

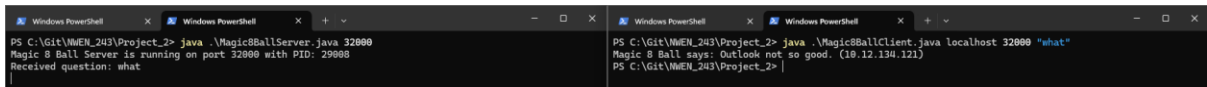
NWEN_243 Project 1

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Date: 08.08.2024

3. Testing Server and Client locally

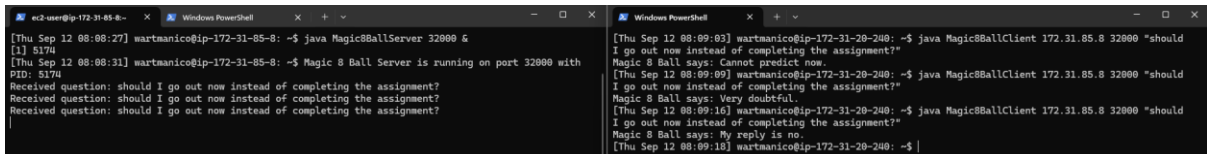


```
PS C:\Git\WME_243\Project_2> java .\Magic8BallServer.java 32000
Magic 8 Ball Server is running on port 32000 with PID: 29008
Received question: what

PS C:\Git\WME_243\Project_2> java .\Magic8BallClient.java localhost 32000 "what"
Magic 8 Ball says: Outlook not so good. (10.12.134.121)
PS C:\Git\WME_243\Project_2>
```

Figure 1: 1.jpg

7. Testing of Server and client on AWS Instances

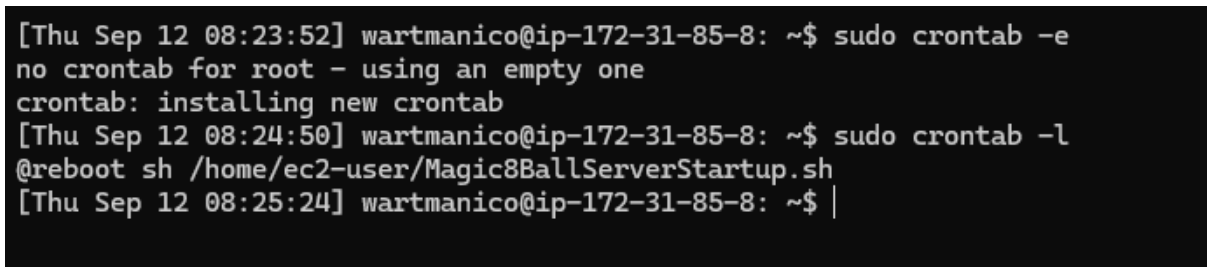


```
[Thu Sep 12 08:08:27] wartmanico@ip-172-31-85-8: ~$ java Magic8BallServer 32000 &
[i] 5174
[Thu Sep 12 08:08:31] wartmanico@ip-172-31-85-8: ~$ Magic 8 Ball Server is running on port 32000 with
PID: 5174
Received question: should I go out now instead of completing the assignment?
Received question: should I go out now instead of completing the assignment?
Received question: should I go out now instead of completing the assignment?

[Thu Sep 12 08:09:03] wartmanico@ip-172-31-20-240: ~$ java Magic8BallClient 172.31.85.8 32000 "should
I go out now instead of completing the assignment?"
Magic 8 Ball says: Cannot predict now.
[Thu Sep 12 08:09:09] wartmanico@ip-172-31-20-240: ~$ java Magic8BallClient 172.31.85.8 32000 "should
I go out now instead of completing the assignment?"
Magic 8 Ball says: Very doubtful.
[Thu Sep 12 08:09:16] wartmanico@ip-172-31-20-240: ~$ java Magic8BallClient 172.31.85.8 32000 "should
I go out now instead of completing the assignment?"
Magic 8 Ball says: My reply is no.
[Thu Sep 12 08:09:18] wartmanico@ip-172-31-20-240: ~$ |
```

