

Hands-on Lab

Application Load Balancers



Linux Academy



Cloud Assessments

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In this lab, we are creating a load balancer after our company's website went unresponsive after a failed update. We need to configure an application load balancer to perform path-based routing based on the request it receives. By doing so, we can create two different servers, one of which will be used if the other goes down, or if one of them needs to be updated.

Initial Setup

Before we can get started, we need to sign into AWS. To do so, use the provided credentials. Once logged in, go to the **Services** drop-down, look under **Compute** and then select **EC2**. Under **Instances** on the left menu bar, select **Instances** to review the running instances we'll be using. Three will be running, but we will not be doing anything to the Bastion instance. Bastion simply allows us to access the Private instances for our web servers.

Remove the Nat Gateway

We need to make sure that both of our servers are safe by making it so that there is only one way to access them. To do so, we need to remove the NAT Gateway that was used to upload Apache to the servers. To remove it, go to the **Services** drop-down, look under **Network & Content Delivery**, and select **VPC**.

From the left-hand side, select NAT Gateways. Only one gateway is present. Using the **Actions** drop-down, select **Delete NAT Gateway**. Go to **Route Tables** using the left menu bar. In here, select **PrivateRT**, select the **Routes** tab, and then **Edit**. Delete the route for the target that begins with **nat** and then save.

Removing this route makes our instances private.

Review Local Hosts

To set up the local hosts for both of our servers, we need to use the Bastion server via our terminal. Go back to your EC2 instances and select the Bastion host. Below, under the **Description** tab, you will see information over the host. Copy the information from **IPv4 Public IP**.

Go to your computer's terminal. Sign into the terminal using the copied IP. When prompted for a password, enter the default password **123456**.

Once logged into Bastion, copy the IP address from the Private1 instance, then **ssh** into the server via the terminal. Again, use the default password of **123456**.

Now that we're in the Private1 instance, we can review our localhost using the `curl` command. Review the localhost first and then use `localhost/quotes/index.html` to review the quote:

```
[linuxacademy@IP ~]$ curl localhost
server 1
[linuxacademy@IP ~]$ curl localhost/quotes/index.html
Server 1 I would tell you a udp joke but you probably wouldn't get
it
```

Once reviewed, we need to exit the local host for the Private1 instance:

```
[linuxacademy@IP ~]$exit
```

Now, log into our Private2 instance and do the same thing:

```
[linuxacademy@IP ~]$ curl localhost
server 2
[linuxacademy@IP ~]$ curl localhost/quotes/index.html
Server 2 there are 10 types of people in this world those who
understand binary and those who do not
```

With that, we have completed the initial setup of the lab by making sure we can get into both of our web servers.

ALB Configuration

With both of our servers set up, we can create a load balancer to make the websites accessible outside of our machine.

While on the EC2 dashboard, select **Load Balancer** from the lefthand menu. Select **Create Load Balancer**. Name this balancer `awsncALB`, make sure to set it as `internet-facing`, and leave the IP address type as `Ipv4`. Under the `Listeners` section, make sure the Load Balancer Protocol is set to `HTTP`. Under **Availability Zones**, set the VPC to the one ending in `ALBlabVPC`. Select the subnets named `Public1` and `Public2`. These should be the only ones that appear.

Select the **Next: Configure Security Settings** button. We will get a warning about HTTPS, which we do not currently have. Ignore this warning and continue.

On the `Configure Security Groups` page, select the **Public Security Group** from the list. Make sure to uncheck the default security group before moving on to the next page.

On the `Configuring Routing` page, set the **Target group** to `New target group`. Name the target group, `TargetGroup`. set the **Protocol** to `HTTP`. Leave all other items as default and head to the next page.

On the [Register Targets](#) page, select both of the private instances. Once you have selected both of them, make sure to select **Add to registered**. If you do not click the add button, then the targets won't register even if they are selected. Go to the next page once you have registered them.

The last page we will come to is the [Review](#) page. Go ahead and review the page and note that the warning we were given still appears next to the [Listeners](#) line. Again, since we aren't doing anything with HTTPS, ignore it and select **Create**. You will get a success message.

On the [Load Balancer](#) page, go to the [Listeners](#) tab. We have a warning under our [Listener Port](#). The warning tells us that the security group for load balancer doesn't allow traffic to the instance port. We need to go in and fix this issue.

