Large Scale Computing

Lab 4

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1. S3 throughput (2p)

Check id

```
PS C:\Users\ltmol> aws sts get-caller-identity
-----------------------------------------------------------------------------------------
|                                  GetCallerIdentity                                    |
+---------+-----------------------------------------------------------------------------+
|  Account|  656247241280                                                               |
|  Arn    |  arn:aws:sts::656247241280:assumed-role/voclabs/user3574227=Adrian_Madej    |
|  UserId |  AROAZRS3CHJAOKJFIHJ45:user3574227=Adrian_Madej                             |
+---------+-----------------------------------------------------------------------------+
```

Create S3 bucket

```
PS C:\Users\ltmol> aws s3api create-bucket --bucket lsc-2025-adrian --region us-east-1
---------------------------------
|          CreateBucket         |
+-----------+-------------------+
|  Location |  /lsc-2025-adrian |
+-----------+-------------------+
```

Local PC

```
PS C:\Users\ltmol> Measure-Command { aws s3 cp large_file.tar.gz s3://lsc-2025-adrian/ }


Days              : 0
Hours             : 0
Minutes           : 0
Seconds           : 21
Milliseconds      : 574
Ticks             : 215746642
TotalDays         : 0,000249706761574074
TotalHours        : 0,00599296227777778
TotalMinutes      : 0,359577736666667
TotalSeconds      : 21,5746642
TotalMilliseconds : 21574,6642
```

Upload ≈ 4.63 MB/s

Local PC

```
PS C:\Users\ltmol> Measure-Command { aws s3 cp s3://lsc-2025-adrian/large_file.tar.gz . }


Days              : 0
Hours             : 0
Minutes           : 0
Seconds           : 19
Milliseconds      : 46
Ticks             : 190463360
TotalDays         : 0,000220443703703704
TotalHours        : 0,00529064888888889
TotalMinutes      : 0,317438933333333
TotalSeconds      : 19,046336
TotalMilliseconds : 19046,336
```

Download ≈ 5.25 MB/s

EC2 instance

```
[ec2-user@ip-172-31-42-138 ~]$ time aws s3 cp large_file.tar.gz s3://lsc-2025-adrian/
upload: ./large_file.tar.gz to s3://lsc-2025-adrian/large_file.tar.gz

real    0m3.648s
user    0m0.863s
sys     0m0.431s
```

Upload ≈ 27.4 MB/s

EC2 instance

```
[ec2-user@ip-172-31-42-138 ~]$ time aws s3 cp s3://lsc-2025-adrian/large_file.tar.gz .
download: s3://lsc-2025-adrian/large_file.tar.gz to ./large_file.tar.gz

real    0m2.785s
user    0m0.985s
sys     0m0.275s
```

