1. Crear una máquina virtual Linux, preferiblemente con java.

2. Revisar la instancia de la máquina

3. Conectarse a la maquina virtual.

4. Conectarse a la máquina, una forma de hacerlo desde windows es con gitbash.

```
ec2-user@ip-172-31-37-253:~                                                    —    □    ✕

willson@DESKTOP-3V142AS MINGW64 ~/Downloads
$ chmod 400        pem

willson@DESKTOP-3V142AS MINGW64 ~/Downloads
$ ssh -i "        pem" ec2-user@ec2-52-91-223-35.compute-1.amazonaws.com
The authenticity of host 'ec2-52-91-223-35.compute-1.amazonaws.com (52.91.223.35)' can't be established.
ECDSA key fingerprint is
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-52-91-223-35.compute-1.amazonaws.com,52.91.223.35' (ECDSA) to the list of known hosts.

       __|  __|_  )
       _|  (     /   Amazon Linux AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/
4 package(s) needed for security, out of 10 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-37-253 ~]$ sudo yum install java-1.8.0
Loaded plugins: priorities, update-motd, upgrade-helper
amzn-main                                                              | 2.1 kB  00:00:00
amzn-updates                                                           | 2.5 kB  00:00:00
Resolving Dependencies
--> Running transaction check
---> Package java-1.8.0-openjdk.x86_64 1:1.8.0.242.b08-0.50.amzn1 will be installed
--> Processing Dependency: java-1.8.0-openjdk-headless(x86-64) = 1:1.8.0.242.b08-0.50.amzn1 for package: 1:java-1.8.0-openjdk-1.8.0.24
2.b08-0.50.amzn1.x86_64
--> Running transaction check
---> Package java-1.8.0-openjdk-headless.x86_64 1:1.8.0.242.b08-0.50.amzn1 will be installed
amzn-main/latest/filelists_db                                          | 5.7 MB  00:00:00
amzn-updates/latest/filelists_db                                       |  13 MB  00:00:01
--> Processing Dependency: lksctp-tools(x86-64) for package: 1:java-1.8.0-openjdk-headless-1.8.0.242.b08-0.50.amzn1.x86_64
--> Processing Dependency: cups-libs(x86-64) for package: 1:java-1.8.0-openjdk-headless-1.8.0.242.b08-0.50.amzn1.x86_64
--> Running transaction check
---> Package cups-libs.x86_64 1:1.4.2-67.21.amzn1 will be installed
--> Processing Dependency: libtiff.so.5(LIBTIFF_4.0)(64bit) for package: 1:cups-libs-1.4.2-67.21.amzn1.x86_64
--> Processing Dependency: libgnutls.so.26(GNUTLS_1_4)(64bit) for package: 1:cups-libs-1.4.2-67.21.amzn1.x86_64
--> Processing Dependency: libtiff.so.5()(64bit) for package: 1:cups-libs-1.4.2-67.21.amzn1.x86_64
