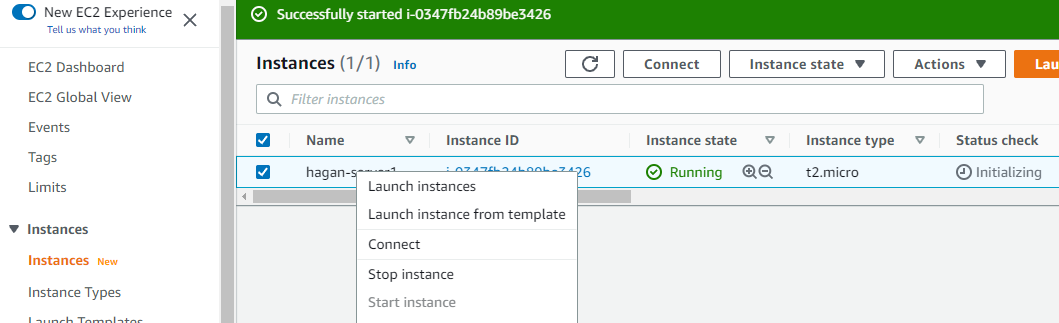
Network Load Balancer (NLB) Lab

A load balancer takes requests from clients and distributes them across targets in a target group, such as EC2 instances, Applications, etc.

**Creating EC2 Instance Targets**

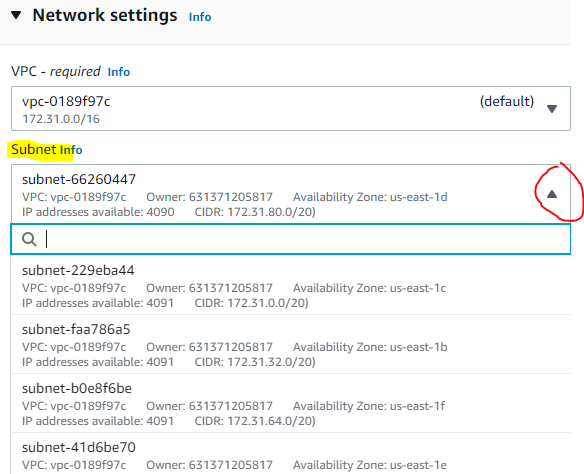
1) Begin by logging into the AWS console as Administrator.

2) Start your EC2 Windows Server by going to ***EC2***, right clicking on the server and go down to ***Start Instance***. Hit the refresh button to until Status Checks pass. (Note the Availability Zone your Instance is running in. You will need this to setup your NLB).

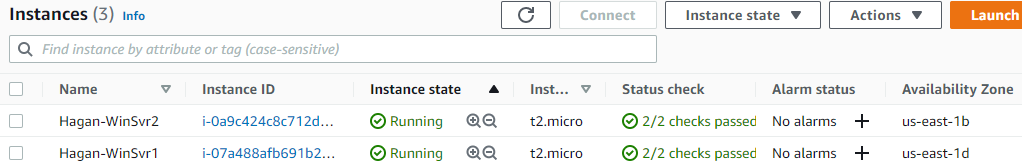


If you don’t have an EC2 Windows instance, create one by following the task from the EC2-*WindowsInstance\_v1* lab doc.

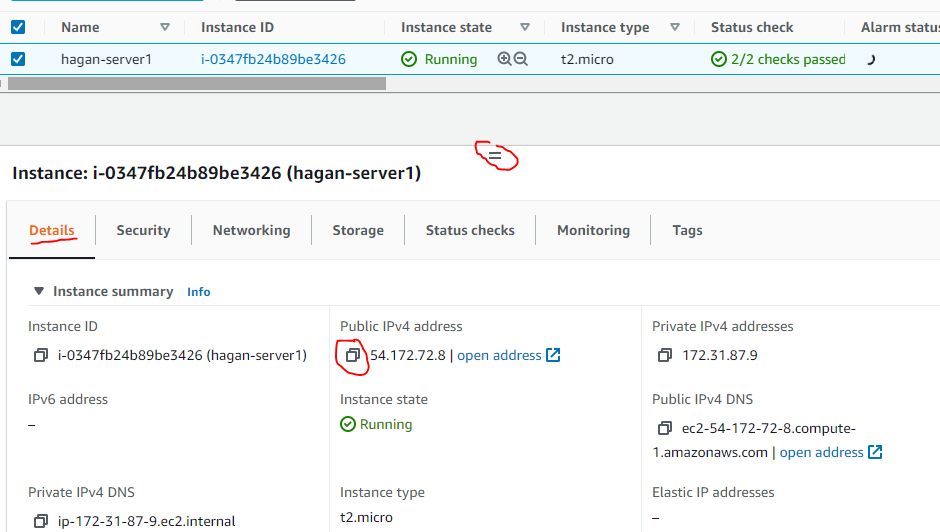
3) Create a second EC2 Windows instance by right-clicking on the server1 instance, go down to ***Image and templates***, and select ***Launch more like this***.

