

Lab 3: CS 524

In this assignment, you will learn to develop and load-balance your own infrastructure (a server farm) using CloudFormation

ANS.

- a. Once registered for AWS, now go into AWS Console



Sign in

☒ **Root user**

Account owner that performs tasks requiring unrestricted access. [Learn more](#)

☐ **IAM user**

User within an account that performs daily tasks. [Learn more](#)

Root user email address

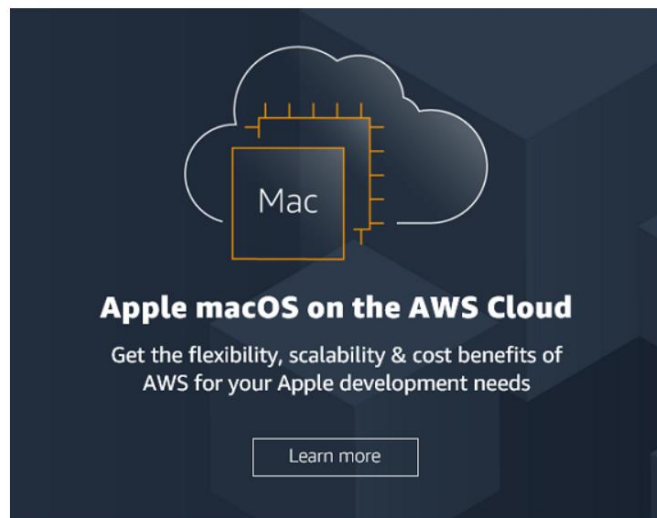
kmodi5@stevens.edu

Next

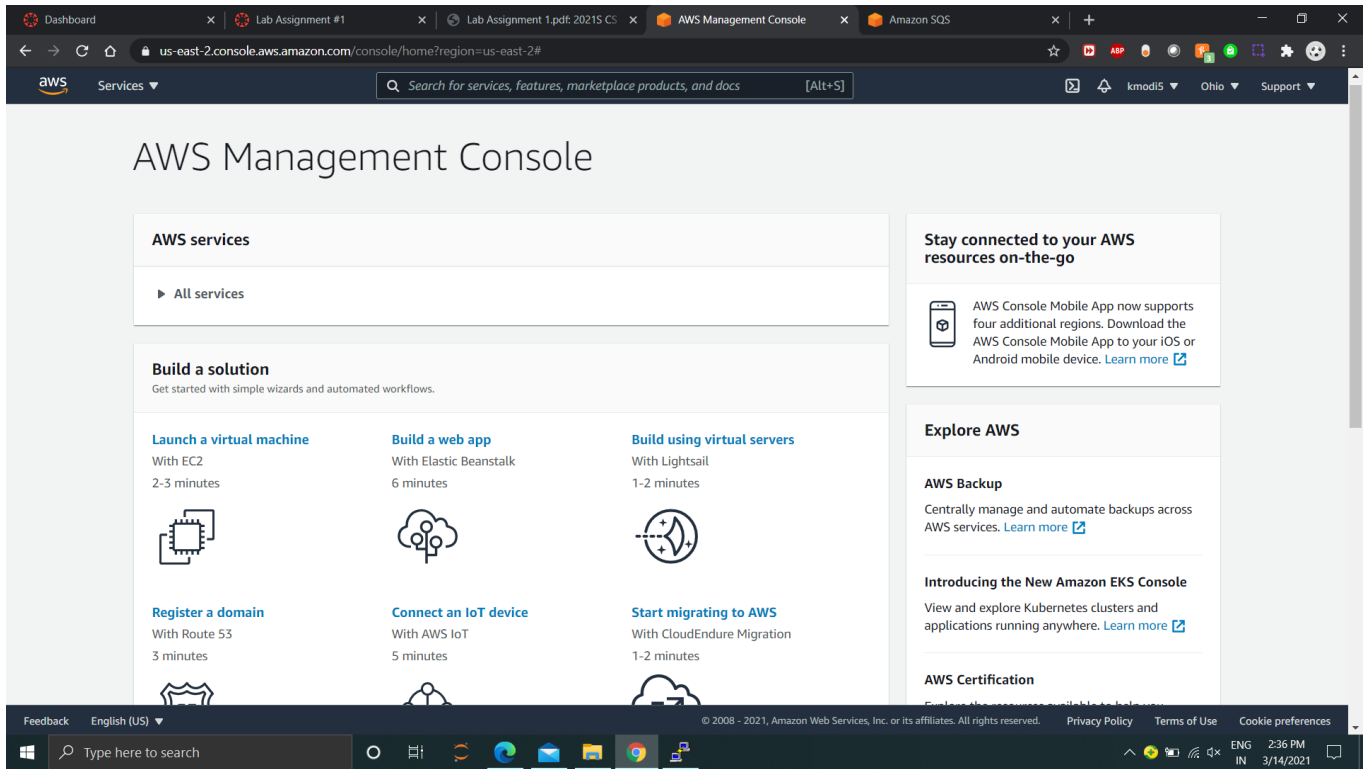
By continuing, you agree to the [AWS Customer Agreement](#) or other agreement for AWS services, and the [Privacy Notice](#). This site uses essential cookies. See our [Cookie Notice](#) for more information.

