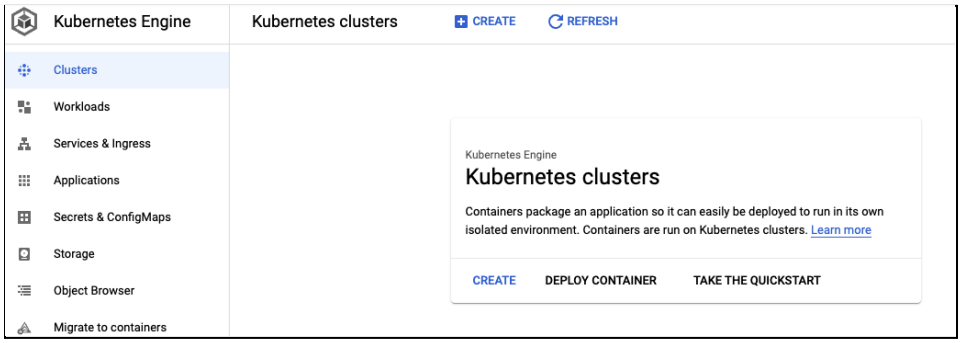
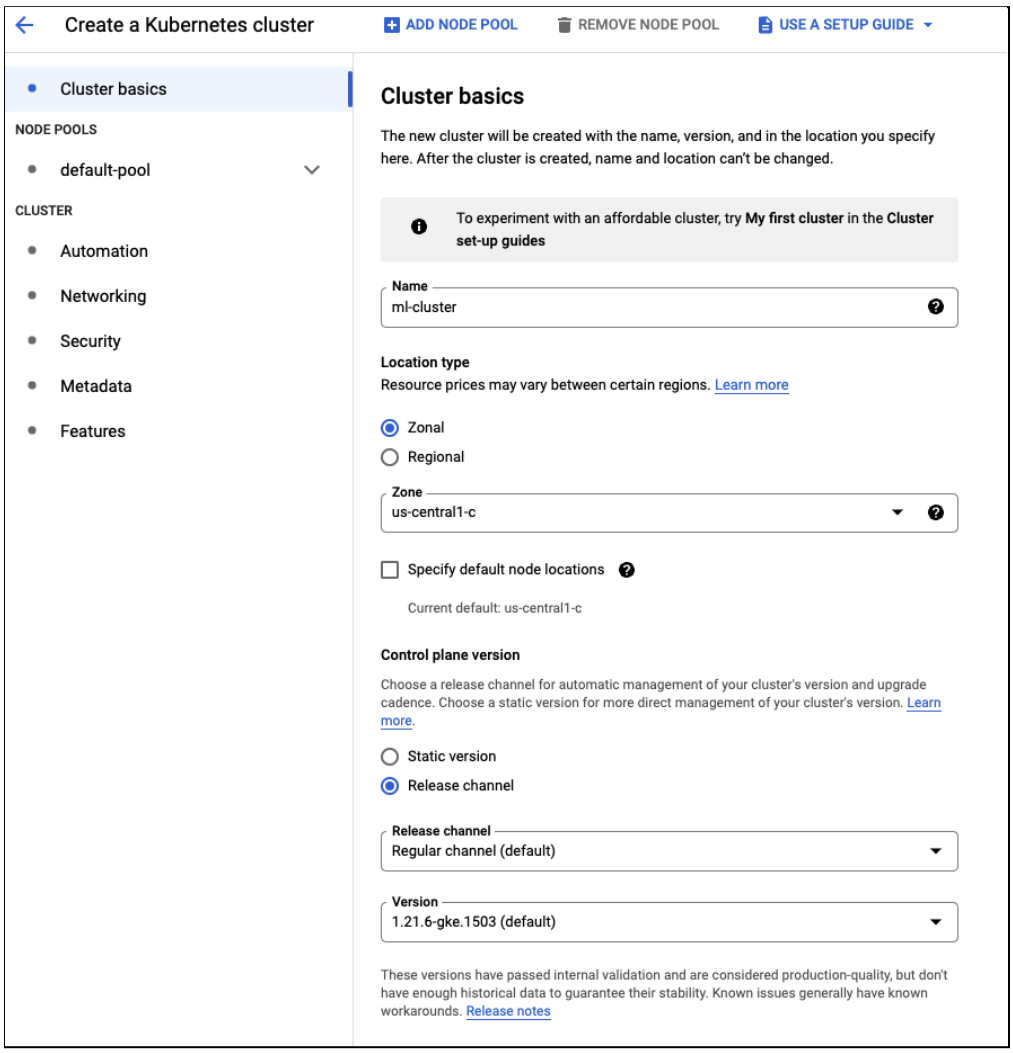
Deploying Automated Essay Scoring System