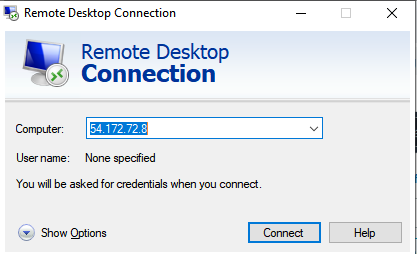
4) On the **Launch an instance page** window, make the following changes:  
 Name and tags: **yourlastname-WinSvr2**  
 Key pair(login): **Use same key pair you used for WinSvr1** Network settings:   
 **Under Subnet select a different AZ from WinSvr1**  
  
 **For Security groups make sure your WinSvr1-sg is selected**  
  
5) Scroll down to the bottom and click the **Launch** **Instance** button.

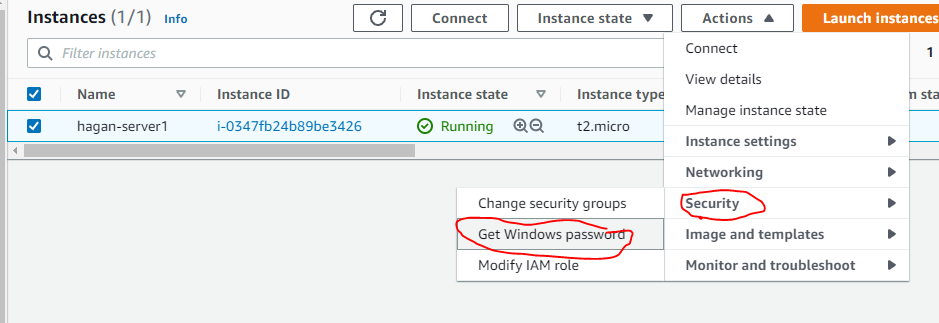
6) Click the **View all instance** button on the next page.

7) You should now see the 2 instances running. Note the Availability Zones.  


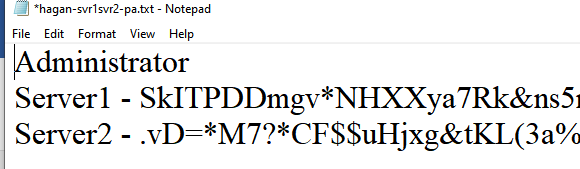
8) Open Remote Desktop by typing RDP in your host’s (laptop) search window. Microsoft Remote Desktop should appear as an option.

9) On the AWS console, select your EC2 server1 and go down to the Details tab. You may need to drag up that portion of the window by dragging to two lines. Click on the icon under Public IPv4 address. This copies the IP address to clipboard.  
  


10) Paste that into the Remote Desktop window and click connect.  
  


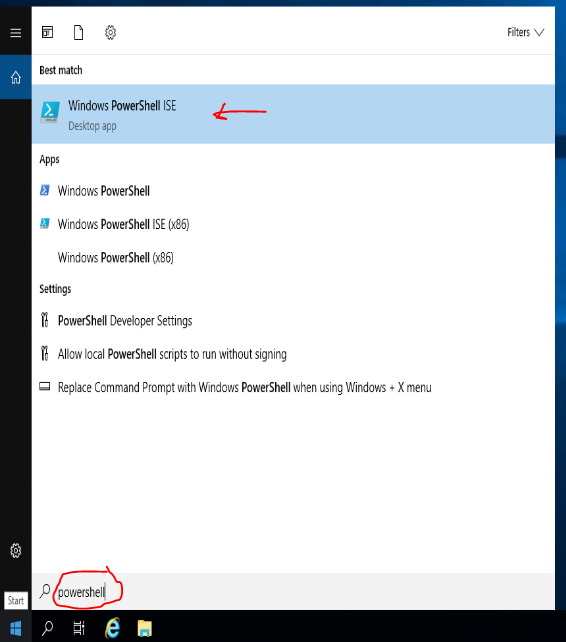
11) Click ***More choices*** then ***Use a different account***. Enter **Administrator** and the password you saved in a text file from EC2 Windows Lab. If you don’t have your password, select your EC2 server1, go to **Action** dropdown, **Security**, and **Get Windows Password**. Use your .pem file (key pair) to decrypt your password. Click the copy icon.   