— New to AWS? —

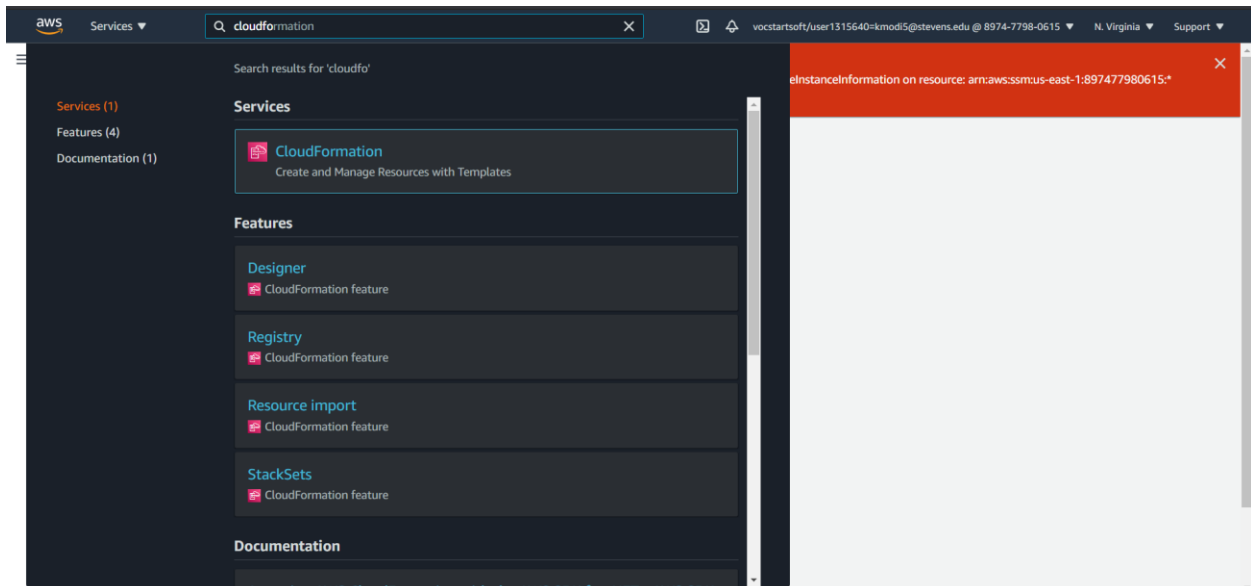
Create a new AWS account



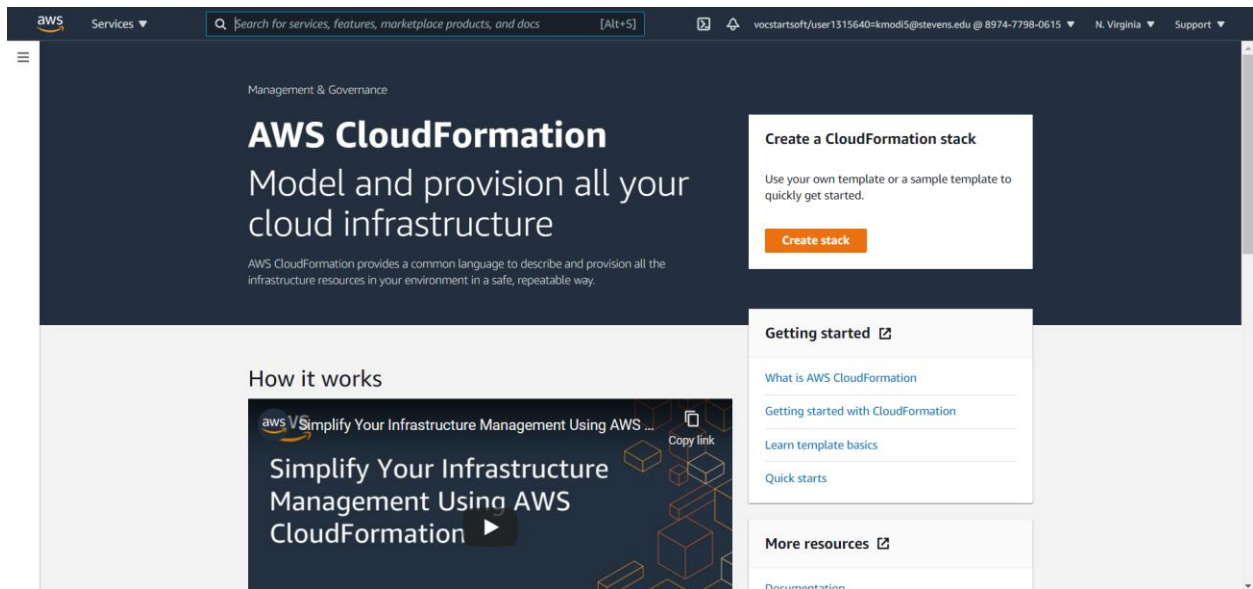
b. Go into AWS Console and Launch a virtual machine