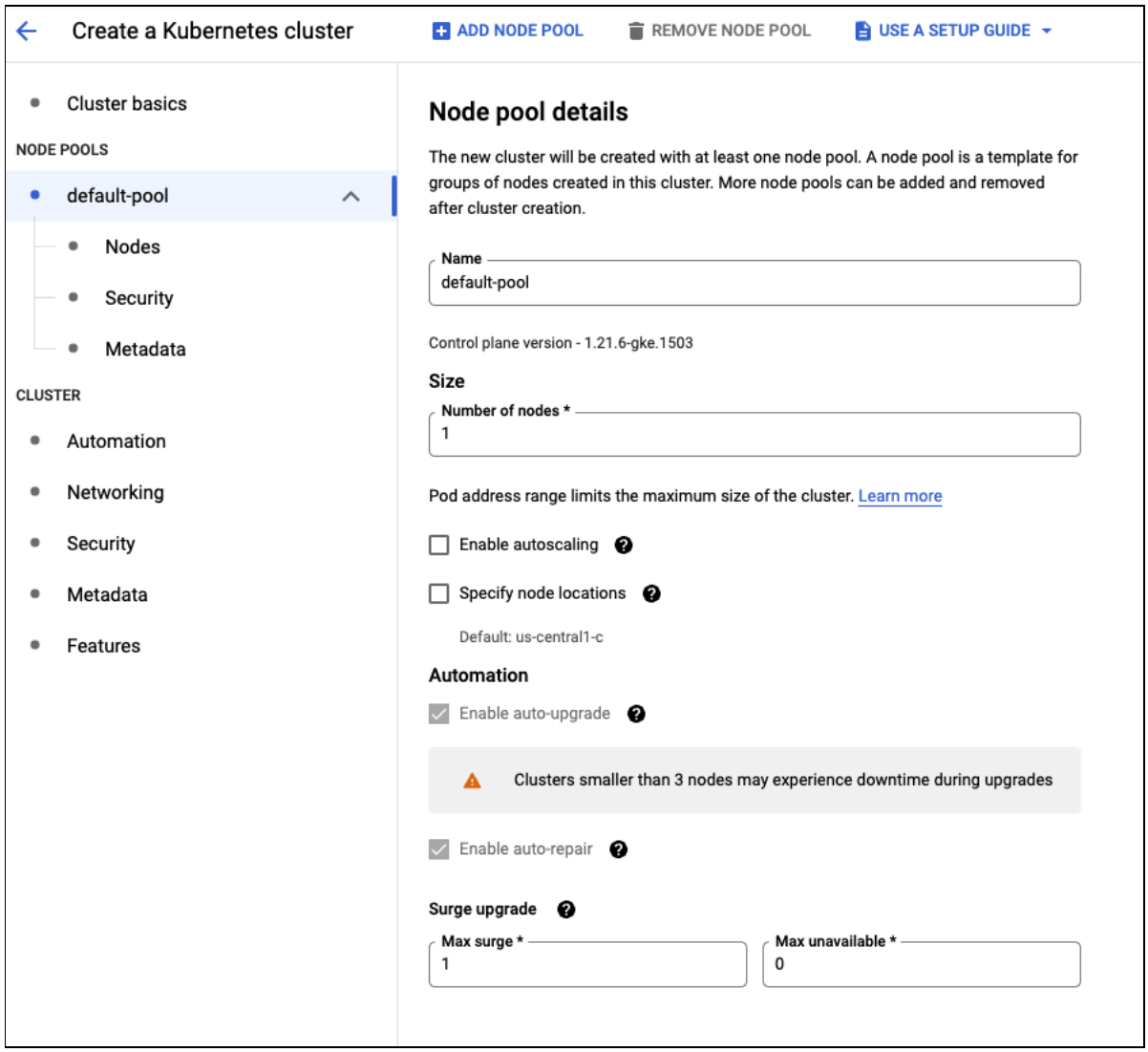
1. Creating a cluster on GKE by using the GCP UI

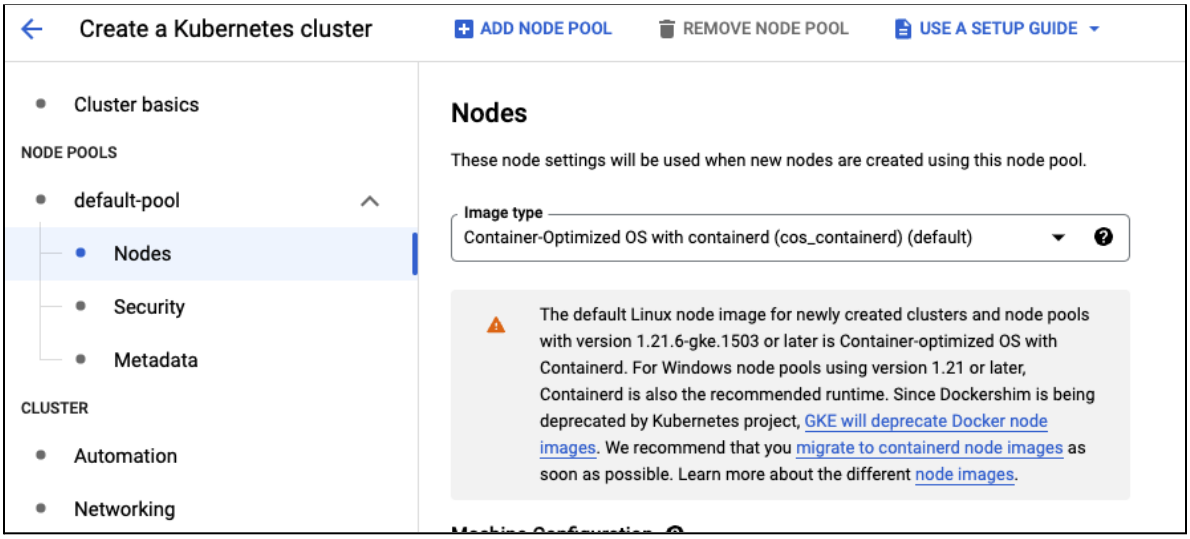
Click Create then choose GKE standart



Configuration is like below:




Create a Kubernetes cluster
ADD NODE POOL
REMOVE NODE POOL
USE A SETUP GUIDE
Cluster basics
NODE POOLS
default-pool
Nodes
Security
Metadata
CLUSTER
Automation
Networking
Security
Metadata
Features
Node pool details
The new cluster will be created with at least one node pool. A node pool is a template for groups of nodes created in this cluster. More node pools can be added and removed after cluster creation.
Name
default-pool
Control plane version - 1.21.6-gke.1503
Size
Number of nodes *
1
Pod address range limits the maximum size of the cluster. Learn more
Enable autoscaling
Specify node locations
Default: us-central1-c
Automation
Enable auto-upgrade
Clusters smaller than 3 nodes may experience downtime during upgrades
Enable auto-repair
Surge upgrade
Max surge *
1
Max unavailable *
0


