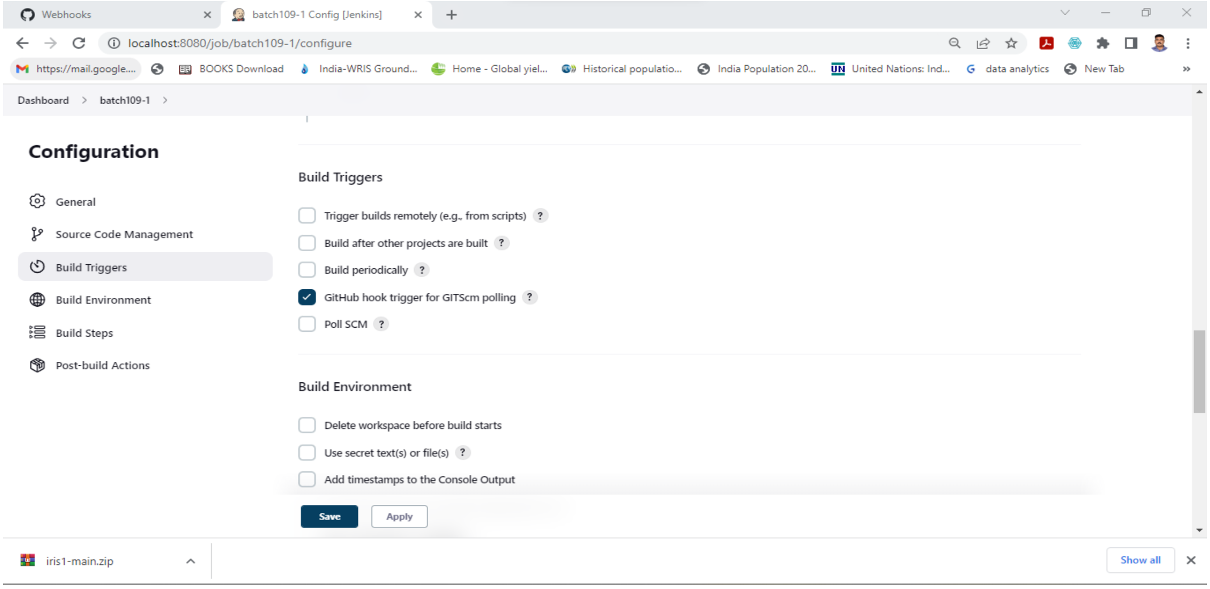
https://ca3e-49-207-220-28.in.ngro... (push) Edit Delete

Step 9

Integration of Webhook with Jenkins

Note

Build the project after the configuration

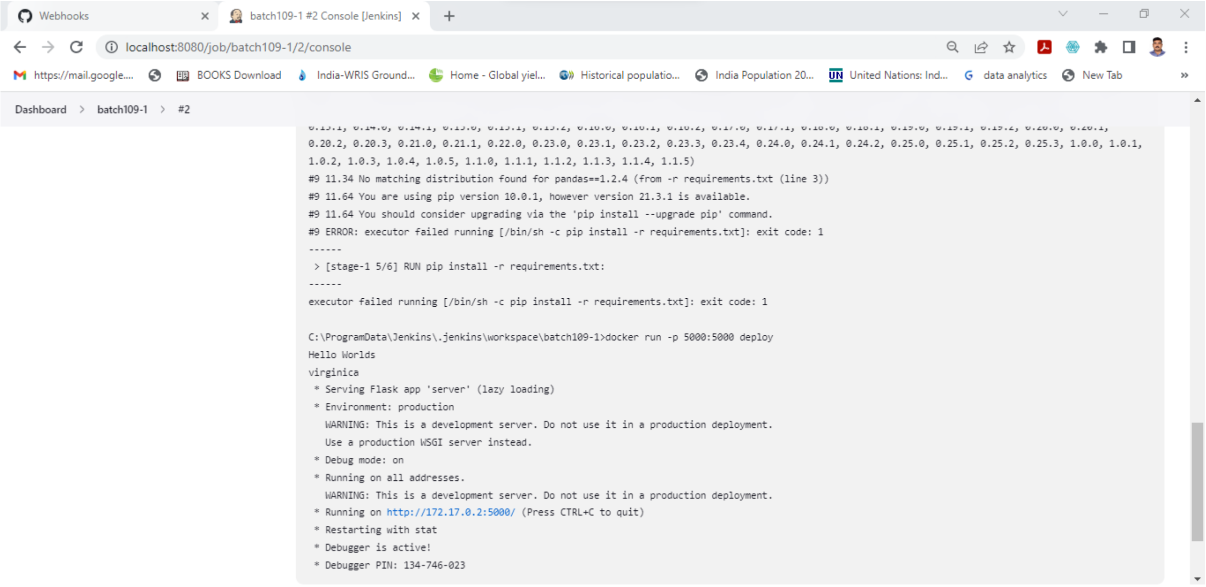


Build Triggers

- □ Trigger builds remotely (e.g., from scripts)
- □ Build after other projects are built
- □ Build periodically
- ☑ GitHub hook trigger for GITScm polling
- □ Poll SCM