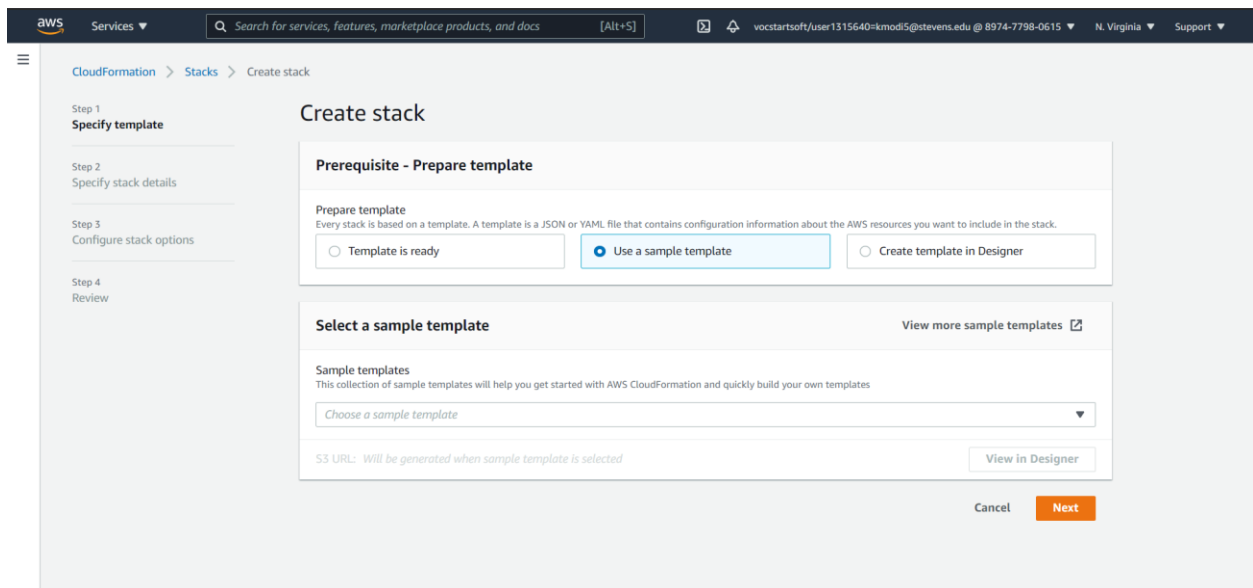
c. Search CloudFormation



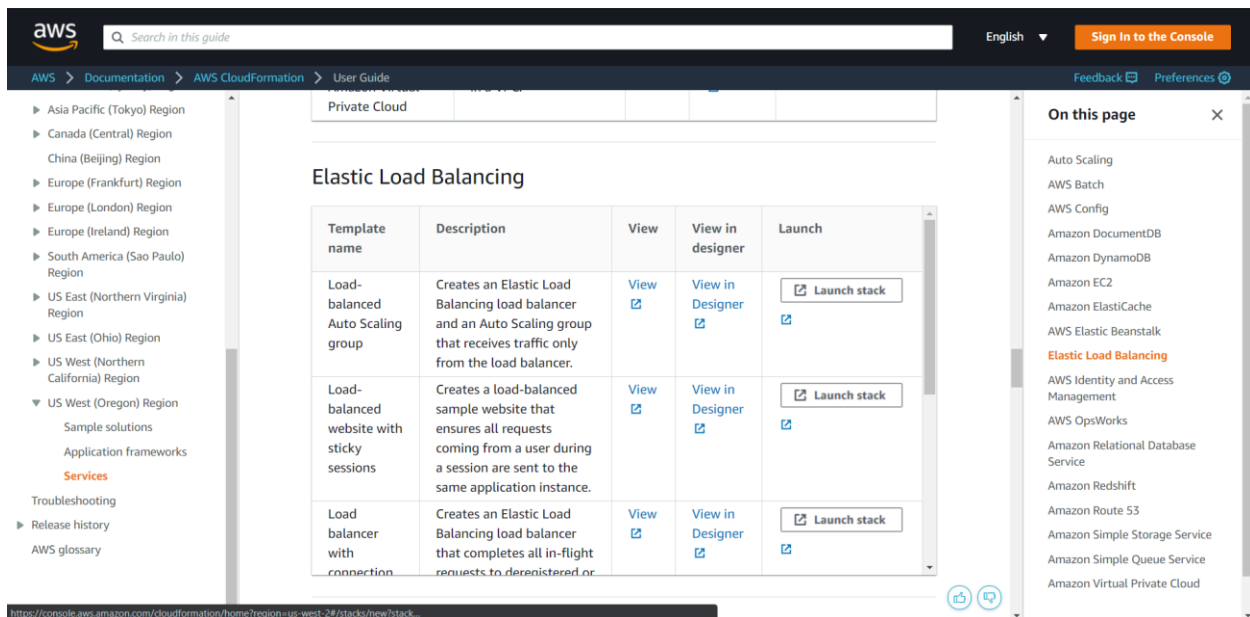
d. Create Stack on CloudFormation



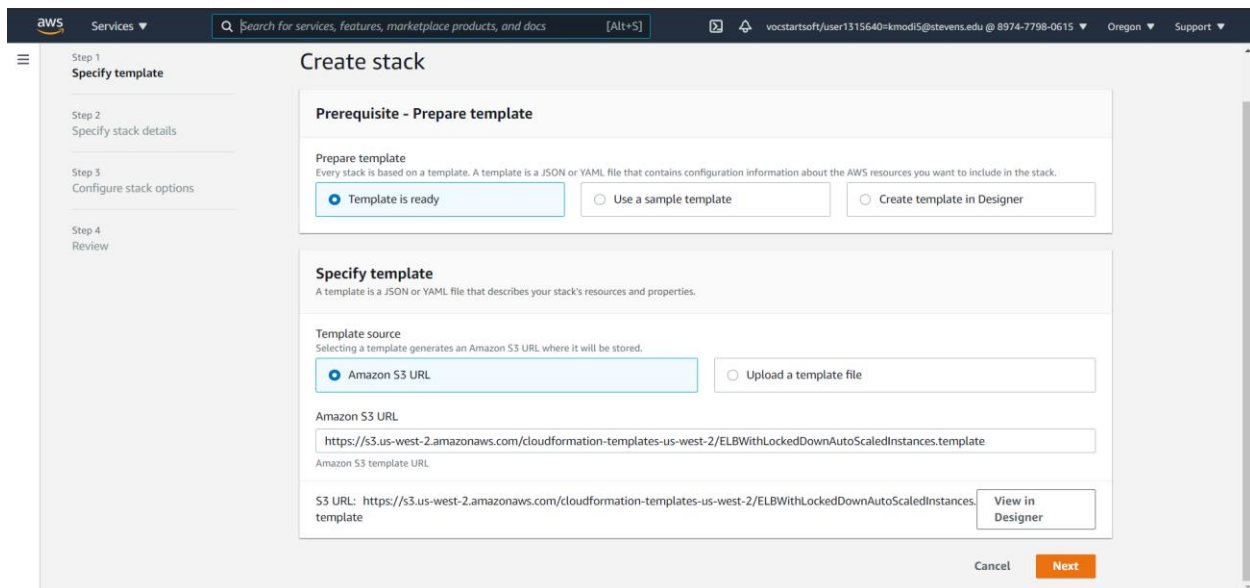
e. Use a sample template or import your own template



f. Importing Load Balancing sample



g. Use Load Balancing Auto Scaling Template and Click on View in Designer



h. Change instance type to t2.micro

aws Services Search for services, features, marketplace products, and docs [Alt+S] vocstartsoft/user1315640-kmod5@stevens.edu @ 8974-7798-0615 N. Virginia Support

File: 'template1'

Resource types

- ACMPCA
- AccessAnalyzer
- AmazonMQ
- Amplify
- ApiGateway
- ApiGatewayV2
- AppConfig
- AppFlow
- AppIntegrations
- AppMesh
- AppStream

Designer is out of date, hit refresh

ALBTarget... TargetGroup

Applicati... LoadBalancer

LaunchCon... LaunchConfig

InstanceS... SecurityGroup

ALBListen... Listener

WebServer... AutoScaling

template1 Choose template language: JSON ☒ YAML

```
17 },
18 },
19 "instancetype": {
20   "description": "WebServer EC2 instance type",
21   "type": "String",
22   "default": "t2.micro",
23   "allowedValues": [ "t1.micro", "t2.nano", "t2.micro", "t2.small", "t2.medium", "t2.large", "m1.small", "m1.medium", "m1.large", "m1.xlarge", "m2.xlarge", "m2.2xlarge" ],
24   "constraintDescription": "must be a valid EC2 instance type."
25 },
26 },
27 },
28 }
```

Components Template

i. Change key name to your key

aws Services Search for services, features, marketplace products, and docs [Alt+S] vocstartsoft/user1315640-kmod5@stevens.edu @ 8974-7798-0615 N. Virginia Support

File: 'template1'

Resource types

- ACMPCA
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Designer is out of date, hit refresh

ALBTarget... TargetGroup

Applicati... LoadBalancer

LaunchCon... LaunchConfig

InstanceS... SecurityGroup

ALBListen... Listener

WebServer... AutoScaling

template1 Choose template language: JSON ☒ YAML

```
26 },
27 },
28 "keyname": {
29   "description": "Name of an existing EC2 KeyPair to enable SSH access to the instances",
30   "type": "AWS::EC2::KeyPair::KeyName",
31   "default": "keyname",
32   "constraintDescription": "must be the name of an existing EC2 KeyPair."
33 },
34 },
35 "sshlocation": {
36   "description": "The IP address range that can be used to SSH to the EC2 instances",
37 }
```

Components Template

j. Use your location for SSH

Resource types

- ACMP
- AccessAnalyzer
- AmazonMQ
- Amplify
- ApiGateway
- ApiGatewayV2
- AppConfig
- AppFlow
- AppIntegrations
- AppMesh
- AppStream

File: 'template1'

Designer is out of date, hit refresh

template1

Choose template language: ☒ JSON ☐ YAML

```

34
35 *
36 "SSHLocation" : {
37   "Description" : "The IP address range that can be used to SSH to the EC2 instances",
38   "Type": "String",
39   "MinLength": "9",
40   "MaxLength": "18",
41   "Default": "69.120.217.106/32",
42   "AllowedPattern": "(\\d{1,3})\\.((\\d{1,3})\\.((\\d{1,3})\\.((\\d{1,3})/((\\d{1,2})|",
43   "ConstraintDescription": "must be a valid IP CIDR range of the form x.x.x.x/x."
44 },
45
46

```

Components

Template

k. Give a name to your Security Group

Resource types

- ACMP
- AccessAnalyzer
- AmazonMQ
- Amplify
- ApiGateway
- ApiGatewayV2
- AppConfig
- AppFlow
- AppIntegrations
- AppMesh
- AppStream

File: 'template1'