Create a Kubernetes cluster
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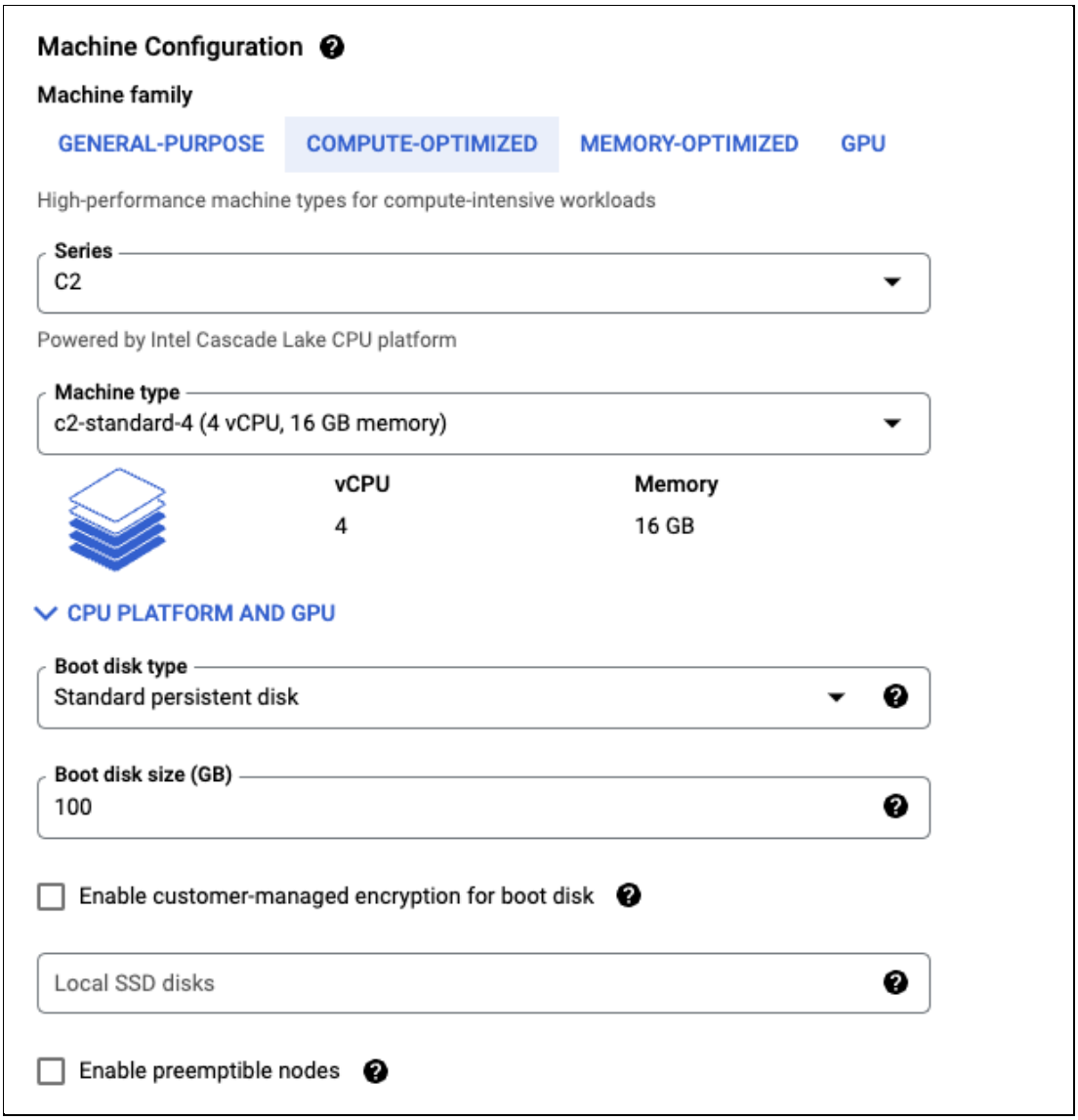
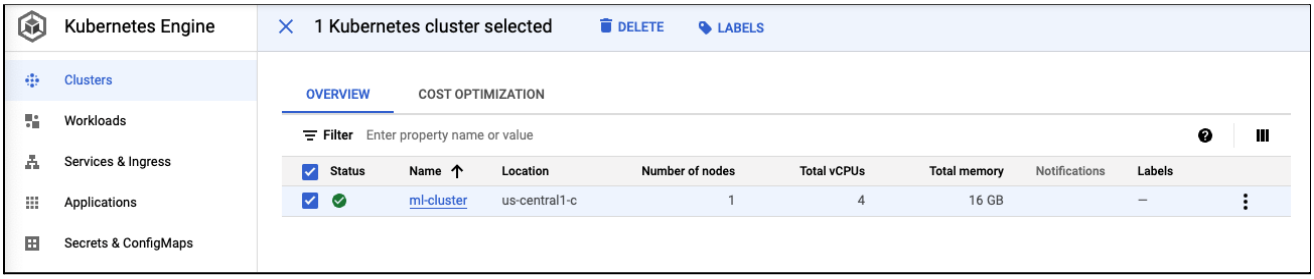
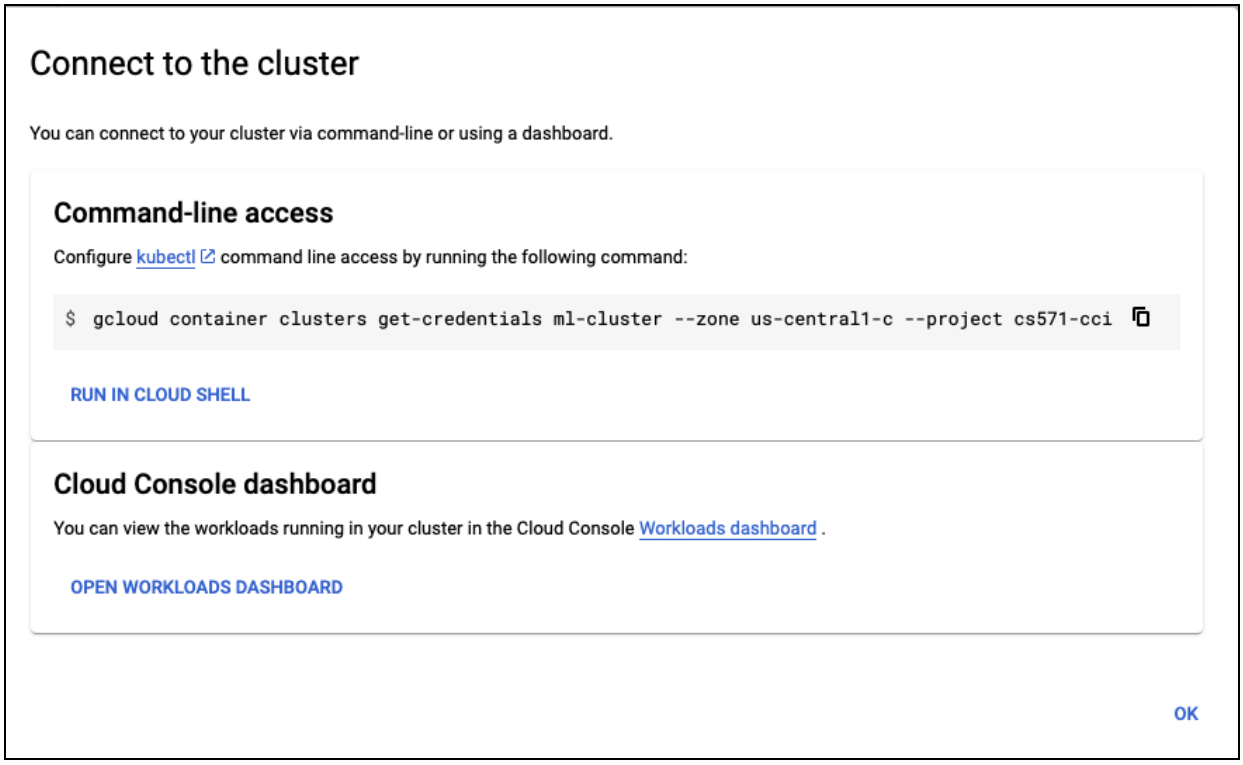
These node settings will be used when new nodes are created using this node pool.
Image type
Container-Optimized OS with containerd (cos_containerd) (default)
The default Linux node image for newly created clusters and node pools with version 1.21.6-gke.1503 or later is Container-optimized OS with Containerd. For Windows node pools using version 1.21 or later, Containerd is also the recommended runtime. Since Dockershim is being deprecated by Kubernetes project, GKE will deprecate Docker node images. We recommend that you migrate to containerd node images as soon as possible. Learn more about the different node images.