Figure 2: 2.jpg

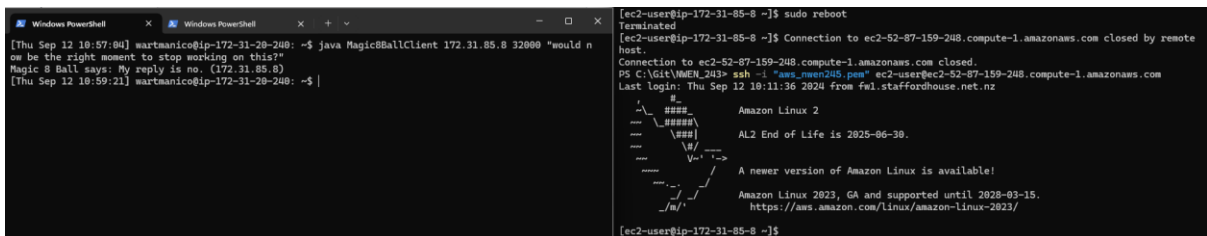
8.2 Crontab setup



```
[Thu Sep 12 08:23:52] wartmanico@ip-172-31-85-8: ~$ sudo crontab -e
no crontab for root - using an empty one
crontab: installing new crontab
[Thu Sep 12 08:24:50] wartmanico@ip-172-31-85-8: ~$ sudo crontab -l
@reboot sh /home/ec2-user/Magic8BallServerStartup.sh
[Thu Sep 12 08:25:24] wartmanico@ip-172-31-85-8: ~$ |
```

Figure 3: 3.jpg

Test after reboot:



```
[Thu Sep 12 10:57:04] wartmanico@ip-172-31-20-240: ~$ java Magic8BallClient 172.31.85.8 32000 "would n
ow be the right moment to stop working on this?"
Magic 8 Ball says: My reply is no. (172.31.85.8)
[Thu Sep 12 10:59:21] wartmanico@ip-172-31-20-240: ~$ |

[ec2-user@ip-172-31-85-8 ~]$ sudo reboot
Terminated
[ec2-user@ip-172-31-85-8 ~]$ Connection to ec2-52-87-159-248.compute-1.amazonaws.com closed by remote
host.
Connection to ec2-52-87-159-248.compute-1.amazonaws.com closed.
PS C:\Git\WME_243> ssh -i "aws_nwen245.pem" ec2-user@ec2-52-87-159-248.compute-1.amazonaws.com
Last login: Thu Sep 12 10:11:36 2024 from fw1.staffordhouse.net.nz

Amazon Linux 2
AL2 End of Life is 2025-06-30.

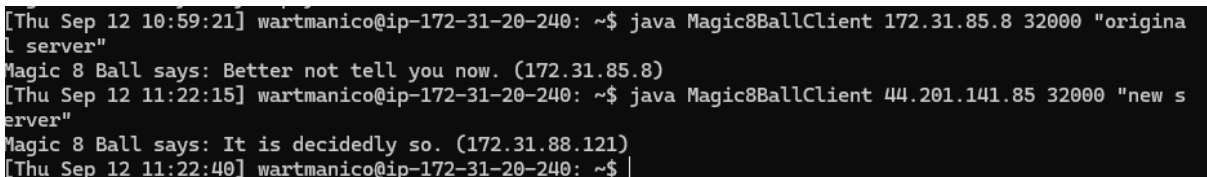
A newer version of Amazon Linux is available!

Amazon Linux 2023, GA and supported until 2028-03-15.
https://aws.amazon.com/linux/amazon-linux-2023/

[ec2-user@ip-172-31-85-8 ~]$
```

Figure 4: 4.jpg

8.4 Creating and running the Image



```
[Thu Sep 12 10:59:21] wartmanico@ip-172-31-20-240: ~$ java Magic8BallClient 172.31.85.8 32000 "origina
l server"
Magic 8 Ball says: Better not tell you now. (172.31.85.8)
[Thu Sep 12 11:22:15] wartmanico@ip-172-31-20-240: ~$ java Magic8BallClient 44.201.141.85 32000 "new s
erver"
Magic 8 Ball says: It is decidedly so. (172.31.88.121)
[Thu Sep 12 11:22:40] wartmanico@ip-172-31-20-240: ~$ |
```

Figure 5: 5.jpg

Instances (3) [Info](#)

Last updated 2 minutes ago

Connect

Instance state ▾

Actions ▾

Launch instances ▾

All states ▾

< 1 >

<input type="checkbox"/>	Name
<input type="checkbox"/>	Magic8BallServer
<input type="checkbox"/>	NWEN243_P1
<input type="checkbox"/>	Magic8BallServer2