A. Open NotePad, paste this password as server1 and save the file. This will save you from having to decrypt the password each time.

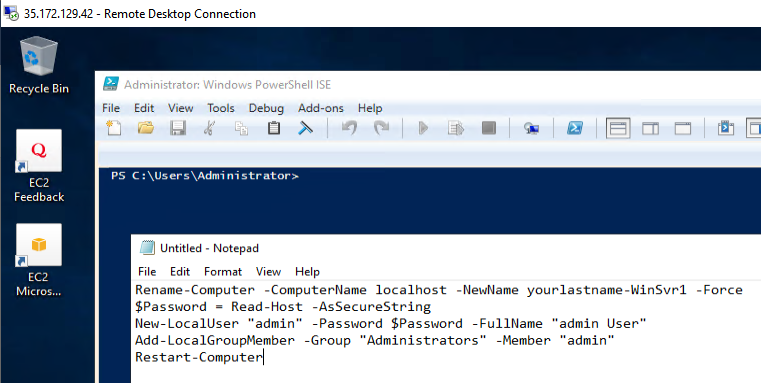


12) Paste the password into the RDP window and click **OK**.

13) Once you are logged in open a Powershell window by typing **powershell** in the search box.



14) In the PowerShell window, copy/paste the following commands (You can also copy/paste to Notepad in WinSvr to make editing the commands easier before pasting into PS:

**Rename-Computer -ComputerName localhost -NewName *yourlastname*-WinSvrX -Force** (replace X with server**1** or **2**)   
**$Password = Read-Host -AsSecureString** (a box will popup. use ***Passw0rd****!* for the password)  
**New-LocalUser "admin" -Password $Password -FullName "admin User"** (creates a user called *admin* )  
**Add-LocalGroupMember -Group "Administrators" -Member "admin"** (adds user admin to Administrators group )  
**Restart-Computer**  


15) Repeat **Steps 8 – 14** for server2

16) Now you will be able to use the credentials **admin** and **Passw0rd!** to log in instead of Administrator and decrypted password.

To create a load balancer using the AWS Management Console, complete the following tasks.

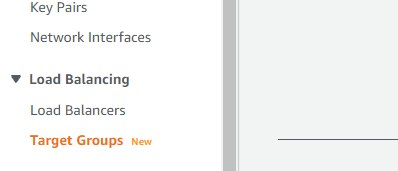
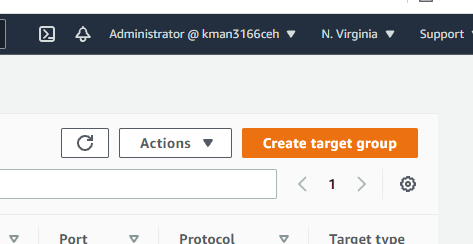
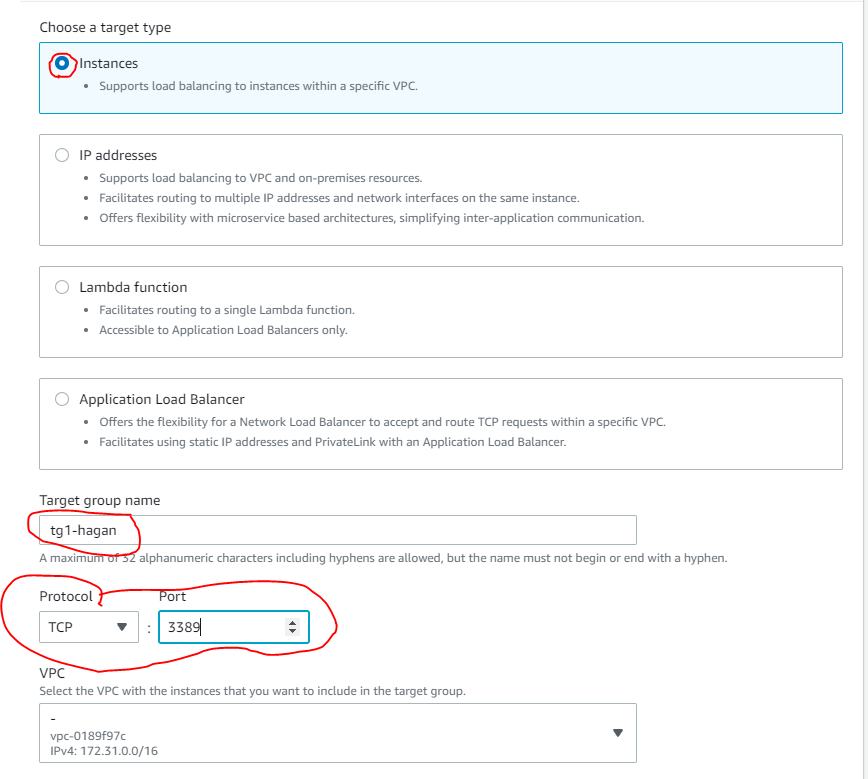
**Tasks**

