

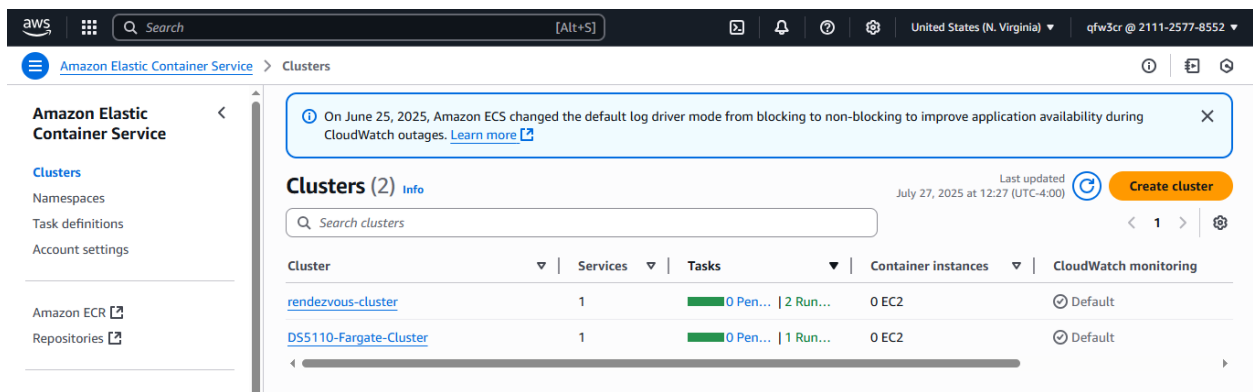
TEAM 3

Nikpour Bardia

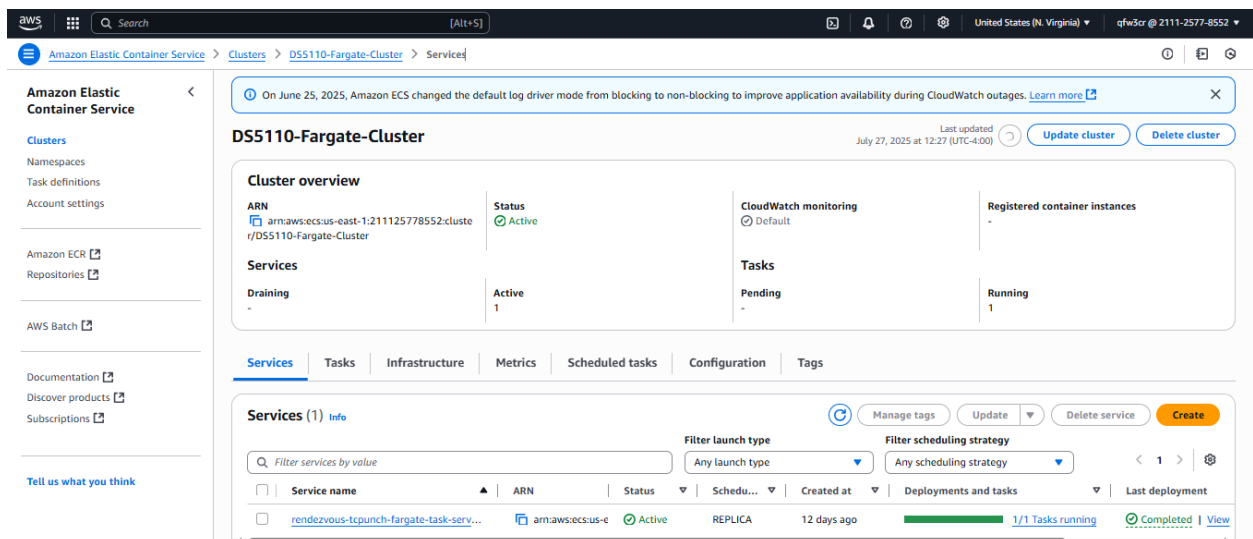
Victor Ontiveros

Project Step 2 Assignment: Rendezvous Server Submission

Screenshots of ECS task deployment



Documentation of Fargate configuration



Amazon Elastic Container Service > Clusters > DS5110-Fargate-Cluster > Services > rendezvous-tcpunch-fargate-task-service-yeozfgee > Tasks

Introducing the new built-in blue/green deployment configuration for ECS services