Build Environment

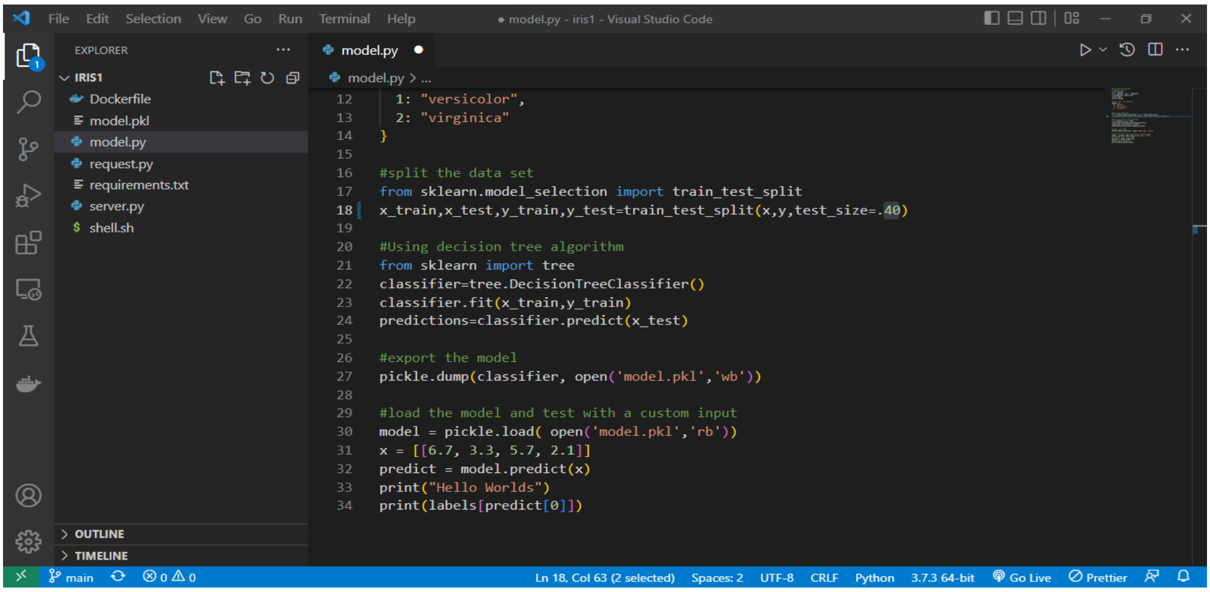
- □ Delete workspace before build starts
- □ Use secret text(s) or file(s)
- □ Add timestamps to the Console Output


Webhooks
batch109-1 #2 Console [Jenkins]
localhost:8080/job/batch109-1/2/console
Dashboard > batch109-1 > #2

