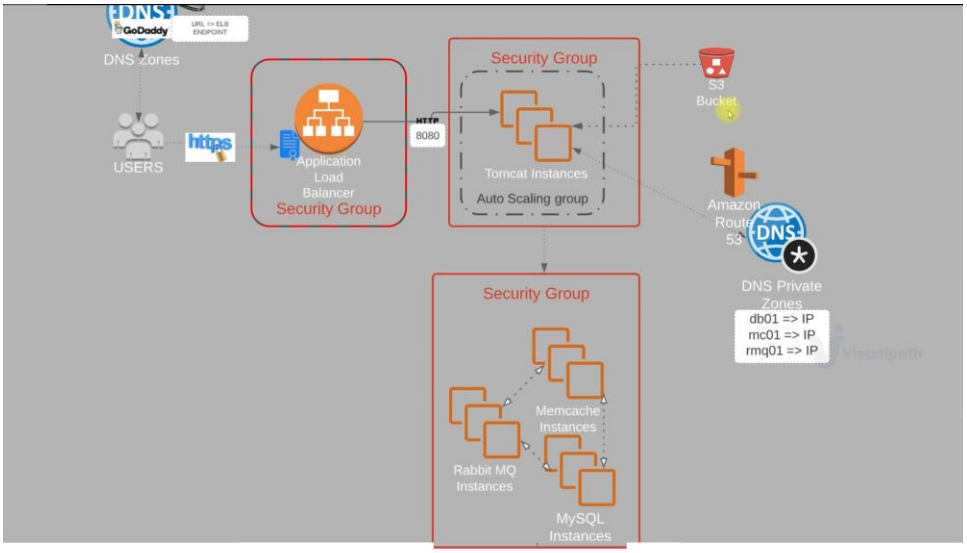
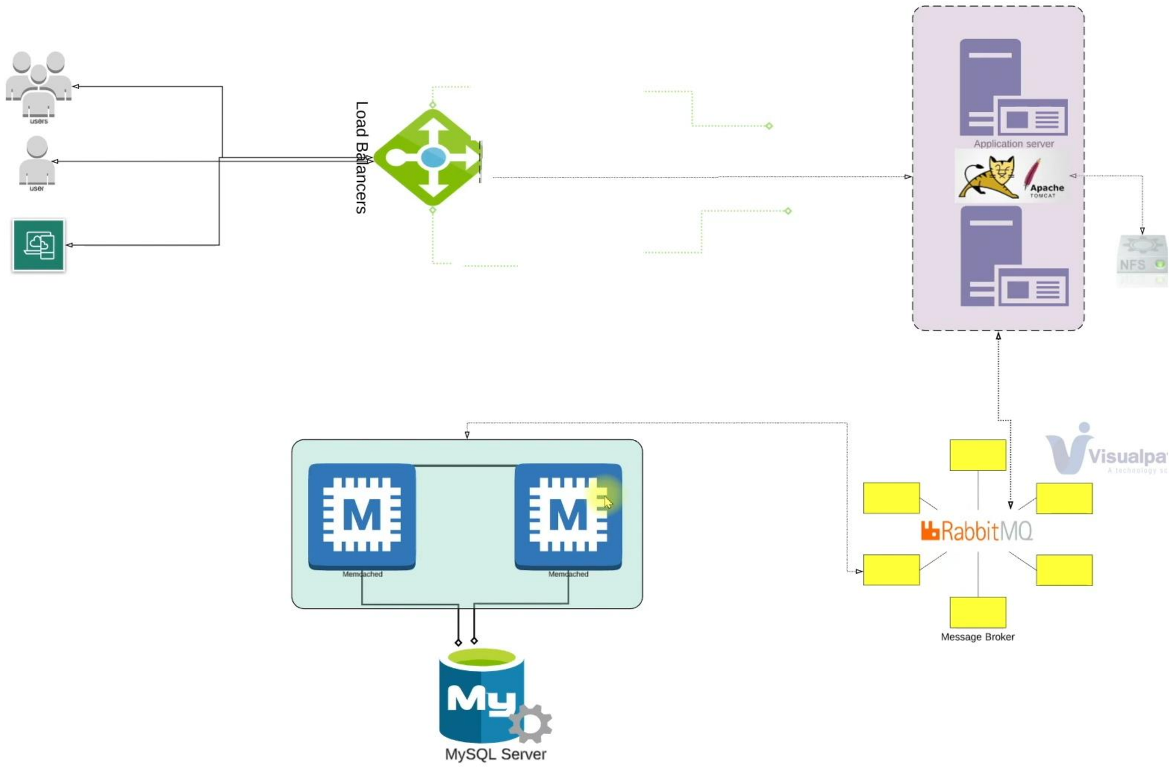
AWS Multi-tier web application hosting

This is a multi-tier web application hosting project in AWS cloud. We used four EC2 Virtual machines, First VM is to host Apache tomcat server with application code in it, second VM is to place a database server, third VM will have Memcached running in it and the last VM will have Rabbit MQ which is the queuing system in between App and DB/Cache layer. A domain satzwebio was registered with the domain provider(Godaddy), a load balancer is used to get traffic from users and point to app servers.

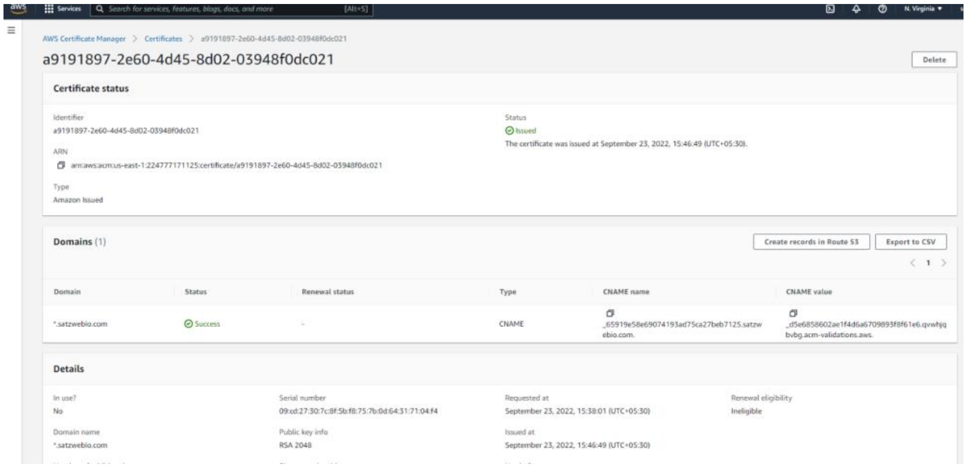
A S3 bucket is created to store artifacts of Application code.