--> Processing Dependency: libgnutls.so.26()(64bit) for package: 1:cups-libs-1.4.2-67.21.amzn1.x86_64
--> Processing Dependency: libavahi-common.so.3()(64bit) for package: 1:cups-libs-1.4.2-67.21.amzn1.x86_64
--> Processing Dependency: libavahi-client.so.3()(64bit) for package: 1:cups-libs-1.4.2-67.21.amzn1.x86_64
---> Package lksctp-tools.x86_64 0:1.0.10-7.7.amzn1 will be installed
--> Running transaction check
---> Package avahi-libs.x86_64 0:0.6.25-12.17.amzn1 will be installed
---> Package gnutls.x86_64 0:2.12.23-21.18.amzn1 will be installed
---> Package libtiff.x86_64 0:4.0.3-32.34.amzn1 will be installed
--> Processing Dependency: libjbig.so.2.0()(64bit) for package: libtiff-4.0.3-32.34.amzn1.x86_64
--> Running transaction check
---> Package jbigkit-libs.x86_64 0:2.0-11.4.amzn1 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

================================================================================================================
 Package                      Arch          Version                        Repository          Size
================================================================================================================
Installing:
 java-1.8.0-openjdk           x86_64        1:1.8.0.242.b08-0.50.amzn1     amzn-updates       322 k
Installing for dependencies:
 avahi-libs                   x86_64        0.6.25-12.17.amzn1             amzn-main           64 k
 cups-libs                    x86_64        1:1.4.2-67.21.amzn1            amzn-main          364 k
 gnutls                       x86_64        2.12.23-21.18.amzn1            amzn-main          450 k
 java-1.8.0-openjdk-headless  x86_64        1:1.8.0.242.b08-0.50.amzn1     amzn-updates        40 M
 jbigkit-libs                 x86_64        2.0-11.4.amzn1                 amzn-main           47 k
 libtiff                      x86_64        4.0.3-32.34.amzn1              amzn-updates       439 k
 lksctp-tools                 x86_64        1.0.10-7.7.amzn1               amzn-main           89 k

Transaction Summary
================================================================================================================
Install  1 Package (+7 Dependent packages)
```
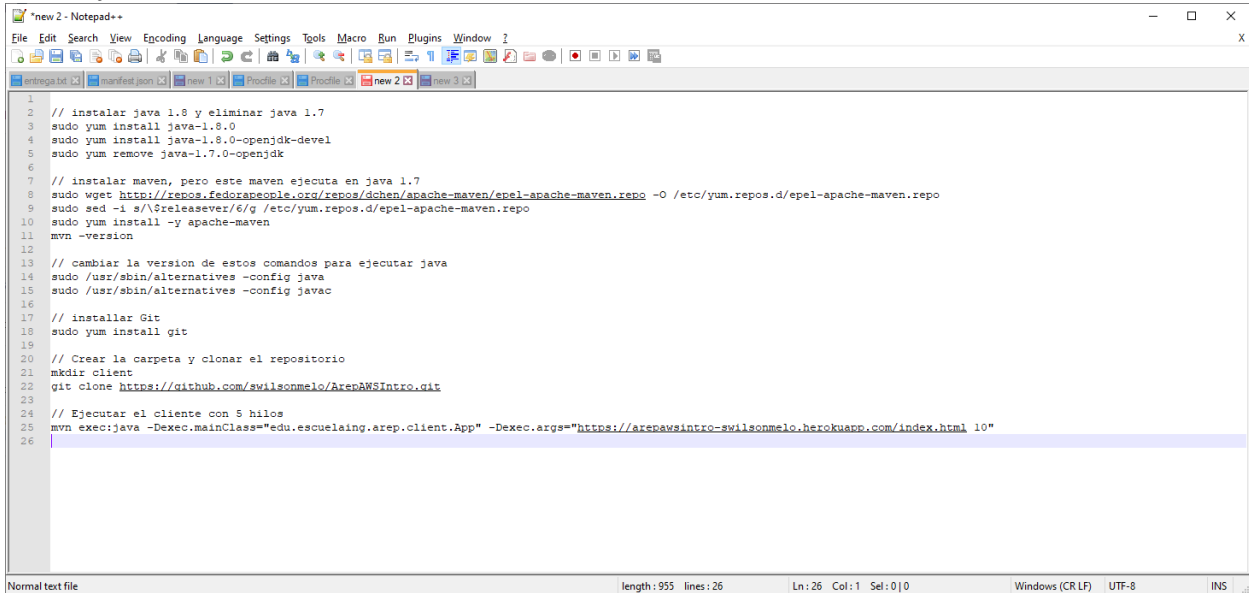
5. Instalar java 8, agregar el jdk de java 8, eliminar java 7, instalar maven, configurar los comandos java y javac para que funcionen con java 8, clonar el repositorio y hacer un mvn exec para ejecutar el cliente.

