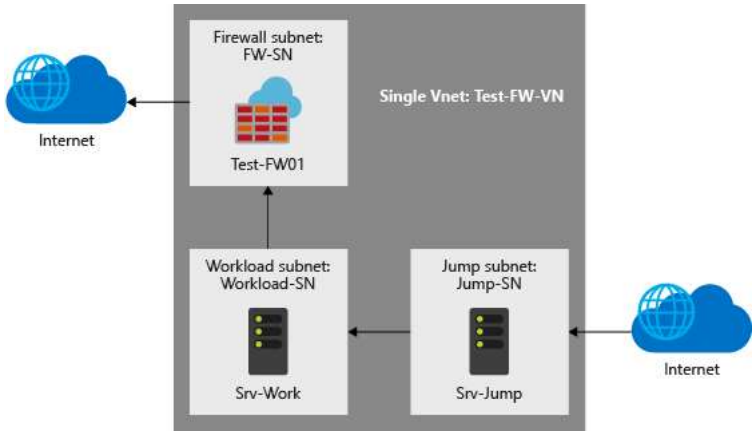
## Module 5 - Lab 3: Deploy Azure Firewall

**Scenario**

In this lab, you will learn how Azure Firewall can be deployed in your environment. Azure Firewall is a managed cloud-based network security service that protects your Azure Virtual Network resources.

- Deploy Azure Firewall.
- Create default routes to change the traffic flows through the firewall and setup rules on the firewall.

**What you will build**

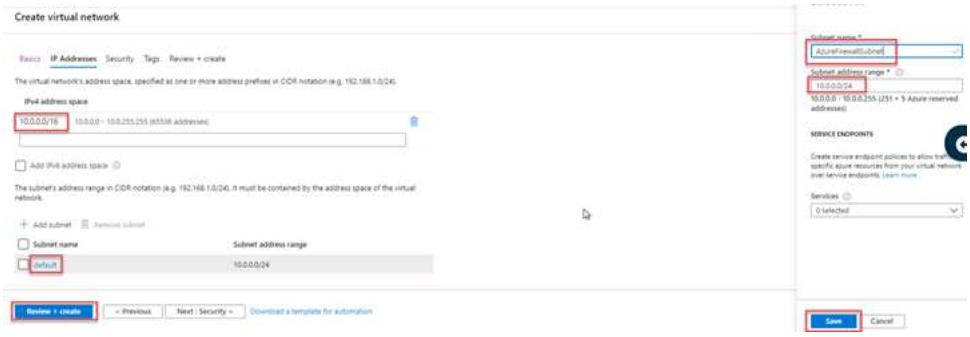



## Exercise 1: Create a Network

### Task 1: Create a Virtual Network

- [ ] 1. Login to the **Azure Port** https://portal.azure.com with the username sheikhnasir4K010@gdcs4.com and password Jb7bs02ehAtRoLsG
- [ ] 2. Expand the portal's left navigation by clicking **Show portal menu** in the top left.

