IBU | International Burch University

IT 334 – DevOps Engineering on AWS Cloud

Project – Building a Highly Available, Scalable Web Application

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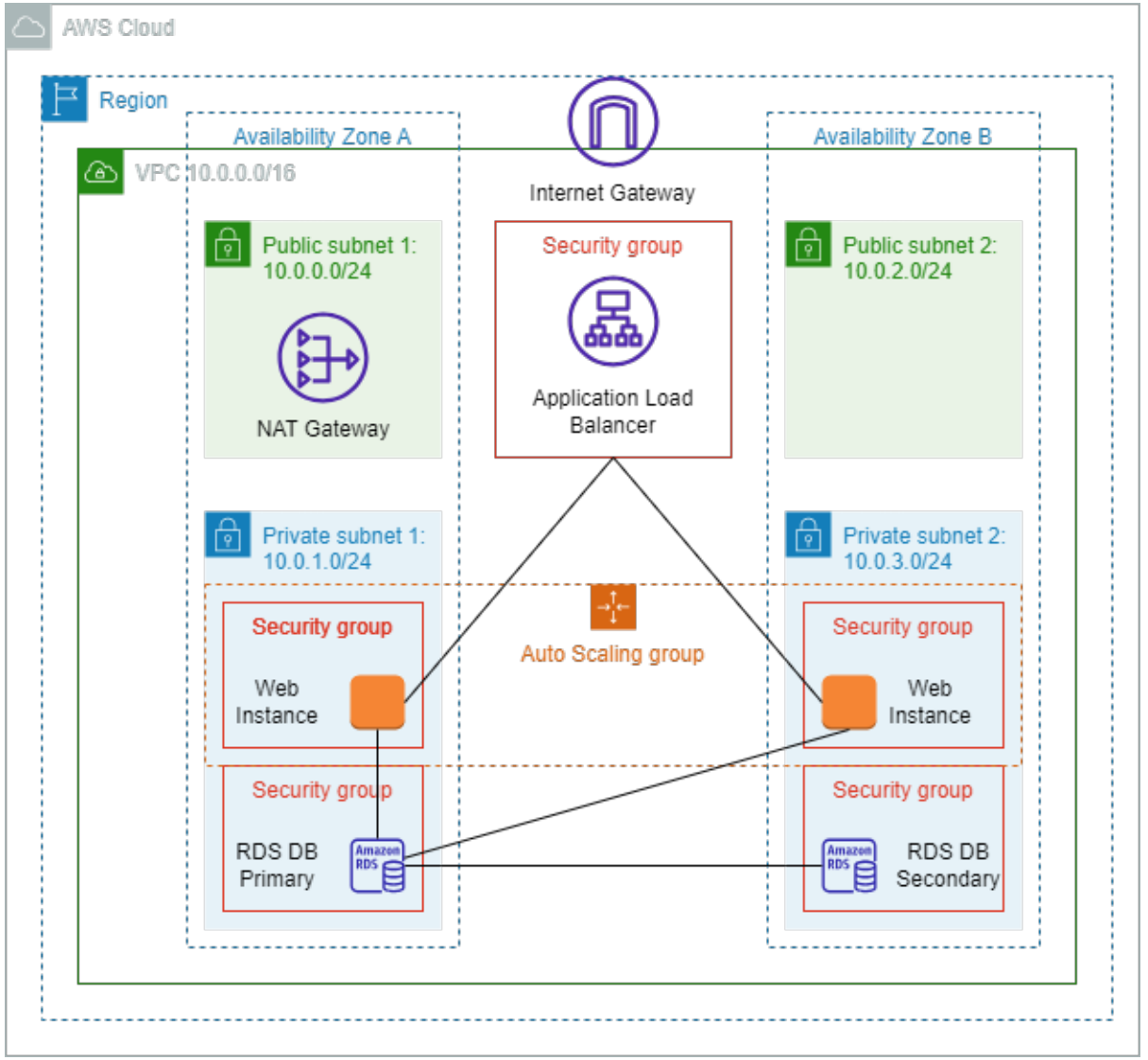
Business scenario overview

- Web Application for enrollment for university.
- It must be fast and available at every part of the year.
- Our assumption is that this web application will be mostly used during enrollment period, which depends from university to university and also number of users will vary from popularity of university.