// instalar java 1.8 y eliminar java 1.7

sudo yum install java-1.8.0

sudo yum install java-1.8.0-openjdk-devel

sudo yum remove java-1.7.0-openjdk

// instalar maven, pero este maven ejecuta en java 1.7

sudo wget http://repos.fedorapeople.org/repos/dchen/apache-maven/epel-apache-maven.repo -O /etc/yum.repos.d/epel-apache-maven.repo

sudo sed -i s/\$releasever/6/g /etc/yum.repos.d/epel-apache-maven.repo

sudo yum install -y apache-maven

mvn –version

// cambiar la version de estos comandos para ejecutar java

sudo /usr/sbin/alternatives –config java

sudo /usr/sbin/alternatives –config javac

// installar Git

sudo yum install git

// Crear la carpeta y clonar el repositorio

mkdir client

git clone https://github.com/swilsonmelo/ArepAWSIntro.git

// Ejecutar el cliente con 5 hilos

mvn exec:java -Dexec.mainClass="edu.escuelaing.arep.client.App" -Dexec.args="https://arepawsintro-swilsonmelo.herokuapp.com/index.html 10"

6. Ejecutar el cliente haciendo una petición al servidor en heroku obteniendo el index.html y con 10 hilos

7. Después de probar el servidor hacer las pruebas necesarias para obtener las gráficas y salir de la máquina con el comando exit.

```
MINGW64:/c/Users/willson/Downloads                                        —    □    ×
[INFO] -----------------------------------------------------------------
[ec2-user@ip-172-31-37-253 ArepAWSIntro]$ mvn exec:java -Dexec.mainClass="edu.escuelaing.arep.client.App" -Dexec.args="https://arepaws
intro-swilsonmelo.herokuapp.com/java.png 500"
[INFO] Scanning for projects...
[WARNING]
[WARNING] Some problems were encountered while building the effective model for edu.escuelaing.arep.app:ArepAWSIntro:jar:1.0-SNAPSHOT