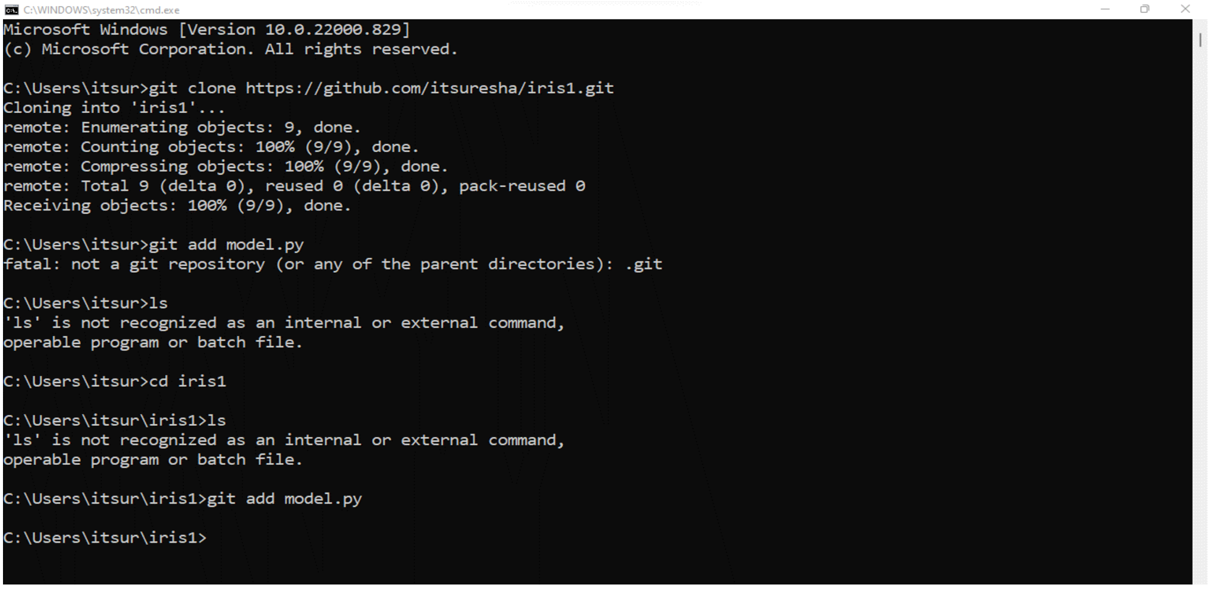
```
0.13.1, 0.14.0, 0.14.1, 0.15.0, 0.15.1, 0.15.2, 0.16.0, 0.16.1, 0.16.2, 0.17.0, 0.17.1, 0.18.0, 0.18.1, 0.19.0, 0.19.1, 0.19.2, 0.20.0, 0.20.1,
0.20.2, 0.20.3, 0.21.0, 0.21.1, 0.22.0, 0.23.0, 0.23.1, 0.23.2, 0.23.3, 0.23.4, 0.24.0, 0.24.1, 0.24.2, 0.25.0, 0.25.1, 0.25.2, 0.25.3, 1.0.0, 1.0.1,
1.0.2, 1.0.3, 1.0.4, 1.0.5, 1.1.0, 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5)
#9 11.34 No matching distribution found for pandas==1.2.4 (from -r requirements.txt (line 3))
#9 11.64 You are using pip version 10.0.1, however version 21.3.1 is available.
#9 11.64 You should consider upgrading via the 'pip install --upgrade pip' command.
#9 ERROR: executor failed running [/bin/sh -c pip install -r requirements.txt]: exit code: 1
------
 > [stage-1 5/6] RUN pip install -r requirements.txt:
------
executor failed running [/bin/sh -c pip install -r requirements.txt]: exit code: 1

C:\ProgramData\Jenkins\.jenkins\workspace\batch109-1>docker run -p 5000:5000 deploy
Hello Worlds
virginica
 * Serving Flask app 'server' (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Running on all addresses.
   WARNING: This is a development server. Do not use it in a production deployment.
 * Running on http://172.17.0.2:5000/ (Press CTRL+C to quit)
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 134-746-023
```

Step 10

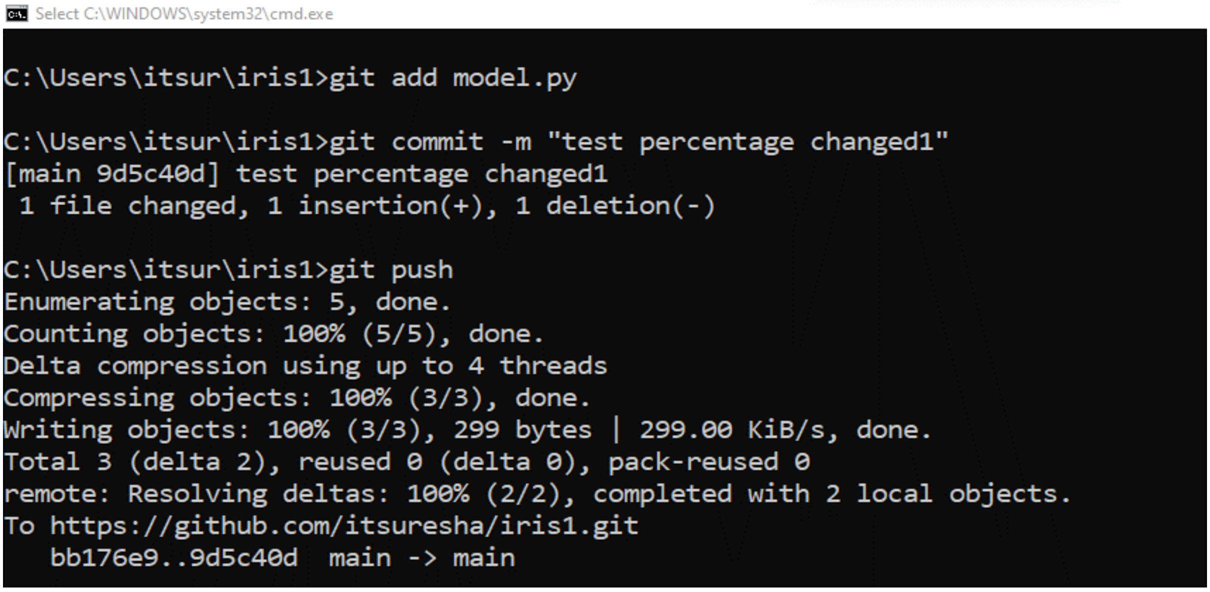
Clone your project from GitHub


File Edit Selection View Go Run Terminal Help
● model.py - iris1 - Visual Studio Code
EXPLORER
IRIS1
Dockerfile
model.pkl
model.py
request.py
requirements.txt
server.py
shell.sh
OUTLINE
TIMELINE
model.py ●
model.py > ...
main
⊗ 0 ⚠ 0
Ln 18, Col 63 (2 selected) Spaces: 2 UTF-8 CRLF Python 3.7.3 64-bit Go Live Prettier

```
  1: "versicolor",
  2: "virginica"
}

#split the data set
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=.40)

#Using decision tree algorithm
from sklearn import tree
classifier=tree.DecisionTreeClassifier()
classifier.fit(x_train,y_train)
predictions=classifier.predict(x_test)

#export the model
pickle.dump(classifier, open('model.pkl','wb'))

#load the model and test with a custom input
model = pickle.load( open('model.pkl','rb'))
x = [[6.7, 3.3, 5.7, 2.1]]
predict = model.predict(x)
print("Hello Worlds")
print(labels[predict[0]])
```