1. Request a public certificate;

Create a public certificate with DNS validation,


aws
Services
Search for services, features, blogs, docs, and more [Alt+S]
N. Virginia
AWS Certificate Manager > Certificates > a9191897-2e60-4d45-8d02-03948f0dc021
Delete
Create records in Route 53
Export to CSV

a9191897-2e60-4d45-8d02-03948f0dc021

Certificate status

Identifier
a9191897-2e60-4d45-8d02-03948f0dc021

ARN
arn:aws:acm:us-east-1:224777171125:certificate/a9191897-2e60-4d45-8d02-03948f0dc021

Type
Amazon Issued

Status
Issued
The certificate was issued at September 23, 2022, 15:46:49 (UTC+05:30).

Domains (1)

Domain	Status	Renewal status	Type	CNAME name	CNAME value
*.satzwebio.com	Success	-	CNAME	_65919e58e69074193ad75ca27beb7125.satzwebio.com.	_d5e6858602ae1f4d6a6709893f8f61e6.qvwhjqbvbg.acm-validations.aws.

Details

In use?
No

Serial number
09:cd:27:30:7c:8f:5b:f8:75:7b:0d:64:31:71:04:f4

Requested at
September 23, 2022, 15:38:01 (UTC+05:30)

Renewal eligibility
Ineligible

Domain name
*.satzwebio.com

Public key info
RSA 2048

Issued at
September 23, 2022, 15:46:49 (UTC+05:30)

2. Create 3 security groups

1. Load balancer security group -

Allow Http traffic in port 80 and Https traffic in port 443 for both ipv4 and ipv6.

2. App server security group -

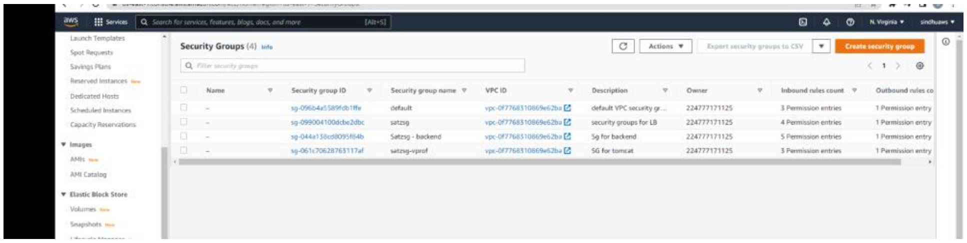
Allow traffic only from LB security group on port 8080.

3. Backend security group

Allow traffic from app security group only on ports 3306, 5672, 11211;

Allow trafiic on all ports for the own security group itself.

Allow ssh(22) for MyIP to login via putty.



Security Groups (4) Info

Name	Security group ID	Security group name	VPC ID	Description	Owner	Inbound rules count	Outbound rules co
–	sg-096b4a5589fdb1ffe	default	vpc-0f7768310869e62ba	default VPC security gr...	224777171125	3 Permission entries	1 Permission entry
–	sg-099004100dcbe2dbc	satzsg	vpc-0f7768310869e62ba	security groups for LB	224777171125	4 Permission entries	1 Permission entry
–	sg-044a138cd8095f84b	Satzsg - backend	vpc-0f7768310869e62ba	Sg for backend	224777171125	5 Permission entries	1 Permission entry
–	sg-061c70628763117af	satzsg-vprof	vpc-0f7768310869e62ba	SG for tomcat	224777171125	3 Permission entries	1 Permission entry

3. Create Key pairs

Create a EC2 key pair in pem format.

4. Launch instances with user data

1. Create a EC2 instance for Database. (centos 7, t2.micro, add backedn sec group)

Add user data from mydbsql file and launch instance.

login to DB instance "ssh -i vprofile-prof-key.pem centos@54.196.151.252"

Check Mariadb is up "systemctl status mariadb"

mysql -u root -p

show databases;

use accounts

show tables;

2. Create a EC2 instance for Memcahced

Login into it

systemctl status memcached

check the ports - "ss -tunpl | grep 11211"

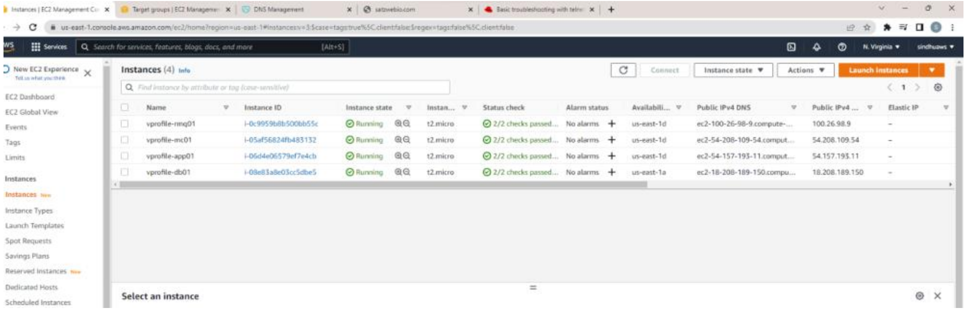
3. Create a EC2 instance for rabbitmq-server