Designer is out of date, hit refresh

template1

Choose template language: ☒ JSON ☐ YAML

```

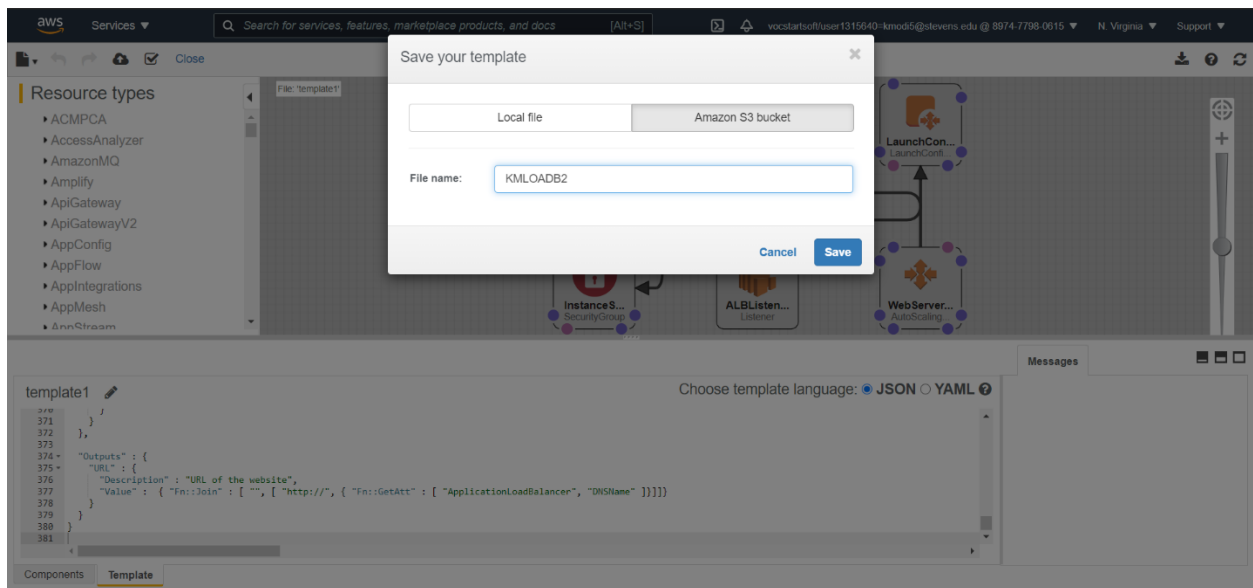
353 *
354 "InstanceSecurityGroup" : {
355   "Type": "AWS::EC2::SecurityGroup",
356   "Properties": {
357     "GroupDescription": "Enable SSH access and HTTP access on the inbound port",
358     "GroupName": "K8sLoadB",
359     "SecurityGroupIngress": [ {
360       "IpProtocol": "tcp",
361       "FromPort": "80",
362       "ToPort": "80",
363       "SourceSecurityGroupId": [{"Fn::Select": [0, {"Fn::GetAtt": ["ApplicationLoadBalancer", "SecurityGroups"]}]}
364     ]
365   }
366 }

```

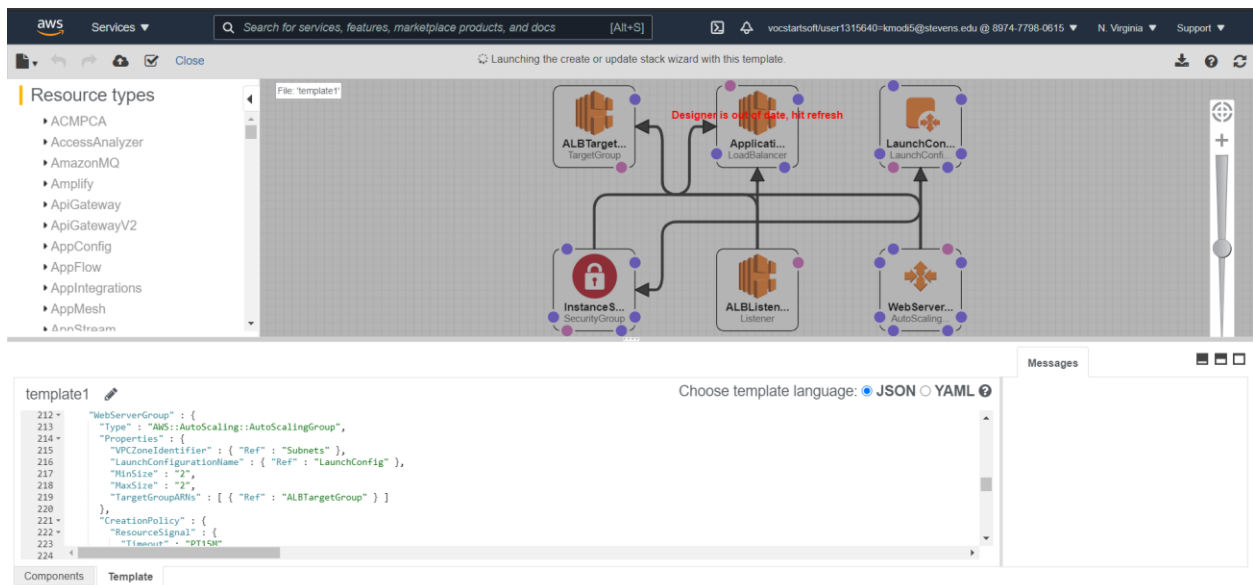
Components

Template

l. Save your Template



m. Launch the Stack



n. Configure the Parameters

The screenshot shows the AWS CloudFormation console interface. The top navigation bar includes the AWS logo, 'Services', a search bar, and user information. The left sidebar shows the 'CloudFormation' menu with 'Stacks' and 'Create stack' options. The main content area is titled 'Specify stack details' and shows the 'Step 2: Specify stack details' step. The 'Stack name' is 'KMLOADB2'. The 'Parameters' section includes 'InstanceType' (t2.micro), 'KeyName' (KMEC2), and 'SSHLocation' (69.120.217.106/32). Below the 'SSHLocation' field, there are additional parameters: 'Subnets' (a list of subnets) and 'VpcId' (vpc-cd1e9bb0).

Stack name

Stack name

KMLOADB2

Stack name can include letters (A-Z and a-z), numbers (0-9), and dashes (-).

Parameters

Parameters are defined in your template and allow you to input custom values when you create or update a stack.

InstanceType

WebServer EC2 instance type

t2.micro

KeyName

Name of an existing EC2 KeyPair to enable SSH access to the instances

KMEC2

SSHLocation

The IP address range that can be used to SSH to the EC2 instances

69.120.217.106/32

Subnets

The list of SubnetIds in your Virtual Private Cloud (VPC)

subnet-e673cfd7 (172.31.48.0/20) × subnet-bd325adb (172.31.0.0/20) × subnet-c190e7e0 (172.31.80.0/20) ×

VpcId

VpcId of your existing Virtual Private Cloud (VPC)

vpc-cd1e9bb0 (172.31.0.0/16)

o. Review and create the stack

The screenshot displays the AWS CloudFormation console interface. The top navigation bar includes the AWS logo, 'Services', a search bar, and user information. The main content area is divided into two sections: 'Review KMLoadB1' and 'KMLOADB2'.