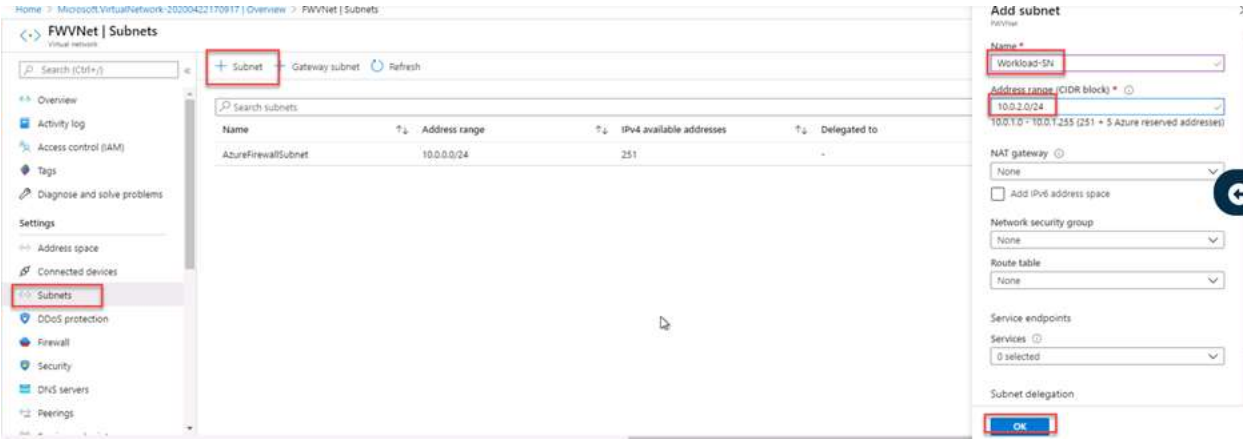

- [ ] 3. From within the **Azure Portal**, click **+ Create a resource** and then select **Networking -> Virtual Network**
- [ ] 4. Select **+Create** and Specify the following settings for your new virtual network then click **Next: IP Addresses**.
    - Resource Group: Select **unrecognised token ($gd.com(azure).resourceGroups(AzureFirewallRG))**
    - Name: FWVNet
        - Region: **East US**
- [ ] 5. Enter the following settings then click **Review + Create** then **Create**.
    - IPv4 Address Space: **10.0.0.0/16**
    - Click **Default** then enter the following configuration and click **Save**.
    - Subnet name: AzureFirewallSubnet
    - Subnet address Range: **10.0.0.0/24**



> ⚠ **Note:** We'll deploy the Azure Firewall in a later step.

## Task 2: Create the subnets required

- [ ] 1. In the Azure portal, select **Virtual Networks** from the left navigation.
- [ ] 2. Select the **FWVNet** virtual network
- [ ] 3. Under **Settings** on the left, click **Subnets**. Click **+ Subnet** to create a new subnet using the following settings and click **Save**.
    - Name: **Workload-SN**
    - Address range: **10.0.2.0/24**




- [ ] 4. Add another subnet using the following settings:
    - Name: **Jump-SN**
    - Address range: **10.0.3.0/24**
- [ ] 5. Accept the defaults and click **Save**.

You have now created all the necessary networking infrastructure. Next you will create a virtual machine.

## Task 3: Create a virtual machine to use as a jump box

- [ ] 1. Within the Azure portal, click **+ Create a Resource** and choose **Windows Server 2019 Datacenter**.
- [ ] 2. Specify the following configuration:
    - Resource Group: Select **unrecognised token ($gd.com(azure).resourceGroups(AzureFirewallRG))**
    - Virtual machine name: **Srv-Jump**
    - Region: **East US**
    - Size: **IMPORTANT -** ensure the size is set to **Standard D2s v3**
    - Username: **localadmin**
    - Password/Confirm Password: **Jb7bs02ehAtRoLsG**
    - Inbound Port Rules: choose **Allow selected ports**, and enable **RDP (3389)**
- [ ] 3. At the top of the page click the **Networking** tab.
    - Set the Virtual Network to **FWVNet** and the subnet to **Jump-SN**
    - Public IP: If it is not already created, click **Create new** and name it **Srv-Jump-ip** and click **OK** .
- [ ] 4. Click **Review + create** and then click **Create**.

## Task 4: Create a virtual machine to use as the protected server

- [ ] 1. Create another **Windows Server 2019 Datacenter** virtual machine using the following values:
    - Resource Group: **unrecognised token ($gd.com(azure).resourceGroups(AzureFirewallRG))**
    - Virtual machine name: **Srv-Work**
    - Region: **East US**
    - Size: **IMPORTANT -** ensure the size is set to **Standard D2s v3**

- Username: **localadmin**
- Password/Confirm Password: **Jb7bs02ehAtRoLsG**
- On the **Networking** tab on the top.
  - Virtual Network: **FWVNet**
  - Subnet: **Workload-SN**
  - Public IP: **None**