[WARNING] 'dependencies.dependency.(groupId:artifactId:type:classifier)' must be unique: junit:junit:jar -> version 3.8.1 vs 4.12 @ li
ne 23, column 21
[WARNING]
[WARNING] It is highly recommended to fix these problems because they threaten the stability of your build.
[WARNING]
[WARNING] For this reason, future Maven versions might no longer support building such malformed projects.
[WARNING]
[INFO]
[INFO] -----------------------------------------------------------------
[INFO] Building ArepAWSIntro 1.0-SNAPSHOT
[INFO] -----------------------------------------------------------------
[INFO]
[INFO] >>> exec-maven-plugin:1.2.1:java (default-cli) > validate @ ArepAWSIntro >>>
[INFO]
[INFO] <<< exec-maven-plugin:1.2.1:java (default-cli) < validate @ ArepAWSIntro <<<
[INFO]
[INFO]
[INFO] --- exec-maven-plugin:1.2.1:java (default-cli) @ ArepAWSIntro ---
https://arepawsintro-swilsonmelo.herokuapp.com/java.png 500
Time(seconds): 22012 22.012
[INFO] -----------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] -----------------------------------------------------------------
[INFO] Total time: 22.909 s
[INFO] Finished at: 2020-03-10T05:43:00Z
[INFO] Final Memory: 8M/29M
[INFO] -----------------------------------------------------------------
[ec2-user@ip-172-31-37-253 ArepAWSIntro]$ mvn exec:java -Dexec.mainClass="edu.escuelaing.arep.client.App" -Dexec.args="https://arepaws
intro-swilsonmelo.herokuapp.com/java.png 1000"
[INFO] Scanning for projects...
[WARNING]
[WARNING] Some problems were encountered while building the effective model for edu.escuelaing.arep.app:ArepAWSIntro:jar:1.0-SNAPSHOT