Click Create, creating might take 3-4 min. After creation cluster can be seen under Kubernetes Engine -> Clusters



Click 3 dots and select connect.



2. Creating a VM and give permission for kubernetes

Run the following command in cloudshell to create a VM and give permission. More detail here

```
gcloud compute instances create [INSTANCE_NAME] \
    --service-account [SERVICE_ACCOUNT_EMAIL] \
    --scopes [SCOPES,...]
```

Copy the command line access command then run in VM:

```
dabanoglu19588@gcloud:~$ gcloud container clusters get-credentials ml-cluster --zone us-central1-c --project cs571-cci
Fetching cluster endpoint and auth data.
kubeconfig entry generated for ml-cluster.
dabanoglu19588@gcloud:~$
```

2. Miniconda Installation

Download the latest shell script for miniconda installation

```
wget
https://repo.anaconda.com/miniconda/Miniconda3-latest-Linux-x86_
64.sh
```

```
dabanoglu19588@gcloud:~$ wget https://repo.anaconda.com/miniconda/Miniconda3-latest-Linux-x86_64.sh
--2022-04-06 10:47:10--  https://repo.anaconda.com/miniconda/Miniconda3-latest-Linux-x86_64.sh
Resolving repo.anaconda.com (repo.anaconda.com)... 104.16.131.3, 104.16.130.3, 2606:4700::6810:8303, ...
Connecting to repo.anaconda.com (repo.anaconda.com)|104.16.131.3|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 75660608 (72M) [application/x-sh]
Saving to: 'Miniconda3-latest-Linux-x86_64.sh'

Miniconda3-latest-Linux-x86_64.s 100%[=====================================================>]  72.16M   221MB/s    in 0.3s

2022-04-06 10:47:10 (221 MB/s) - 'Miniconda3-latest-Linux-x86_64.sh' saved [75660608/75660608]
```

Make the miniconda installation script executable

`chmod +x Miniconda3-latest-Linux-x86_64.sh`

Run miniconda installation script

`./Miniconda3-latest-Linux-x86_64.sh`

```
Do you accept the license terms? [yes|no]
[no] >>>
Please answer 'yes' or 'no':'
>>>
Please answer 'yes' or 'no':'
>>> yes

Miniconda3 will now be installed into this location:
/home/dabanoglu19588/miniconda3

  - Press ENTER to confirm the location
  - Press CTRL-C to abort the installation
  - Or specify a different location below

[/home/dabanoglu19588/miniconda3] >>>
PREFIX=/home/dabanoglu19588/miniconda3
Unpacking payload ...
Collecting package metadata (current_repodata.json): done
Solving environment: done

## Package Plan ##

  environment location: /home/dabanoglu19588/miniconda3
```

Type Yes

```
Preparing transaction: done
Executing transaction: done
installation finished.
Do you wish the installer to initialize Miniconda3
by running conda init? [yes|no]
[no] >>>
```

```
Thank you for installing Miniconda3!
dabanoglu19588@cloudshell:~ (cs571-cci)$
```

IMPORTANT NOTE!!

Activate conda environment to run conda commands:

```
. <path_to_your_conda_install>/etc/profile.d/conda.sh
```

```
conda activate base
```

```
dabanoglu19588@gcloud:~$ . miniconda3/etc/profile.d/conda.sh
dabanoglu19588@gcloud:~$ conda activate base
(base) dabanoglu19588@gcloud:~$
```

You should see the (base) in the beginning of the line to run conda commands

2. Creating Python Environment by using Miniconda

```
conda create -n myenv python=3.6
conda activate myenv
```

3. Downloading the project from GitHub

```
git clone https://github.com/Quan25/flask-summary.git
final_project
```

```
(myenv) dabanoglu19588@gcloud:~$ git clone https://github.com/Quan25/flask-summary.git final_project
Cloning into 'final_project'...
remote: Enumerating objects: 191, done.
remote: Counting objects: 100% (191/191), done.
remote: Compressing objects: 100% (136/136), done.
remote: Total 191 (delta 91), reused 148 (delta 51), pack-reused 0
Receiving objects: 100% (191/191), 710.58 KiB | 6.64 MiB/s, done.
Resolving deltas: 100% (91/91), done.
```

Go to final_project folder

```
cd final_project
```

Type the following command to download rough.zip to your directory

```
wget --load-cookies /tmp/cookies.txt
"https://docs.google.com/uc?export=download&confirm=$(wget
--quiet --savecookies/tmp/cookies.txt --keep-session-cookies
--no-check-certificate
'https://drive.google.com/file/d/1RxfZOYyNvzvCf37_vABfJMkohAsEZK
```

```
tH/' -O- | sed -rn
's/.confirm=([0-9A-Za-z_]+)./\1\n/p')&id=1RxfZOYyNvzvCf37_vABfJM
kohAsEZKtH" -O rough.zip && rm -rf /tmp/cookies.txt
```

```
(myenv) dabanoglu19588@gcloud:~/final_project$ wget --load-cookies /tmp/cookies.txt "https://docs.google.com/uc?export=download&confirm=$(wget
 --quiet --savecookies/tmp/cookies.txt --keep-session-cookies --no-check-certificate 'https://drive.google.com/file/d/1RxfZOYyNvzvCf37_vABfJMk
ohAsEZKtH/' -O- | sed -rn 's/.confirm=([0-9A-Za-z_]+)./\1\n/p')&id=1RxfZOYyNvzvCf37_vABfJMkohAsEZKtH" -O rough.zip && rm -rf /tmp/cookies.txt
wget: unrecognized option '--savecookies/tmp/cookies.txt'
Usage: wget [OPTION]... [URL]...

Try `wget --help' for more options.
Cannot open cookies file '/tmp/cookies.txt': No such file or directory
--2022-04-06 10:54:22--  https://docs.google.com/uc?export=download&confirm=&id=1RxfZOYyNvzvCf37_vABfJMkohAsEZKtH
Resolving docs.google.com (docs.google.com)... 142.250.152.101, 142.250.152.113, 142.250.152.102, ...
Connecting to docs.google.com (docs.google.com)|142.250.152.101|:443... connected.
HTTP request sent, awaiting response... 303 See Other
Location: https://doc-14-ao-docs.googleusercontent.com/docs/securesc/ha0ro937gcuc7l7deffksulhg5h7mbp1/fogn79i97gealeprfhdccjl3p91u3sqf/1649242425000/09591
049636102722091/*/1RxfZOYyNvzvCf37_vABfJMkohAsEZKtH?e=download [following]
Warning: wildcards not supported in HTTP.
--2022-04-06 10:54:27--  https://doc-14-ao-docs.googleusercontent.com/docs/securesc/ha0ro937gcuc7l7deffksulhg5h7mbp1/fogn79i97gealeprfhdccjl3p91u3sqf/1649
242425000/09591049636102722091/*/1RxfZOYyNvzvCf37_vABfJMkohAsEZKtH?e=download
Resolving doc-14-ao-docs.googleusercontent.com (doc-14-ao-docs.googleusercontent.com)... 142.250.159.132, 2607:f8b0:4001:c58::84
Connecting to doc-14-ao-docs.googleusercontent.com (doc-14-ao-docs.googleusercontent.com)|142.250.159.132|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 3916745 (3.7M) [application/zip]
Saving to: 'rough.zip'

rough.zip                           100%[=================================================================>]   3.73M  --.-KB/s    in 0.02s

2022-04-06 10:54:28 (188 MB/s) - 'rough.zip' saved [3916745/3916745]
```

