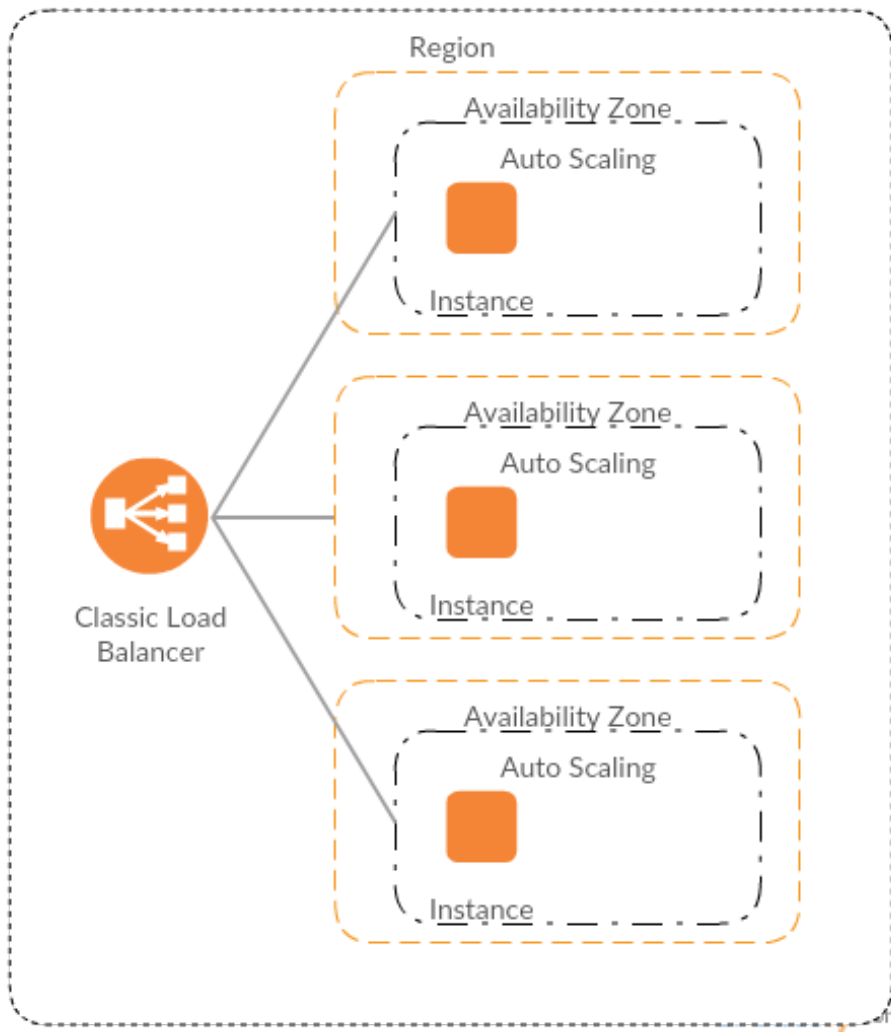


Cloudshape Your Idea / Lab 8: Cloud Networking

The purpose of the lab is to demonstrate some of the concepts presented at course in a cloud environment.

A. Create and configure Elastic Load Balancer **1 point**



Create Loadbalancer

1. Go to in **AWS Console -> EC2 -> Load Balancing -> Load balancers**
2. Press **"Create Loadbalancer"** button. Choose Classic Loadbalancer.
3. In textbox **"Load Balancer name:"**, insert **"EU-Loadbalancer"**
4. Continue with **Next -> "Assign Security Groups"**. Choose to create a **new** security group.
5. In textbox **"Security group name:"** insert **"ELB Security Group"** and let the rules as they are.
6. Continue with **Next -> Next**
7. In the **"Step 4: Configure Health Check"**, change the value of textbox **"Ping Path"** to **"/"**
8. Continue with **Next: Add EC2 Instances**. Don't add any instances at this step.
9. Continue with **Next -> Next -> Review and Create -> Create**
10. Click on link that will be in the **"Load balancer EU-Loadbalancer was successfully created"** text.
11. At this point you created the Loadbalancer, but you should also configure the Security Groups