Review KMLoadB1

Step 1: Specify template

Template

Template URL
https://s3-external-1.amazonaws.com/cf-templates-qxcc2d9orfix-us-east-1/2021102pdl-template1tnxdwsb7uqe

Stack description
AWS CloudFormation Sample Template ELBWithLockedDownAutoScaledInstances: Create a load balanced, Auto Scaled sample website where the instances are locked down to only accept traffic from the load balancer. This example creates an Auto Scaling group behind a load balancer with a simple health check. The web site is available on port 80, however, the instances can be configured to listen on any port (8888 by default).
WARNING This template creates one or more Amazon EC2 instances and an Application Load Balancer. You will be billed for the AWS resources used if you create a stack from this template.

Estimate cost

Step 2: Specify stack details

Parameters (5)

Search parameters

KMLOADB2

Stack info | **Events** | Resources | Outputs | Parameters | Template | Change sets

Events (6)

Search events

Timestamp	Logical ID	Status	Status reason
2021-04-12 14:53:31 UTC-0400	ApplicationLoadBalancer	CREATE_IN_PROGRESS	Resource creation Initiated
2021-04-12 14:53:30 UTC-0400	ALBTargetGroup	CREATE_COMPLETE	-
2021-04-12 14:53:30 UTC-0400	ALBTargetGroup	CREATE_IN_PROGRESS	Resource creation Initiated
2021-04-12 14:53:30 UTC-0400	ApplicationLoadBalancer	CREATE_IN_PROGRESS	-
2021-04-12 14:53:30 UTC-0400	ALBTargetGroup	CREATE_IN_PROGRESS	-
2021-04-12 14:53:22 UTC-0400	KMLOADB2	CREATE_IN_PROGRESS	User Initiated

The screenshot displays the AWS Management Console interface. On the left, the navigation menu includes 'New EC2 Experience', 'EC2 Dashboard', 'Events', 'Tags', 'Limits', 'Instances', 'Images', 'Elastic Block Store', and 'Snapshots'. The main content area shows the 'Load Balancers' page for the 'KMLoadB' load balancer. The table lists the load balancer's name, DNS name, state, VPC ID, availability zones, type, and creation date. Below the table, the 'Security groups' section lists the associated security groups: 'sg-05783afa41c166c2e, KMLoadB', 'sg-0be26de9b316904a6, Default Karan', and 'sg-50f5d951, default'. The 'Edit security groups' button is visible at the bottom.

Navigation Menu:

- New EC2 Experience
- EC2 Dashboard
- Events
- Tags
- Limits
- Instances
- Images
- Elastic Block Store
- Snapshots

Load Balancers Table:

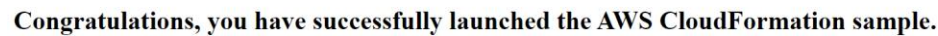
Name	DNS name	State	VPC ID	Availability Zones	Type	Created
KMLoadB	...	active	vpc-cd1e9bb0	us-east-1c, us-east-1d, ...	application	April 12, 2023

Security groups:

- sg-05783afa41c166c2e, KMLoadB
 - Enable SSH access and HTTP access on the inbound port
- sg-0be26de9b316904a6, Default Karan
 - SSH Laptop HTTP anywhere
- sg-50f5d951, default
 - default VPC security group

[Edit security groups](#)

<http://kmla-appli-rdqlvmxuzh4-1343419306.us-east-1.elb.amazonaws.com/>



r. Edit Resource file and set min max size as 4 to recreate 4 servers like lab 2

template1

Choose template language: ☒ JSON ☐ YAML

```
200 },
201
202 "Resources": {
203   "WebServerGroup": {
204     "Type": "AWS::AutoScaling::AutoScalingGroup",
205     "Properties": {
206       "VPCZoneIdentifier": { "Ref": "Subnets" },
207       "LaunchConfigurationName": { "Ref": "LaunchConfig" },
208       "MinSize": "4",
209       "MaxSize": "4",
210       "TargetGroupARNs": [ { "Ref": "ALBTargetGroup" } ]
211     }
212   }
213 }
```

s. Update stack

Monitoring time

CloudWatch alarm ARN

Notification options

No notification options

There are no notification options defined

Change set preview

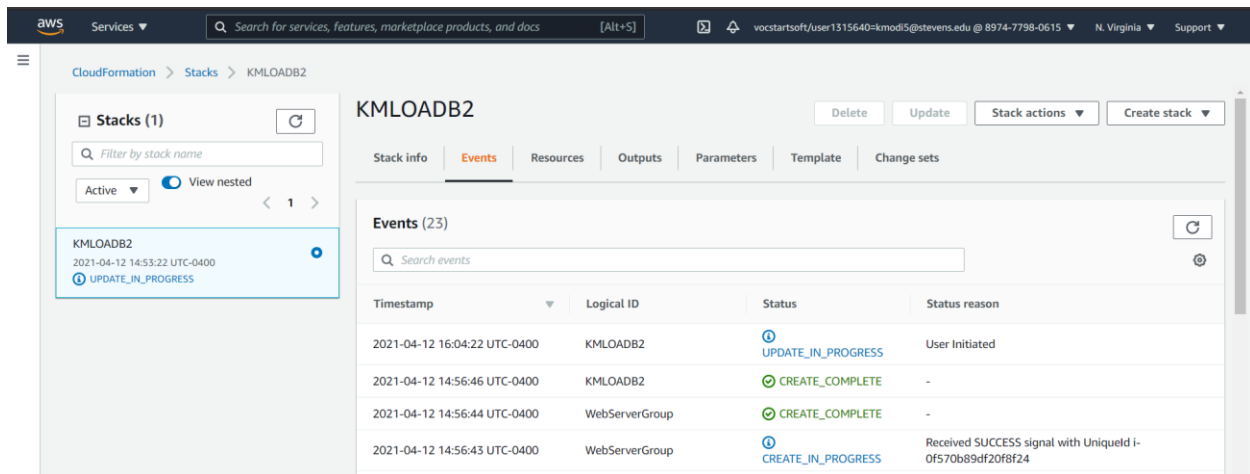
Changes

Search changes

Action	Logical ID	Physical ID	Resource type	Replacement	Module
Change set preview in progress, this operation may take up to a few minutes.					