systemctl status rabbitmq-server

4. Create a EC2 instance for App01

OS: Ubuntu 18 free tier

Update user data with the content present in tomcat_ubuntu.sh file not tomcat.sh



Instances (4) Info

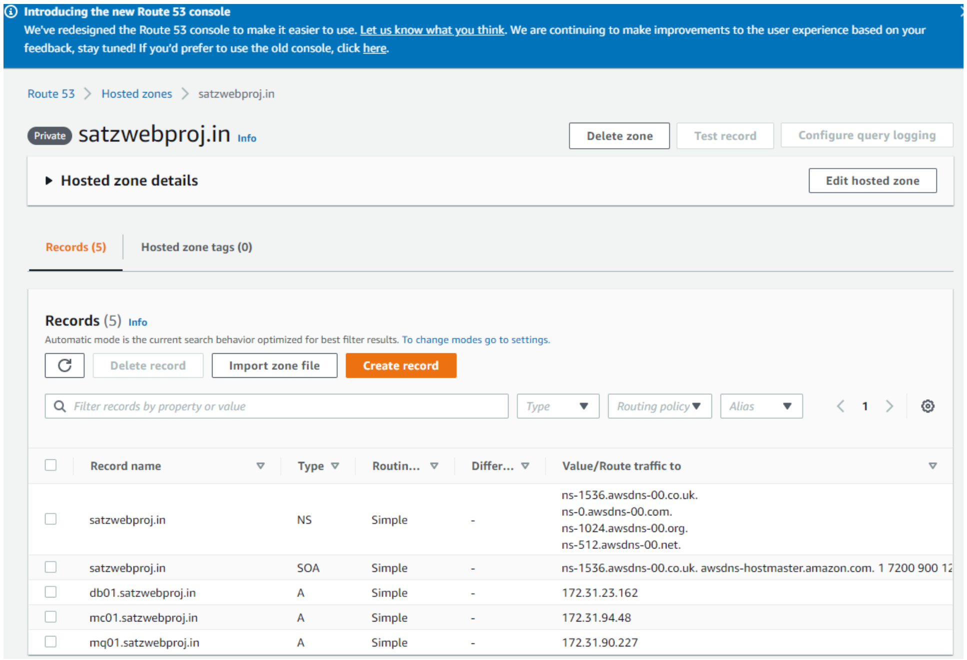
Find instance by attribute or tag (case-sensitive)

□	Name	Instance ID	Instance state	Instan...	Status check	Alarm status	Availabili...	Public IPv4 DNS	Public IPv4 ...	Elastic IP
□	vprofile-rmq01	i-0c9959b8b500bb55c	Running	t2.micro	2/2 checks passed...	No alarms	us-east-1d	ec2-100-26-98-9.compute-...	100.26.98.9	-
□	vprofile-mc01	i-05af56824fb483132	Running	t2.micro	2/2 checks passed...	No alarms	us-east-1d	ec2-54-208-109-54.comput...	54.208.109.54	-
□	vprofile-app01	i-06d4e06579ef7e4cb	Running	t2.micro	2/2 checks passed...	No alarms	us-east-1d	ec2-54-157-193-11.comput...	54.157.193.11	-
□	vprofile-db01	i-08e83a8e03cc5dbe5	Running	t2.micro	2/2 checks passed...	No alarms	us-east-1a	ec2-18-208-189-150.compu...	18.208.189.150	-

5. Update IP to name mapping in route 53

Create route 53 hosted zone for the selected VPC.

Create 3 simple records like, db01, mc01 and mq01 and provide the corresponding private Ip Addresses.



Introducing the new Route 53 console

We've redesigned the Route 53 console to make it easier to use. Let us know what you think. We are continuing to make improvements to the user experience based on your feedback, stay tuned! If you'd prefer to use the old console, click here.

Route 53 > Hosted zones > satzwebproj.in

Private satzwebproj.in Info

Hosted zone details

Records (5) Info

Automatic mode is the current search behavior optimized for best filter results. To change modes go to settings.

□	Record name	Type	Routin...	Differ...	Value/Route traffic to
□	satzwebproj.in	NS	Simple	-	ns-1536.awsdns-00.co.uk. ns-0.awsdns-00.com. ns-1024.awsdns-00.org. ns-512.awsdns-00.net.
□	satzwebproj.in	SOA	Simple	-	ns-1536.awsdns-00.co.uk. awsdns-hostmaster.amazon.com. 1 7200 900 12
□	db01.satzwebproj.in	A	Simple	-	172.31.23.162
□	mc01.satzwebproj.in	A	Simple	-	172.31.94.48
□	mq01.satzwebproj.in	A	Simple	-	172.31.90.227

6. Build application from source code

Go to the source code and update application.properties file in src/main/resources.

update db01 with db01.satzwebproj.in; Do this similar to mc01 and mq01.

Cd to the repository which has pom file and run "mvn install" it will generate artifacts

Make sure below:

```
[root@ip-172-31-23-162 etc]# java -version

openjdk version "1.8.0_345"

OpenJDK Runtime Environment (build 1.8.0_345-b01)

OpenJDK 64-Bit Server VM (build 25.345-b01, mixed mode)

[root@ip-172-31-23-162 etc]# mvn -version

Apache Maven 3.0.5 (Red Hat 3.0.5-17)

Maven home: /usr/share/maven

Java version: 1.8.0_345, vendor: Red Hat, Inc.

Java home: /usr/lib/jvm/java-1.8.0-openjdk-1.8.0.345.b01-1.el7_9.x86_64/jre

Default locale: en_US, platform encoding: UTF-8
```

```
OS name: "linux", version: "3.10.0-1160.76.1.el7.x86_64", arch: "amd64", family: "unix"
[root@ip-172-31-23-162 etc]#
```