Download ≈ 35.9 MB/s

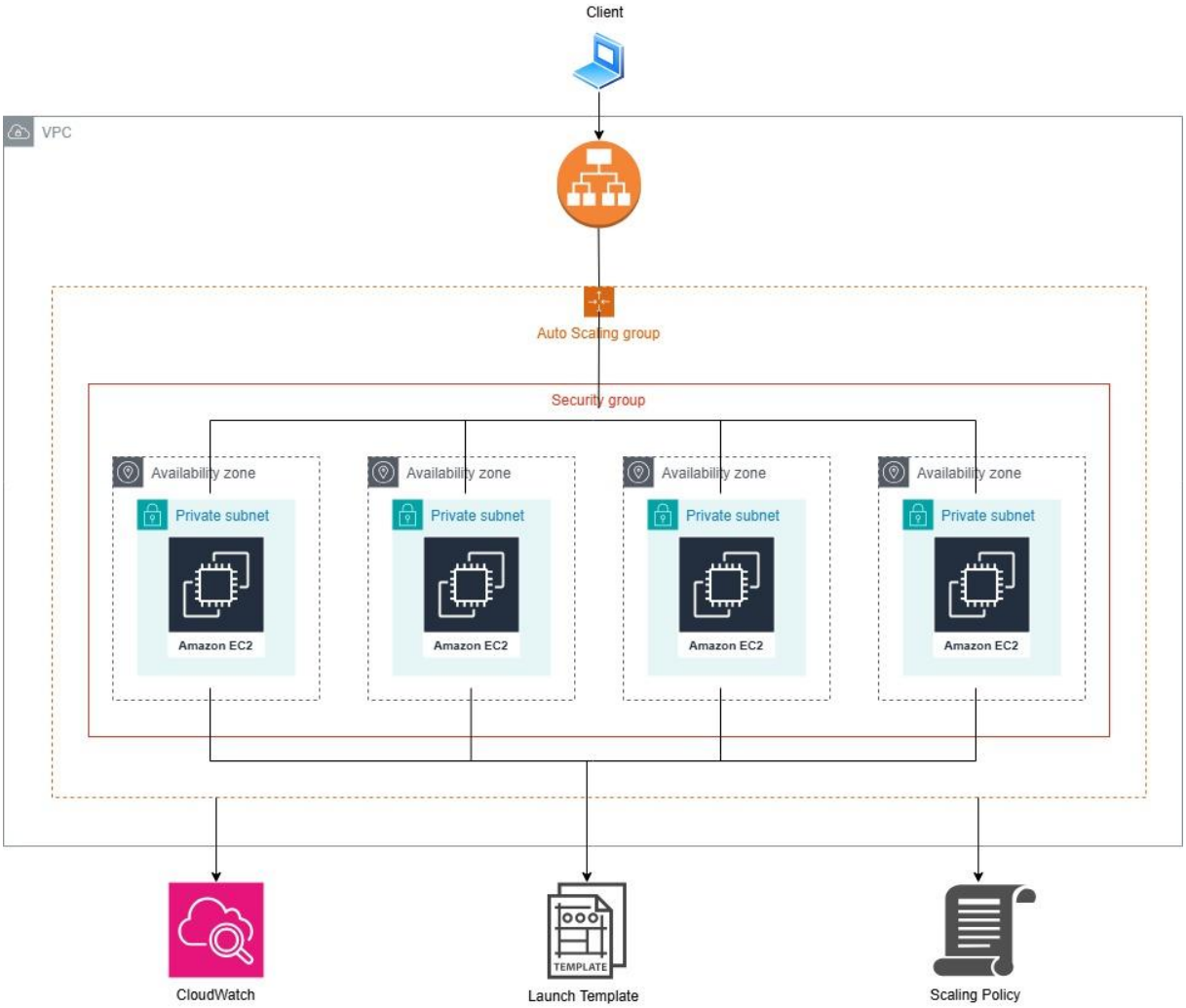
Throughput

	Upload [MB/s]	Download [MB/s]
Local PC	4.63	5.25
EC2 instance	27.4	35.9

2. EC2 auto-scaling (5p)

After opening: http://<machine-ip>/phpinfo.php

Architecture diagram of EC2



- **Autoscaling Group**: Manages a group of EC2 instances, automatically scaling them up or down based on demand to maintain availability and performance.

- **Launch Template**: Defines the configuration (AMI, instance type, key pair, etc.) for EC2 instances launched within an ASG.

- **Load Balancer**: Distributes incoming traffic across multiple EC2 instances to ensure high availability and reliability.

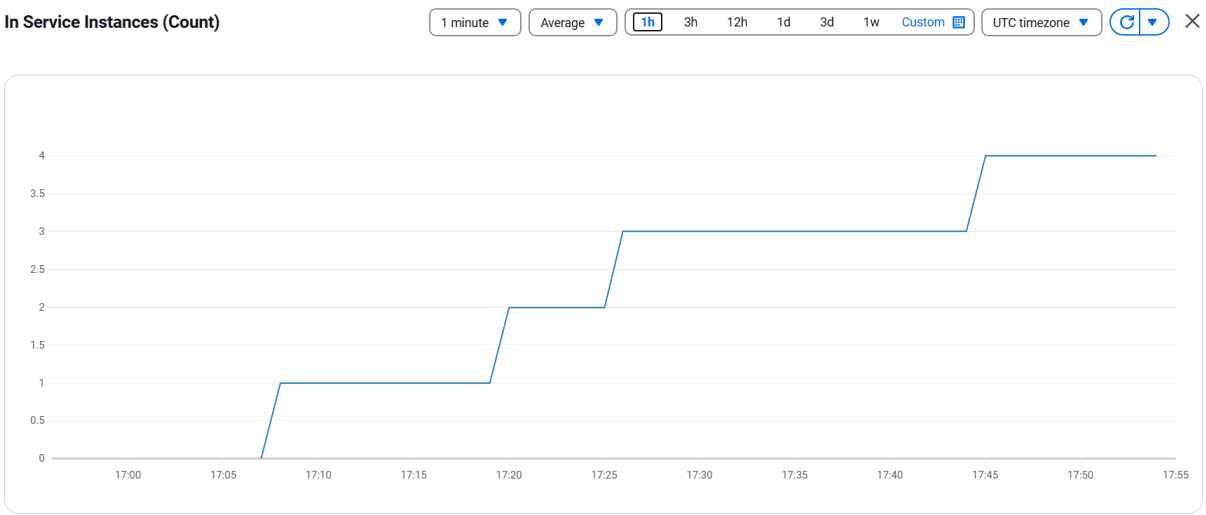
- **Security Groups**: Act as virtual firewalls, controlling inbound and outbound traffic to EC2 instances.