With Amazon ECS native blue/green deployments, you can validate new service revisions before directing production traffic to them. This approach provides a safer way to deploy changes with the ability to quickly roll back if needed. [Learn more](#)

Service overview [Info](#)

Status: Active

Tasks (1 Desired): 0 Pending | 1 Running

Task definition: [revision rendezvous-tcpunch-fargate-task-2](#)

Deployment status: Success

Health and metrics | **Tasks** | Logs | Deployments | Events | Configuration and networking | Service auto scaling | Tags

Tasks (1/2)

Filter tasks by property or value

Filter desired status: Any desired status

Filter launch type: Any launch type

Task	Last status	Desired st...	Ta...	Health sta...	Created at	Started by	Started at	Conta
b3c553a24c244416a5185...	Running	Running	rend...	Unknown	29 minutes ago	ecs-svc/81941763133...	29 minutes ago	-
85375eea95464cf494dfd...	Stopped ...	Stopped	rend...	Unknown	3 days ago	ecs-svc/81941763133...	3 days ago	-

Amazon Elastic Container Service > ... > Services > rendezvous-tcpunch-fargate-task-service-yeozfgee > Tasks > [b3c553a24c244416a518523cd18e12b2](#) > Configuration

Configuration | Logs | Networking | Volumes (0) | Tags

Task overview

ARN: [arn:aws:ecs:us-east-1:211125778552:task-definition/DS5110-Fargate-Cluster/b3c553a24c244416a518523cd18e12b2](#)

Last status: Running

Desired status: Running

Started/Created at: [July 27, 2025 at 12:00 \(UTC-4:00\)](#)
[July 27, 2025 at 11:59 \(UTC-4:00\)](#)

Fargate ephemeral storage

Encryption: [Info](#)
Default AWS Fargate encryption

Size (GiB): 20

Configuration

Operating system/Architecture: Linux/X86_64	Capacity provider: -	ENI ID: eni-09dd9ab4449b76bbc	Public IP: 54.225.60.90 open address
CPU Memory: 1 vCPU 3 GB	Launch type: FARGATE	Network mode: awsvpc	Private IP: 172.31.40.140
Platform version: 1.4.0	Container instance ID: -	Subnet ID: subnet-0942a55798ce989af	MAC address: 0e:00:65:a3:91:83
Fault injection: -	Task definition: revision rendezvous-tcpunch-fargate-task-2		

Container details for rendezvous

Evidence of successful DNS record update

Route 53 > Dashboard

Route 53 Dashboard [Info](#)

DNS management

1 Hosted zone

[Create policy](#)

Traffic management

A visual tool that lets you easily create policies for multiple endpoints in complex configurations.

[Create health check](#)

Availability monitoring

Health checks monitor your applications and web resources, and direct DNS queries to healthy resources.

[Create health check](#)

Domain registration

1 Domain

Route 53 > Hosted zones

Hosted zones (1)

Automatic mode is the current search behavior optimized for best filter results. [To change modes go to settings.](#)

Filter records by property or value

Hosted zone name	Type	Created by	Record count	Description	Hosted zone ID
uva-ds5110.com	Public	Route 53	8	HostedZone created by R...	Z1038506205DMQHGCA...

Route 53 details

Hosted zone details

Records (8) | DNSSEC signing | Hosted zone tags (0)

Records (1/8) Info

Automatic mode is the current search behavior optimized for best filter results. [To change modes go to settings.](#)

Filter records by property or value

Record name	Type	Routing p...	Alias	Value
<input type="checkbox"/> uva-ds5110.com	NS	Simple	-	No
<input type="checkbox"/> uva-ds5110.com	SOA	Simple	-	No
<input type="checkbox"/> fa.uva-ds5110.com	A	Simple	-	Yes
<input type="checkbox"/> _odd9934327659eca326bdf52d954ff.fa.uva-ds5110.com	CNAME	Simple	-	No
<input type="checkbox"/> finance.uva-ds5110.com	A	Simple	-	Yes
<input type="checkbox"/> _4eb4fcb1d47e8dfa0ad215a4bdb2d69c.finance.uva-ds5110.com	CNAME	Simple	-	No
<input type="checkbox"/> rendezvous-team1.uva-ds5110.com	A	Simple	-	No
<input checked="" type="checkbox"/> rendezvous.uva-ds5110.com	A	Simple	-	No