* Step 1: Configure a target group
* Step 2: Register targets
* Step 3: Configure a load balancer and a listener
* Step 4: Test the load balancer

Step 1: Configure a target group

Configuring a target group allows you to register targets such as EC2 instances. The target group that you configure in this step is used as the target group in the listener rule when you configure your load balancer.

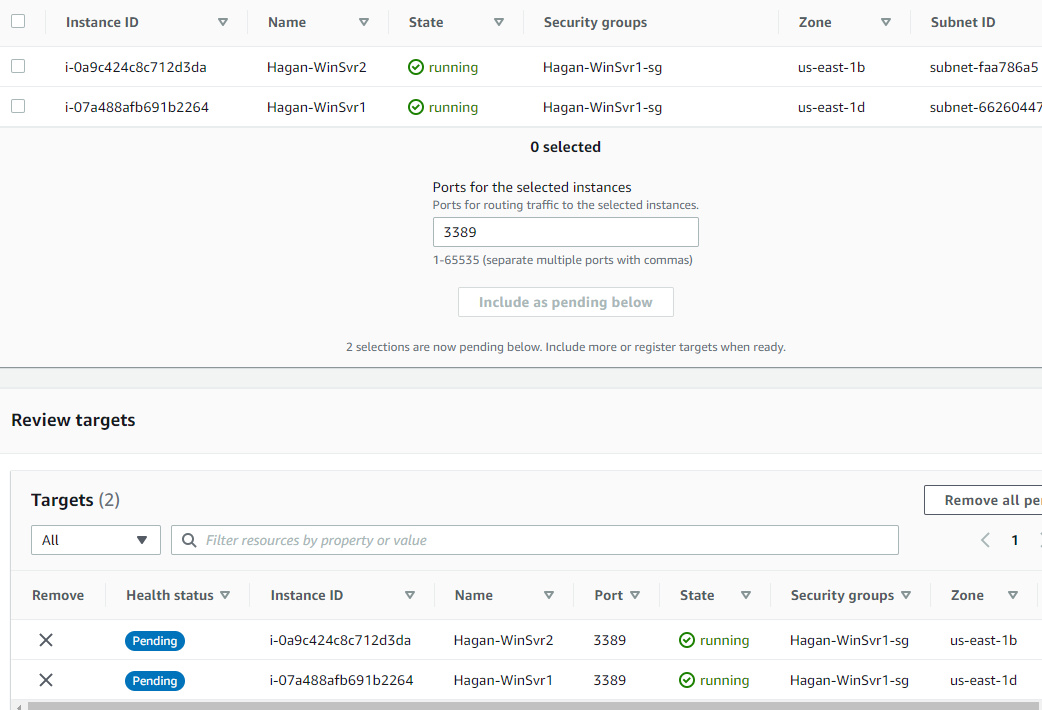
**To configure your target group**

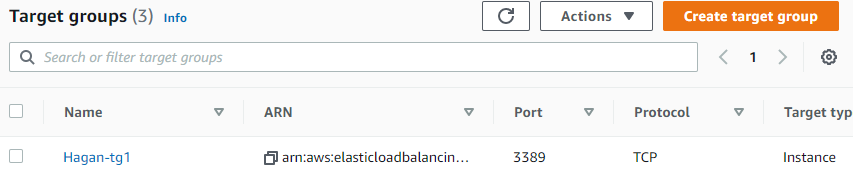
1. Open the Amazon EC2 console (you should still be there).
2. In the navigation pane, under **Load Balancing**, choose **Target Groups**.  
     