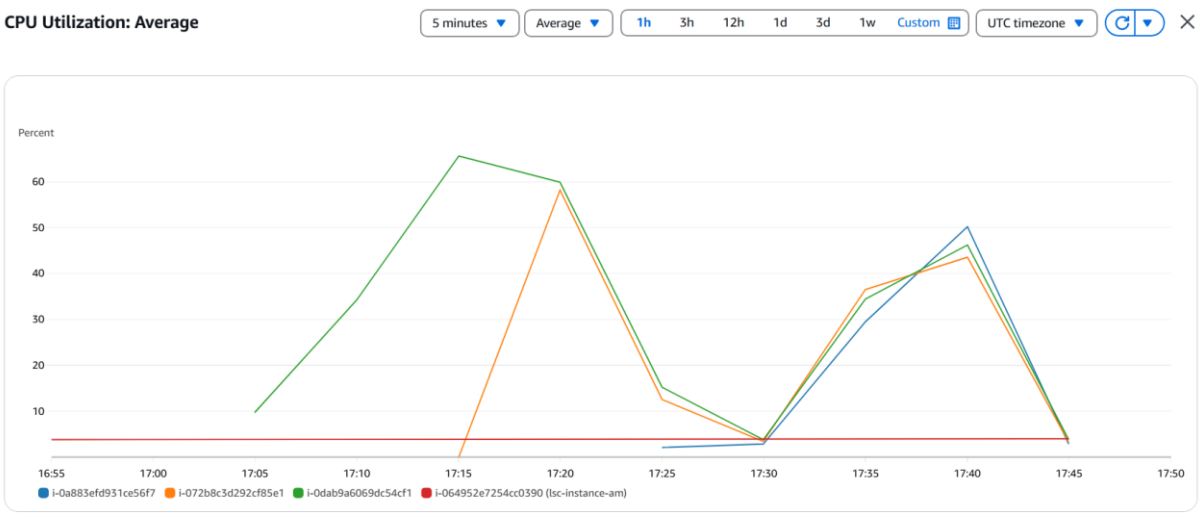
- **EC2 Instances**: Virtual servers that run applications and services in AWS.

- **CloudWatch**: Monitors metrics, logs, and alarms for AWS resources to provide observability and automated responses to changes.

- **Scaling Policy**: Defines the conditions and rules for automatically adjusting the number of instances in an ASG based on CloudWatch metrics.

CloudWatch charts





Logs

ltmollo@DESKTOP-2QCT8V6:~$ ab -c 100 -n 10000 http://lsc-load-balancer-920270590.us-east-1.elb.amazonaws.com/phpinfo.php

This is ApacheBench, Version 2.3 <$Revision: 1879490 $>

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Benchmarking lsc-load-balancer-920270590.us-east-1.elb.amazonaws.com (be patient)

Completed 1000 requests

Completed 2000 requests

Completed 3000 requests

Completed 4000 requests

Completed 5000 requests

Completed 6000 requests

Completed 7000 requests

Completed 8000 requests

Completed 9000 requests

Completed 10000 requests

Finished 10000 requests

Server Software: Apache/2.4.62

Server Hostname: lsc-load-balancer-920270590.us-east-1.elb.amazonaws.com

Server Port: 80

Document Path: /phpinfo.php

Document Length: 76660 bytes

Concurrency Level: 100

Time taken for tests: 309.256 seconds

Complete requests: 10000

Failed requests: 9982

(Connect: 0, Receive: 0, Length: 9982, Exceptions: 0)

Total transferred: 768170814 bytes

HTML transferred: 766640814 bytes

Requests per second: 32.34 [#/sec] (mean)

Time per request: 3092.564 [ms] (mean)

Time per request: 30.926 [ms] (mean, across all concurrent requests)

Transfer rate: 2425.71 [Kbytes/sec] received

Connection Times (ms)

	min	mean[+/-sd]	median	max
Connect:	110	174	103.0	152	1842
Processing:	451	2905	647.2	3041	9899
Waiting:	182	2238	442.7	2369	5465
Total:	563	3080	653.0	3211	10309

Percentage of the requests served within a certain time (ms)

50% 3211

66% 3301

75% 3359

80% 3398

90% 3521

95% 3677

98% 4049

99% 4498

100% 10309 (longest request)