

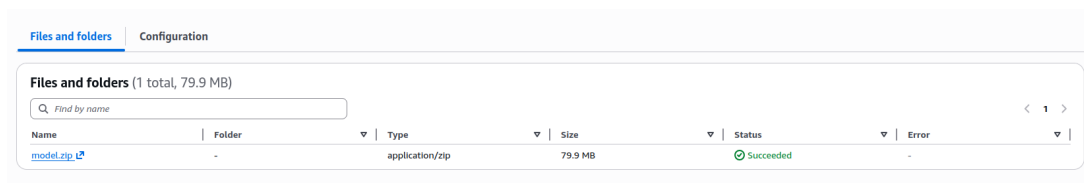
1 Account setup & IAM configuration

1.3 Connect to AWS using the CLI

I configured the AWS CLI in the terminal with the command `aws configure`. After running this command, I entered my AWS Access Key ID, AWS Secret Access Key, AWS Session Token and the default region.

2 Amazon S3 setup and file management

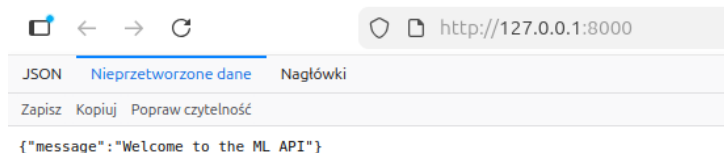
2.1 Create an S3 bucket and 2.2 Upload files to S3 bucket



2.3 Integrate S3 into an ML workflow

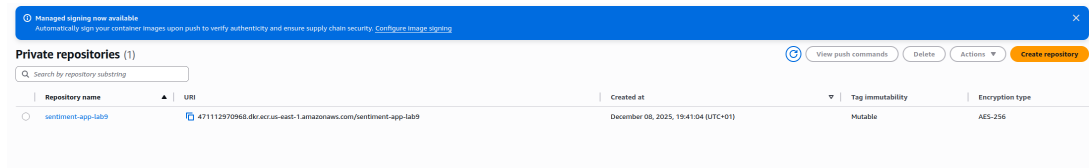
```
(lab_9MLProject) jacek-tyszkiewicz@jacek-tyszkiewicz-Nitro-AN16-41:~/lab_9MLProject$ python downloads.py
downloading s3://mlops-lab9-jacek-01/model.zip to lab_1MLHomework/models/models/model.zip
download finished
extracting lab_1MLHomework/models/models/model.zip to lab_1MLHomework/models
extraction finished
removed ZIP file: lab_1MLHomework/models/models/model.zip
```

```
✓ lab_1mlhomework-ml-app Built
0.0s
✓ Network lab_1mlhomework_default Created
0.0s
✓ Container lab_1mlhomework-ml-app-1 Created
0.1s
Attaching to ml-app-1
ml-app-1 | Downloading mypy (13.0MiB)
ml-app-1 | Downloading ruff (13.4MiB)
ml-app-1 | Downloaded mypy
ml-app-1 | Downloaded ruff
ml-app-1 | Installed 7 packages in 65ms
ml-app-1 | INFO: Started server process [32]
ml-app-1 | INFO: Waiting for application startup.
ml-app-1 | INFO: Application startup complete.
ml-app-1 | INFO: Uvicorn running on http://0.0.0.0:8000 (Press CTRL+C to quit)
```



3 Elastic Container Registry (ECR) & Docker management

3.1 Create an ECR repository



3.2 Authenticate your Docker client to ECR

```
jacek-tyszkiewicz@jacek-tyszkiewicz-Nitro-AN16-41:~/lab_9MLProject/lab_1MLHomework$ aws ecr get-login-password --region us-east-1 | docker login --username AWS
WARNING! Your credentials are stored unencrypted in '/home/jacek-tyszkiewicz/.docker/config.json'.
Configure a credential helper to remove this warning. See
https://docs.docker.com/go/credential-store/
Login Succeeded
```