Configure Security Groups

Allow HTTP traffic from ELB to your hosts

1. Go to in **AWS Console** -> **EC2** -> **NETWORK & SECURITY**-> **Security Groups**
2. Select the security group that have “**AutoScaling Security Group**” description
3. Select “**Inbound**” tab
4. Press “**Edit**” button. Press “**Add Rule**” button
5. Change “**Type**” field to “**HTTP**”. Change “**Source**” field to “Custom IP”
6. In the next field to “Custom IP”, start writing “sg”, it should provide a drop down menu with all other Security Groups, choose the security group that have “ELB Security Group” in the description. This will allow traffic from Loadbalancers to your servers

Allow SSH traffic from Anywhere to your hosts (so you can ssh on the hosts)

7. Change **Inbound** rule with Type “**SSH**” to allow Source **Anywhere**
8. Press “**Save**” button

Add the Loadbalancer to the AutoScaling Groups

1. Go to in **AWS Console** -> **EC2** -> **Auto Scaling**-> **Auto Scaling Groups**
2. **For each** Auto Scaling Group do the following:
 - a. Select one AutoScaling Group
 - b. At the bottom of the page, in the “**Details**” tab, find the “**Edit**” button. Press it.
 - c. Click in the “**Load Balancers**” textbox
 - d. Select the “EU-Loadbalancer” option from the dropdown menu
 - e. Change the “**Health Check Type**” from “**EC2**” to “**ELB**”
 - f. Press “**Save**” button
 - g. Continue with next Auto Scaling Group

Check that the loadbalancer is working

1. Go to in **AWS Console** -> **EC2** -> **Load Balancing** -> **Load balancers**
2. Select the loadbalancer if it is not selected
3. Find the “**DNS Name:**” field
4. Copy the URL from that field (without the “(A Record)” text) to a new tab in your browser. (It should be something like “[EU-Loadbalancer-1-123456789.eu-west-1.elb.amazonaws.com](https://eu-loadbalancer-1-123456789.eu-west-1.elb.amazonaws.com)”)
5. Refresh the page in browser multiple times in order to see how the “This machine is” field is changing. Also, the Availability zone should change between (eu-west-1a, eu-west-1b, eu-west-1c)