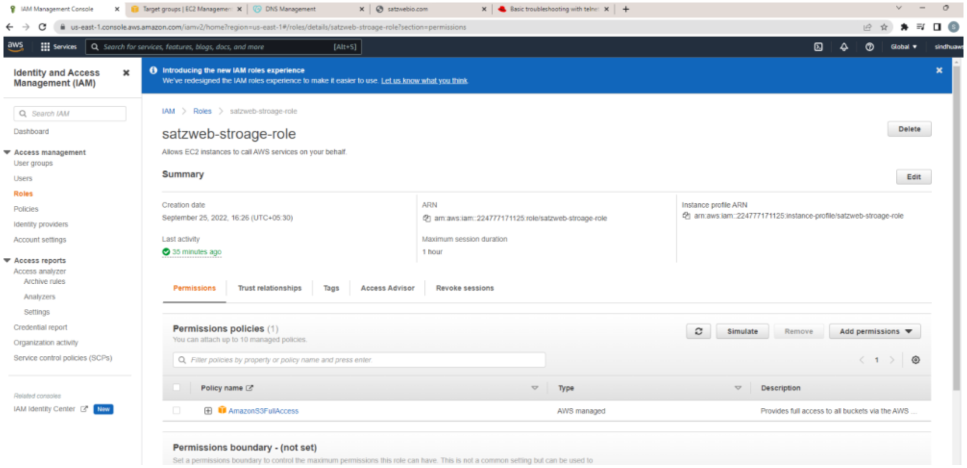
7. Upload to S3 bucket

```
aws s3 mb s3://satzweb-storage
```

Go to the target directory(Which is the one maven generated) and perform below

```
 aws s3 cp vprofile-v2.war s3://satzweb-storage/vprofile-v2.war
```

```
PS E:\devops\aws\liftshift\target> aws s3 ls s3://satzweb-storage
2022-09-25 16:18:45   48451801 vprofile-v2.war
```



Introducing the new IAM roles experience
We've redesigned the IAM roles experience to make it easier to use. Let us know what you think

satzweb-stroage-role

Allows EC2 instances to call AWS services on your behalf.

Summary

Creation date
September 25, 2022, 16:26 (UTC+05:30)

Last activity
35 minutes ago

ARN
arn:aws:iam::224777171125:role/satzweb-stroage-role

Maximum session duration
1 hour

Instance profile ARN
arn:aws:iam::224777171125:instance-profile/satzweb-stroage-role

Permissions policies (1)
You can attach up to 10 managed policies.

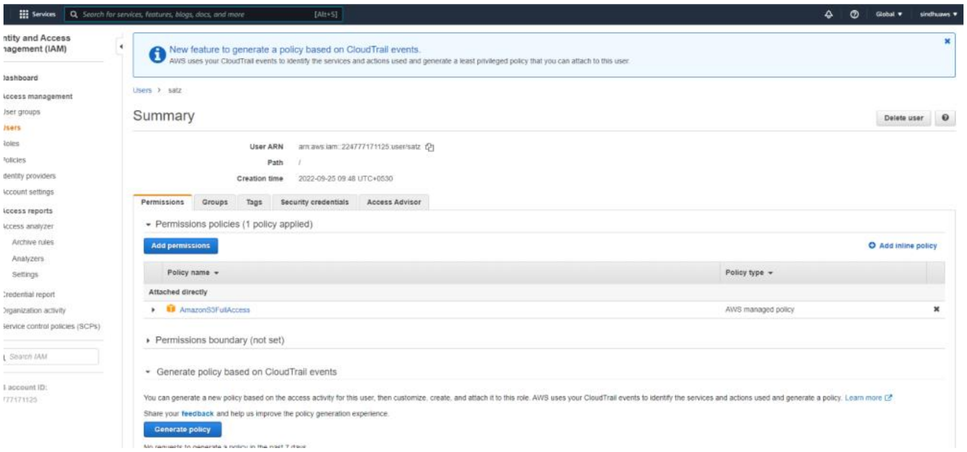
Policy name	Type	Description
AmazonS3FullAccess	AWS managed	Provides full access to all buckets via the AWS ...

Permissions boundary - (not set)
Set a permissions boundary to control the maximum permissions this role can have. This is not a common setting but can be used to

8. Create a role and assign it to Ec2 App instance:

Go to IAM and create a EC2 role with Amazon S3 Full access.

Update the new role in EC2 app instance



New feature to generate a policy based on CloudTrail events.
AWS uses your CloudTrail events to identify the services and actions used and generate a least privileged policy that you can attach to this user.

Summary

User ARN arn:aws:iam::224777171125:user/satz
Path /
Creation time 2022-09-25 09:48 UTC+0530

Permissions policies (1 policy applied)

Policy name	Policy type
Attached directly	
AmazonS3FullAccess	AWS managed policy

Permissions boundary (not set)

Generate policy based on CloudTrail events

You can generate a new policy based on the access activity for this user, then customize, create, and attach it to this role. AWS uses your CloudTrail events to identify the services and actions used and generate a policy. Learn more

Share your feedback and help us improve the policy generation experience.

No requests to generate a policy in the past 7 days

9. Download artifact to Tomcat EC2 instance

ssh into app server

ssh -i vprofile-prof-key.pem ubuntu@54.157.193.11

switch to root and go to /var/lib/tomcat8/webapps

stop tomcat service - systemctl stop tomcat8

rm -rf ROOT/

apt install awscli

aws s3 cp s3://satzweb-storage/vprofile-v2.war /tmp/vprofile-v2.war

cd /tmp/

cp vprofile-v2.war /var/lib/tomcat8/webapps/ROOT.war

systemctl start tomcat8

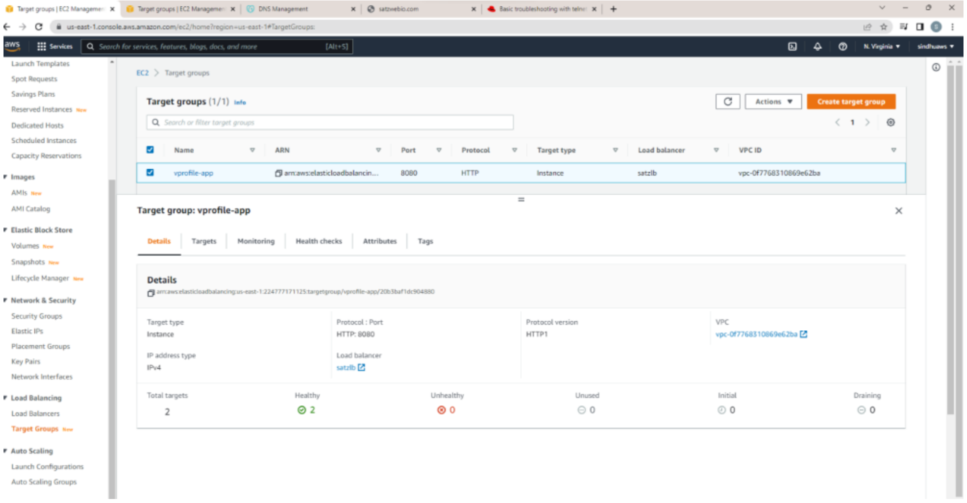
cd /var/lib/tomcat8/webapps/ROOT/WEB-INF/classes#

telnet db01.satzwebproj.in 3306

(Just checking if app is able to connect to db, try similar for all hosts)