3.3 Build and push a Docker image to ECR

```
jacek-tyszkiewicz@jacek-tyszkiewicz-Nitro-AN16-41:~/lab_9MLProject/lab_1MLHomework$ sudo docker tag lab_1mlhomework-ml-app:latest \
471112970968.dkr.ecr.us-east-1.amazonaws.com/sentiment-app-lab9:14.01.25

jacek-tyszkiewicz@jacek-tyszkiewicz-Nitro-AN16-41:~/lab_9MLProject$ sudo docker push \
471112970968.dkr.ecr.us-east-1.amazonaws.com/sentiment-app-lab9:14.01.25
The push refers to repository [471112970968.dkr.ecr.us-east-1.amazonaws.com/sentiment-app-lab9]
910e281fc135: Pushed
bd20e3d2420a: Pushed
8e45e80a935f: Pushed
9c7def175d13: Pushed
e00fdcad471: Pushed
e6644e81cf69: Pushed
0f40e99006df: Pushed
400af0b05c1f: Pushed
c07f79cd8299: Pushed
db419cb0c9eb: Pushed
bd2be69c2f99: Pushed
14.01.25: digest: sha256:a2420faf0f67ca4649b41dc7951c3c7b0abdb7246aac7e0a09cf3b6463abd02d size: 2635
```

4 Virtual Private Cloud (VPC) configuration

4.1 Create a new VPC

vpc-0b5ff41ef06f747d5 / sentiment-app-vpc

Details Info

VPC ID
vpc-0b5ff41ef06f747d5

DNS resolution
Enabled

Main network ACL
acl-0b36c71643cfb0da6

IPv6 CIDR (Network border group)
-

Encryption control ID
-

State
Available

Tenancy
default

Default VPC
No

Network Address Usage metrics
Disabled

Encryption control mode
-

Block Public Access
Off

DHCP option set
dopt-08df955498c497b0e

IPv4 CIDR
10.0.0.0/16

Route 53 Resolver DNS Firewall rule groups
Failed to load rule groups

DNS hostnames
Disabled

Main route table
rtb-0ff29d864c13b82e3

IPv6 pool
-

Owner ID
471112970968

4.2 Create public and private subnets

4.2.1 Create public subnets and 4.2.2 Create private subnets

Subnet ID: subnet-0c510915184b963c3										Subnet ID: subnet-0b389f964dfc0e0d										Subnet ID: subnet-0388f33cb6322312										Show more (+1)										Clear filters																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
<input type="checkbox"/>	Name	Subnet ID	State	VPC	Block Public	IPv4 CIDR	IPv6 CIDR	IPv6 CIDR association ID	Available IPv4 addresses	Availability Zone																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														

4.3 Set up an Internet Gateway

igw-0a21321a55d09f021 / sentiment-app-igw

Details Info

Internet gateway ID
igw-0a21321a55d09f021

State
Attached

VPC ID
vpc-0b5ff41ef06f747d5 | sentiment-app-vpc

Owner ID
471112970968

4.4 Configure route tables

4.4.1 Public route table

Updated routes for rtb-0c116f86a42a56f27 / public-route-table successfully

rtb-0c116f86a42a56f27 / public-route-table

Details Info

Route table ID
rtb-0c116f86a42a56f27

VPC
vpc-0b5ff41ef06f747d5 | sentiment-app-vpc

Main
No

Owner ID
471112970968

Explicit subnet associations
2 subnets

Edge associations
-

Routes (2)

Destination	Target	Status	Propagated	Route Origin
0.0.0.0/0	igw-0a21321a55d09f021	Active	No	Create Route
10.0.0.0/16	local	Active	No	Create Route Table

4.4.2 Private route table

Opis prywatnej tablicy tras (na razie bez trasy internetowej).

You have successfully updated subnet associations for rtb-07740847995d899f / private-route-table.

Route tables (4)

Name	Route table ID	Explicit subnet associ...	Edge associations	Main	VPC	Owner ID
rtb-001301129d8f547d4	-	-	-	Yes	vpc-036a6b009a83ae1d	471112970968
-	rtb-0ff29d864c13b82e3	-	-	Yes	vpc-0b5ff41ef06f747d5 senti...	471112970968
public-route-table	rtb-0c116f86a42a56f27	2 subnets	-	No	vpc-0b5ff41ef06f747d5 senti...	471112970968
private-route-table	rtb-07740847995d899f	2 subnets	-	No	vpc-0b5ff41ef06f747d5 senti...	471112970968

4.5 Set up a NAT Gateway

NAT gateways (1) [info](#)

Find NAT gateways by attribute or tag

Name	NAT gateway ID	Connectivity...	State	State message	Availability ...	Route table ID	Primary public L...	Primary private L...	Primary network...	VPC	Subnet
sentiment-app-nat-gw	nat-11c29e29445191816	Public	Available	-	Regional	rtb-0e403bdf...	18.304.20.244	-	-	vpc-0b5ff41ef06f747d5 / senti...	-

Updated routes for [rtb-077f40847f95e899f](#) / private-route-table successfully

[Details](#)

rtb-077f40847f95e899f / private-route-table [Actions](#)

Details [info](#)