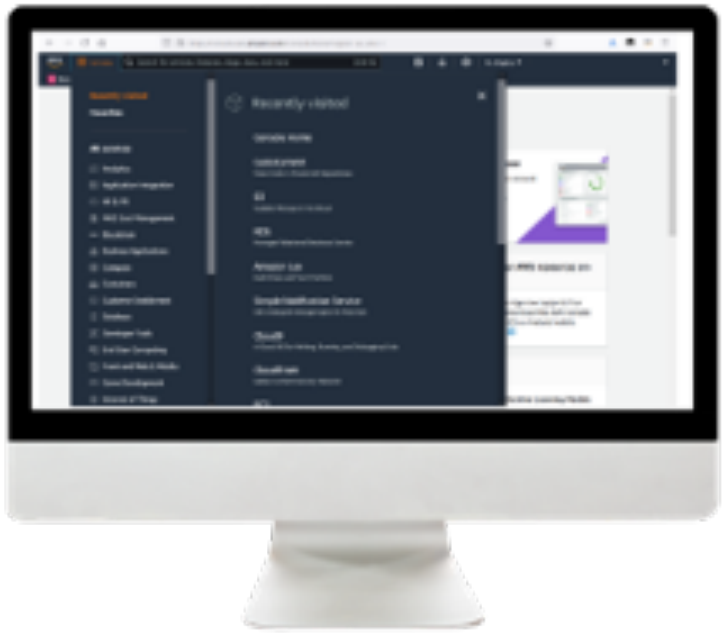
Solution overview

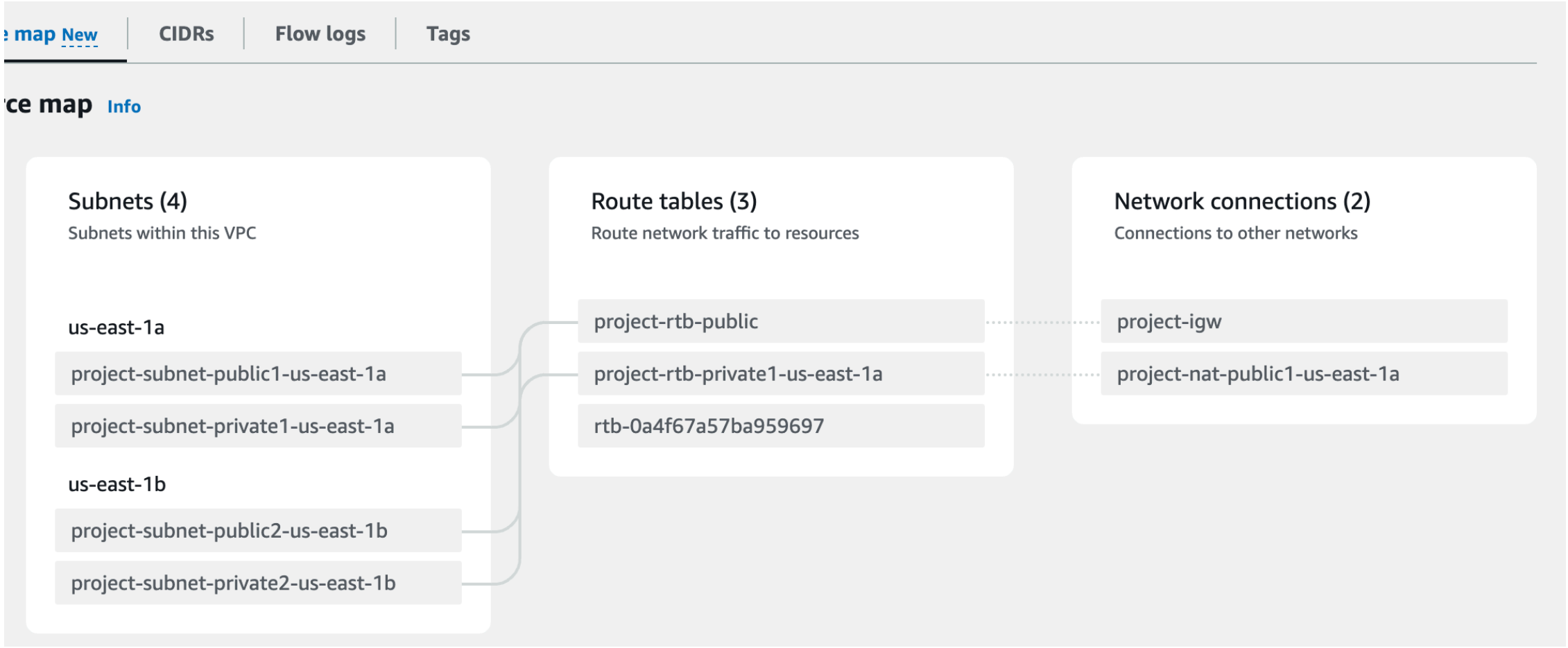
- Our group built web application for universities to host enrollment system.
- We implemented auto scaling and load balancers so that application would be able operate under high number of users, fast and without any issues.
- People at the universities will be able to see full list of their students, edit their credentials and update information about them at any time of the year.