10. Create Target group:

For port 8080 and add app instance



Target groups (1/1)

Name	ARN	Port	Protocol	Target type	Load balancer	VPC ID
vprofile-app	arn:aws:elasticloadbalancin...	8080	HTTP	Instance	satzlb	vpc-0f7768310869e62ba

Target group: vprofile-app

Details
arn:aws:elasticloadbalancing:us-east-1:224777171125:targetgroup/vprofile-app/20b3baf1dc904880

Target type: Instance
Protocol : Port: HTTP: 8080
Protocol version: HTTP1
VPC: vpc-0f7768310869e62ba
IP address type: IPv4
Load balancer: satzlb

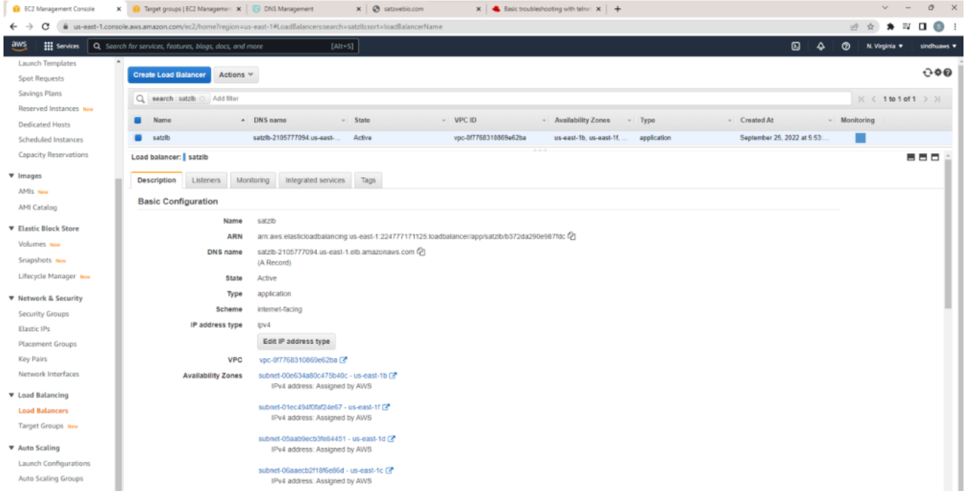
Total targets	Healthy	Unhealthy	Unused	Initial	Draining
2	2	0	0	0	0

11. Setup ELB with HTTPS [Cert from Amazon certificate Manager]

Create a load balancer internet facing and IPV4, select all the regions, add the target group.

Choose the LB security group, add both http and https as listeners.

Add the cert that we created.



Name	DNS name	State	VPC ID	Availability Zones	Type	Created At	Monitoring
satzlb	satzlb-2105777094.us-east-...	Active	vpc-0f7768310869e62ba	us-east-1b, us-east-1f, ...	application	September 25, 2022 at 5:53:...	

Load balancer: satzlb

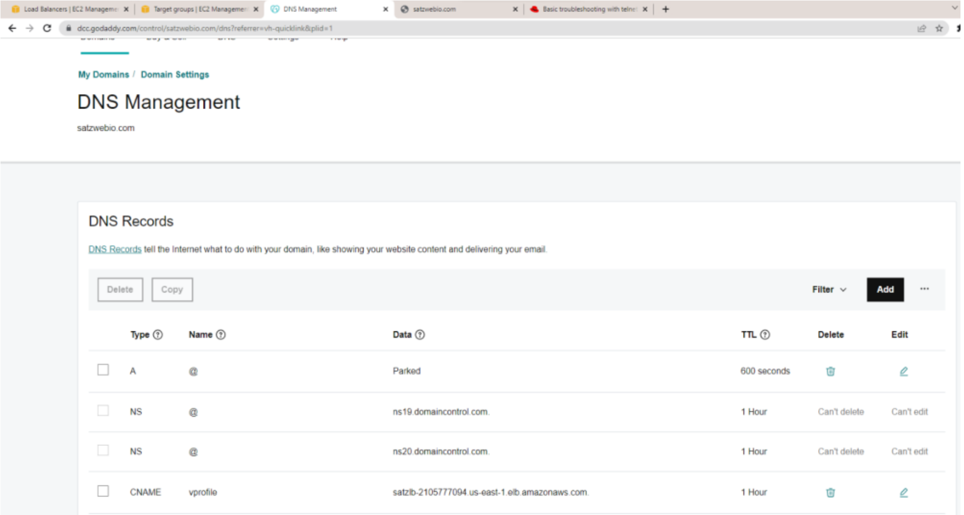
Basic Configuration

Name: satzlb
ARN: arn:aws:elasticloadbalancing:us-east-1:224777171125:loadbalancer/app/satzlb/b372da290e987fdc
DNS name: satzlb-2105777094.us-east-1.elb.amazonaws.com (A Record)
State: Active
Type: application
Scheme: internet-facing
IP address type: ipv4
Edit IP address type
VPC: vpc-0f7768310869e62ba
Availability Zones: subnet-00e634a80c475b40c - us-east-1b
IPv4 address: Assigned by AWS
subnet-01ec494f0faf24e67 - us-east-1f
IPv4 address: Assigned by AWS
subnet-05aab9ecb3fe84451 - us-east-1d
IPv4 address: Assigned by AWS
subnet-06aaecb2f18f6e86d - us-east-1c
IPv4 address: Assigned by AWS