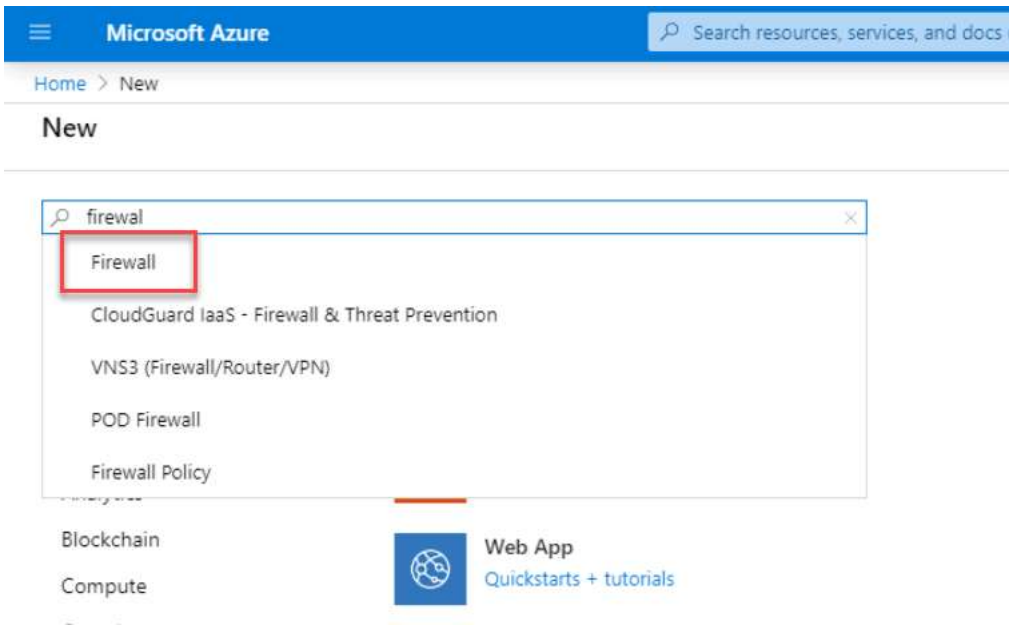
☐ 2. Click **Review + create** and then click **Create**.

At this point, we have all the necessary infrastructure ready and will now deploy the Azure Firewall.

## Exercise 2: Deploy the Azure Firewall

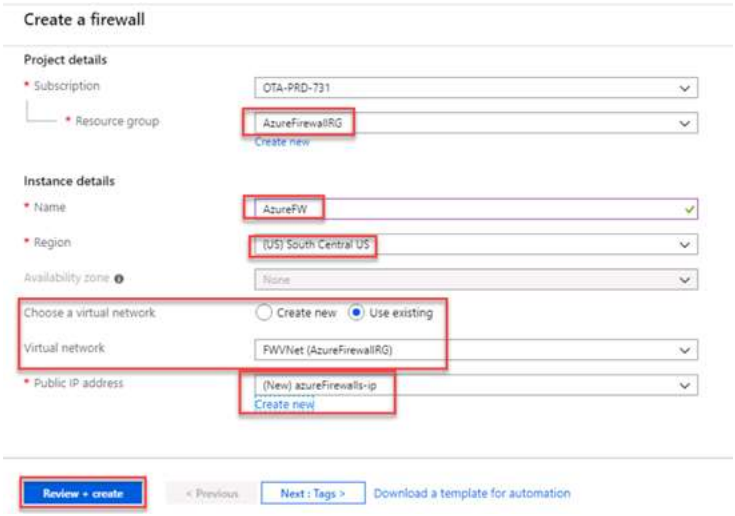
### Task 1: Deploy the Azure Firewall

☐ 1. In the portal, click **+ Create a Resource** and search for Firewall. Click **Firewall** from the returned results and click **Create**.