Figure 6: 6.jpg

Amazon Machine Images (AMIs) (1) [Info](#)

Actions ▾

Launch instance from AMI

Owned by me ▾

< 1 >

<input type="checkbox"/>	Name
<input type="checkbox"/>	Magic8BallServerImage2

Figure 7: 7.jpg

Part II

Launch Templates

```
[Thu Sep 12 11:54:02] wartmanico@ip-172-31-20-240: ~$ java Magic8BallClient 54.198.72.249 32000 "Launch Template Instance 1"
Magic 8 Ball says: Cannot predict now. (192.168.1.108)
[Thu Sep 12 11:54:10] wartmanico@ip-172-31-20-240: ~$ java Magic8BallClient 44.223.1.25 32000 "Launch Template Instance 2"
Magic 8 Ball says: Very doubtful. (192.168.0.127)
```

```
PS C:\Git\NWEN_243> ssh -i "aws_nwen245.pem" ec2-user@44.223.1.25
The authenticity of host '44.223.1.25 (44.223.1.25)' can't be established.
ED25519 key fingerprint is SHA256:fT7Jvx3lHp1CCLZpnTAcR3/f9715LAU9U6M2kQhyxAI.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '44.223.1.25' (ED25519) to the list of known hosts.
Last login: Thu Sep 12 10:59:13 2024 from fw1.staffordhouse.net.nz
```

```
  #_
 ~\_ #####_      Amazon Linux 2
~~  \#####\
~~   \###|      AL2 End of Life is 2025-06-30.
~~    \#/  ---
~~     V~'  '--->
      ~~~
      ~.._.._/_/
      _/_/_/_/_/
      _/m/'      A newer version of Amazon Linux is available!

                  Amazon Linux 2023, GA and supported until 2028-03-15.
                  https://aws.amazon.com/linux/amazon-linux-2023/
```

```
[ec2-user@ip-192-168-0-127 ~]$ exit
```

logout

Connection to 44.223.1.25 closed.

```
PS C:\Git\NWEN_243> ssh -i "aws_nwen245.pem" ec2-user@54.198.72.249
```

The authenticity of host '54.198.72.249 (54.198.72.249)' can't be established.

ED25519 key fingerprint is SHA256:HSWO+4PNOW/Z7Wbo3ejRb/45nYzH8ekb5jf5dCtl9kE.

This key is not known by any other names

Are you sure you want to continue connecting (yes/no/[fingerprint])? yes

Warning: Permanently added '54.198.72.249' (ED25519) to the list of known hosts.

Last login: Thu Sep 12 10:59:13 2024 from fw1.staffordhouse.net.nz

```
  #_
 ~\_ #####_      Amazon Linux 2
~~  \#####\
~~   \###|      AL2 End of Life is 2025-06-30.
~~    \#/  ---
~~     V~'  '--->
      ~~~
      ~.._.._/_/
      _/_/_/_/_/
      _/m/'      A newer version of Amazon Linux is available!

                  Amazon Linux 2023, GA and supported until 2028-03-15.
                  https://aws.amazon.com/linux/amazon-linux-2023/
```

```
[ec2-user@ip-192-168-1-108 ~]$ exit
```