12. Map ELB endpoint to website name in Godaddy DNS.

Copy DNS name from LB and go to godaddy, add a new Cname records like xyz.

so xyz.satzwebio.com


Load Balancers | EC2 Manageme
Target groups | EC2 Managemen
DNS Management
satzwebio.com
Basic troubleshooting with telne
dcc.godaddy.com/control/satzwebio.com/dns?referrer=vh-quicklink&plid=1
Delete
Copy
Filter
Add

My Domains / Domain Settings

DNS Management

satzwebio.com

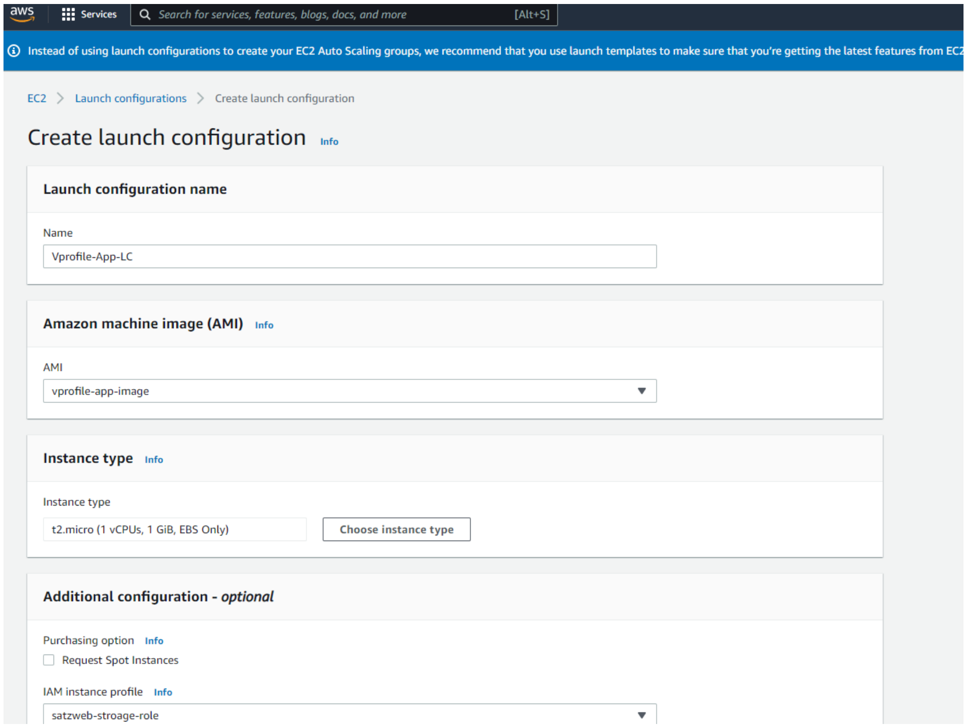
DNS Records

DNS Records tell the Internet what to do with your domain, like showing your website content and delivering your email.

	Type	Name	Data	TTL	Delete	Edit
□	A	@	Parked	600 seconds	🗑	✎
□	NS	@	ns19.domaincontrol.com.	1 Hour	Can't delete	Can't edit
□	NS	@	ns20.domaincontrol.com.	1 Hour	Can't delete	Can't edit
□	CNAME	vprofile	satzlb-2105777094.us-east-1.elb.amazonaws.com.	1 Hour	🗑	✎

13. Create Image for the App instance

14. Create a launch configuration with the AMI, existing key pair.



Instead of using launch configurations to create your EC2 Auto Scaling groups, we recommend that you use launch templates to make sure that you're getting the latest features from EC2

EC2 > Launch configurations > Create launch configuration

Create launch configuration Info

Launch configuration name

Name: Vprofile-App-LC

Amazon machine image (AMI) Info

AMI: vprofile-app-image

Instance type Info

Instance type: t2.micro (1 vCPUs, 1 GiB, EBS Only)

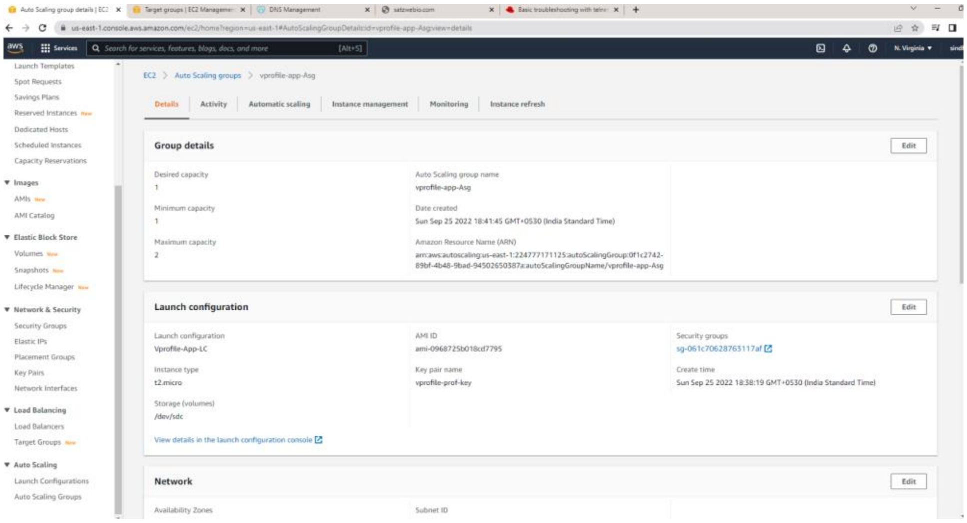
Additional configuration - *optional*

Purchasing option Info

□ Request Spot Instances

IAM instance profile Info: satzweb-stroage-role

15. Create a Autoscaling group and setup target policy,



Group details

Desired capacity: 1

Minimum capacity: 1

Maximum capacity: 2

Auto Scaling group name: vprofile-app-Asg

Date created: Sun Sep 25 2022 18:41:45 GMT+0530 (India Standard Time)