Unzip the rough.zip:

```
unzip rough.zip
```

4. Installing libxml-parser-perl and perl modules.

This step is required for installing ROUGE-1.5.5

```
sudo apt-get install libxml-parser-perl
```

```
(myenv) dabanoglu19588@gcloud:~/final_project$ sudo apt-get install libxml-parser-perl
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libauthen-sasl-perl libdata-dump-perl libencode-locale-perl libfile-listing-perl libfont-afm-perl libhtml-form-perl
  libhtml-format-perl libhtml-parser-perl libhtml-tagset-perl libhtml-tree-perl libhttp-cookies-perl libhttp-daemon-pe
  libhttp-date-perl libhttp-message-perl libhttp-negotiate-perl libio-html-perl libio-socket-ssl-perl liblwp-mediatype
  liblwp-protocol-https-perl libmailtools-perl libnet-http-perl libnet-smtp-ssl-perl libnet-ssleay-perl libtimedate-pe
  libtry-tiny-perl liburi-perl libwww-perl libwww-robotrules-perl perl-openssl-defaults
Suggested packages:
  libdigest-hmac-perl libgssapi-perl libcrypt-ssleay-perl libauthen-ntlm-perl
The following NEW packages will be installed:
  libauthen-sasl-perl libdata-dump-perl libencode-locale-perl libfile-listing-perl libfont-afm-perl libhtml-form-perl
  libhtml-format-perl libhtml-parser-perl libhtml-tagset-perl libhtml-tree-perl libhttp-cookies-perl libhttp-daemon-pe
  libhttp-date-perl libhttp-message-perl libhttp-negotiate-perl libio-html-perl libio-socket-ssl-perl liblwp-mediatype
  liblwp-protocol-https-perl libmailtools-perl libnet-http-perl libnet-smtp-ssl-perl libnet-ssleay-perl libtimedate-pe
  libtry-tiny-perl liburi-perl libwww-perl libwww-robotrules-perl libxml-parser-perl perl-openssl-defaults
```

```
sudo cpan install XML::Parser::PerlSAX
```

```
(myenv) dabanoglu19588@gcloud:~/final_project$ sudo cpan install XML::Parser::PerlSAX
Loading internal logger. Log::Log4perl recommended for better logging

CPAN.pm requires configuration, but most of it can be done automatically.
If you answer 'no' below, you will enter an interactive dialog for each
```

```
sudo cpan install XML::RegExp
```

```
(myenv) dabanoglu19588@gcloud:~/final_project/RELEASE-1.5.5$ sudo cpan install XML::RegExp
Loading internal logger. Log::Log4perl recommended for better logging
Reading '/root/.cpan/Metadata'
  Database was generated on Wed, 06 Apr 2022 10:41:03 GMT
Running install for module 'XML::RegExp'
Fetching with LWP:
http://www.cpan.org/authors/id/T/TJ/TJMATHER/XML-RegExp-0.04.tar.gz
Fetching with LWP:
http://www.cpan.org/authors/id/T/TJ/TJMATHER/CHECKSUMS
Checksum for /root/.cpan/sources/authors/id/T/TJ/TJMATHER/XML-RegExp-0.04.tar.gz ok
'YAML' not installed, will not store persistent state
Configuring T/TJ/TJMATHER/XML-RegExp-0.04.tar.gz with Makefile.PL
Checking if your kit is complete...
Looks good
Generating a Unix-style Makefile
Writing Makefile for XML::RegExp
Writing MYMETA.yml and MYMETA.json
  TJMATHER/XML-RegExp-0.04.tar.gz
  /usr/bin/perl Makefile.PL INSTALLDIRS=site -- OK
Running make for T/TJ/TJMATHER/XML-RegExp-0.04.tar.gz
```

`sudo cpan install XML::DOM`

```
(myenv) dabanoglu19588@gcloud:~/final_project/RELEASE-1.5.5$ sudo cpan install XML::DOM
Loading internal logger. Log::Log4perl recommended for better logging
Reading '/root/.cpan/Metadata'
  Database was generated on Wed, 06 Apr 2022 10:41:03 GMT
Running install for module 'XML::DOM'
Fetching with LWP:
http://www.cpan.org/authors/id/T/TJ/TJMATHER/XML-DOM-1.46.tar.gz
Checksum for /root/.cpan/sources/authors/id/T/TJ/TJMATHER/XML-DOM-1.46.tar.gz ok
'YAML' not installed, will not store persistent state
Configuring T/TJ/TJMATHER/XML-DOM-1.46.tar.gz with Makefile.PL
Checking if your kit is complete...
Looks good
```