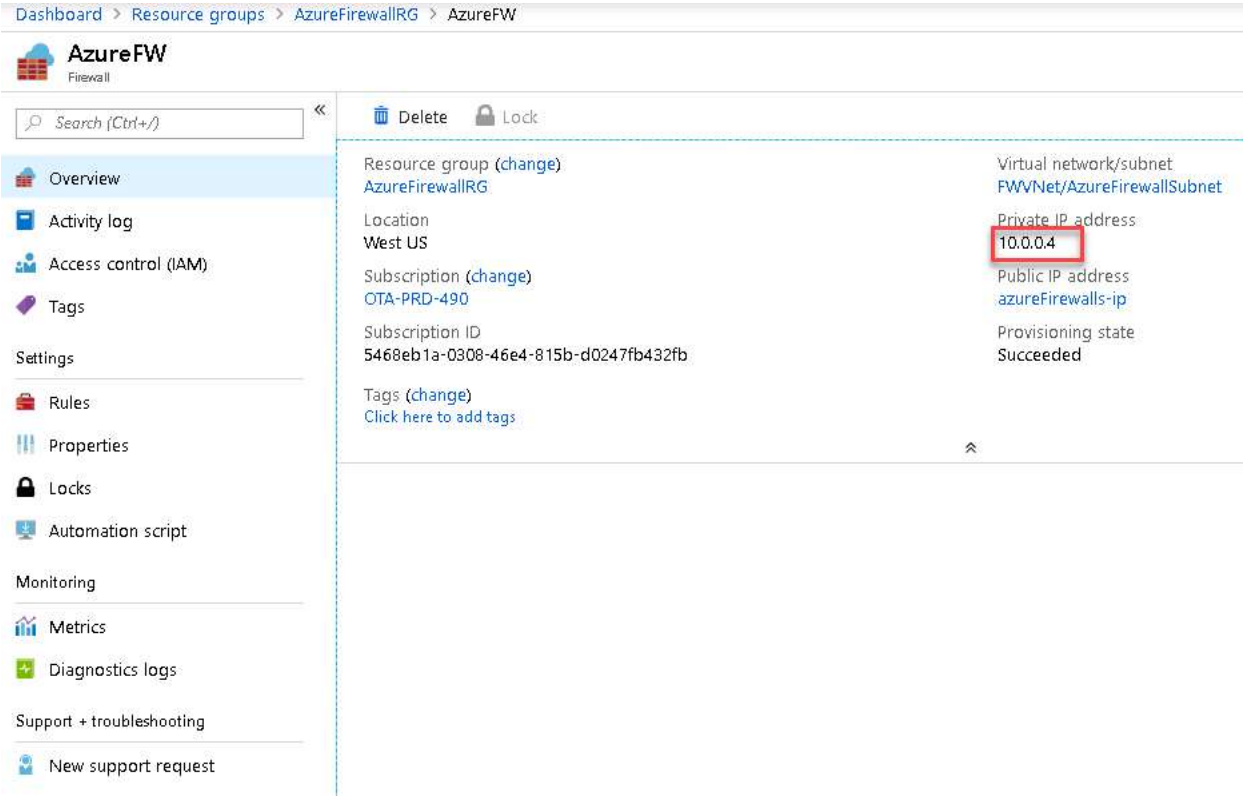

☐ 2. Specify the following settings and click **Review + Create** and then **Create**.

- Resource Group: **unrecognised token ($gd.com(azure).resourceGroups(AzureFirewallRG))**
- Name: **AzureFW**
- Region: **East US**
- Firewall Management: **Use Firewall rules (Classic) to manage this firewall**
- Virtual network: **(use existing) FWVNet**
- Public IP: **(create new)** **azureFirewalls-ip**
- Firewall Policy: **(create new)** **azurefirewall-policy**




The Firewall will take a few minutes to deploy. Once completed we need to get the private ip address of the Firewall.

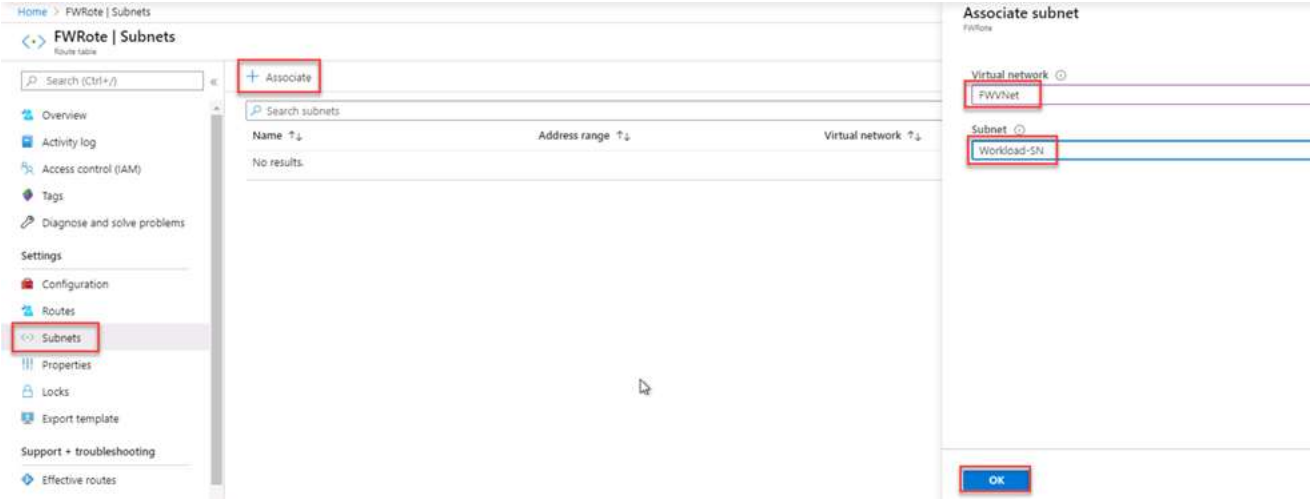
Navigate to the firewall and note the private ip address. Click **azureFirewalls-ip** then make note of the public ip addresses.