Cancel Previous View change set Update stack

t. Stack updation state



Stacks (1)

Filter by stack name

Active View nested

KMLOADB2
2021-04-12 14:53:22 UTC-0400
UPDATE_IN_PROGRESS

KMLOADB2

Delete Update Stack actions Create stack

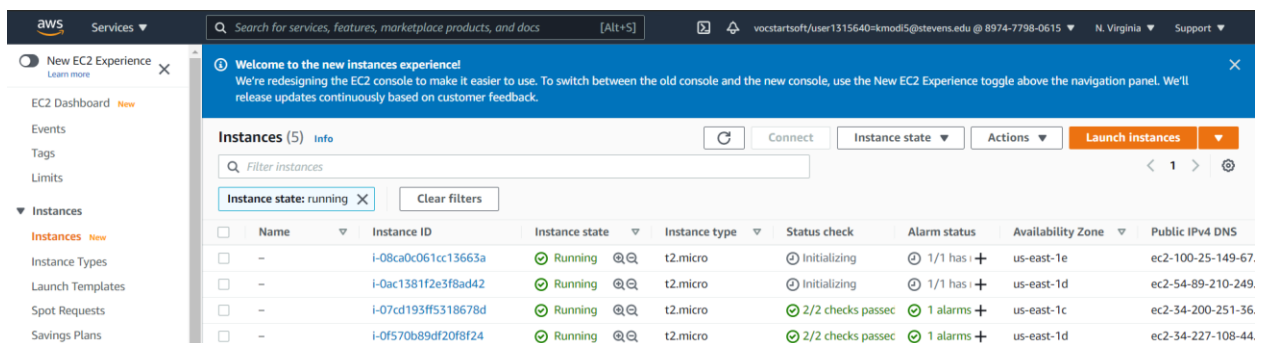
Stack info Events Resources Outputs Parameters Template Change sets

Events (23)

Search events

Timestamp	Logical ID	Status	Status reason
2021-04-12 16:04:22 UTC-0400	KMLOADB2	UPDATE_IN_PROGRESS	User Initiated
2021-04-12 14:56:46 UTC-0400	KMLOADB2	CREATE_COMPLETE	-
2021-04-12 14:56:44 UTC-0400	WebServerGroup	CREATE_COMPLETE	-
2021-04-12 14:56:43 UTC-0400	WebServerGroup	CREATE_IN_PROGRESS	Received SUCCESS signal with Uniquelid i-0f570b89df20f8f24

u. Checking our instances



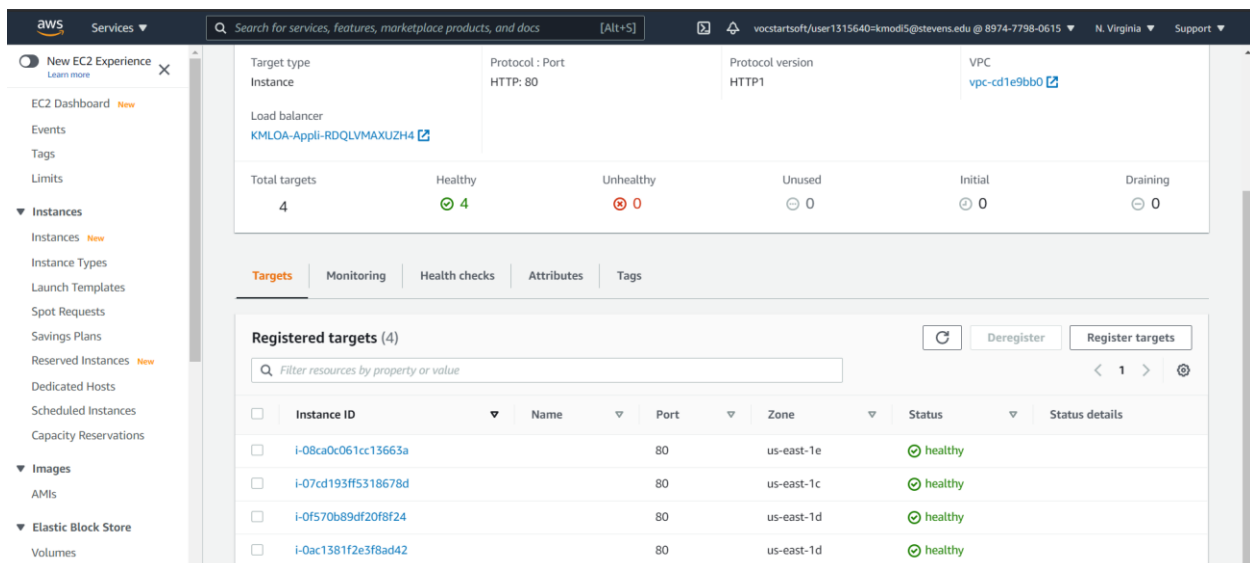
Instances (5)

Filter instances

Instance state: running Clear filters

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
<input type="checkbox"/>	-	i-08ca0c061cc13663a	Running	t2.micro	Initializing	1/1 has +	us-east-1e	ec2-100-25-149-67.
<input type="checkbox"/>	-	i-0ac1381f2e3f8ad42	Running	t2.micro	Initializing	1/1 has +	us-east-1d	ec2-54-89-210-249.
<input type="checkbox"/>	-	i-07cd193ff5318678d	Running	t2.micro	2/2 checks pass	1 alarms +	us-east-1c	ec2-34-200-251-36.
<input type="checkbox"/>	-	i-0f570b89df20f8f24	Running	t2.micro	2/2 checks pass	1 alarms +	us-east-1d	ec2-34-227-108-44.

v. Checking the target group which are our instances



Target type: Instance

Protocol: Port HTTP: 80

Protocol version: HTTP1

VPC: vpc-cd1e9bb0

Load balancer: KMLOA-Appli-RDQLVMAXUZH4

Total targets: 4

Healthy: 4

Unhealthy: 0

Unused: 0

Initial: 0

Draining: 0

Targets Monitoring Health checks Attributes Tags

Registered targets (4)

Filter resources by property or value

	Instance ID	Name	Port	Zone	Status	Status details
<input type="checkbox"/>	i-08ca0c061cc13663a		80	us-east-1e	healthy	
<input type="checkbox"/>	i-07cd193ff5318678d		80	us-east-1c	healthy	
<input type="checkbox"/>	i-0f570b89df20f8f24		80	us-east-1d	healthy	
<input type="checkbox"/>	i-0ac1381f2e3f8ad42		80	us-east-1d	healthy	

w. Connecting to Server using SSH and giving permission to load our webpage on all servers

```
[ec2-user@ip-172-31-1-222 ~]$ ssh -i "KMEC2.pem" ec2-user@ec2-34-200-251-36.compute-1.amazonaws.com
Warning: Identity file KMEC2.pem not accessible: No such file or directory.
The authenticity of host 'ec2-34-200-251-36.compute-1.amazonaws.com (172.31.1.222)' can't be established.
ECDSA key fingerprint is SHA256:u97ZQWU0k7sqMhGgPbc3d8x0SsxFBuJHauTtWS+Hz0.
ECDSA key fingerprint is MD5:fe:17:d5:66:12:2c:be:c0:2f:da:00:0b:9e:de:73:4a.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ec2-34-200-251-36.compute-1.amazonaws.com,172.31.1.222' (ECDSA) to the list of known hosts.
Permission denied (publickey).
[ec2-user@ip-172-31-1-222 ~]$ sudo chown -R ec2-user /var/www/html
chmod -[ec2-user@ip-172-31-1-222 ~]$ sudo chmod -R 755 /var/www/html
```