Run following to check if ROUGE is successfully installed

`./runROUGE-test.pl`

```
(myenv) dabanoglu19588@gcloud:~/final_project/RELEASE-1.5.5$ ./runROUGE-test.pl
../ROUGE-1.5.5.pl -e ../data -c 95 -2 -1 -U -r 1000 -n 4 -w 1.2 -a ROUGE-test.xml > ../sample-output/ROUGE-test-c95-2-1-U-r1000-
n4-w1.2-a.out
../ROUGE-1.5.5.pl -e ../data -c 95 -2 -1 -U -r 1000 -n 4 -w 1.2 -a -m ROUGE-test.xml > ../sample-output/ROUGE-test-c95-2-1-U-r10
00-n4-w1.2-a-m.out
../ROUGE-1.5.5.pl -e ../data -c 95 -2 -1 -U -r 1000 -n 4 -w 1.2 -a -m -s ROUGE-test.xml > ../sample-output/ROUGE-test-c95-2-1-U-
r1000-n4-w1.2-a-m-s.out
../ROUGE-1.5.5.pl -e ../data -c 95 -2 -1 -U -r 1000 -n 4 -w 1.2 -l 10 -a ROUGE-test.xml > ../sample-output/ROUGE-test-c95-2-1-U-
r1000-n4-w1.2-l10-a.out
../ROUGE-1.5.5.pl -e ../data -c 95 -2 -1 -U -r 1000 -n 4 -w 1.2 -l 10 -a -m ROUGE-test.xml > ../sample-output/ROUGE-test-c95-2-1
-U-r1000-n4-w1.2-l10-a-m.out
../ROUGE-1.5.5.pl -e ../data -c 95 -2 -1 -U -r 1000 -n 4 -w 1.2 -l 10 -a -m -s ROUGE-test.xml > ../sample-output/ROUGE-test-c95-
2-1-U-r1000-n4-w1.2-l10-a-m-s.out
../ROUGE-1.5.5.pl -e ../data -c 95 -2 -1 -U -r 1000 -n 4 -w 1.2 -b 75 -a ROUGE-test.xml > ../sample-output/ROUGE-test-c95-2-1-U-
r1000-n4-w1.2-b75-a.out
../ROUGE-1.5.5.pl -e ../data -c 95 -2 -1 -U -r 1000 -n 4 -w 1.2 -b 75 -a -m ROUGE-test.xml > ../sample-output/ROUGE-test-c95-2-1
-U-r1000-n4-w1.2-b75-a-m.out
../ROUGE-1.5.5.pl -e ../data -c 95 -2 -1 -U -r 1000 -n 4 -w 1.2 -b 75 -a -m -s ROUGE-test.xml > ../sample-output/ROUGE-test-c95-
2-1-U-r1000-n4-w1.2-b75-a-m-s.out
../ROUGE-1.5.5.pl -e ../data -3 HM -z SIMPLE DUC2002-BE-F.in.26.lst 26 > ../sample-output/DUC2002-BE-F.in.26.lst.out
../ROUGE-1.5.5.pl -e ../data -3 HM DUC2002-BE-F.in.26.simple.xml 26 > ../sample-output/DUC2002-BE-F.in.26.simple.out
../ROUGE-1.5.5.pl -e ../data -3 HM -z SIMPLE DUC2002-BE-L.in.26.lst 26 > ../sample-output/DUC2002-BE-L.in.26.lst.out
../ROUGE-1.5.5.pl -e ../data -3 HM DUC2002-BE-L.in.26.simple.xml 26 > ../sample-output/DUC2002-BE-L.in.26.simple.out
../ROUGE-1.5.5.pl -e ../data -n 4 -z SPL DUC2002-ROUGE.in.26.spl.lst 26 > ../sample-output/DUC2002-ROUGE.in.26.spl.lst.out
../ROUGE-1.5.5.pl -e ../data -n 4 DUC2002-ROUGE.in.26.spl.xml 26 > ../sample-output/DUC2002-ROUGE.in.26.spl.out
```

4. Installing pyrouge

`git clone https://github.com/bheinzerling/pyrouge.git`

`cd pyrouge`

```
(myenv) dabanoglu19588@gcloud:~/final_project/RELEASE-1.5.5$ git clone https://github.com/bheinzerling/pyrouge.git
Cloning into 'pyrouge'...
remote: Enumerating objects: 551, done.
remote: Total 551 (delta 0), reused 0 (delta 0), pack-reused 551
Receiving objects: 100% (551/551), 123.17 KiB | 1.64 MiB/s, done.
Resolving deltas: 100% (198/198), done.
(myenv) dabanoglu19588@gcloud:~/final_project/RELEASE-1.5.5$ cd pyrouge
(myenv) dabanoglu19588@gcloud:~/final_project/RELEASE-1.5.5/pyrouge$
```

pip install -e .

```
(myenv) dabanoglu19588@gcloud:~/final_project/RELEASE-1.5.5/pyrouge$ pip install -e .
Obtaining file:///home/dabanoglu19588/final_project/RELEASE-1.5.5/pyrouge
Installing collected packages: pyrouge
  Running setup.py develop for pyrouge
Successfully installed pyrouge-0.1.3
(myenv) dabanoglu19588@gcloud:~/final_project/RELEASE-1.5.5/pyrouge$
```

5. Installing pytorch

conda install pytorch-cpu==1.1.0 torchvision-cpu==0.3.0 cpuonly -c pytorch

```
Proceed ([y]/n)? y


Downloading and Extracting Packages
blas-1.0            | 6 KB      | ########################################################################################################################## | 100
pillow-8.3.1        | 637 KB    | ########################################################################################################################## | 100
openjpeg-2.4.0      | 331 KB    | ########################################################################################################################## | 100
numpy-1.19.2        | 22 KB     | ########################################################################################################################## | 100
libtiff-4.2.0       | 502 KB    | ########################################################################################################################## | 100
lz4-c-1.9.3         | 185 KB    | ########################################################################################################################## | 100
ninja-1.10.2        | 1.5 MB    | ########################################################################################################################## | 100
certifi-2021.5.30   | 139 KB    | ########################################################################################################################## | 100
libwebp-base-1.2.2  | 440 KB    | ########################################################################################################################## | 100
torchvision-cpu-0.3. | 3.8 MB    | ########################################################################################################################## | 100
cpuonly-2.0         | 2 KB      | ########################################################################################################################## | 100
mkl-service-2.3.0   | 52 KB     | ########################################################################################################################## | 100
mkl-2020.2          | 138.3 MB  | ########################################################################################################################## | 100
jpeg-9d             | 232 KB    | ########################################################################################################################## | 100
mkl_fft-1.3.0       | 170 KB    | ########################################################################################################################## | 100
mkl_random-1.1.1    | 327 KB    | ########################################################################################################################## | 100
intel-openmp-2022.0. | 4.2 MB    | ########################################################################################################################## | 100
cffi-1.14.6         | 220 KB    | ########################################################################################################################## | 100
freetype-2.11.0     | 618 KB    | ########################################################################################################################## | 100
six-1.16.0          | 18 KB     | ########################################################################################################################## | 100
zstd-1.4.9          | 480 KB    | ########################################################################################################################## | 100
lcms2-2.12          | 312 KB    | ########################################################################################################################## | 100
pytorch-cpu-1.1.0   | 53.5 MB   | ########################################################################################################################## | 100
libpng-1.6.37       | 278 KB    | ########################################################################################################################## | 100
numpy-base-1.19.2   | 4.1 MB    | ########################################################################################################################## | 100
olefile-0.46        | 48 KB     | ########################################################################################################################## | 100
pytorch-mutex-1.0   | 3 KB      | ########################################################################################################################## | 100
Preparing transaction: done
Verifying transaction: done
Executing transaction: done
```