Record details

Record name: rendezvous.uva-ds5110.com

Record type: A

Value: 54.225.60.90

Alias: No

TTL (seconds): 300

Routing policy: Simple

Results of connection test between Lambda functions

Lambda > Functions > test_fmi

test_fmi

Throttle | Copy ARN | Actions

Function overview

Diagram | Template

+ Add trigger

+ Add destination

test_fmi

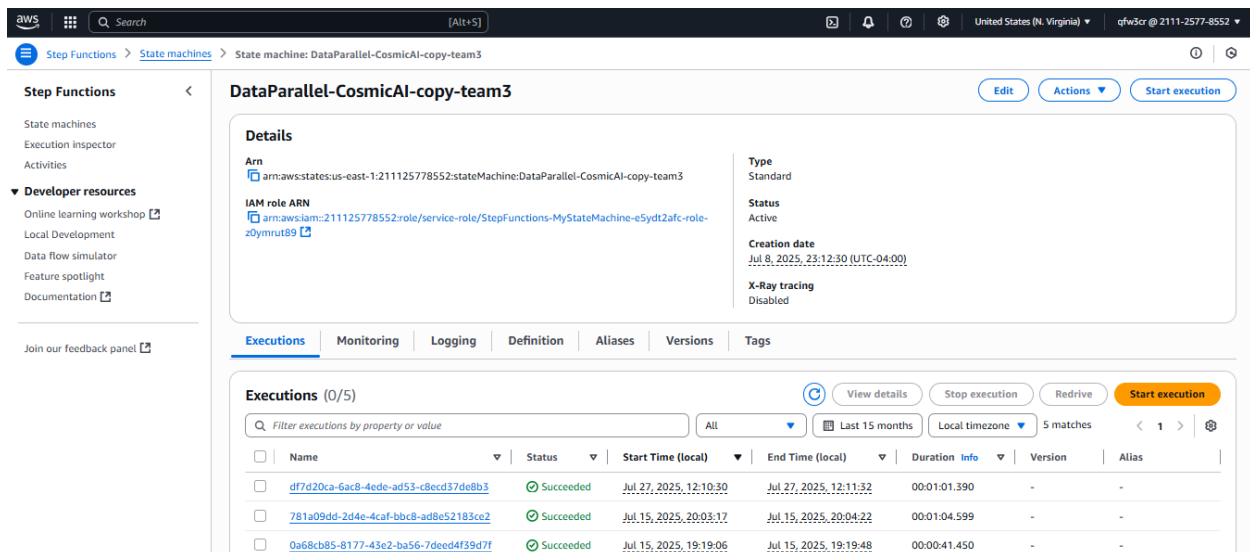
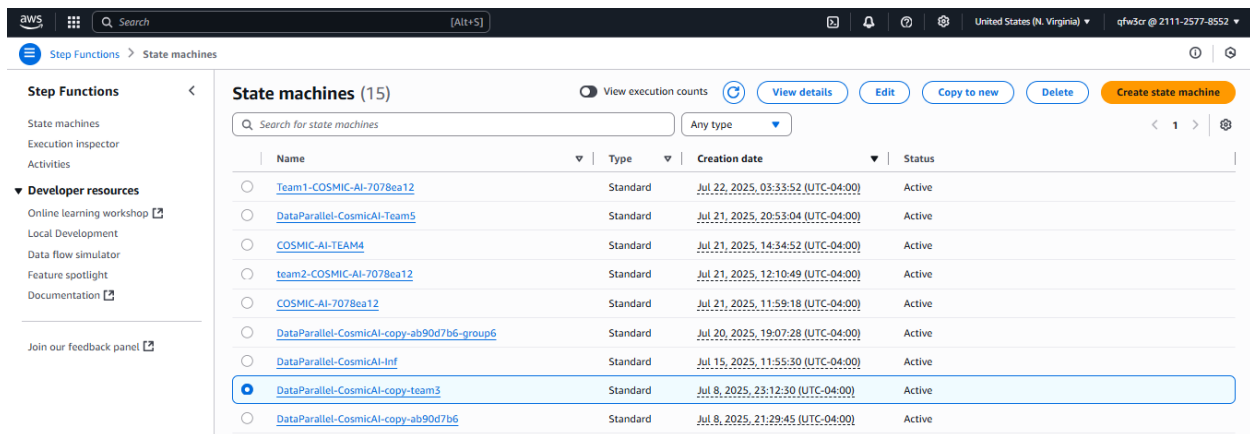
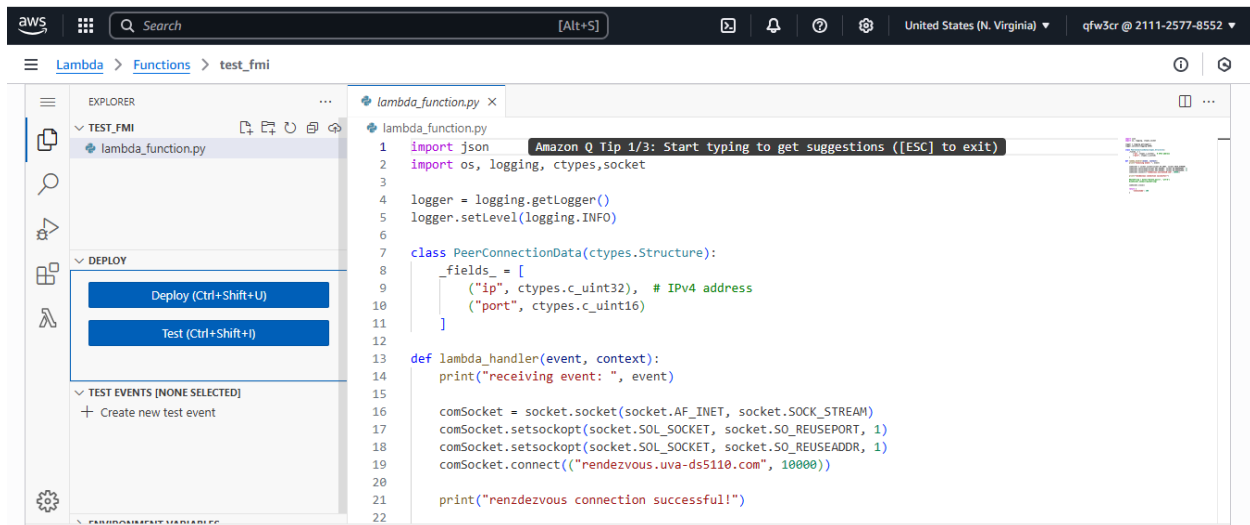
Layers (0)