logout

Connection to 54.198.72.249 closed.

```
PS C:\Git\NWEN_243> |
```

Instance Test with Load balancer

```

PS C:\Git\NWEN_243\Project_2> java .\Magic8BallClient.java 54.80.122.38 32000 "Test 1"
Magic 8 Ball says: Outlook good. (192.168.1.89)
PS C:\Git\NWEN_243\Project_2> java .\Magic8BallClient.java 54.235.3.26 32000 "Test 2"
Magic 8 Ball says: It is certain. (192.168.0.208)
PS C:\Git\NWEN_243\Project_2> cd ..
PS C:\Git\NWEN_243> ssh -i "aws_nwen245.pem" ec2-user@54.80.122.38
The authenticity of host '54.80.122.38 (54.80.122.38)' can't be established.
ED25519 key fingerprint is SHA256:pKS2Sres8sejKiIJ/8WaNkj5/NNPV97BQkoqoVROBaA.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '54.80.122.38' (ED25519) to the list of known hosts.
Last login: Thu Sep 12 10:59:13 2024 from fw1.staffordhouse.net.nz

      #_
    ~\_ #####_      Amazon Linux 2
  NN  \_#####\
  NN   \###|      AL2 End of Life is 2025-06-30.
  NN    \#/  ____
  NN     V~'  '--->
      NNN
      NN_._.  /
      _/_/_/_/
      _/m/'      A newer version of Amazon Linux is available!

      Amazon Linux 2023, GA and supported until 2028-03-15.
      https://aws.amazon.com/linux/amazon-linux-2023/

[ec2-user@ip-192-168-1-89 ~]$ exit
logout
Connection to 54.80.122.38 closed.
PS C:\Git\NWEN_243> ssh -i "aws_nwen245.pem" ec2-user@54.235.3.26
The authenticity of host '54.235.3.26 (54.235.3.26)' can't be established.
ED25519 key fingerprint is SHA256:TZjYeHdT7T73Sccg6+HJFrcI7HziXpRVcgbL05DhJUC.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '54.235.3.26' (ED25519) to the list of known hosts.
Last login: Thu Sep 12 10:59:13 2024 from fw1.staffordhouse.net.nz

      #_
    ~\_ #####_      Amazon Linux 2
  NN  \_#####\
  NN   \###|      AL2 End of Life is 2025-06-30.
  NN    \#/  ____
  NN     V~'  '--->
      NNN
      NN_._.  /
      _/_/_/_/
      _/m/'      A newer version of Amazon Linux is available!

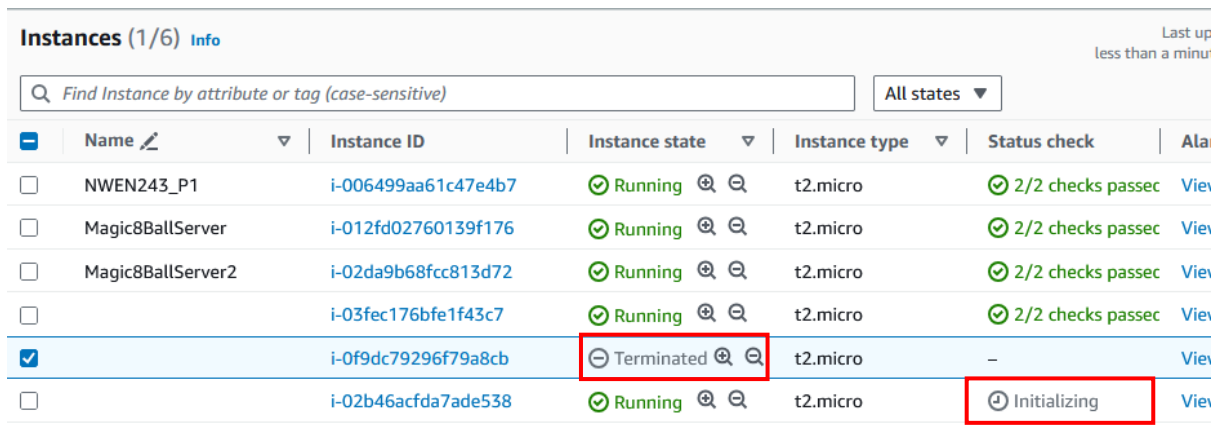
      Amazon Linux 2023, GA and supported until 2028-03-15.
      https://aws.amazon.com/linux/amazon-linux-2023/

[ec2-user@ip-192-168-0-208 ~]$ exit
logout
Connection to 54.235.3.26 closed.
PS C:\Git\NWEN_243>

```

7. Question 1

New instances are created until the desired minimum is met again (in my case this is 2 instances):



The screenshot shows the AWS Management Console 'Instances' page. At the top, there's a search bar with the placeholder 'Find Instance by attribute or tag (case-sensitive)' and a dropdown menu set to 'All states'. Below the header, a table lists the instances. The table has columns for Name, Instance ID, Instance state, Instance type, Status check, and Actions. One instance, 'i-0f9dc79296f79a8cb', is in the 'Terminated' state, highlighted with a red box. Another instance, 'i-02b46acfd7ade538', is in the 'Initializing' state, also highlighted with a red box. The other four instances are in the 'Running' state.