[WARNING] 'dependencies.dependency.(groupId:artifactId:type:classifier)' must be unique: junit:junit:jar -> version 3.8.1 vs 4.12 @ li
ne 23, column 21
[WARNING]
[WARNING] It is highly recommended to fix these problems because they threaten the stability of your build.
[WARNING]
[WARNING] For this reason, future Maven versions might no longer support building such malformed projects.
[WARNING]
[INFO]
[INFO] -----------------------------------------------------------------
[INFO] Building ArepAWSIntro 1.0-SNAPSHOT
[INFO] -----------------------------------------------------------------
[INFO]
[INFO] >>> exec-maven-plugin:1.2.1:java (default-cli) > validate @ ArepAWSIntro >>>
[INFO]
[INFO] <<< exec-maven-plugin:1.2.1:java (default-cli) < validate @ ArepAWSIntro <<<
[INFO]
[INFO]
[INFO] --- exec-maven-plugin:1.2.1:java (default-cli) @ ArepAWSIntro ---
https://arepawsintro-swilsonmelo.herokuapp.com/java.png 1000
Time(seconds): 73894 73.894
[INFO] -----------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] -----------------------------------------------------------------
[INFO] Total time: 01:14 min
[INFO] Finished at: 2020-03-10T05:44:38Z
[INFO] Final Memory: 8M/30M
[INFO] -----------------------------------------------------------------
[ec2-user@ip-172-31-37-253 ArepAWSIntro]$ exit
logout
Connection to ec2-52-91-223-35.compute-1.amazonaws.com closed.

willson@DESKTOP-3V142AS MINGW64 ~/Downloads
$ |
```
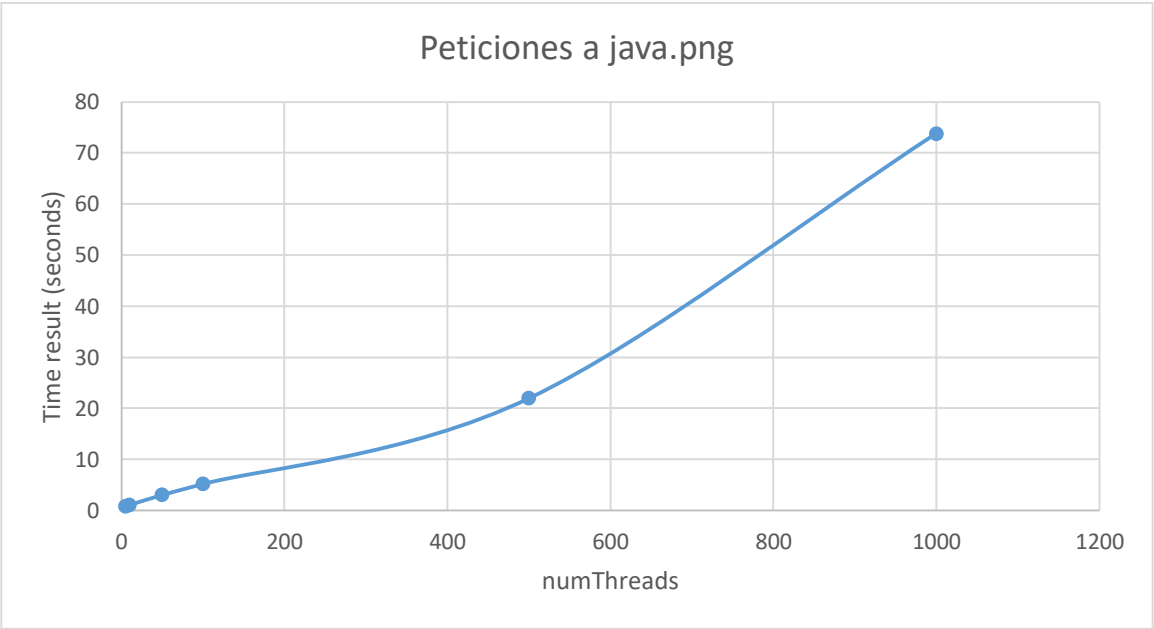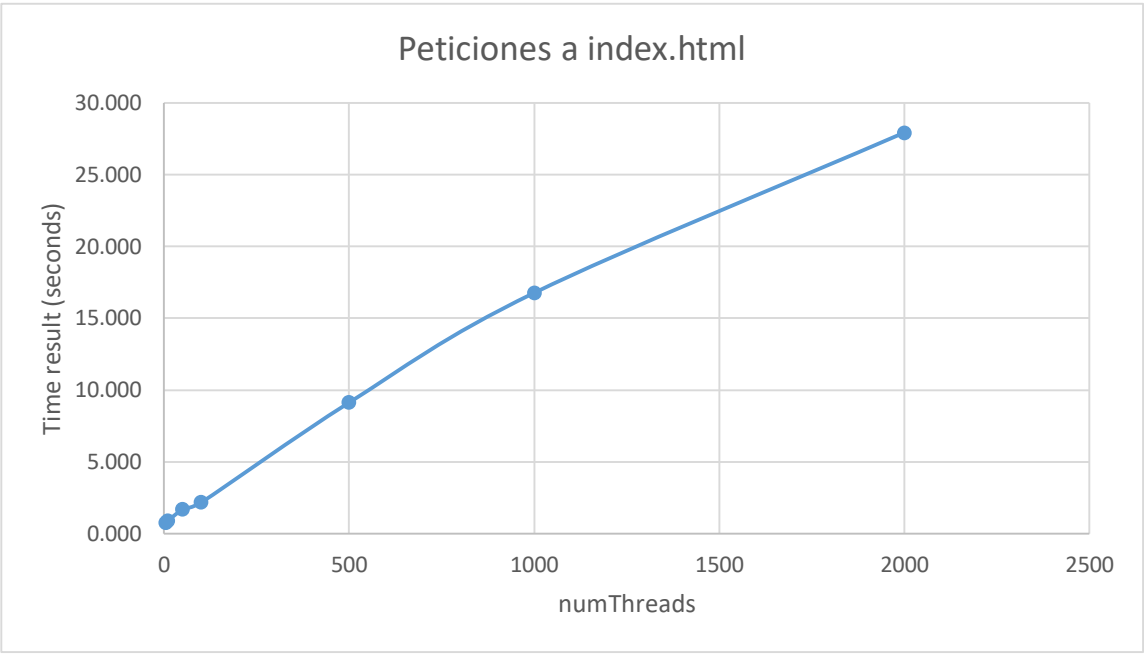
8. Apagar la máquina para que no consuma los créditos que tenemos.
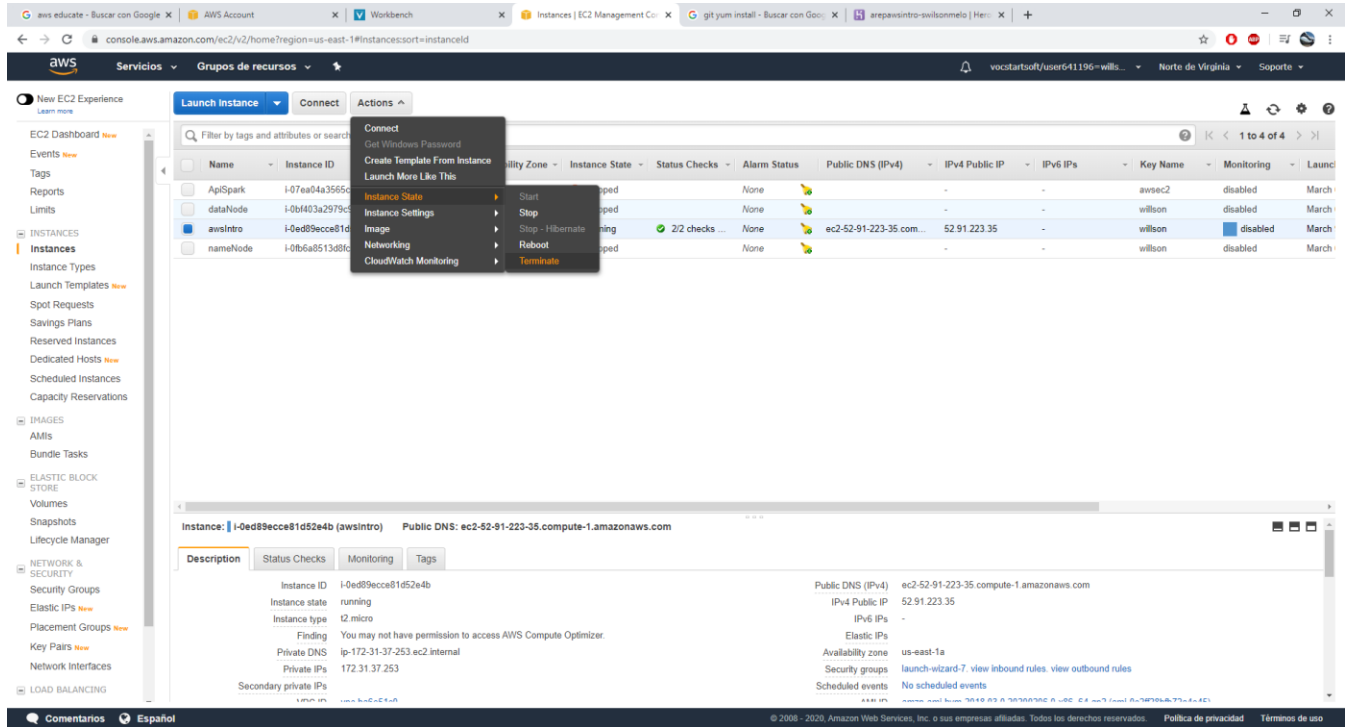
9. Tabular y graficar los resultados de tiempo al momento de hacer las peticiones a heroku, tanto del recurso html como del png.