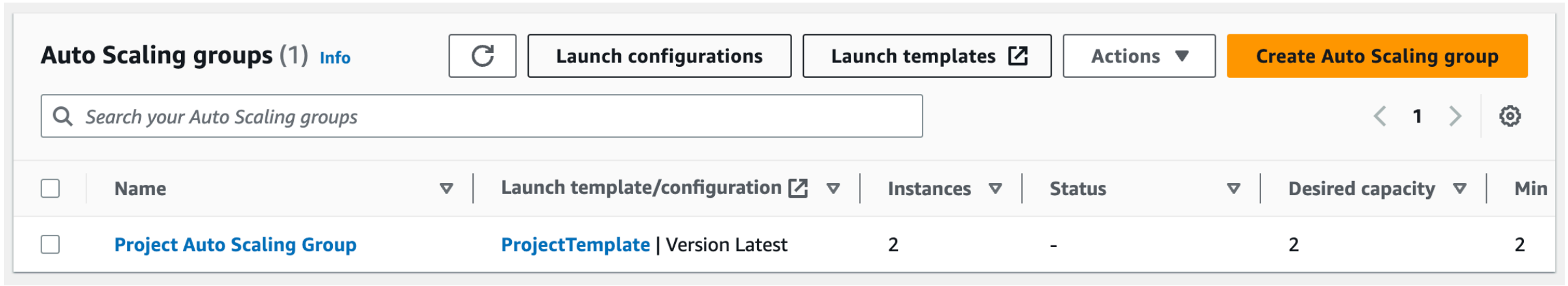
Architecture diagram of the solution



Demo




e map New
CIDRs
Flow logs
Tags
ce map Info
Subnets (4)
Subnets within this VPC
us-east-1a
project-subnet-public1-us-east-1a
project-subnet-private1-us-east-1a
us-east-1b
project-subnet-public2-us-east-1b
project-subnet-private2-us-east-1b
Route tables (3)
Route network traffic to resources
project-rtb-public
project-rtb-private1-us-east-1a
rtb-0a4f67a57ba959697
Network connections (2)
Connections to other networks
project-igw
project-nat-public1-us-east-1a


Auto Scaling groups (1) Info
Launch configurations
Launch templates
Actions
Create Auto Scaling group
Search your Auto Scaling groups
1
Name
Launch template/configuration
Instances
Status
Desired capacity
Min
Project Auto Scaling Group
ProjectTemplate | Version Latest
2
-
2
2