	Name	Instance ID	Instance state	Instance type	Status check	Actions
<input type="checkbox"/>	NWEN243_P1	i-006499aa61c47e4b7	Running	t2.micro	2/2 checks passed	View
<input type="checkbox"/>	Magic8BallServer	i-012fd02760139f176	Running	t2.micro	2/2 checks passed	View
<input type="checkbox"/>	Magic8BallServer2	i-02da9b68fcc813d72	Running	t2.micro	2/2 checks passed	View
<input type="checkbox"/>		i-03fec176bfe1f43c7	Running	t2.micro	2/2 checks passed	View
<input checked="" type="checkbox"/>		i-0f9dc79296f79a8cb	Terminated	t2.micro	-	View
<input type="checkbox"/>		i-02b46acfd7ade538	Running	t2.micro	Initializing	View

Figure 8: Instance termination

As can be seen in Figure 8, I have terminated an automatically created Instance and instead of it another Instance has been created automatically by the autoscaler.

8. Question 2

Before:

<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check
<input type="checkbox"/>	NWEN243_P1	i-006499aa61c47e4b7	Running	t2.micro	2/2 checks passed
<input type="checkbox"/>	Magic8BallServer	i-012fd02760139f176	Running	t2.micro	2/2 checks passed
<input type="checkbox"/>	Magic8BallServer2	i-02da9b68fcc813d72	Running	t2.micro	2/2 checks passed
<input type="checkbox"/>		i-03fec176bfe1f43c7	Running	t2.micro	2/2 checks passed
<input type="checkbox"/>		i-0f9dc79296f79a8cb	Terminated	t2.micro	-
<input type="checkbox"/>		i-02b46acfd7ade538	Running	t2.micro	2/2 checks passed

Figure 9: Before adjusting settings

Adjustment I made:

Group size

Specify the size of the Auto Scaling group by changing the desired capacity. You can also specify minimum and maximum scaling limits.

Desired capacity type

Choose the unit of measurement for the desired capacity value. vCPUs and Memory(GiB) are only supported for mixed instances groups configured with a set of instance attributes.

Units (number of instances)

Desired capacity

Specify your group size.

Scaling limits

Set limits on how much your desired capacity can be increased or decreased.

Min desired capacity

Equal or less than desired capacity

Max desired capacity

Equal or greater than desired capacity

Cancel

Update

Figure 10: Adjusting of the settings

After:

<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check
<input type="checkbox"/>	NWEN243_P1	i-006499aa61c47e4b7	Running	t2.micro	2/2 checks passed
<input type="checkbox"/>	Magic8BallServer	i-012fd02760139f176	Running	t2.micro	2/2 checks passed
<input type="checkbox"/>	Magic8BallServer2	i-02da9b68fcc813d72	Running	t2.micro	2/2 checks passed
<input type="checkbox"/>		i-03fec176bfe1f43c7	Terminated	t2.micro	-
<input type="checkbox"/>		i-0f9dc79296f79a8cb	Terminated	t2.micro	-
<input type="checkbox"/>		i-02b46acfd7ade538	Running	t2.micro	2/2 checks passed

Figure 11: after adjusting the settings

9. Monitoring

Target Group:

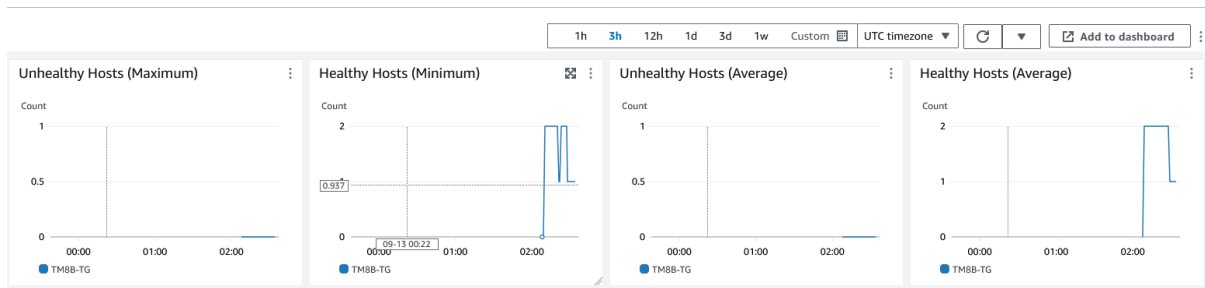


Figure 12: Target Group Monitoring

There are no unhealthy hosts and never have been. This is to be expected, as the complexity of the instances is very minimal and I did not add any additional health checks like Application monitoring or similar.