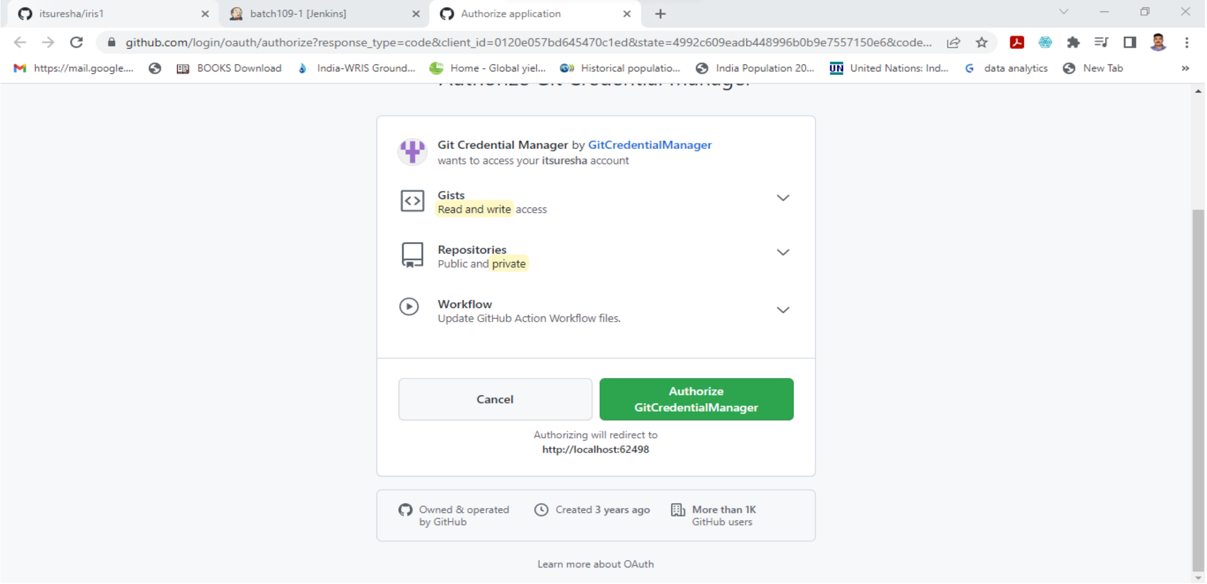


```
Microsoft Windows [Version 10.0.22000.829]
(c) Microsoft Corporation. All rights reserved.

C:\Users\itsur>git clone https://github.com/itsuresha/iris1.git
Cloning into 'iris1'...
remote: Enumerating objects: 9, done.
remote: Counting objects: 100% (9/9), done.
remote: Compressing objects: 100% (9/9), done.
remote: Total 9 (delta 0), reused 0 (delta 0), pack-reused 0
Receiving objects: 100% (9/9), done.

C:\Users\itsur>git add model.py
fatal: not a git repository (or any of the parent directories): .git

C:\Users\itsur>ls
'ls' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\itsur>cd iris1

C:\Users\itsur\iris1>ls
'ls' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\itsur\iris1>git add model.py

C:\Users\itsur\iris1>
```



Select C:\WINDOWS\system32\cmd.exe

```
C:\Users\itsur\iris1>git add model.py

C:\Users\itsur\iris1>git commit -m "test percentage changed1"
[main 9d5c40d] test percentage changed1
 1 file changed, 1 insertion(+), 1 deletion(-)

C:\Users\itsur\iris1>git push
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 4 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 299 bytes | 299.00 KiB/s, done.
Total 3 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To https://github.com/itsuresha/iris1.git
   bb176e9..9d5c40d  main -> main
```



Git Credential Manager by GitCredentialManager
wants to access your itsuresha account