Route table ID rtb-077f40847f95e899f	Main No	Explicit subnet associations 2 subnets	Edge associations -
VPC vpc-0b5ff41ef06f747d5 sentiment-app-vpc	Owner ID 471112970968		

[Routes](#) | [Subnet associations](#) | [Edge associations](#) | [Route propagation](#) | [Tags](#)

Routes (2) [Filter routes](#) [Both](#) [Edit routes](#)

Destination	Target	Status	Propagated	Route Origin
0.0.0.0/0	nat-11c29e29445191816	Active	No	Create Route
10.0.0.0/16	local	Active	No	Create Route Table

4.6 Security Groups

sg-0e14afc3e563fa57f - sentiment-app-lb-sg [Actions](#)

Details

Security group name sentiment-app-lb-sg	Security group ID sg-0e14afc3e563fa57f	Description Security group for ALB	VPC ID vpc-0b5ff41ef06f747d5
Owner 471112970968	Inbound rules count 1 Permission entry	Outbound rules count 1 Permission entry	

[Inbound rules](#) | [Outbound rules](#) | [Sharing](#) | [VPC associations](#) | [Tags](#)

Inbound rules (1) [Manage tags](#) [Edit inbound rules](#)

Name	Security group rule ID	IP version	Type	Protocol	Port range	Source	Description
-	sgr-017d58665c5826c58	IPv4	HTTP	TCP	80	0.0.0.0/0	-

sg-0f0cf3d1477fb7c27 - sentiment-app-resources-sg [Actions](#)

Details

Security group name sentiment-app-resources-sg	Security group ID sg-0f0cf3d1477fb7c27	Description Backend resources security group	VPC ID vpc-0b5ff41ef06f747d5
Owner 471112970968	Inbound rules count 1 Permission entry	Outbound rules count 1 Permission entry	

[Inbound rules](#) | [Outbound rules](#) | [Sharing](#) | [VPC associations](#) | [Tags](#)

Inbound rules (1) [Manage tags](#) [Edit inbound rules](#)

Name	Security group rule ID	IP version	Type	Protocol	Port range	Source	Description
-	sgr-0d1da44fb3598d70b	-	Custom TCP	TCP	8000	sg-0e14afc3e563fa57f ...	-

4.7 Set up an Application Load Balancer (ALB)

4.7.1 Target Group

sentiment-app-target-group Actions

Details

aws:elasticloadbalancing:us-east-1:471112970968:targetgroup/sentiment-app-target-group/3e12a6693c229030

Target type IP	Protocol : Port HTTP: 8000	Protocol version HTTP1	VPC vpc-0b5ff41ef06f747d5
IP address type IPv4	Load balancer None associated		

0 Total targets	0 Healthy 0 Anomalous	0 Unhealthy	0 Unused	0 Initial	0 Draining
--------------------	-----------------------------	----------------	-------------	--------------	---------------

Targets | Monitoring | Health checks | Attributes | Tags

Registered targets (0) Info Anomaly mitigation: Not applicable Deregister Register targets

Target groups route requests to individual registered targets using the protocol and port number specified. Health checks are performed on all registered targets according to the target group's health check settings. Anomaly detection is automatically applied to HTTP/HTTPS target groups with at least 3 healthy targets.

☐ IP address ☐ Port ☐ Zone ☐ Health status ☐ Health status details ☐ Administrative override ☐ Override ...

No registered targets
You have not registered targets to this group yet

[Register targets](#)

4.7.2 Create the ALB

Successfully created load balancer: sentiment-app-alb
It might take a few minutes for your load balancer to fully set up and route traffic. Targets will also take a few minutes to complete the registration process and pass initial health checks.

Introducing ALB target optimizer
Target optimizer lets you enforce a maximum number of requests per target using an ALB-provided agent, improving success rates, latency, and efficiency. [Learn more](#)

sentiment-app-alb Actions

Details

Load balancer type Application	Status Provisioning	VPC vpc-0b5ff41ef06f747d5	Load balancer IP address type IPv4
Scheme Internet-facing	Hosted zone Z35SXDOTRQ7X7K	Availability Zones subnet-0c510915184b963c3 us-east-1a (use1-az1) subnet-0638f9864dfcc6edd us-east-1b (use1-az2)	Date created December 12, 2025, 17:16 (UTC+01:00)

Load balancer ARN
[arn:aws:elasticloadbalancing:us-east-1:471112970968:loadbalancer/app/sentiment-app-alb/b1a63148011bd3b4](#)

DNS name info
[sentiment-app-alb-2003052103.us-east-1.elb.amazonaws.com](#) (A Record)

Listeners and rules (1) Info Manage rules Manage listener Add listener

A listener checks for connection requests on its configured protocol and port. Traffic received by the listener is routed according to the default action and any additional rules.