Fixing the Security Group

Head to the VPC console and select **Security Groups**. Choose the **Private Security Group**, the **Inbound rules** tab, then select **Edit**. Click on **Add another rule** and set the **Type** to [HTTP](#). We then need to set the source to [10.0.0.0/16](#). This will only allow traffic from our designated VPC through.

Now we need to set up the [Public security group](#). Click on it just as we did with the private version, select **EDIT**, and then add a new rule that will allow traffic from HTTP through. This time, however, our source is going to be [0.0.0.0/0](#) and will allow traffic in from anywhere.

Check the Servers

With everything set up, we can view our web servers. Go back to **EC2**, **Target Groups**, select **TargetGroup**, and then the **Targets** tab. Look at the [Status](#) section. If it shows 'initial', refresh your page. It may take several minutes for the security checks to run after changing our information. Keep refreshing until the status is 'healthy.'

Once the status says 'healthy', go to **Load Balancers**. Check that the state of the load balancer is 'Active'. Copy the [DNS Name A](#) record from the load balancer as this is our webpage URL. Save this in a note as we will use it again later.

Open a new tab and paste it into the address bar. Enter the URL and hit **Enter**. Each time we press **Enter** we will swap between server 1 and server 2.

Add [/quotes/index.html](#) to the end of our URL. Hit **Enter** again to view the quote from a server. These will also flip back and forth as the servers change.

Configuring the Path Routing

We now know how to set up our load balancer and switch between our two servers, but what if we only want one server to appear over the other instead of both appearing? Let's set it up so that we only see the quotes from Server 2 and the index from server 1.

Set up a Target Group

We need to set up new target groups for our servers. Go to **Target Groups** and select **Create target group**. Name this target group **Server2-TG**. We want to set the VPC for this target group to the one that ends with **ALBlabVPC**. Create the target group with the rest of the items set to their default.

Since we want to see the quote with our second server, we need to set up a rule on our load balancer to include the quote when the page opens. To do so, go to our **Load Balancer** page. Under the **Listeners** tab, expand the Rules section. Select **Add Rule**, enter **_/quotes/_** and then route it to the **Server2-TG*** target. **Save** the rule when finished.

Go back to **Target Groups**. Select the **Server2-TG** target. Go in and select **Private2** as its server and then click **Add and registered**, then **Save**. Check that it appears as 'healthy'. Remember, this may take few moments.

Using the URL address we saved earlier, place it in the search bar with the addition of **/quotes/index.html** at the end. When we hit **Enter**, server 2 will appear over and over. Server 1 will not appear.

Switch to Server 1

Congrats, we have made it so that only server 2 will appear, but we still haven't created a load balancer that will switch between the two if one goes down. Let's go ahead and create that form of load balancer now.

Go to the **Target Group** page and create another target. Name this one **Server1-TG**, make sure the VPC is set to **ALBlabVPC**, and create it.

Select the new target group and then select **Edit**. This time, set the target to **Private1**. Remember to click **Add to registered** before you save.

Now, head to **Load Balancers**, select the **Listeners** tab, and then select the **Rules** drop-down. Add a new rule with **_/quotes/_** attached to **Server1-TG***. It will automatically be set to a priority of 2. Save the rule.

Go back to your target groups and see check that our new target is 'healthy'. As with the previous times, this may take a few moments.

Once it shows as 'healthy', use the URL from earlier and start hitting enter. It looks like we are only getting server 2 still. Why? Well, when we were in our rules, we set server 1 as a priority of 2. Let's go fix that so that server 1 is our primary server.

Head into **Load balancer**, then the **Listeners** tab, select **Reorder Rules** and then move **Server1-TG** up in the list. Save the rule.

Go back to our web browser, select the URL, and hit **Enter**. Be aware that it might take a moment for our servers to update before they will only server 1, but as soon as it starts showing server 1, it will only show server 1 unless server 1 goes down, then it will move to server 2, which we can not replicate in this lab.

Review

Upon completing this lab you are now able to create a load balancer and configure it to perform path-based routing based on the request it receives. Not only that, but you know how to prioritize one server over another and set them up so that one backs up the other. Congratulations on completing this lab!