   
3. Choose **Create target group**.  
     
   
4. In the **Basic configuration** section, set the following parameters:
   1. For **Choose a target type**, select **Instance** to register targets by instance ID as a target.
   2. For **Target group name**, enter ***yourlastname-tg1*** for the target group.
      * For **Protocol**, choose **TCP**.
   3. For **Port**, type ***3389***.
   4. For **VPC**, select a virtual private cloud (VPC) with the targets that you want to include in your target group. (**Leave default**).
5. In the **Health checks** section, you would modify the default settings as needed. For **Advanced health check settings**, choose the health check port, count, timeout, interval, and specify success codes. If health checks consecutively exceed the **Unhealthy threshold** count, the load balancer takes the target out of service. If health checks consecutively exceed the **Healthy threshold** count, the load balancer puts the target back in service. ***For now, leave defaults.***
6. Choose **Next**.

Step 2: Register targets

You can register EC2 instances, IP addresses, or an Application Load Balancer with your target group. This is an optional step to create a load balancer. However, you must register your targets to ensure that your load balancer can route traffic to them.

1. In the **Register targets** page, add one or more targets as follows:
   * If the target type is **Instances (and it is)**, select both instances, enter port 3389, and then choose **Include as pending below**.

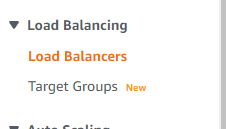
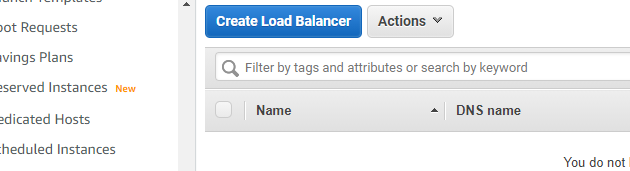
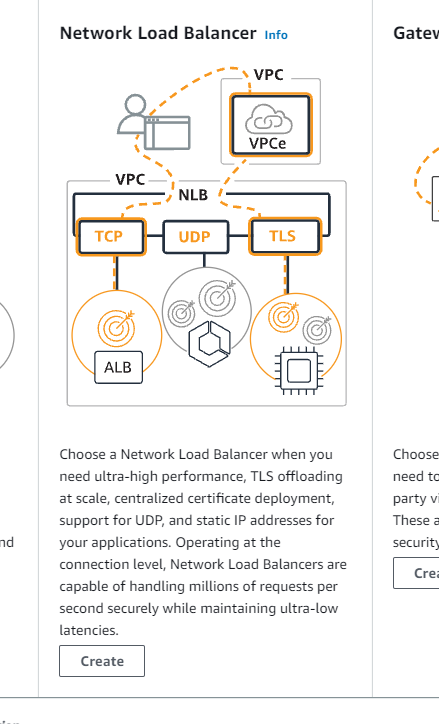
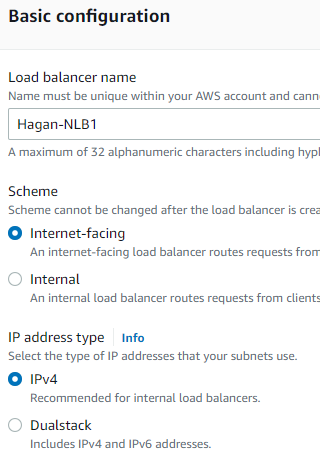
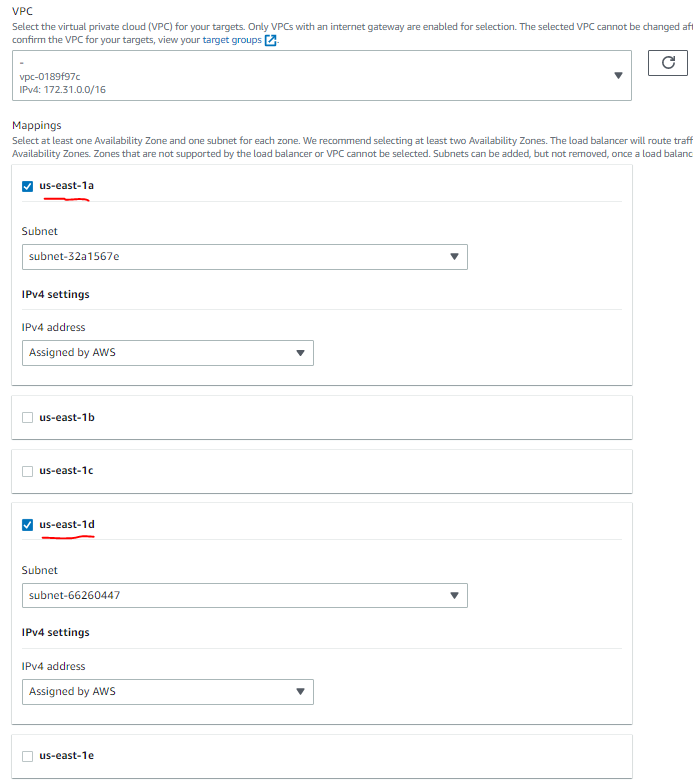
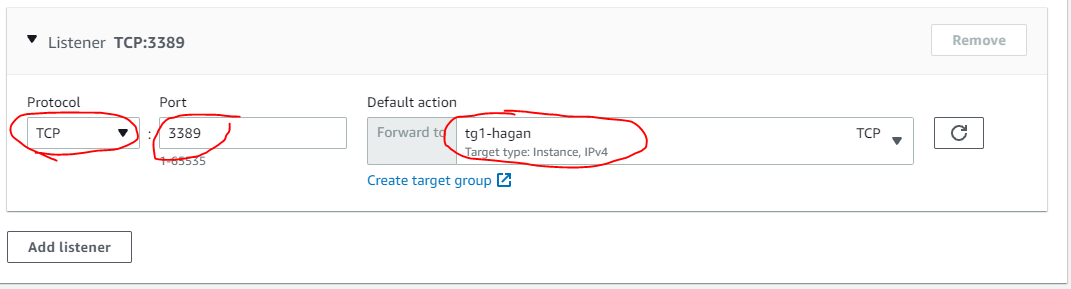
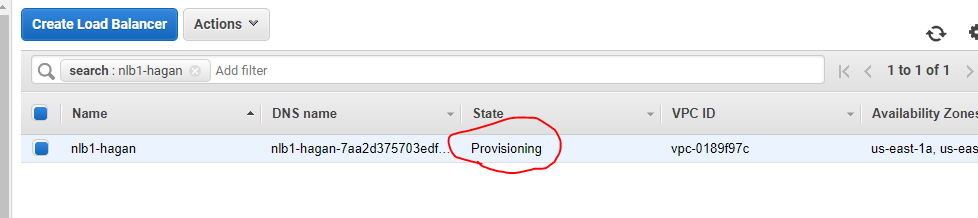