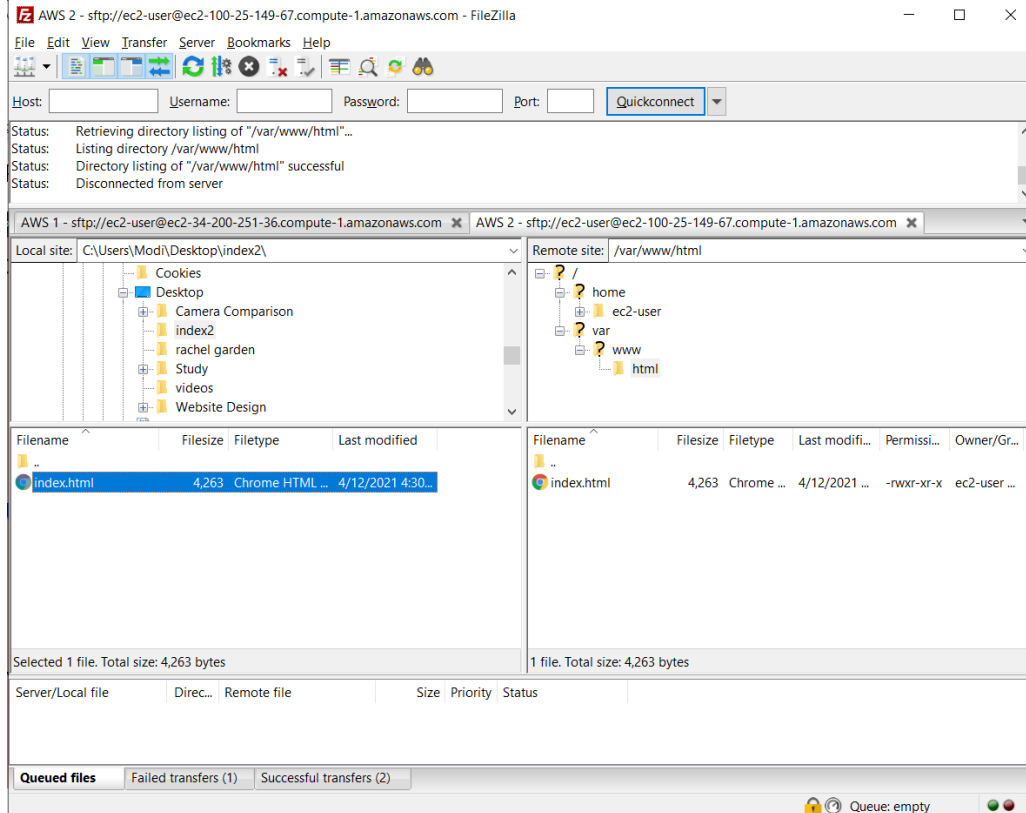
x. Also update all servers

```
The authenticity of host 'ec2-54-89-210-249.compute-1.amazonaws.com (54.89.210.249)' can't be established.
ECDSA key fingerprint is SHA256:01Lnr+Q6TM0QsRqe4D7V8U/pKhLPYNHkKgOWTCmC1hY.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ec2-54-89-210-249.compute-1.amazonaws.com,54.89.210.249' (ECDSA) to the list of known hosts.

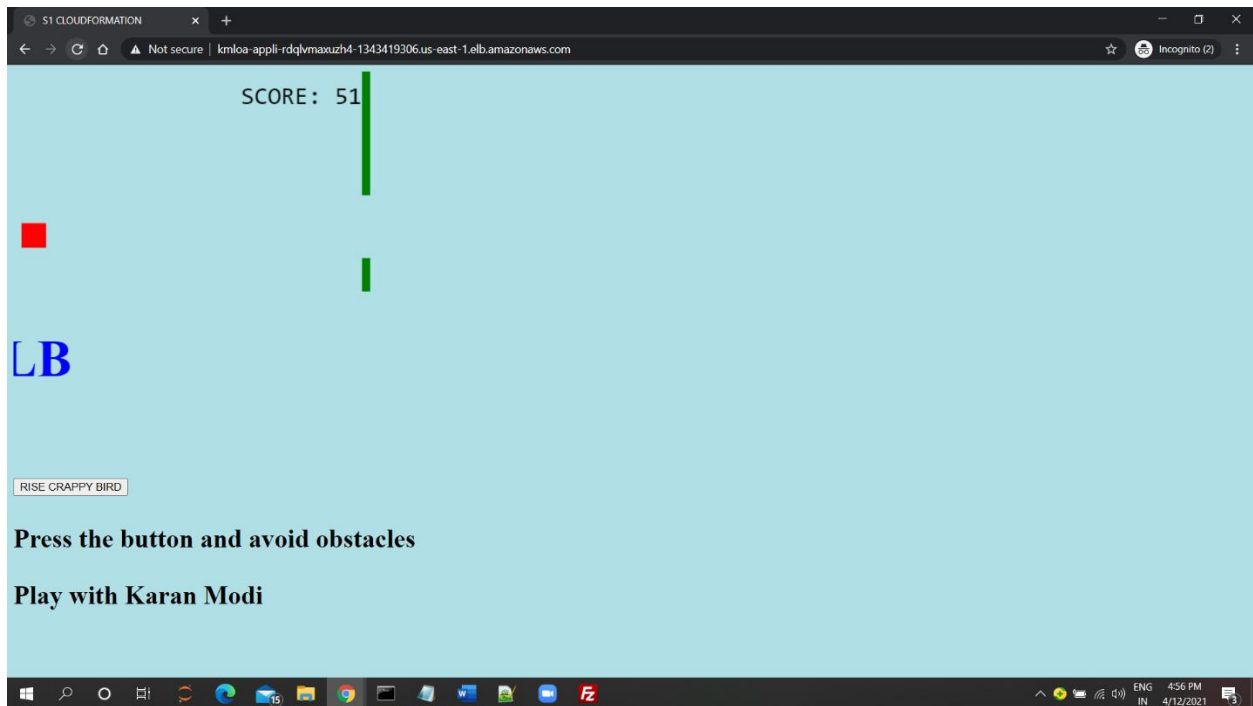
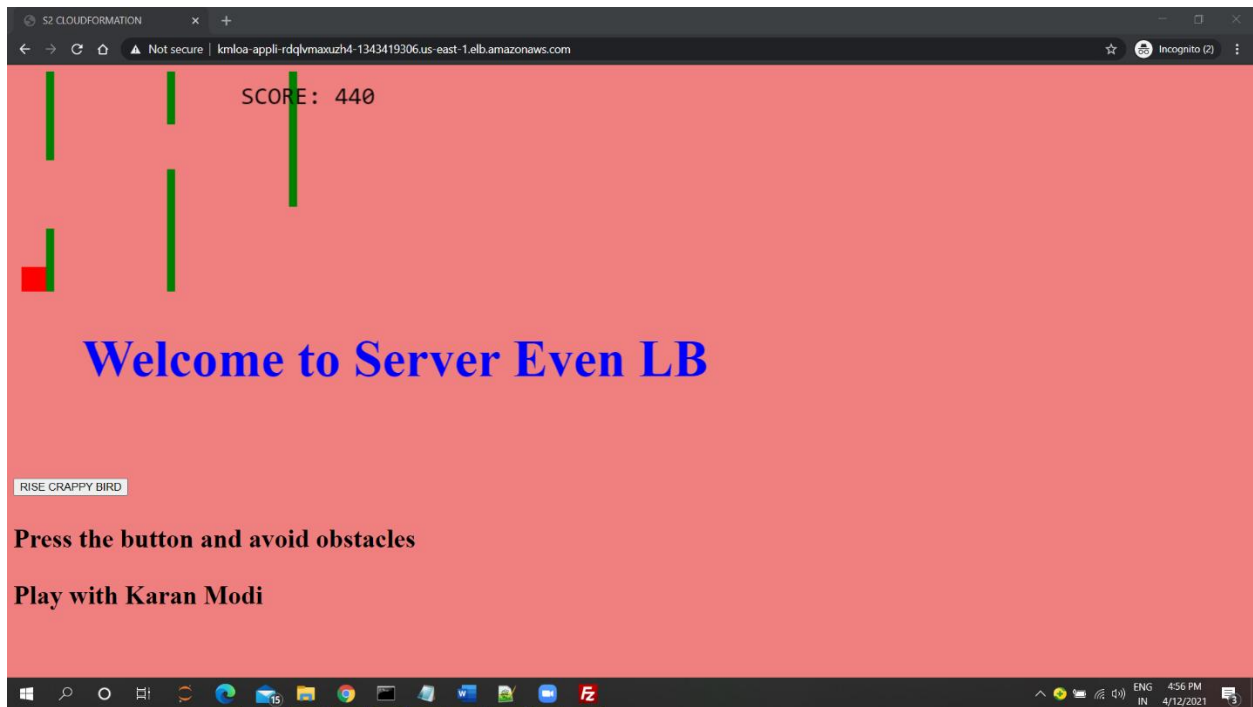
 _ | _ | )
 _ | ( _ /
 _ | \ _ |
      Amazon Linux AMI

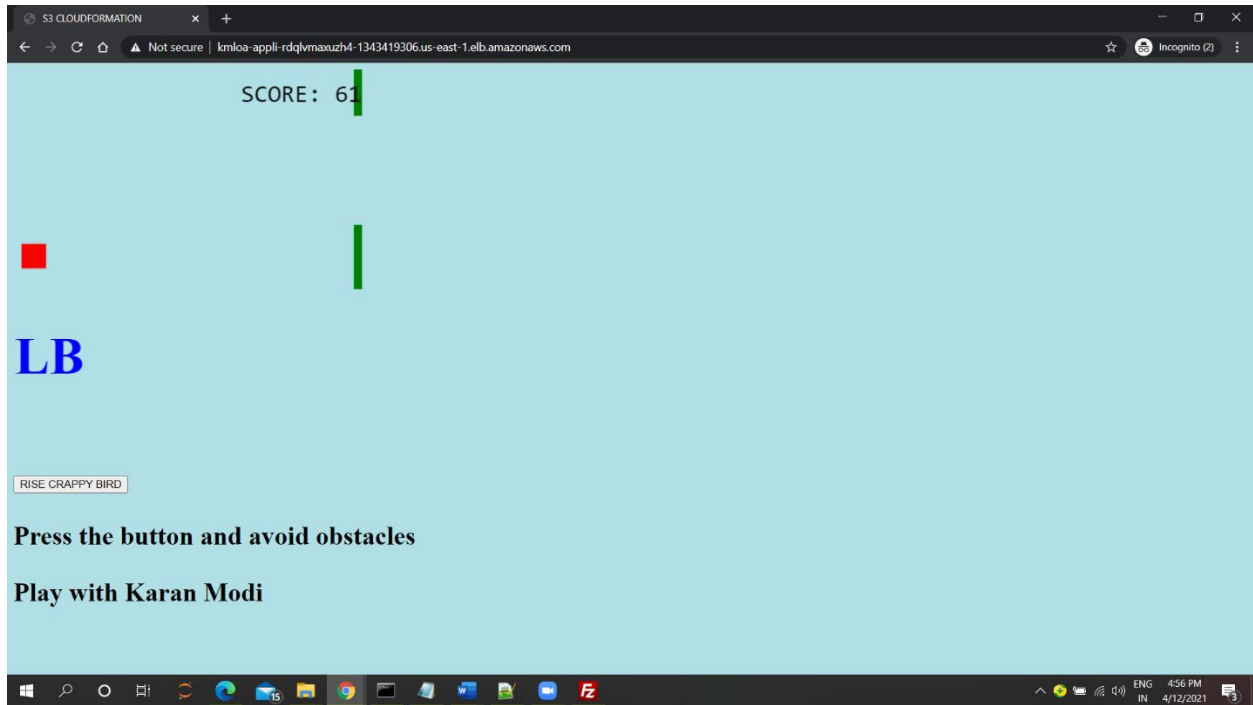
https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/
26 package(s) needed for security, out of 54 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-85-196 ~]$ sudo yum update
```