Amazon Resource Name (ARN): arn:aws:autoscaling:us-east-1:224777171125:autoScalingGroup:0f1c2742-89bf-4b48-9bad-94502650387a:autoScalingGroupName/vprofile-app-Asg

Launch configuration

Launch configuration: Vprofile-App-LC

Instance type: t2.micro

Storage (volumes): /dev/sdc

AMI ID: ami-0968725b018cd7795

Key pair name: vprofile-prof-key

Security groups: sg-061c70628763117af

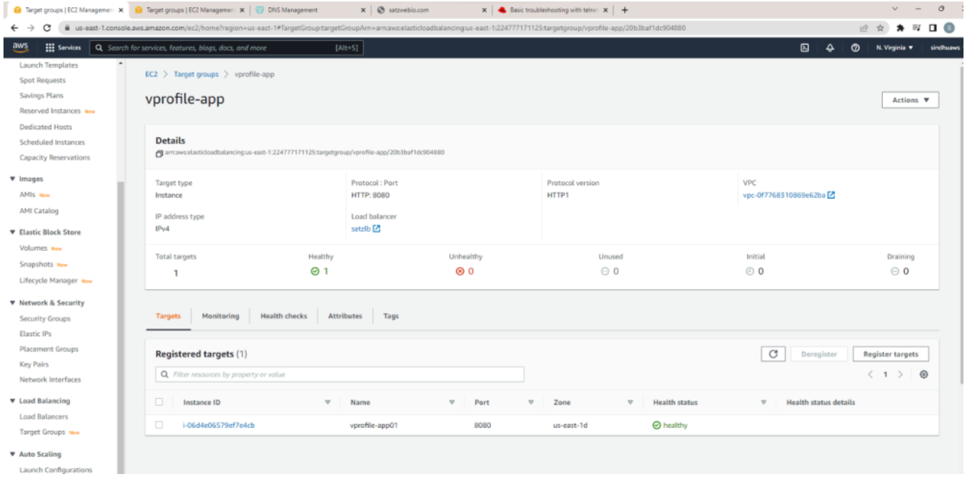
Create time: Sun Sep 25 2022 18:38:19 GMT+0530 (India Standard Time)

View details in the launch configuration console

Network

Availability Zones

Subnet ID



us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#TargetGroup:targetGroupArn=arn:aws:elasticloadbalancing:us-east-1:224777171125:targetgroup/vprofile-app/20b3baf1dc904880

vprofile-app

Details

arn:aws:elasticloadbalancing:us-east-1:224777171125:targetgroup/vprofile-app/20b3baf1dc904880

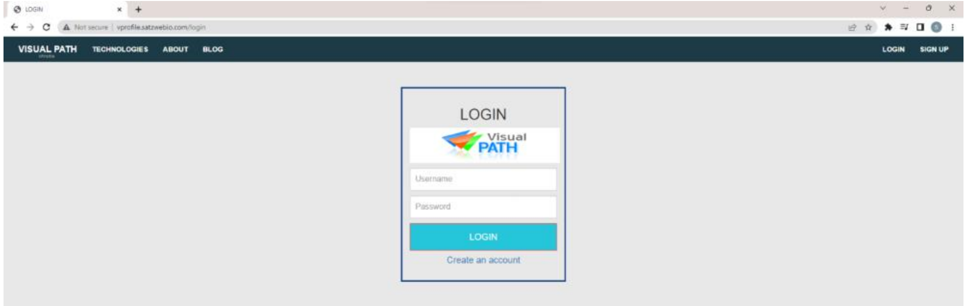
Target type: Instance
Protocol : Port: HTTP: 8080
Protocol version: HTTP1
VPC: vpc-0f7768310869e62ba
IP address type: IPv4
Load balancer: satzlb

Total targets	Healthy	Unhealthy	Unused	Initial	Draining
1	1	0	0	0	0

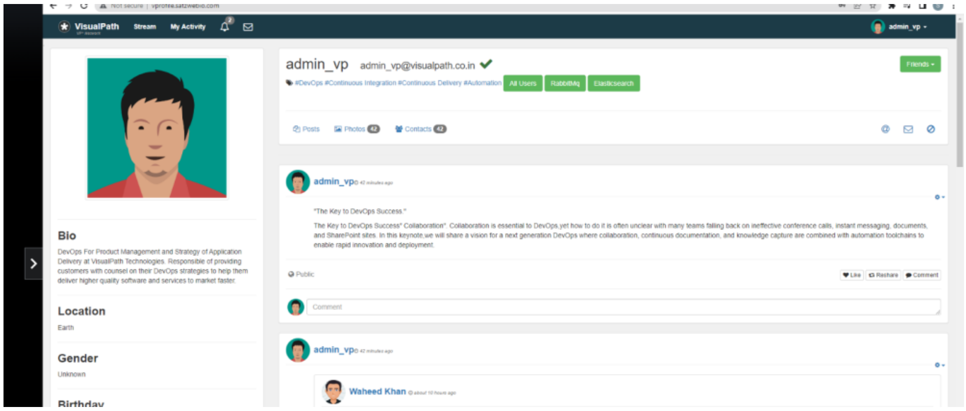
Registered targets (1)

Instance ID	Name	Port	Zone	Health status	Health status details
i-06d4e06579ef7e4cb	vprofile-app01	8080	us-east-1d	healthy	

16. Verify the application



Not secure | vprofile.satzwebio.com/login



Not secure | vprofile.satzwebio.com

admin_vp admin_vp@visualpath.co.in ✓

#DevOps #Continuous Integration #Continuous Delivery #Automation

Bio

DevOps For Product Management and Strategy of Application Delivery at VisualPath Technologies. Responsible of providing customers with counsel on their DevOps strategies to help them deliver higher quality software and services to market faster.