## Task 2: Create the default route table

We will now create the default route

- [ ] 1. In the portal, click **+ Create a resource** then search for and select **Route Table** and click **Create**.
- [ ] 2. Specify the following configuration and click **Create**.
    - Name: **FW-Rout**
    - Resource Group: **unrecognised token ($gd.com(azure).resourceGroups(AzureFirewallRG))**
    - Location: **East US**
- [ ] 3. When the route table is created click **Go to Resource** in the notifications to open the route table you just created.
- [ ] 4. Select **Subnets** under **Settings** on the left and click **+ Associate**. Choose the **FWVNet** virtual network and the **Workload-SN** subnet from the dropdowns and click **OK**.



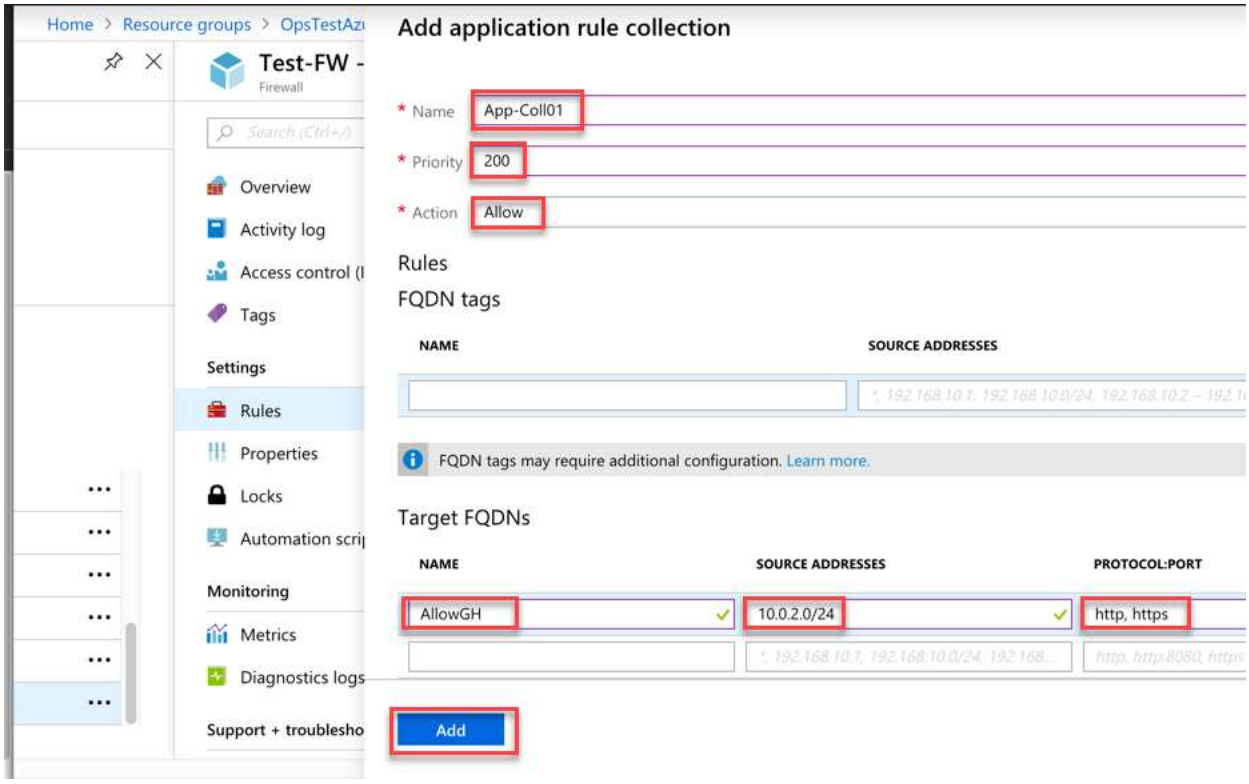

## Task 3: Add a route to the route table

- [ ] 1. Click **Routes** on the left under **Settings** and click **+ Add**.
- [ ] 2. Specify the following configuration and click **OK**.
    - Route name: **FW-DG**
    - Address prefix: **0.0.0.0/0**
    - Next hop type: **Virtual appliance**
    - Next hop address: **The private ip address of your Azure firewall that you made note of earlier**


## Task 4: Configure an application rule

> You will now configure an application rule on the firewall.