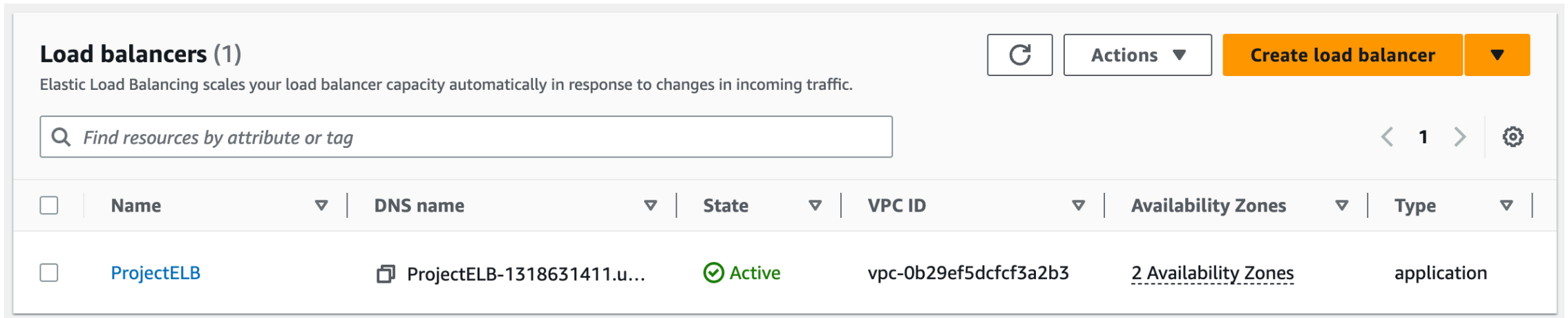
Target groups (1) Info

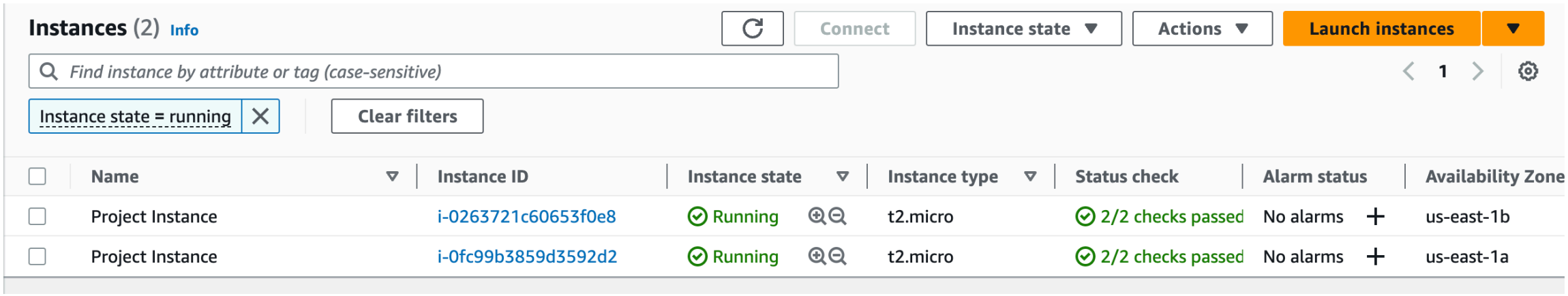
Actions | Create target group

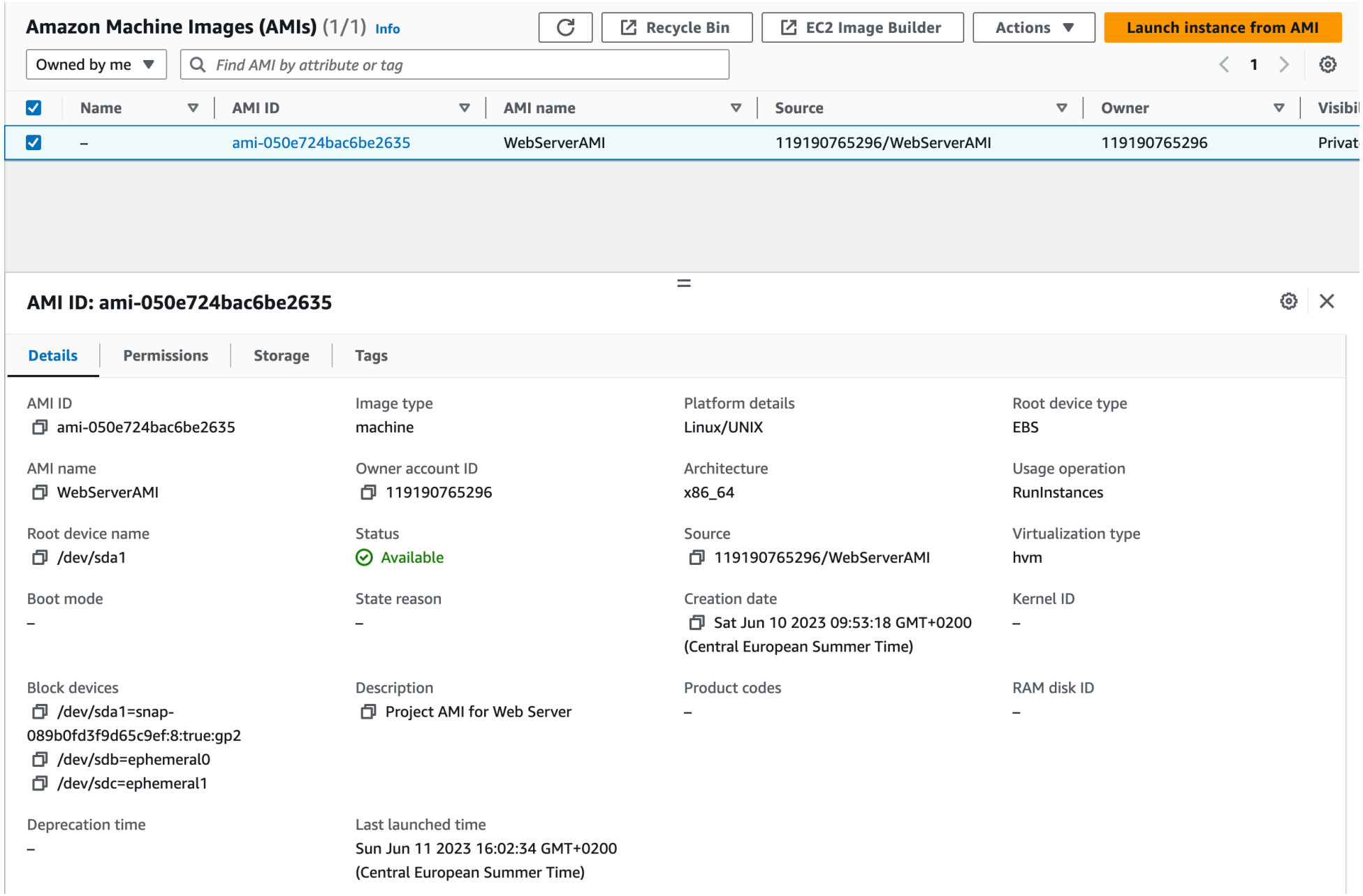
Find resources by attribute or tag

1

Name	ARN	Port	Protocol	Target type	Load balancer
ProjectGroup	arn:aws:elasticloadbalanci…	80	HTTP	Instance	ProjectELB


Load balancers (1)
Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.
Actions
Create load balancer
Find resources by attribute or tag
1
Name
DNS name
State
VPC ID
Availability Zones
Type
ProjectELB
ProjectELB-1318631411.u...
Active
vpc-0b29ef5dcfcf3a2b3
2 Availability Zones
application


Instances (2) Info
Connect
Instance state
Actions
Launch instances
Find instance by attribute or tag (case-sensitive)
1
Instance state = running
Clear filters
Name
Instance ID
Instance state
Instance type
Status check
Alarm status
Availability Zone
Project Instance
i-0263721c60653f0e8
Running
t2.micro
2/2 checks passed
No alarms
us-east-1b
Project Instance
i-0fc99b3859d3592d2
Running
t2.micro
2/2 checks passed
No alarms
us-east-1a


Amazon Machine Images (AMIs) (1/1) Info
Recycle Bin
EC2 Image Builder
Actions
Launch instance from AMI
Owned by me
Find AMI by attribute or tag
1
Name
AMI ID
AMI name
Source
Owner
Visibi
–
ami-050e724bac6be2635
WebServerAMI