B. Put a host in a bad state 1 point

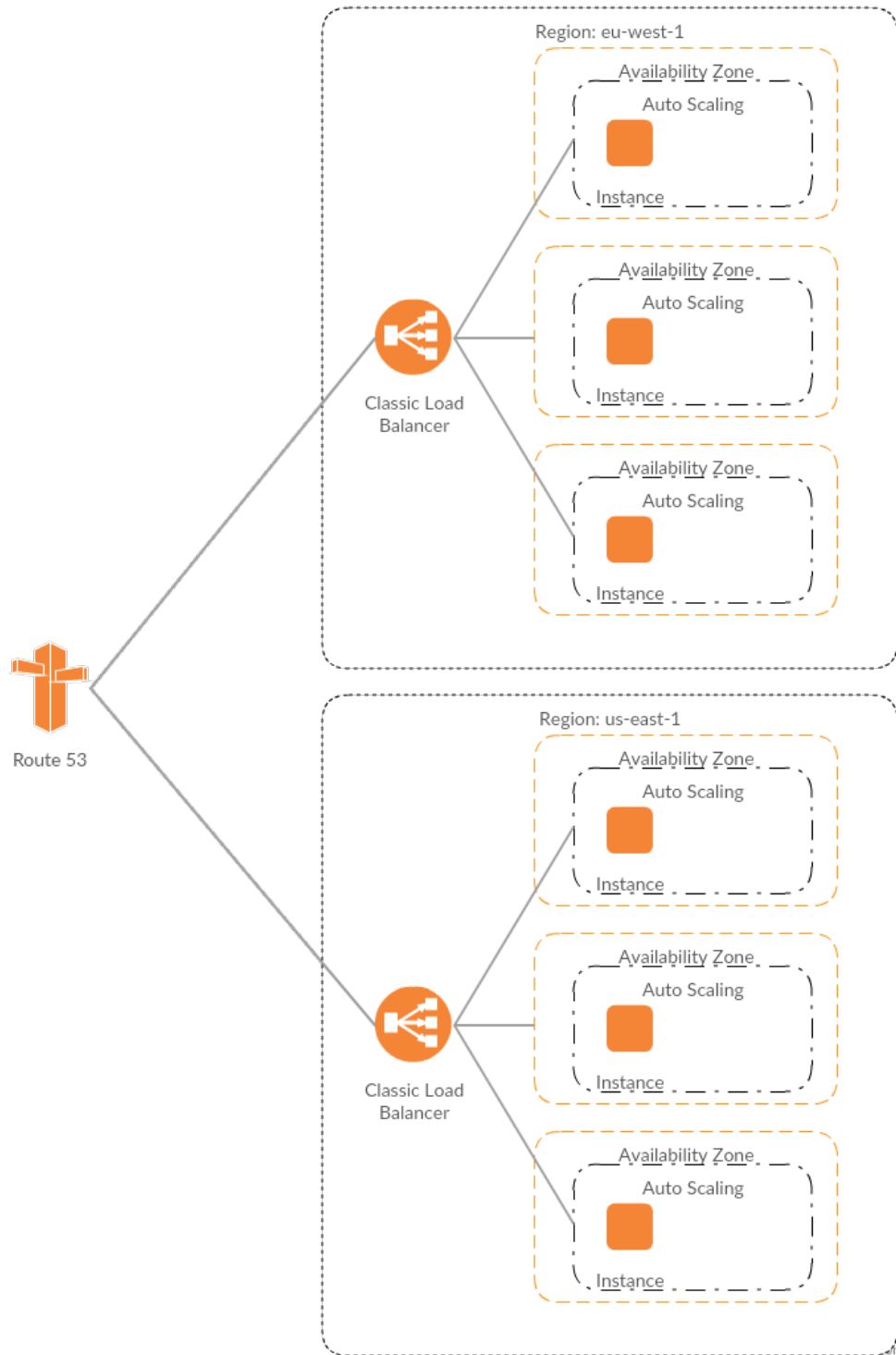
Purpose of this task is to put 1 instance in a bad state, and to observe how AutoScaling Group will replace that instance.

1. Download SSH Key
 - a. For Linux:
<https://s3-eu-west-1.amazonaws.com/cloudshapeyourideas-lab/ssh-key.pem>
 - b. For Windows (putty):
<https://s3-eu-west-1.amazonaws.com/cloudshapeyourideas-lab/ssh-key.ppk>
2. Go to in **AWS Console** -> **EC2** -> **Instances**
3. Choose any instance and connect over SSH to it (you will need to use the SSH Key pair that was provided at step #1, and don't forget to use “ec2-user” as user)
4. Execute the following command on the host:

```
sudo /etc/init.d/nginx stop
```
5. Wait for 30 seconds
6. Go to in **AWS Console** -> **EC2** -> **Load Balancing** -> **Load balancers** -> **Instances**
7. You should notice that one instance has “**OutOfService**” status, remember the “**Availability Zone**” for that instance

8. Go to in **AWS Console -> EC2 -> Auto Scaling-> Auto Scaling Groups**
9. Select the AutoScaling Group from the “**Availability Zone**” you saw on step #6
10. Choose the tab “**Activity History**”
11. You should see an entry “**Terminating EC2 instance**”.
12. If you click on it should say: “At an instance was taken out of service in response to a ELB system health check failure.”
13. This means that AutoScaling group noticed that this instance was failing the ELB health checks and decided to replace it.