1. Then choose **Create target group**. Your Target Group will be created.  
     
   

Step 3: Configure a load balancer and a listener

To create a Network Load Balancer, you must first provide basic configuration information for your load balancer, such as a name, scheme, and IP address type. Then provide information about your network, and one or more listeners. A listener is a process that checks for connection requests. It is configured with a protocol and a port for connections from clients to the load balancer.

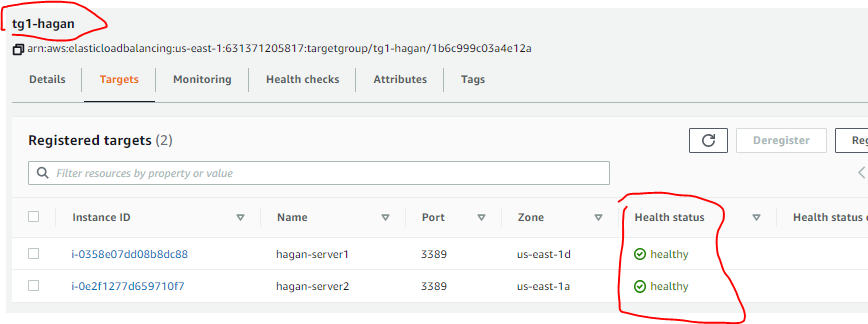
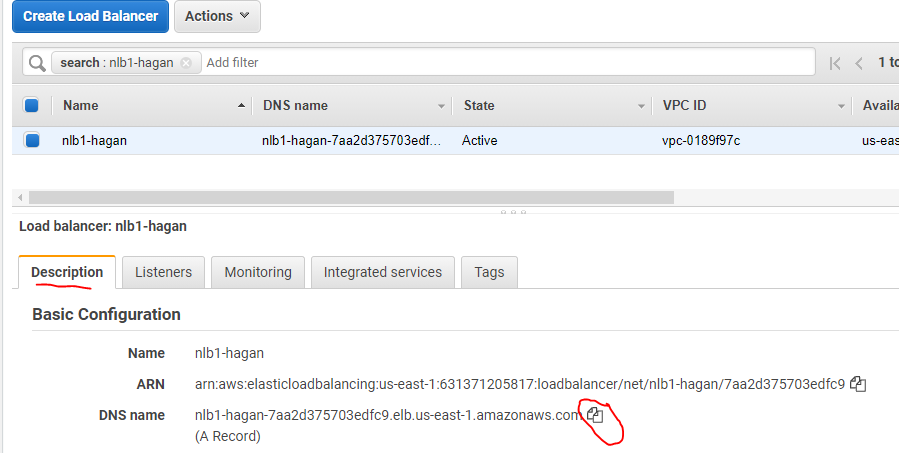
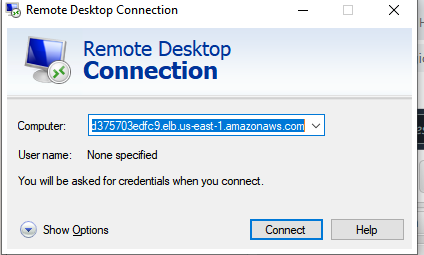
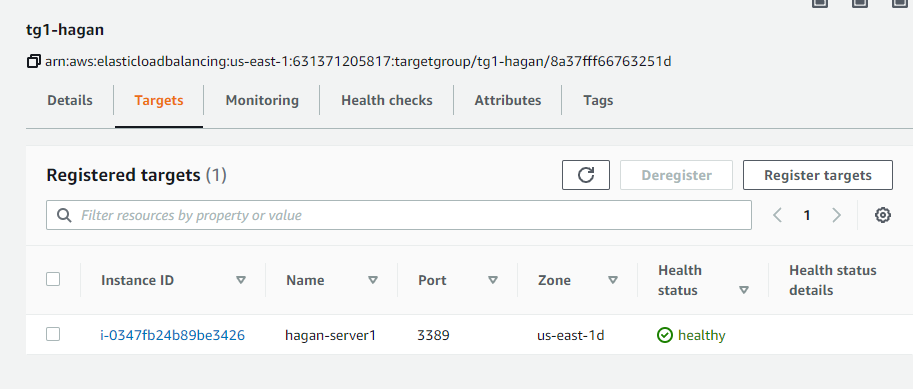
**To configure your load balancer and listener**

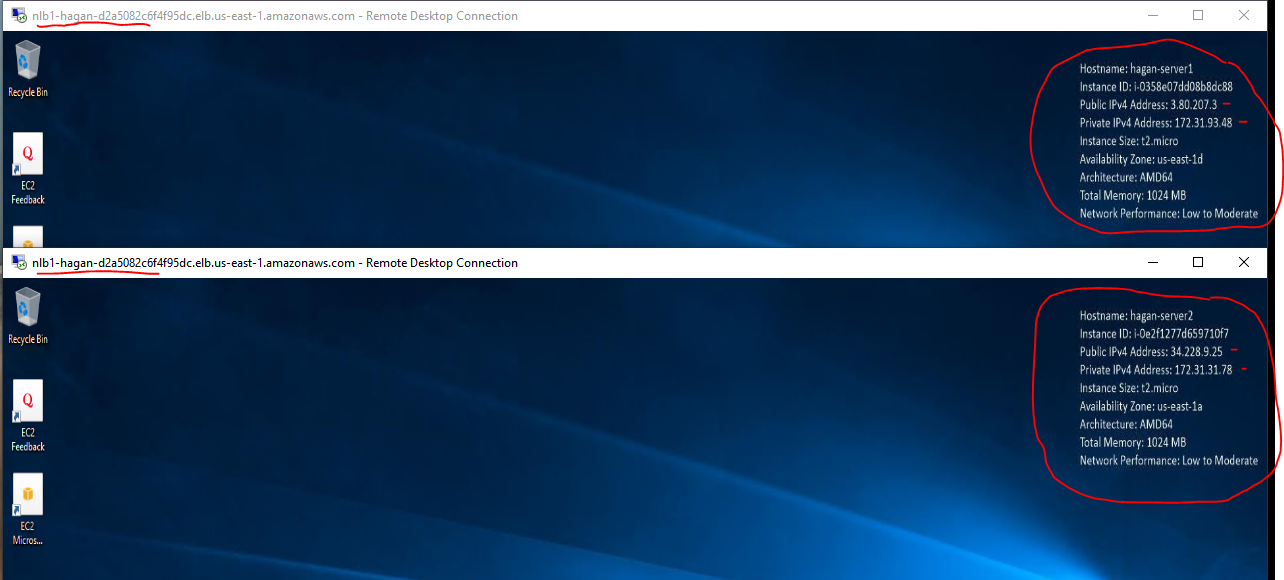
1. Open the Amazon EC2 console at <https://console.aws.amazon.com/ec2/>.
2. In the navigation pane, under **Load Balancing**, choose **Load Balancers**.  
     