119190765296/WebServerAMI
119190765296
Privat
AMI ID: ami-050e724bac6be2635
Details
Permissions
Storage
Tags
AMI ID
ami-050e724bac6be2635
Image type
machine
Platform details
Linux/UNIX
Root device type
EBS
AMI name
WebServerAMI
Owner account ID
119190765296
Architecture
x86_64
Usage operation
RunInstances
Root device name
/dev/sda1
Status
Available
Source
119190765296/WebServerAMI
Virtualization type
hvm
Boot mode
–
State reason
–
Creation date
Sat Jun 10 2023 09:53:18 GMT+0200
(Central European Summer Time)
Kernel ID
–
Block devices
/dev/sda1=snap-
089b0fd3f9d65c9ef:8:true:gp2
/dev/sdb=ephemeral0
/dev/sdc=ephemeral1
Description
Project AMI for Web Server
Product codes
–
RAM disk ID
–
Deprecation time
–
Last launched time
Sun Jun 11 2023 16:02:34 GMT+0200
(Central European Summer Time)

project-db

Modify | Actions

Summary

DB identifier	CPU	Status	Class
project-db	3.30%	Available	db.t3.micro
Role	**Current activity**	**Engine**	**Region & AZ**
Instance	5 Connections	MySQL Community	us-east-1a

Connectivity & security | Monitoring | Logs & events | Configuration | Maintenance & backups | Tags

Connectivity & security

Endpoint & port

Endpoint
project-db.cjx3eg3cjwju.us-east-1.rds.amazonaws.com

Port
3306

Networking

Availability Zone
us-east-1a

VPC
project-vpc (vpc-0b29ef5dcfcf3a2b3)