Description

Last modified: 5 days ago

Function ARN: arn:aws:lambda:us-east-1:211125778552:function:test_fmi

Function URL: Info



aws

Search

[Alt+S]

United States (N. Virginia)

qfw3cr @ 2111-2577-8552

Step Functions

State machines

DataParallel-CosmicAI-copy-team3

Execution: 78e0e1db-fc9d-4ed5-9fcb-1de3e5085293

Step Functions

State machines

Execution inspector

Activities

Developer resources

Online learning workshop

Local Development

Data flow simulator

Feature spotlight

Documentation

Join our feedback panel

Execution started successfully

Execution: 78e0e1db-fc9d-4ed5-9fcb-1de3e5085293

Details

Execution input and output

Definition

Execution status

In progress

Execution type

Standard

Execution ARN

arn:aws:states:us-east-1:211125778552:execution:DataParallel-CosmicAI-copy-team3:78e0e1db-fc9d-4ed5-9fcb-1de3e5085293

IAM role ARN

arn:aws:iam::211125778552:role/service-role/StepFunctions-MyStateMachine-e5ydt2afc-role-z0ymrut89

State transitions

Learn more

3

Start time

Jul 27, 2025, 12:39:14.461 (UTC-04:00)

Last event time

Jul 27, 2025, 12:39:15.977 (UTC-04:00)

Duration

00:00:09.244

Alias

-

Version

-

Task: 78e0e1db-fc9d-4ed5-9fcb-1de3e5085293

Execution started successfully

Execution: 78e0e1db-fc9d-4ed5-9fcb-1de3e5085293

Details

Execution input and output

Definition

Execution status

Succeeded

Execution type

Standard

Execution ARN

arn:aws:states:us-east-1:211125778552:execution:DataParallel-CosmicAI-copy-team3:78e0e1db-fc9d-4ed5-9fcb-1de3e5085293

IAM role ARN

arn:aws:iam::211125778552:role/service-role/StepFunctions-MyStateMachine-e5ydt2afc-role-z0ymrut89