Peticiones a heroku					
Index.html				java.png	
numThreads	Time result (seconds)			numThreads	Time result (seconds)
5	0.766			5	0.877
10	0.892			10	1.138
50	1.666			50	3.095
100	2.16			100	5.239
500	9.118			500	22.012
1000	16.752			1000	73.84
2000	27.906				

Peticiones a index.html

Peticiones a java.png

10. Por último, tabular y graficar los resultados de tiempo al momento de hacer las peticiones a al
    localhost. Ya que noté que estas peticiones al servidor corriendo localmente es más eficiente,
    tanto del recurso html como del png.

Peticiones a localhost						

Index.html				java.png	
numThreads	Time result (seconds)			numThreads	Time result (seconds)
5	0.126			5	0.59
10	0.134			10	1.488
50	0.242			50	3.589
100	0.404			100	6.786
500	1.001			500	34.677
1000	1.728			1000	76.36
2000	2.902				

Peticiones a index.html

Peticiones a java.png
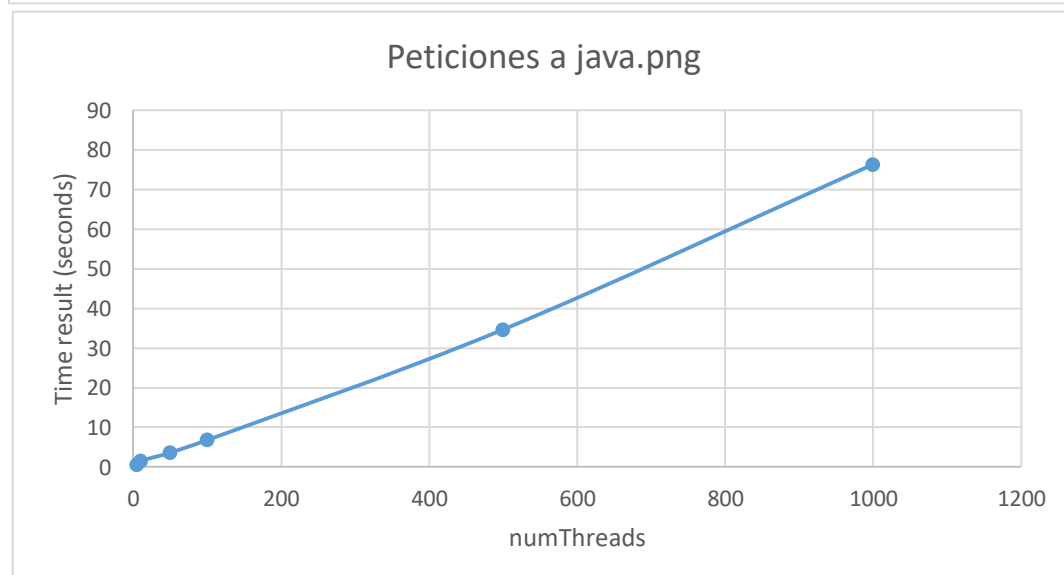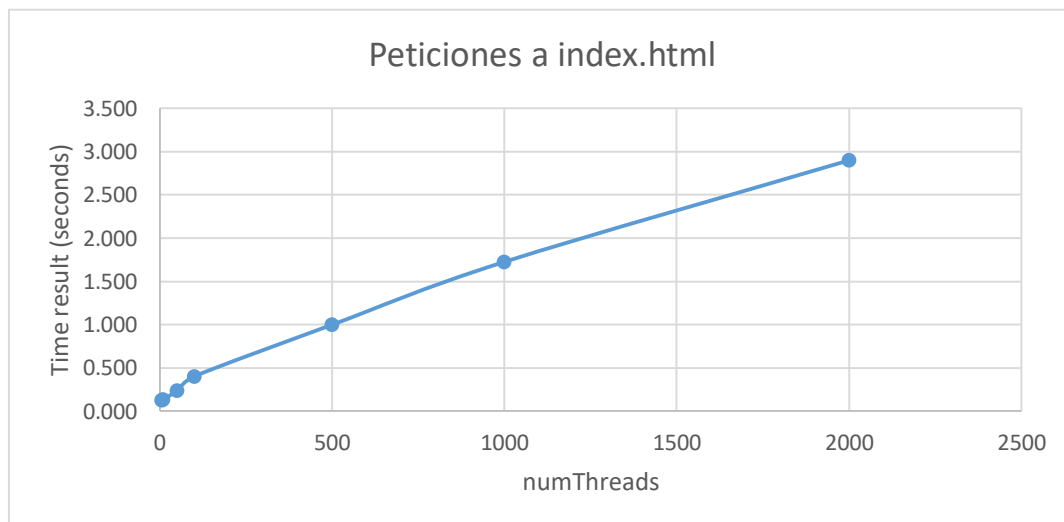
Como conclusión podemos ver una gran diferencia al momento de pedir el recurso index.html, el servidor localhost resuelve las peticiones mucho más rápido que el servidor desplegado en heroku.