Gists
Read and write access

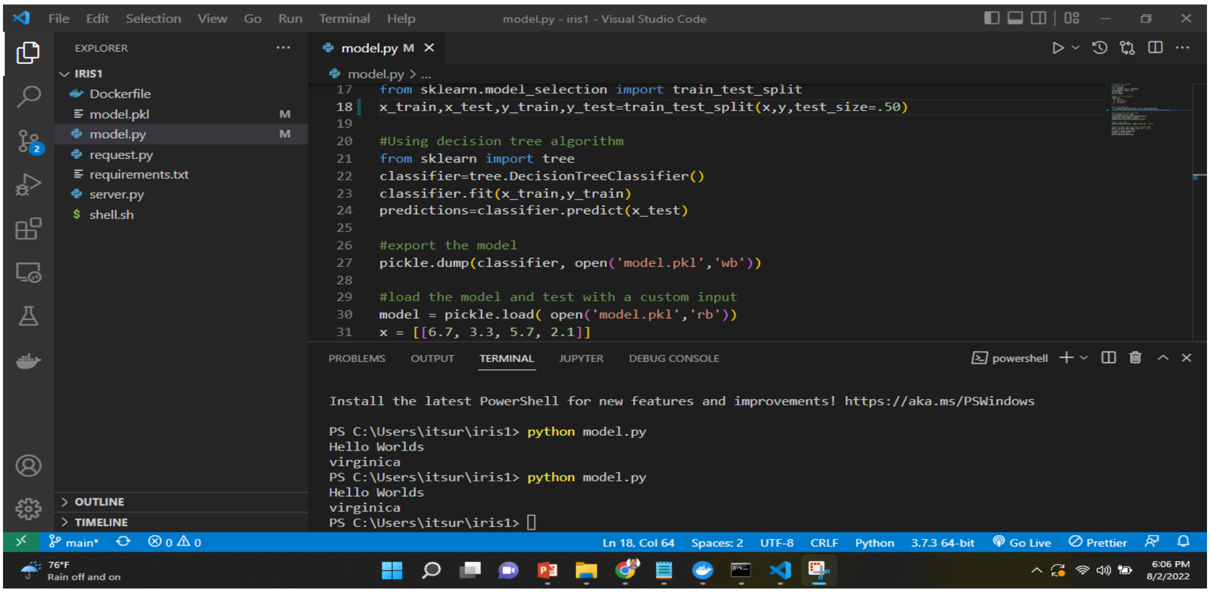
Repositories
Public and private

Workflow
Update GitHub Action Workflow files.