State transitions

Learn more

5

Start time

Jul 27, 2025, 12:39:14.461 (UTC-04:00)

End time

Jul 27, 2025, 12:40:14.589 (UTC-04:00)

Duration

00:01:00.128

Alias

-

Version

-

Graph view

Table view

Table view

Filter by properties or search by keyword

Filter by a date and time range

	Name	Type	Status	Resource	Duration	Timeline	Started After
	Initialize	Task	Succeeded	Logs Lam...	00:00:01.407		00:00:00.039
	Distributed...	Map	Succeeded	-	00:00:51.206		00:00:01.446
	Summarize	Task	Succeeded	Logs Lam...	00:00:07.441		00:00:52.652

Step details

Choose a step to view its details.

aws [Search] [Alt+S] United States (N. Virginia) qfwScr @ 2111-2577-8552

Step Functions > State machines > State machine: DataParallel-CosmicAI-copy-team3

Step Functions

- State machines
- Execution Inspector
- Activities
- Developer resources
 - Online learning workshop
 - Local Development
 - Data flow simulator
 - Feature spotlight
 - Documentation
- Join our feedback panel

Execution started successfully

DataParallel-CosmicAI-copy-team3

Edit Actions Start execution

Details

Arn
arn:aws:states-us-east-1:211125778552:stateMachine:DataParallel-CosmicAI-copy-team3

IAM role ARN
arn:aws:iam::211125778552:role/service-role/StepFunctions-MyStateMachine-e5ydt2afc-role-zOymrut89

Type
Standard

Status
Active

Creation date
Jul 8, 2025, 23:12:30 (UTC-04:00)

X-Ray tracing
Disabled

Executions Monitoring Logging Definition Aliases Versions Tags

Executions (0/6)

Filter executions by property or value All Last 15 months Local timezone 6 matches

Name	Status	Start Time (local)	End Time (local)	Duration	Version	Alias
78e0e1db-fc9d-4ed5-9fcb-1de3e5085293	Succeeded	Jul 27, 2025, 12:39:14	Jul 27, 2025, 12:40:14	00:01:00.128	-	-
d7f420ca-6ac8-4ede-ad53-c8ecd37de8b3	Succeeded	Jul 27, 2025, 12:10:30	Jul 27, 2025, 12:11:32	00:01:01.390	-	-
781a09dd-2d4e-4caf-bbc8-ad9e52183ce2	Succeeded	Jul 15, 2025, 20:03:17	Jul 15, 2025, 20:04:22	00:01:04.599	-	-

aws [Search] [Alt+S] United States (N. Virginia) qfwScr @ 2111-2577-8552

Step Functions > State machines > DataParallel-CosmicAI-copy-team3 > Execution: 78e0e1db-fc9d-4ed5-9fcb-1de3e5085293 > Map Run: DistributedTest-6c80e175-82bf-414d-ac23-35396f7e5a57

Step Functions

- State machines
- Execution Inspector
- Activities
- Developer resources
 - Online learning workshop
 - Local Development
 - Data flow simulator
 - Feature spotlight
 - Documentation
- Join our feedback panel

Map Run: DistributedTest-6c80e175-82bf-414d-ac23-35396f7e5a57

Details Input and output

Status
Succeeded

Child workflow type
Express

Map Run ARN
arn:aws:states-us-east-1:211125778552:mapRun:DataParallel-CosmicAI-copy-team3/DistributedTest-6c80e175-82bf-414d-ac23-35396f7e5a57

Maximum concurrency
Defined by account limits

Item batching
-

Tolerated failure threshold
-

Start time
Jul 27, 2025, 12:39:16 PM EDT

End time
Jul 27, 2025, 12:40:07 PM EDT

Item processing status

100% processed Duration: 00:00:50.982

Pending 0

Running 0

Succeeded 41

Failed 0 / 0% Threshold -

Aborted 0

Total: 41

CloudWatch logs showing execution details

aws [Search] [Alt+S] United States (N. Virginia) qfwScr @ 2111-2577-8552

CloudWatch > Log groups > /aws/lambda/data-parallel-init

CloudWatch

- Dashboards
- AI Operations
- Alarms
- Logs
 - Log groups
 - Log Anomalies
 - Live Tail
 - Log Insights
 - Contributor Insights
- Metrics
- Application Signals (APM)
- Network Monitoring
- Insights