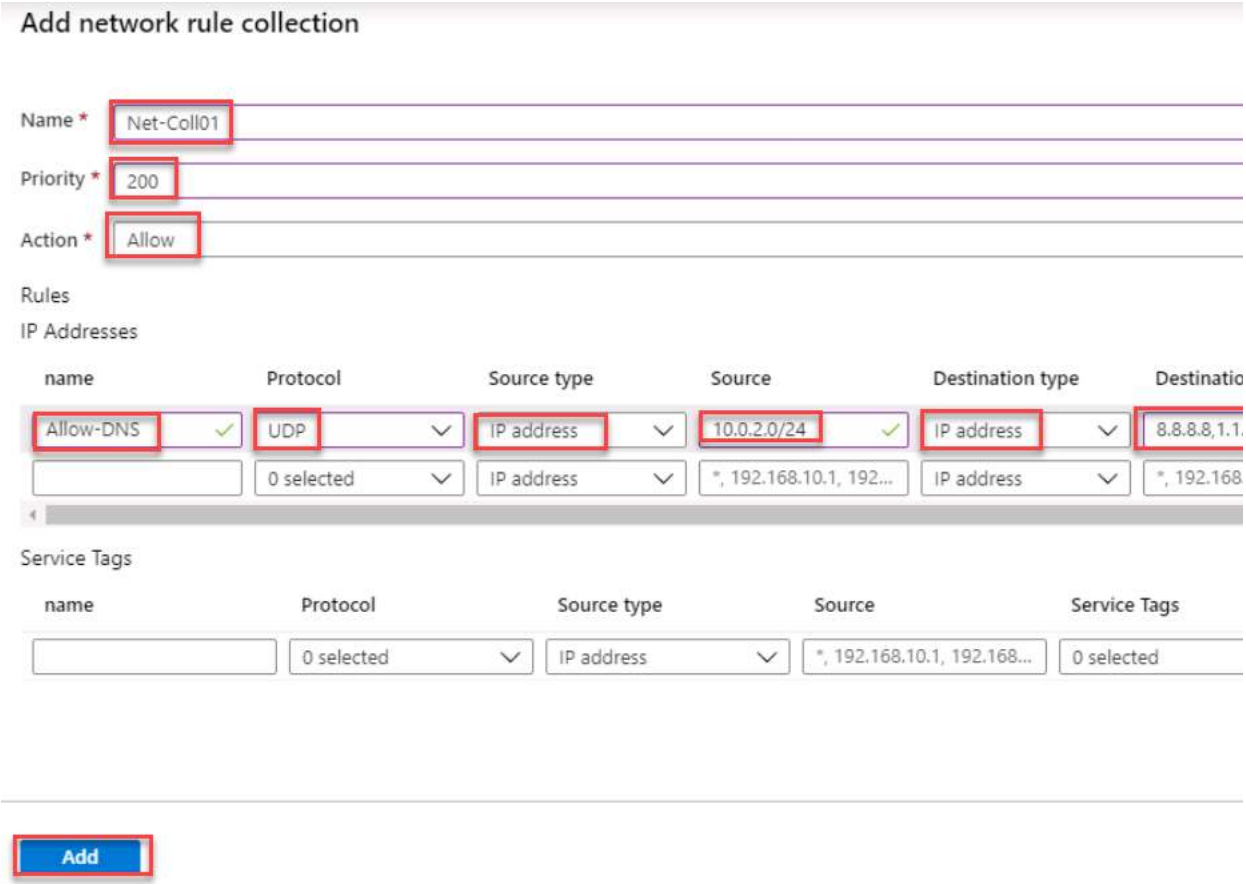
- [ ] 1. Open the **AzureFirewallRG** resource group and select the AzureFW.
- [ ] 2. Under **Settings** on the left, click **Rules**.
- [ ] 3. Click **Application rule collection** then click **+ Add application rule collection**
- [ ] 4. Specify the following configuration and click **Add**.
    - Name: **App-Coll01**
    - Priority: **200**
    - Action: **Allow**
    - Target FQDNs
    - Name: **AllowGH**
    - Source Addresses: **10.0.2.0/24**
    - Protocol: **http, https**
    - Target FQDN: **github.com**




You will now configure a network rule.