Authorizing will redirect to
http://localhost:62498

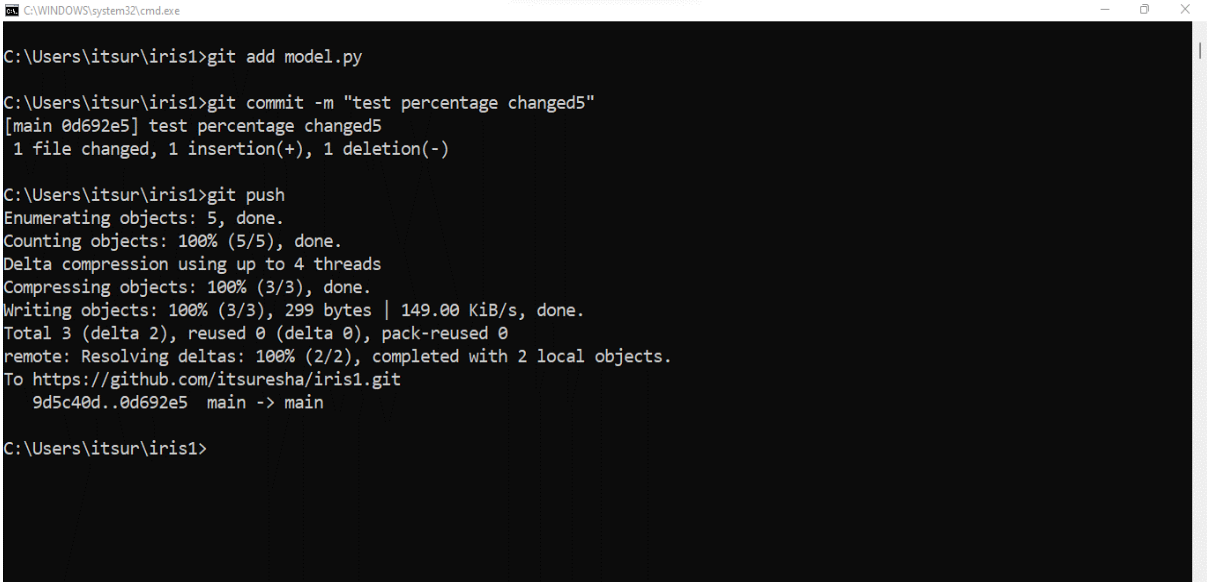
Step 11

Triggering CI/CD

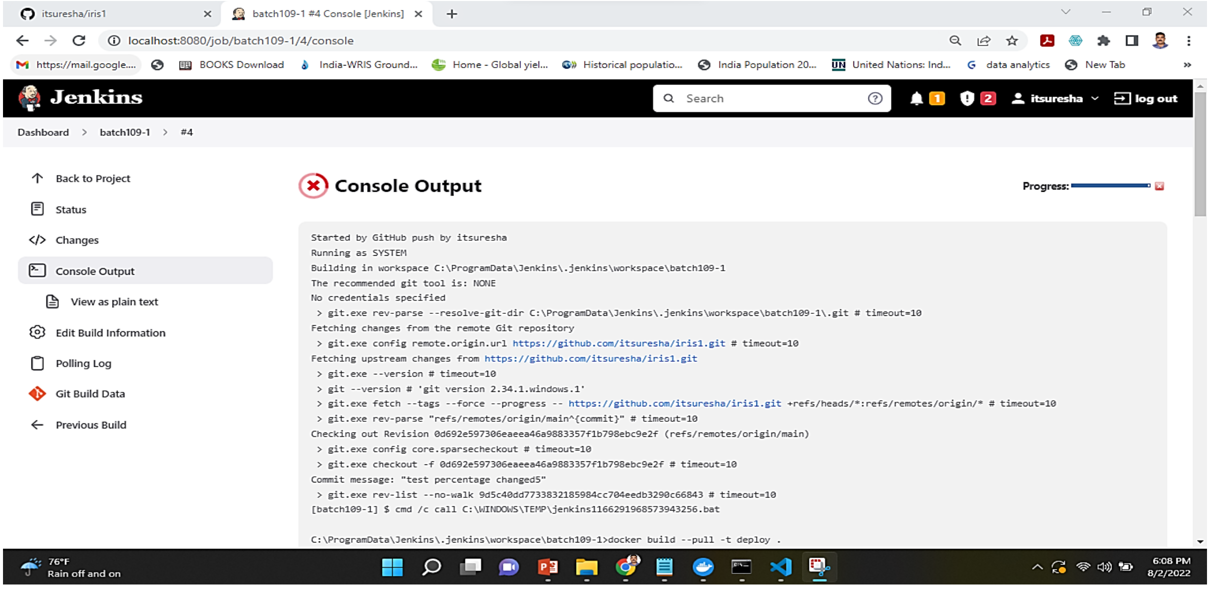


```python
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=.50)

#Using decision tree algorithm
from sklearn import tree
classifier=tree.DecisionTreeClassifier()
classifier.fit(x_train,y_train)
predictions=classifier.predict(x_test)

#export the model
pickle.dump(classifier, open('model.pkl','wb'))

#load the model and test with a custom input
model = pickle.load( open('model.pkl','rb'))
x = [[6.7, 3.3, 5.7, 2.1]]
```

```
Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\itsur\iris1> python model.py
Hello Worlds
virginica
PS C:\Users\itsur\iris1> python model.py
Hello Worlds
virginica
PS C:\Users\itsur\iris1>
```

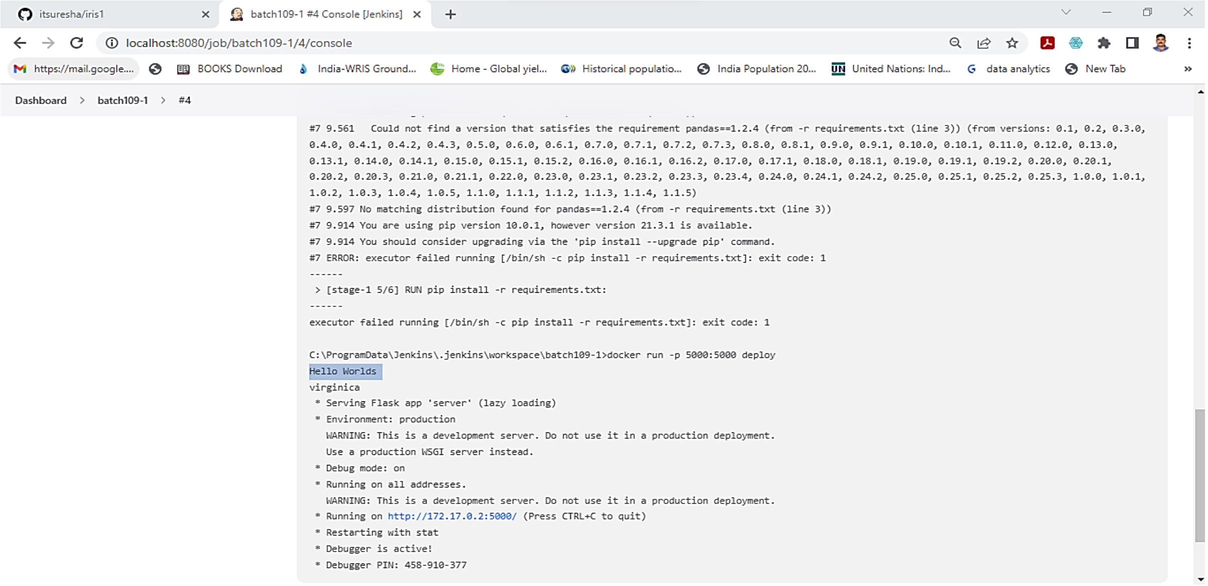


```
C:\Users\itsur\iris1>git add model.py

C:\Users\itsur\iris1>git commit -m "test percentage changed5"
[main 0d692e5] test percentage changed5
 1 file changed, 1 insertion(+), 1 deletion(-)

C:\Users\itsur\iris1>git push
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 4 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 299 bytes | 149.00 KiB/s, done.
Total 3 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To https://github.com/itsuresha/iris1.git
   9d5c40d..0d692e5  main -> main

C:\Users\itsur\iris1>
```