Location

Earth

Gender

Unknown

Birthday

admin_vp 42 minutes ago

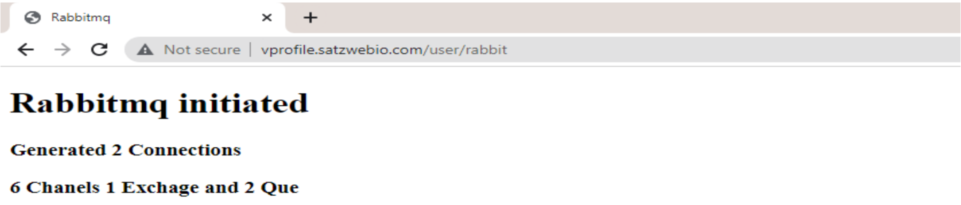
"The Key to DevOps Success."

The Key to DevOps Success" Collaboration". Collaboration is essential to DevOps,yet how to do it is often unclear with many teams falling back on ineffective conference calls, instant messaging, documents, and SharePoint sites. In this keynote,we will share a vision for a next generation DevOps where collaboration, continuous documentation, and knowledge capture are combined with automation toolchains to enable rapid innovation and deployment.

Public

admin_vp 42 minutes ago

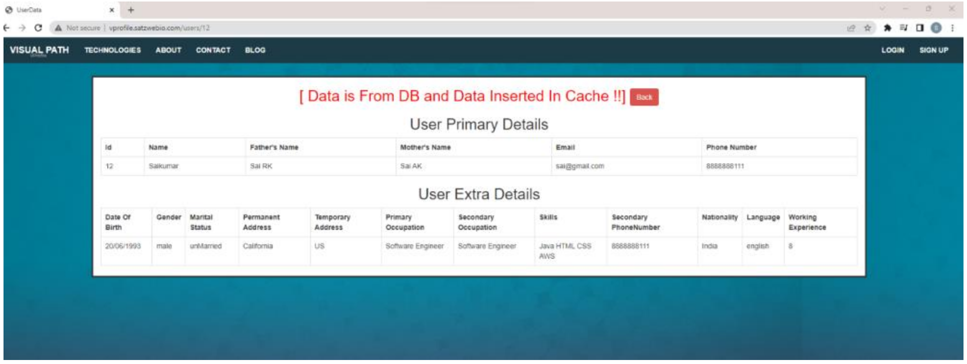
Waheed Khan about 10 hours ago



Rabbitmq initiated

Generated 2 Connections

6 Chanels 1 Exchage and 2 Que



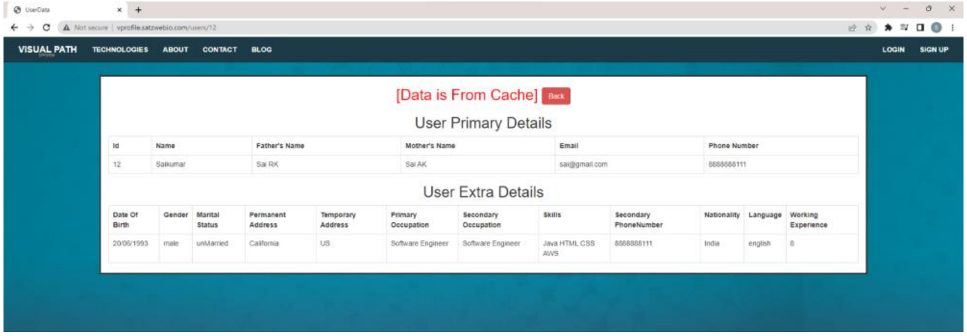
[Data is From DB and Data Inserted In Cache !!]

User Primary Details

Id	Name	Father's Name	Mother's Name	Email	Phone Number
12	Saikumar	Sai RK	Sai AK	sai@gmail.com	8888888111

User Extra Details

Date Of Birth	Gender	Marital Status	Permanent Address	Temporary Address	Primary Occupation	Secondary Occupation	Skills	Secondary PhoneNumber	Nationality	Language	Working Experience
20/06/1993	male	unMarried	California	US	Software Engineer	Software Engineer	Java HTML CSS AWS	8888888111	India	english	8



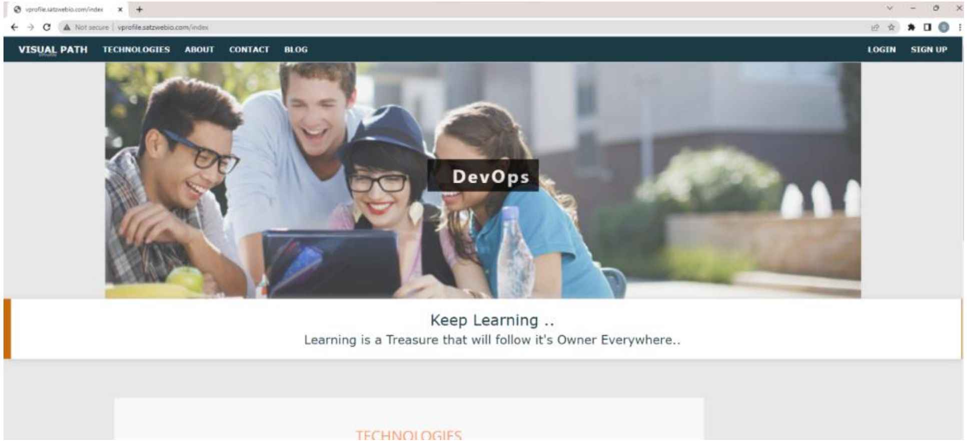
[Data is From Cache]

User Primary Details

Id	Name	Father's Name	Mother's Name	Email	Phone Number
12	Saikumar	Sai RK	Sai AK	sai@gmail.com	8888888111

User Extra Details

Date Of Birth	Gender	Marital Status	Permanent Address	Temporary Address	Primary Occupation	Secondary Occupation	Skills	Secondary PhoneNumber	Nationality	Language	Working Experience
20/06/1993	male	unMarried	California	US	Software Engineer	Software Engineer	Java HTML CSS AWS	8888888111	India	english	8



vprofile.satzwebio.com/index
Not secure | vprofile.satzwebio.com/index
VISUAL PATH
TECHNOLOGIES
ABOUT
CONTACT
BLOG
LOGIN
SIGN UP
DevOps

Keep Learning ..

Learning is a Treasure that will follow it's Owner Everywhere..

TECHNOLOGIES