y. Connecting using SFTP with Filezilla



z. Checking our load balancer if it loads all different versions of websites





Our instances:

1. ec2-34-227-108-44.compute-1.amazonaws.com
2. ec2-34-200-251-36.compute-1.amazonaws.com
3. ec2-100-25-149-67.compute-1.amazonaws.com

This will be the auto generated instance after deleting any instance

ec2-34-200-214-128.compute-1.amazonaws.com

aa. First Server one than Server 3 then 2 then 4

Now when we terminate one instance the cloudformation should automatically generate and run another similar instance

Successfully terminated i-0ac1381f2e3f8ad42

Instances (1/5) Info

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
-	i-07cd193ff5318678d	Running	t2.micro	2/2 checks passed	1 alarms	us-east-1c	ec2-34-200-251-36
-	i-08036fdb167a0d9d8	Running	t2.micro	2/2 checks passed	1 alarms	us-east-1e	ec2-18-210-13-215
-	i-08ca0c061cc13663a	Running	t2.micro	2/2 checks passed	1 alarms	us-east-1e	ec2-100-25-149-67
-	i-0f570b89df20f8f24	Running	t2.micro	2/2 checks passed	1 alarms	us-east-1d	ec2-34-227-108-44
-	i-0ac1381f2e3f8ad42	Shutting-down	t2.micro	-	1 alarms	us-east-1d	ec2-54-89-210-249

Successfully terminated i-0ac1381f2e3f8ad42

Instances (1/6) Info

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
-	i-0ad586317957e1876	Pending	t2.micro	-	No alarms	us-east-1c	ec2-34-200-214-12
-	i-07cd193ff5318678d	Running	t2.micro	2/2 checks passed	1 alarms	us-east-1c	ec2-34-200-251-36
-	i-08036fdb167a0d9d8	Running	t2.micro	2/2 checks passed	1 alarms	us-east-1e	ec2-18-210-13-215
-	i-08ca0c061cc13663a	Running	t2.micro	2/2 checks passed	1 alarms	us-east-1e	ec2-100-25-149-67
-	i-0f570b89df20f8f24	Running	t2.micro	2/2 checks passed	1 alarms	us-east-1d	ec2-34-227-108-44

ab. Since we deleted the instance it will again generate a template instance and thus show the original webpage

Introducing AWS CloudFormation

Use simple templates to deploy your AWS Infrastructure.

> Learn more...

Congratulations, you have successfully launched the AWS CloudFormation sample.