<input type="checkbox"/>	Protocol:Port	Default action	Rules	ARN	Security policy	Default SSL/TLS certificate	mTLS	Trust store
<input type="checkbox"/>	HTTP:80	Forward to target group sentiment-app-target-group : 1 (100%) Target group stickiness: Off	1 rule	ARN	Not applicable	Not applicable	Not applicable	Not applic

5 AWS Fargate deployment & CloudWatch configuration

5.1 Create an ECS Cluster

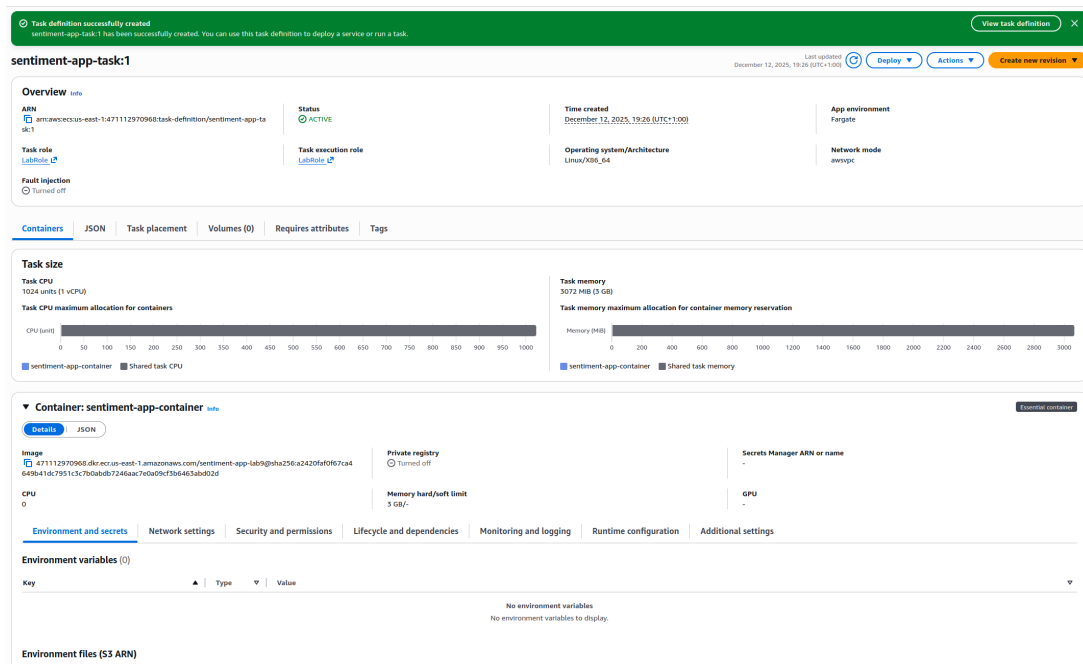
Cluster sentiment-app-cluster has been created successfully. View cluster

Introducing Express Mode
Amazon ECS Express Mode provides a simplified way to quickly launch highly available, scalable containerized applications. This streamlined experience automates infrastructure setup, including a default domain for each ECS service. [Learn more](#) Try Express Mode

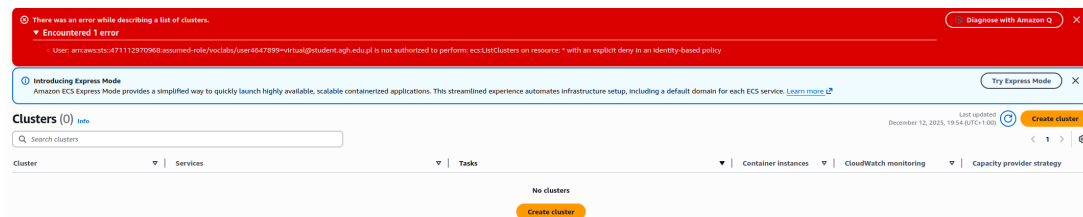
Clusters (1) Info Search clusters December 12, 2025, 17:39 (UTC+1:00) Create cluster

Cluster	Services	Tasks	Container instances	CloudWatch monitoring	Capacity provider strategy
sentiment-app-cluster	0	No tasks running	0 EC2	Default	No default found

5.2 Create a Task Definition



5.3 Create a Service



5.4 Running the service

Impossible

5.5 Access the application

Impossible

6 Application testing and monitoring

6.1 Test the application

Impossible