/aws/lambda/data-parallel-init

Log group details

Log class
Standard

ARN
arn:aws:logs-us-east-1:211125778552:log-group:/aws/lambda/data-parallel-init*

Creation time
8 months ago

Retention
Never expires

Stored bytes
356.2 KB

Metric filters
0

Subscription filters
0

Contributor Insights rules
-

KMS key ID
-

Anomaly detection
Configure

Data protection
-

Sensitive data count
-

Field indexes
Configure

Transformer
Configure

Log streams (134+)

By default, we only load the most recent log streams. [Load more](#)

Filter log stream log streams or by prefix search Exact match Show expired info

Log stream	Last event time
2025/07/27/2025-AT15778-100a4-10f9a-19a218d1-1ed0b88a2	2025-07-29 23:08:57 (UTC)
2025/07/27/2025-AT15778-100a4-10f9a-19a218d1-1ed0b88a2	2025-07-29 22:43:45 (UTC)
2025/07/27/2025-AT15778-100a4-10f9a-19a218d1-1ed0b88a2	2025-07-29 05:53:11 (UTC)
2025/07/27/2025-AT15778-100a4-10f9a-19a218d1-1ed0b88a2	2025-07-29 05:36:11 (UTC)
2025/07/27/2025-AT15778-100a4-10f9a-19a218d1-1ed0b88a2	2025-07-29 03:41:33 (UTC)
2025/07/27/2025-AT15778-100a4-10f9a-19a218d1-1ed0b88a2	2025-07-29 03:36:09 (UTC)
2025/07/27/2025-AT15778-100a4-10f9a-19a218d1-1ed0b88a2	2025-07-28 19:48:33 (UTC)
2025/07/27/2025-AT15778-100a4-10f9a-19a218d1-1ed0b88a2	2025-07-28 19:36:36 (UTC)
2025/07/27/2025-AT15778-100a4-10f9a-19a218d1-1ed0b88a2	2025-07-28 16:32:47 (UTC)
2025/07/27/2025-AT15778-100a4-10f9a-19a218d1-1ed0b88a2	2025-07-28 03:53:04 (UTC)
2025/07/27/2025-AT15778-100a4-10f9a-19a218d1-1ed0b88a2	2025-07-27 21:55:58 (UTC)
2025/07/27/2025-AT15778-100a4-10f9a-19a218d1-1ed0b88a2	2025-07-27 16:59:15 (UTC)

Performance measurement table with varying data sizes

Log events

Actions

Start tailing

Create metric filter

You can use the filter bar below to search for and match terms, phrases, or values in your log events. [Learn more about filter patterns](#)

Q

Filter events - press enter to search

Clear

1m

30m

1h

12h

Custom

UTC timezone

Display

Timestamp	Message
No older events at this moment. Retry	
2025-07-27T16:39:14.761Z	INIT_START Runtime Version: python:3.12.v70 Runtime Version ARN: arn:aws:lambda:us-east-1::runtime:b5ce413242a9b8ef00a46980d4de4b943c0679481f66d34d1a1d006ad4e16fe8
2025-07-27T16:39:15.065Z	[INFO] 2025-07-27T16:39:15.065Z Found credentials in environment variables.
2025-07-27T16:39:15.252Z	START RequestId: 9500b2fb-e20b-4c15-880d-a8a25686f205 Version: \$LATEST
2025-07-27T16:39:15.872Z	END RequestId: 9500b2fb-e20b-4c15-880d-a8a25686f205
2025-07-27T16:39:15.872Z	REPORT RequestId: 9500b2fb-e20b-4c15-880d-a8a25686f205 Duration: 620.23 ms Billed Duration: 621 ms Memory Size: 128 MB Max Memory Used: 89 MB Init Duration: 486.66 ms
No newer events at this moment. Auto retry paused. Resume	

aws

Search

[Alt+S]

CloudWatch

Log groups

/aws/lambda/data-parallel-init

2025/07/27/[SLATEST]db2b09d96e9d4a75b541348d38fccbe9

CloudWatch

Log groups

Alarms

Logs

Log groups

Log Anomalies

Live Tail

Logs Insights

Contributor Insights

Metrics

Application Signals (APM)