C. Configure Cross region load-balancing 2 point



Switch the region

1. You will need to switch the region in the AWS Console
2. Previously you worked only in the EU Ireland region
3. In the top-right corner of the AWS Console you have a dropdown menu where you have “Ireland”
4. Press on it and choose “US East (N. Virginia)”
5. At this point all resources you created will not be visible anymore, you will need to go back to “Ireland” region in order to see them
6. All resources that you will create, will be created in US

Create AutoScaling Groups

1. Go to in **AWS Console -> Management Tools -> CloudFormation**
2. Click the “**CreateStack**” button
3. In the “**Choose a template**” section, choose “**Specify an Amazon S3 template URL**” option
4. Copy following URL in that textbox:
5. <https://s3-eu-west-1.amazonaws.com/cloudshapeyourideas-lab/US.txt>
6. Press “**Next**” button
7. In the “**Stack name**” textbox write “USStack”
8. Press **Next -> Next -> Create**
8. Wait for 2.5 minutes, until status will change from “**CREATE_IN_PROGRESS**” to “**CREATE_COMPLETE**”
(use  button for refreshing the page)
9. Go to **AWS Console -> EC2 -> Instances**. You should see 2 instances there.

Create Loadbalancer

1. Repeat all the steps from task “A”, with the exception that you should use “US” instead of “EU” in the name of the resources that you will create

Create a new domain

1. Go to in **AWS Console -> Route53 -> DNS management-> Hosted Zones**
2. In the “Hosted Zones” section choose “Create hosted zone”
3. In the “**Domain Name:**” textbox insert “cloudshape-your-idea-*<firstName>-<lastName>.com*”
Example: cloudshape-your-idea-popescu-andrei.com
4. Press the “**Create**” button

Create a traffic policy

1. Go to “**Traffic policies**”
2. Press “**Create traffic policy**” button
3. In the “**Policy name***” textbox insert “TestPolicy”
4. Press “**Next**”
5. “Connect to” -> “Weighted rule”
6. **For each** “Connect to” choose “New endpoint”
7. For each “**Endpoint**” choose Type “**ELB Classic Load balancer**”
8. For one “**Endpoint**” choose Value EU-Loadbalancer and for the other the US-Loadbalancer
9. For each “**Weight**” field in the “**Weighted rule**” component put value **50**
10. Press “**Create Traffic Policy**” button
11. Write “**www**” in the available textbox
12. Press “**Create Traffic Policy**” button
13. Wait until “Status” section will change from “Creating” to “**Applied**”

Generate cross region traffic

1. Go to “Hosted zones”
2. Select the domain
3. In the right you should have “Name Servers *:” field
4. Save somewhere one of the four domains you see there. It should be like “ns-114.awsdns-14.com”
5. Access any EC2 instances over SSH (in the same way as you did during task “C”)
6. Execute the following command (as a single line) on the host, where **NAMESERVER** should be replace with the value you saved during step #4

```
sudo bash -c 'echo -e "nameserver $(dig +short NAMESERVER)\n$(  
cat /etc/resolv.conf)" > /etc/resolv.conf'
```

This is needed for ensuring that the host will be able to resolve the domain you created, without actually registering it as a public domain, which would make it visible from anywhere on the Internet

7. In order to generate load, execute the following command ():

```
for i in {1..50}; do ab -k -n 1000 -c 100 http://www.cloudshape-your-idea-  
<firstName>-<lastName>.com/; done
```

8. Wait for command to finish.

Observe the Load balancer Metrics

1. Open 2 tabs in browser with the AWS Console.
2. Set one tab in region **Ireland** and one in **US-East (N. Virginia)** (you can change the region from the right corner)
3. For each region go to **AWS Console -> EC2 -> Load Balancing -> Load balancers, Monitoring** tab
4. Check the “**Sum Requests**” graph
5. You should observe values over 10,000 for each region