The most interesting thing here is the “Healthy Hosts (Minimum)” chart. First 2 Instances are created which can be seen by the line rising to 2. After that the line drops to 1. This is where I terminated one of the instances and the line rising back to 2 is where the autoscaling created another instance to match the requirements made in the settings. After that the line drops back to 1 where I adjusted the Autoscaling to 1 Max Host, which lead to the Autoscaler terminating one Instance.

The remaining two plots just display averages of the things just described. This would be interesting in a larger setup where there are tens or hundreds of hosts involved. In this case there isn’t really anything interesting to be said about them.

Load Balancer:

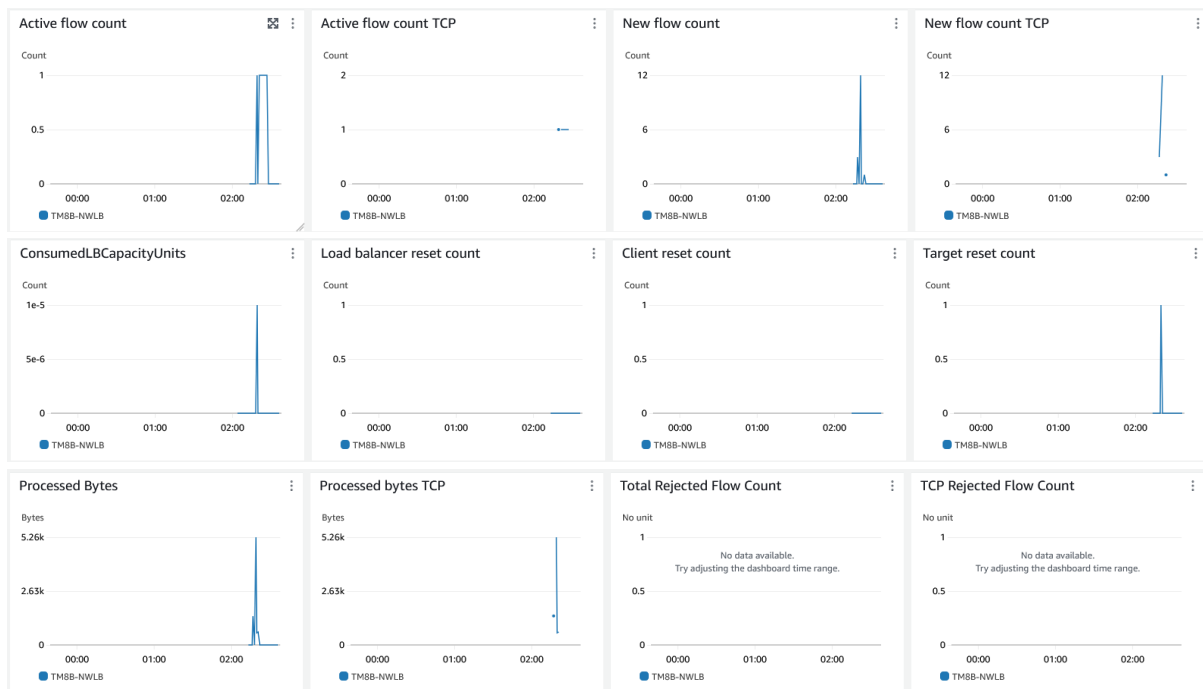


Figure 13: Load Balancer Monitoring

The Load balancer Monitoring is different in a way that it does not list the available hosts, but the traffic that is incoming. The Spikes that can be seen on the charts are my client tests where I executed the TM8B client application on my local machine with the load balancer DNS name as Server. These requests are directed through the load balancer to an available Instance and this traffic is monitored here.

These charts are especially interesting in analysing times of the day where there is high and low traffic.

10. Question 3

As described above both of these monitorings have different uses although it can be useful to overlay them in larger scaled setups. For example if more instances are supposed to be launched when there is high traffic both of these monitorings together can give insights in the proper function or in the other case dysfunction of the setup created.

The displayed data is very intuitive to understand with these charts. When there are a lot of requests the TCP monitoring spikes and if hosts are instantiated or terminated this can be seen in the Target Group monitoring.