## Task 5: Configure a network rule

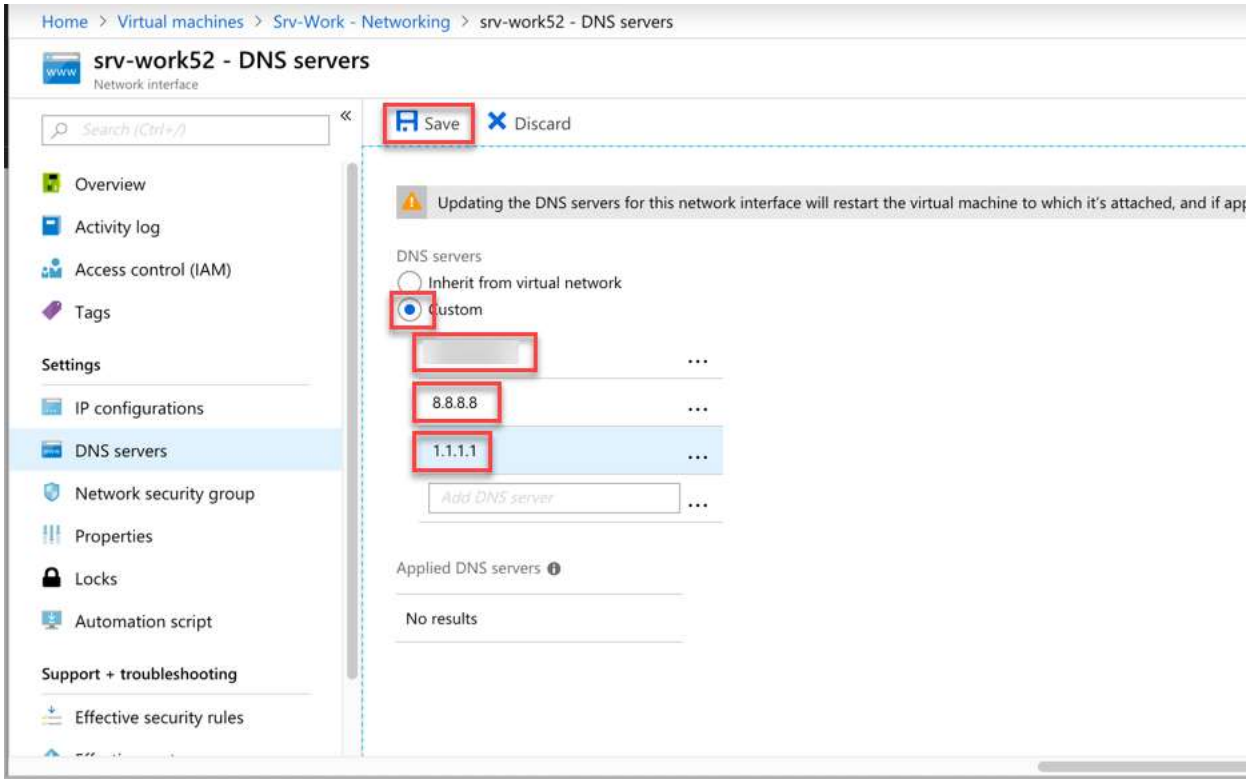
- [ ] 1. Click **Network rule collection** then click **+ Add network rule collection**
- [ ] 2. Specify the following configuration and click **Add**:
    - Name: **Net-Coll01**
    - Priority: **200**
    - Action: **Allow**
    - Rules (IP Addresses):
    - Name: **Allow-DNS**
    - Protocol: **UDP**
    - Source address: **10.0.2.0/24**
    - Destination Addreses: **8.8.8.8,1.1.1.1**
    - Destination port: **53**




You will now change the DNS servers on the Srv-Work NIC

### Task 6: Change DNS for Srv-Work NIC

- [ ] 1. Within the **Azure portal**, click **Virtual Machines** on the left navigation and open the **Srv-Work** VM.
- [ ] 2. Click **Networking** on the left under **Settings** then by where it says **Network Interface:**, click **srv-workXXX** to open the network interface configuration.
- [ ] 3. Under **Settings** on the left click **DNS Servers** then click **Custom**.
- [ ] 4. Add the following DNS servers and click **Save**.
    - The AzureFW public IP address you noted earlier
    - 8.8.8.8
    - 1.1.1.1