5. Downloading the pretrained-bert-model into final_project folder

wget https://s3.amazonaws.com/models.huggingface.co/bert/bert-large-uncased.tar.gz

```
(myenv) dabanoglu19588@gcloud:~/final_project/RELEASE-1.5.5$ cd ..
(myenv) dabanoglu19588@gcloud:~/final_project$ wget https://s3.amazonaws.com/models.huggingface.co/bert/bert-large-uncased.tar.gz
--2022-04-06 11:16:26--  https://s3.amazonaws.com/models.huggingface.co/bert/bert-large-uncased.tar.gz
Resolving s3.amazonaws.com (s3.amazonaws.com)... 52.217.44.102
Connecting to s3.amazonaws.com (s3.amazonaws.com)|52.217.44.102|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1248501532 (1.2G) [application/x-tar]
Saving to: 'bert-large-uncased.tar.gz'

bert-large-uncased.tar.gz               100%[=====================================================================================>]   1.16G  39.4MB/s    in 29s

2022-04-06 11:16:56 (41.4 MB/s) - 'bert-large-uncased.tar.gz' saved [1248501532/1248501532]
```

Go to summarizer folder and change BertParent.py file like below:

```
self.model =
BertModel.from_pretrained('YOUR_PROJECT_Directory/bert-largeuncased.ta
r.gz')
```

```
cd summarizer
vim BertParent.py
```

```
def __init__(self, model_type: str, size: str):
    #self.model = self.model_handler[model_type].from_pretrained(self.size_handler[size][model_type])
    self.model = BertModel.from_pretrained('final_project/bert-large-uncased.tar.gz')
    self.tokenizer = self.token_handler[model_type].from_pretrained(self.size_handler[size][model_type])
    self.vector_size = self.vector_handler[size][model_type]
    self.model_type = model_type
    self.model.eval()
```

6. Installing required packages

```
pip3 install flask
pip3 install pandas
pip3 install sklearn
pip3 install nltk
pip3 install gensim==3.8.3
pip3 install pytorch-pretrained-bert
pip3 install matplotlib==3.0.0
```

Download punkt package with nltk

```
python3
```

```
import nltk
nltk.download('punkt')
exit()
```

```
(myenv) dabanoglu19588@gcloud:~/final_project/summarizer$ python3
Python 3.6.13 |Anaconda, Inc.| (default, Jun  4 2021, 14:25:59)
[GCC 7.5.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import nltk
>>> nltk.download('punkt')
[nltk_data] Downloading package punkt to
[nltk_data]     /home/dabanoglu19588/nltk_data...
[nltk_data]   Unzipping tokenizers/punkt.zip.
True
>>> exit()
(myenv) dabanoglu19588@gcloud:~/final_project/summarizer$
```

7. Running the application

```
python3 app.py
```

```
(myenv) dabanoglu19588@gcloud:~/final_project$ python3  app.py
 * Serving Flask app 'app' (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
WARNING:werkzeug: * Running on all addresses.
   WARNING: This is a development server. Do not use it in a production deployment.
INFO:werkzeug: * Running on http://10.128.0.28:5000/ (Press CTRL+C to quit)
INFO:werkzeug: * Restarting with stat
WARNING:werkzeug: * Debugger is active!
```

As you can see it is running. Now we need to access this service from everywhere. We need to reserve a static IP to this virtual machine and open a port.

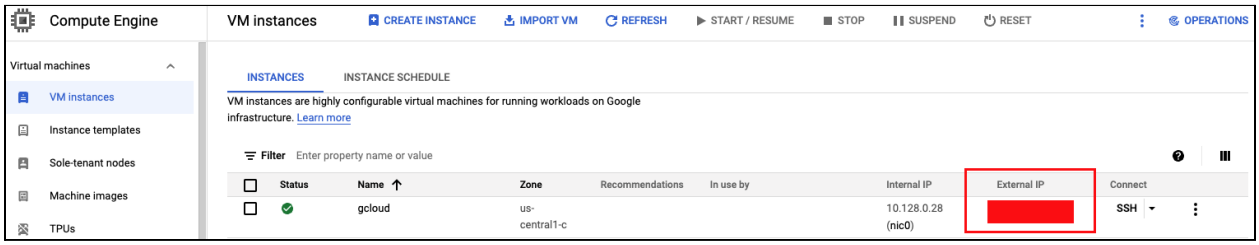
8. Reserving an Static IP address and Opening a Port

Go to VPC network -> External IP addresses -> click RESERVE STATIC ADDRESS on the top menu

I reserved an address with configuration below

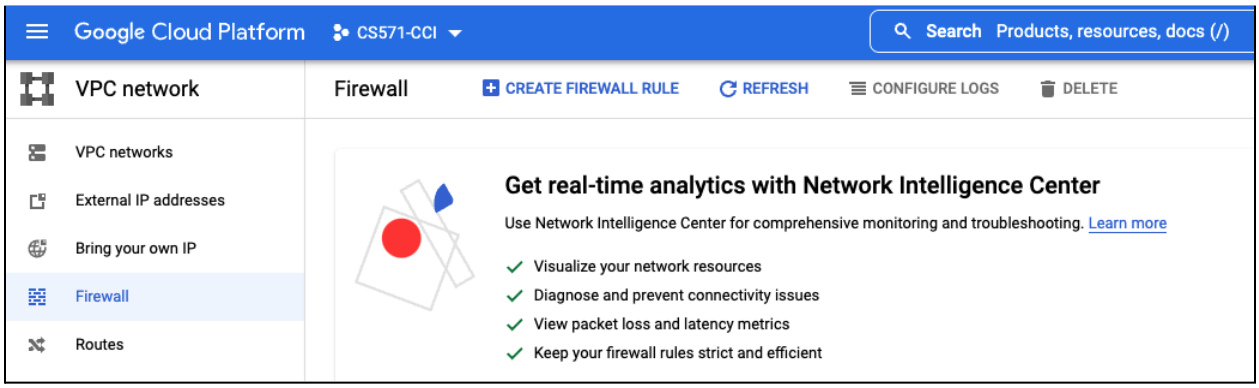
1. Enter a name for the address
2. Network Service Tier : Standart
3. IP version : IPv4
4. Type: Regional