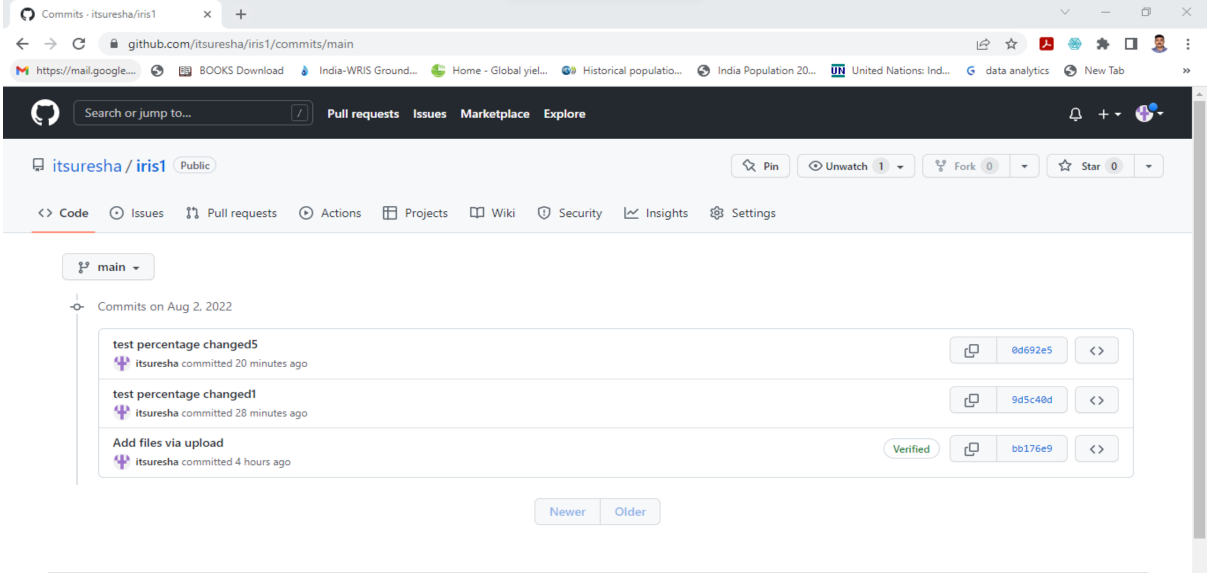


Console Output

```
Started by GitHub push by itsuresha
Running as SYSTEM
Building in workspace C:\ProgramData\Jenkins\.jenkins\workspace\batch109-1
The recommended git tool is: NONE
No credentials specified
 > git.exe rev-parse --resolve-git-dir C:\ProgramData\Jenkins\.jenkins\workspace\batch109-1\.git # timeout=10
Fetching changes from the remote Git repository
 > git.exe config remote.origin.url https://github.com/itsuresha/iris1.git # timeout=10
Fetching upstream changes from https://github.com/itsuresha/iris1.git
 > git.exe --version # timeout=10
 > git --version # 'git version 2.34.1.windows.1'
 > git.exe fetch --tags --force --progress -- https://github.com/itsuresha/iris1.git +refs/heads/*:refs/remotes/origin/* # timeout=10
 > git.exe rev-parse "refs/remotes/origin/main^{commit}" # timeout=10
Checking out Revision 0d692e597306eaeea46a9883357f1b798ebc9e2f (refs/remotes/origin/main)
 > git.exe config core.sparsecheckout # timeout=10
 > git.exe checkout -f 0d692e597306eaeea46a9883357f1b798ebc9e2f # timeout=10
Commit message: "test percentage changed5"
 > git.exe rev-list --no-walk 9d5c40dd7733832185984cc704eedb3290c66843 # timeout=10
[batch109-1] $ cmd /c call C:\WINDOWS\TEMP\jenkins1166291968573943256.bat

C:\ProgramData\Jenkins\.jenkins\workspace\batch109-1>docker build --pull -t deploy .
```



```
#7 9.561   Could not find a version that satisfies the requirement pandas==1.2.4 (from -r requirements.txt (line 3)) (from versions: 0.1, 0.2, 0.3.0,
0.4.0, 0.4.1, 0.4.2, 0.4.3, 0.5.0, 0.6.0, 0.6.1, 0.7.0, 0.7.1, 0.7.2, 0.7.3, 0.8.0, 0.8.1, 0.9.0, 0.9.1, 0.10.0, 0.10.1, 0.11.0, 0.12.0, 0.13.0,
0.13.1, 0.14.0, 0.14.1, 0.15.0, 0.15.1, 0.15.2, 0.16.0, 0.16.1, 0.16.2, 0.17.0, 0.17.1, 0.18.0, 0.18.1, 0.19.0, 0.19.1, 0.19.2, 0.20.0, 0.20.1,
0.20.2, 0.20.3, 0.21.0, 0.21.1, 0.22.0, 0.23.0, 0.23.1, 0.23.2, 0.23.3, 0.23.4, 0.24.0, 0.24.1, 0.24.2, 0.25.0, 0.25.1, 0.25.2, 0.25.3, 1.0.0, 1.0.1,
1.0.2, 1.0.3, 1.0.4, 1.0.5, 1.1.0, 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5)
#7 9.597 No matching distribution found for pandas==1.2.4 (from -r requirements.txt (line 3))
#7 9.914 You are using pip version 10.0.1, however version 21.3.1 is available.
#7 9.914 You should consider upgrading via the 'pip install --upgrade pip' command.
#7 ERROR: executor failed running [/bin/sh -c pip install -r requirements.txt]: exit code: 1
------
 > [stage-1 5/6] RUN pip install -r requirements.txt:
------
executor failed running [/bin/sh -c pip install -r requirements.txt]: exit code: 1

C:\ProgramData\Jenkins\.jenkins\workspace\batch109-1>docker run -p 5000:5000 deploy
Hello Worlds
virginica
 * Serving Flask app 'server' (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Running on all addresses.
   WARNING: This is a development server. Do not use it in a production deployment.
 * Running on http://172.17.0.2:5000/ (Press CTRL+C to quit)
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 458-910-377
```