   
3. Choose **Create Load Balancer**.  
     
   
4. Under **Network Load Balancer**, choose **Create**.  
     
   
5. **Basic configuration**
   1. For **Load balancer name**, enter ***yourlastname-NLB1*** for your load balancer. The name of your Network Load Balancer must be unique within your set of Application Load Balancers and Network Load Balancers for the Region. It can have a maximum of 32 characters, and contain only alphanumeric characters and hyphens. It must not begin or end with a hyphen, or with internal-.
   2. For **Scheme**, choose **Internet-facing**. An internet-facing load balancer routes requests from clients to targets over the internet.
   3. For **IP address type**, choose **IPv4**.   
        
      
6. **Network mapping**
   1. For **VPC**, select the VPC that you used for your EC2 instances. If you selected **Internet-facing** for **Scheme**, only VPCs with an internet gateway are available for selection.
   2. For **Mappings**, select the Availability Zones that your Instances are running in (Task 7 in first section). So, you should have 2 Availability Zones select and leave subnets as is. Enabling multiple Availability Zones increases the fault tolerance of your applications. For internet-facing load balancers, you can select an Elastic IP address for each Availability Zone. This provides your load balancer with static IP addresses.  
        
      
7. **Listeners and routing**
   1. For **Listeners**, the Protocol is TCP and the port is 3389.
   2. For **Default action**, select the target group you created earlier (**yourlastname-tg1**).   
        
      
8. Review your configuration in Summary and choose **Create load balancer**
9. Click **View Load Balancer** button
10. The State column will show Provisioning. Hit refresh until it shows **Active**  
      
    

Step 4: Test the load balancer

After creating your load balancer, you can verify that your EC2 instances have passed the initial health check and then test that the load balancer is sending traffic to your EC2 instances.

**To test the load balancer**

1. In the left navigation pane, under **Load Balancing**, choose **Target Groups**.
2. Select the newly created target group.
3. Choose **Targets** and verify that your instances are ready. If the status of an instance is initial, it's probably because the instance is still in the process of being registered, or it has not passed the minimum number of health checks to be considered healthy. After the status of at least one instance is healthy, you can test your load balancer.   
     
   
4. Open Remote Desktop by type RDP in your host’s (laptop) search window. Microsoft Remote Desktop should appear as an option.
5. Go back to the AWS console
6. Now go to **Load Balancing** then click **Load Balancers**. Under the **Description** tab, click the copy icon at the end of the **DNS name**.   
     
   
7. Paste the DNS name of your NLB in RDP and click **Connect**.  
     
   
8. Click ***More choices*** then ***Use a different account***. Enter **admin** and **Passw0rd!**. If you can’t connect, check your Targets under the Load Balancer. It should say healthy.  
     
     
   
9. Once you connect via the NLB DNS name, open a second RDP session, using the NLB DNS name again and connect using **admin** and **Passw0rd!**.
10. The NLB should connect you to server1 with the first session and server2 for the second. If you get a popup saying you are being Disconnect from the server, this means the NLB is connecting you to the same server again. You can only have one remote session at a time.
11. Repeat Step 9 trying to connect so that both servers are connected at the same time. When successful, align your screens to capture the screenshot in the next step.
12. Your screenshot should appear as follows. Paste you screenshot into a Word doc (or PDF) and upload to Bb. Note this is showing the 2 different servers.



**Clean up**

1. When done, shutdown your Windows Server by issue a shutdown from the server to stop the instance or terminate via the AWS console.
2. Delete your load balancer by going to **Load Balancer**, **Action**, **Delete**.  
     
   