After these steps GCP will assign your device a static IP. You can see that on VM instances page

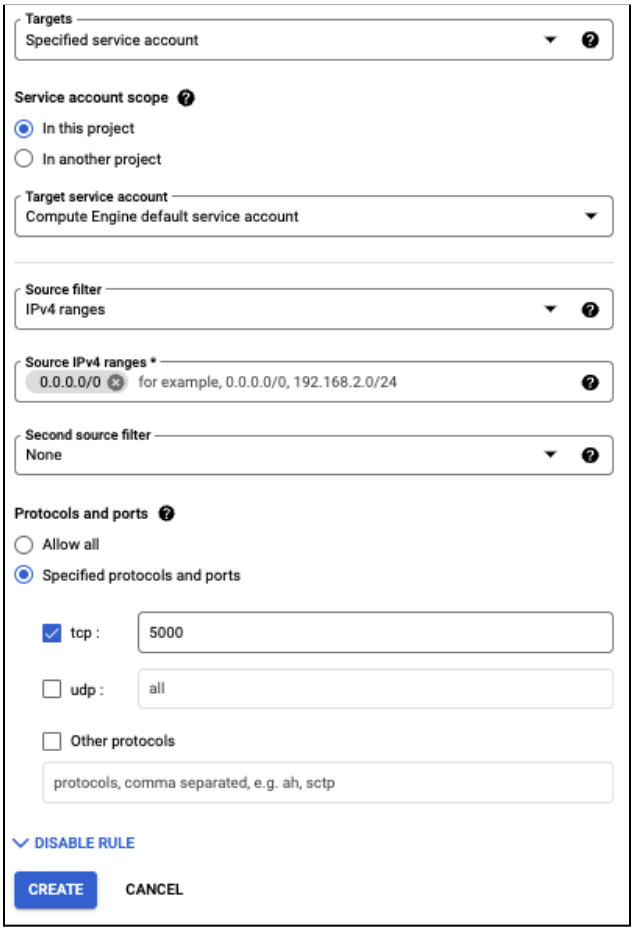


Second step is open a port by Creating a firewall rule

Go to VPC network -> Firewall -> click CREATE FIREWALL RULE on the top menu



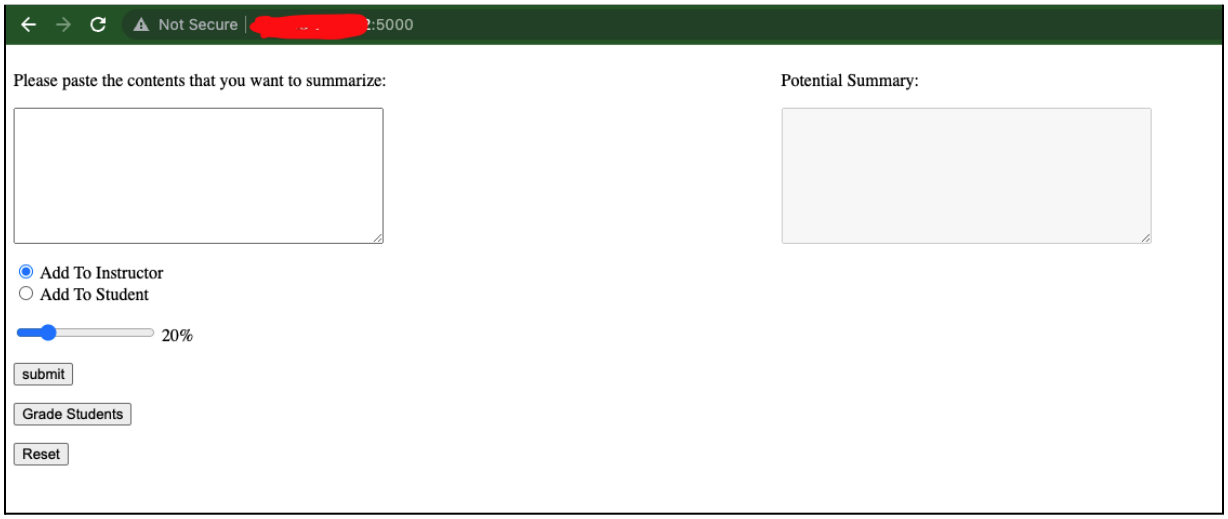
The application is running on port number 5000 so I use following configuration:



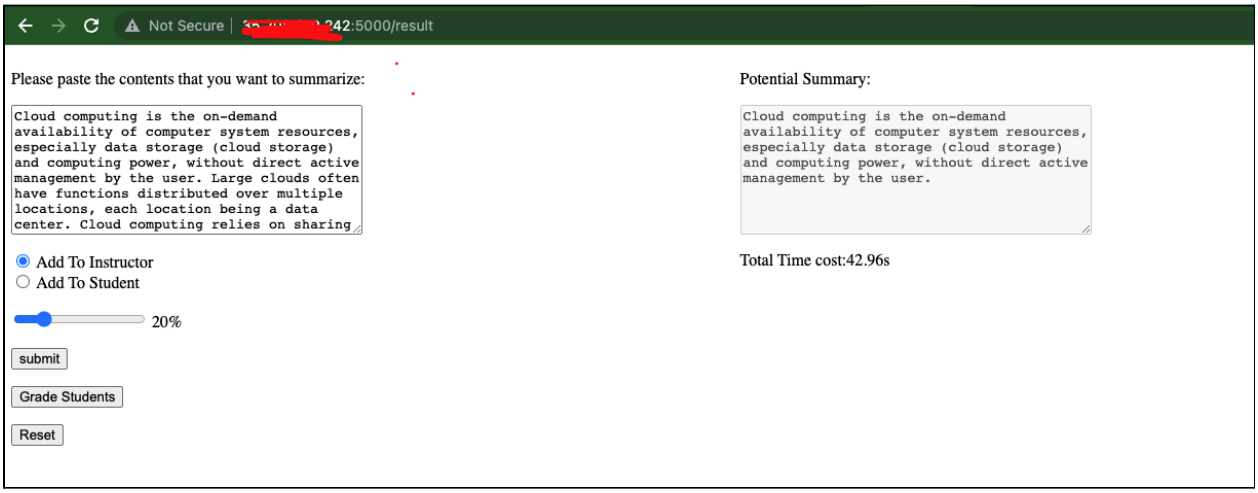
Click create to create a firewall rule.

9. Accessing the service.

Go to another browser and enter following address : <Your-VM-StaticIP:5000->



Enter an article to summarize:



If everything goes well, the app is running on the VM.