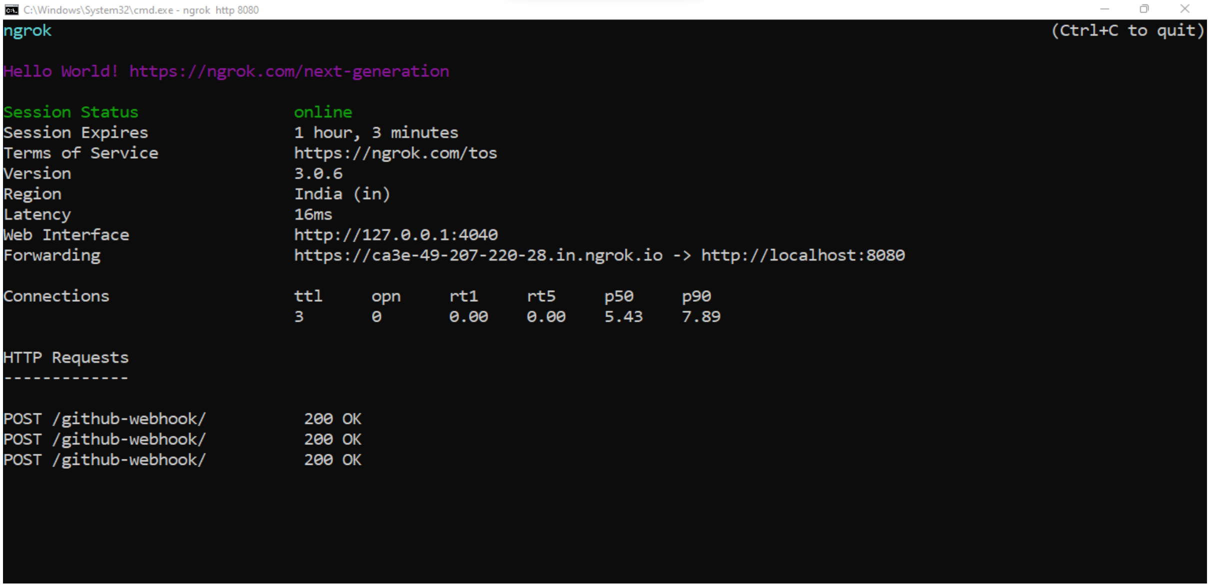
itsuresha / iris1 Public

Commits on Aug 2, 2022

test percentage changed5
itsuresha committed 20 minutes ago — 0d692e5

test percentage changed1
itsuresha committed 28 minutes ago — 9d5c40d

Add files via upload
itsuresha committed 4 hours ago — Verified — bb176e9



```
ngrok                                                                              (Ctrl+C to quit)

Hello World! https://ngrok.com/next-generation

Session Status                online
Session Expires               1 hour, 3 minutes
Terms of Service              https://ngrok.com/tos
Version                       3.0.6
Region                        India (in)
Latency                       16ms
Web Interface                 http://127.0.0.1:4040
Forwarding                    https://ca3e-49-207-220-28.in.ngrok.io -> http://localhost:8080

Connections                   ttl     opn     rt1     rt5     p50     p90
                              3       0       0.00    0.00    5.43    7.89

HTTP Requests
-------------

POST /github-webhook/          200 OK
POST /github-webhook/          200 OK
POST /github-webhook/          200 OK
```