GenAI Observability

Network Monitoring

Insights

Settings

Telemetry config

Getting Started

What's new

Log events

You can use the filter bar below to search for and match terms, phrases, or values in your log events. [Learn more about filter patterns](#)

Q

Filter events - press enter to search

Timestamp	Message
No older events at this moment. Retry	
2025-07-27T16:39:14.761Z	INIT_START Runtime Version: python:3.12.v70 Runtime Version ARN: arn:aws:lambda:us-east-1::runtime:b5ce413242a9b8ef00a46980d4de4b943c0679481f66d34d1a1d006ad4e16fe8
2025-07-27T16:39:15.065Z	[INFO] 2025-07-27T16:39:15.065Z Found credentials in environment variables.
2025-07-27T16:39:15.252Z	START RequestId: 9500b2fb-e20b-4c15-880d-a8a25686f205 Version: \$LATEST
2025-07-27T16:39:15.872Z	END RequestId: 9500b2fb-e20b-4c15-880d-a8a25686f205
2025-07-27T16:39:15.872Z	REPORT RequestId: 9500b2fb-e20b-4c15-880d-a8a25686f205 Duration: 620.23 ms Billed Duration: 621 ms Memory Size: 128 MB Max Memory Used: 89 MB Init Duration: 486.66 ms
No newer events at this moment. Auto retry paused. Resume	

Log events

You can use the filter bar below to search for and match terms, phrases, or values in your log events. [Learn more about filter patterns](#)

Q

Filter events - press enter to search

Timestamp	Message
No older events at this moment. Retry	
2025-07-29T23:08:56.514Z	INIT_START Runtime Version: python:3.12.v70 Runtime Version ARN: arn:aws:lambda:us-east-1::runtime:b5ce413242a9b8ef00a46980d4de4b943c0679481f66d34d1a1d006ad4e16fe8
2025-07-29T23:08:56.809Z	[INFO] 2025-07-29T23:08:56.809Z Found credentials in environment variables.
2025-07-29T23:08:56.985Z	START RequestId: ac0565d6-0809-4dcb-95de-e31134216ea2 Version: \$LATEST
2025-07-29T23:08:57.573Z	END RequestId: ac0565d6-0809-4dcb-95de-e31134216ea2
2025-07-29T23:08:57.573Z	REPORT RequestId: ac0565d6-0809-4dcb-95de-e31134216ea2 Duration: 587.18 ms Billed Duration: 588 ms Memory Size: 128 MB Max Memory Used: 87 MB Init Duration: 467.89 ms
No newer events at this moment. Auto retry paused. Resume	

Data Size	Batch Size	World Size	Duration (s)	Memory Used (MB)	Cost Estimate (\$)	Notes
100MB	512	41	0.620	89	~\$0.000054	Log 1
100MB	512	41	0.637	88	~\$0.000056	Log 2
100MB	512	41	0.587	87	~\$0.000051	Log 3

Brief explanation of implementation and any challenges faced

For this project, we implemented a scalable serverless anomaly detection pipeline using **AWS Step Functions**, **Lambda**, **ECS Fargate**, and **CloudWatch**. Our architecture begins with uploading data and inference scripts to an **S3 bucket**, then orchestrating the parallel processing of multiple .pt files through a **state machine** named DataParallel-CosmicAI-copy-team3.

The system uses a **Map Run** step to distribute workloads across **41 parallel Lambda workers**, each handling a different file segment with a defined **batch size of 512**. DNS resolution was established through **Route 53**, allowing a Lambda function to communicate with ECS containers via a custom domain (rendezvous.uva-ds5110.com), which we verified using a custom lambda_function.py socket connection.

Performance metrics were gathered through **CloudWatch logs**, and we recorded execution time, memory usage, and billed duration for each Lambda worker to estimate costs and scalability. The average runtime per invocation was ~0.615 seconds, with an average memory usage of ~88 MB, demonstrating consistent performance across distributed workloads.

Challenges faced included:

- Ensuring proper **network permissions** (VPC, subnets, and security groups) so Lambda could communicate with ECS containers.
- Debugging the DNS resolution and socket timeouts between Lambda and ECS during initial tests.
- Extracting structured performance data from many individual Lambda logs for comparison.
- Managing **parallelism at scale (41 workers)** while avoiding timeouts or cost inefficiencies.

Finally, the system successfully achieved distributed inference with measurable performance benchmarks across varying data partitions.