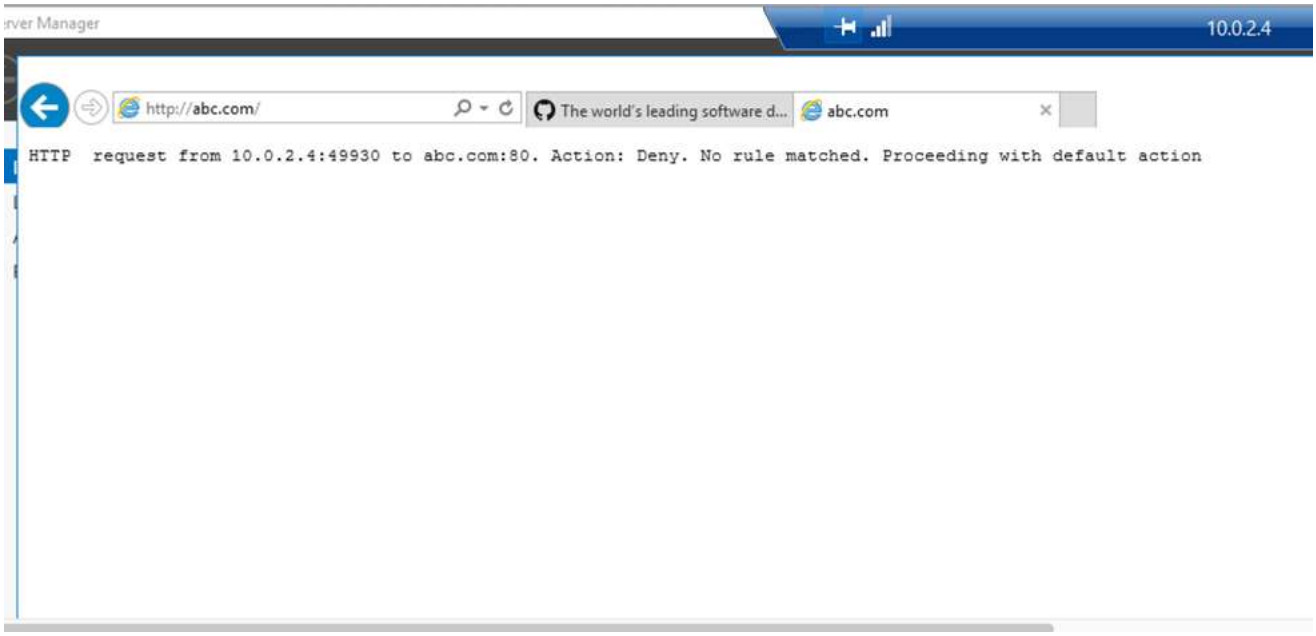



- [ ] 5. Upon completion restart the **Srv-Work** virtual machine by clicking **Restart** on the virtual machine overview page.

  You will now test the firewall

## Task 7: Testing

- [ ] 1. Note the private ip address of the Srv-Work VM on the **Overview** blade.
- [ ] 2. Click **Connect** then **RDP**. Download and open the RDP file, click **Connect** and login using:
  - Username: **localadmin**
  - Password: **Jb7bs02ehAtRoLsG**
- [ ] 3. From within **Srv-Jump** launch the remote desktop client by clicking the Windows start button, then search for and select **mstsc.exe**.
- [ ] 4. Enter the private ip address of **Srv-Work**, click **Connect** and login using the following credentials:
  - Username: **localadmin**
  - Password: **Jb7bs02ehAtRoLsG**
- [ ] 5. In the **Srv-Work** VM, start Internet Explorer and navigate to: **https://github.com**
- [ ] 6. This works (you will receive an error that GitHub no longer supports IE and several warnings - you can ignore all of them)
- [ ] 7. Now try another site: **http://abc.com**
- [ ] 8. This is blocked because no rule matched.




✓ **Results**: In this lab, you deployed a jump box and a simulated production server and then configured the Azure Firewall to only allow access to GitHub.com from the production server. You then tested by accessing the production server from a Jumpbox and connected to GitHub successfully and abc.com unsucessfully because it is blocked.