Subnet group
db-subnet-group

Subnets
subnet-030d50f993f7d9aa4
subnet-0e04b097eb5e7b2c8

Network type
IPv4

Security

VPC security groups
RDS-SG (sg-05d5ff95236a78bc9)
Active

Publicly accessible
No

Certificate authority Info
rds-ca-2019

Certificate authority date
August 22, 2024, 19:08 (UTC+02:00)

DB instance certificate expiration date
August 22, 2024, 19:08 (UTC+02:00)

Mydbsecret

Replicate secret to other Regions

Secret details

Actions

Encryption key
aws/secretsmanager

Secret name
Mydbsecret

Secret ARN
arn:aws:secretsmanager:us-east-1:119190765296:secret:Mydbsecret-Knrqd1

Secret description
Database secret for web app

Tags

Edit tags

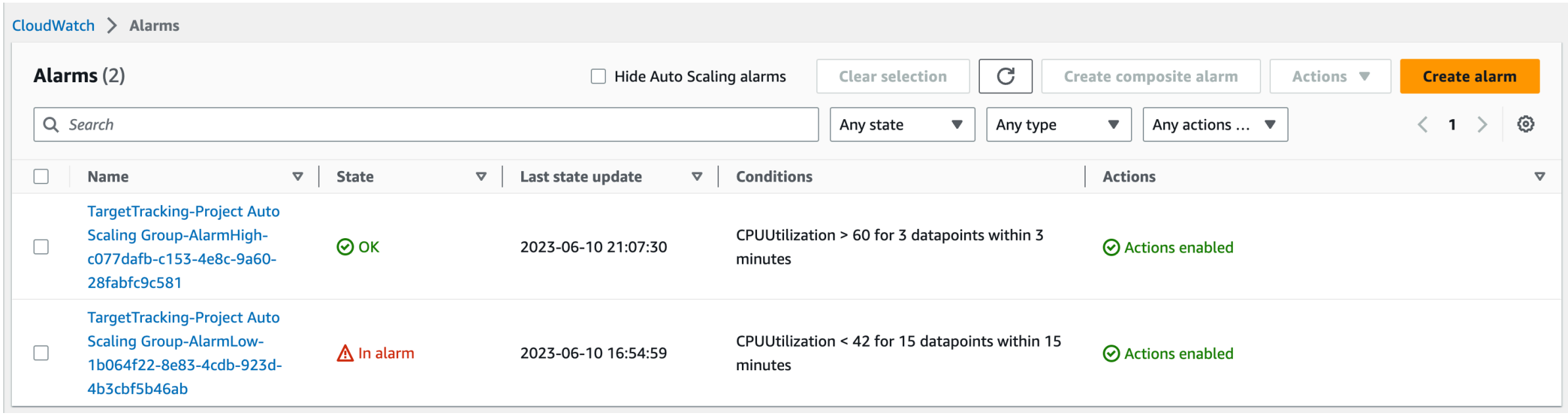
Secret value Info

Retrieve and view the secret value.

Close | Edit

Key/value | Plaintext

Secret key	Secret value
user	main
password	project-password
host	project-db.cjx3eg3cjwju.us-east-1.rds.amazonaws.com
db	STUDENTS


CloudWatch > Alarms
Alarms (2)
Hide Auto Scaling alarms
Clear selection
Create composite alarm
Actions
Create alarm
Search
Any state
Any type
Any actions ...
1
Name
State
Last state update
Conditions
Actions
TargetTracking-Project Auto Scaling Group-AlarmHigh-c077dafb-c153-4e8c-9a60-28fabfc9c581
OK
2023-06-10 21:07:30
CPUUtilization > 60 for 3 datapoints within 3 minutes
Actions enabled
TargetTracking-Project Auto Scaling Group-AlarmLow-1b064f22-8e83-4cdb-923d-4b3cbf5b46ab
In alarm
2023-06-10 16:54:59
CPUUtilization < 42 for 15 datapoints within 15 minutes
Actions enabled

XYZ University

Home

Students list

All students

Name	Address	City	State	Email	Phone	
Ajdin	ajdin.bajric.2016@gmail.com	Tuzla	Bosnia	ajdin.bajric.2016@gmail.com	38762919733	edit
keno	bralic	ajdasda	dsada	keno@gmail.com	38798721241	edit
jjkh	hkhk	okhjkj	kjhhjkjk	test@gmail.com	38762919744	edit

Add a new student

Lessons learned

- Do not create your infrastructure from scratch
- Use Fargate, ECS, or serverless
- Costs of the infrastructure can be high

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Questions?

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THANK YOU!