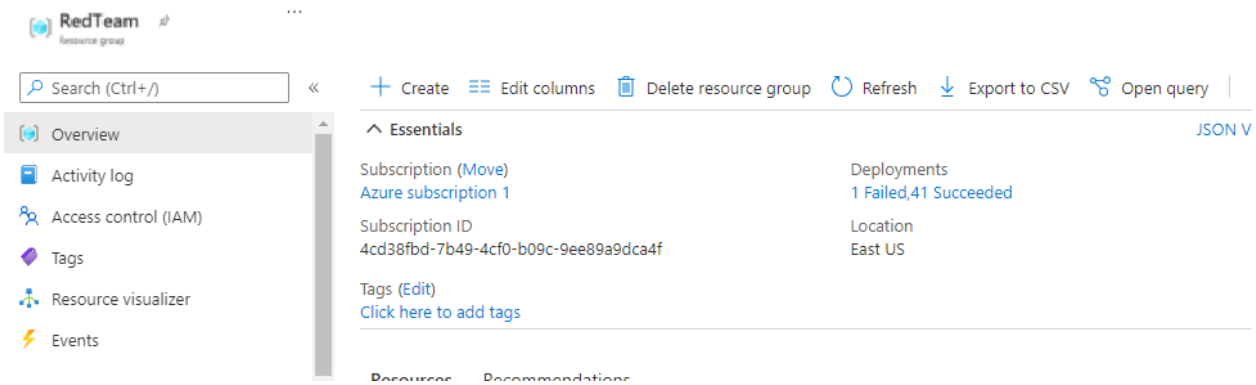
A description of deployment

1) Setting up the Cloud Environment

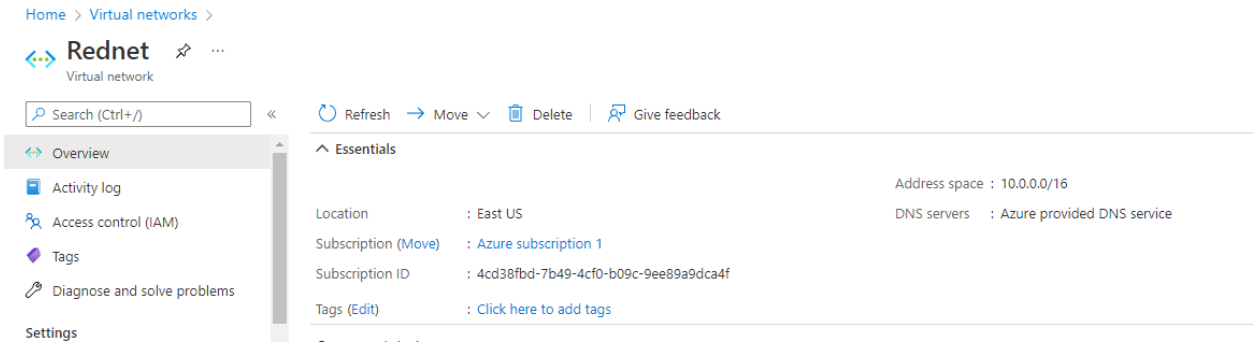
Create Resource Group

- Create a resource group and a region, I chose US East region:
    - Named as Resource Group RedTeam.



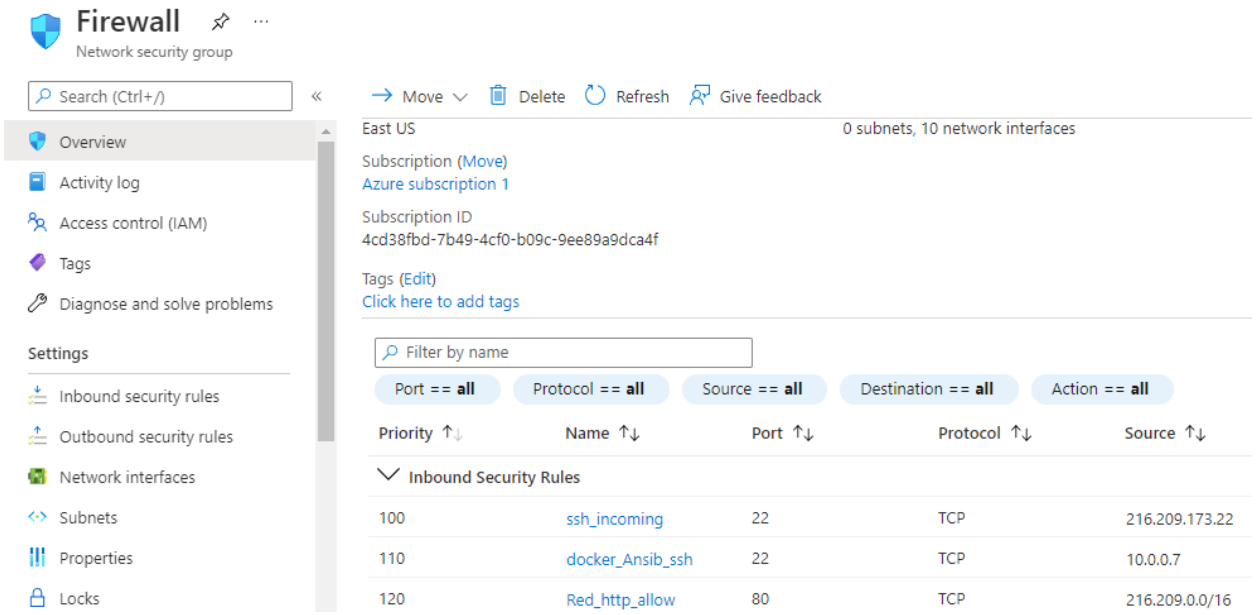
Create Vnet (Virtual Network)

- Create a new Virtual Network.
- Make sure to select the resource group we created previously as well as the same region:
    - Also, use the default IP and subnet settings.



Create a Network Security Group (NSG)

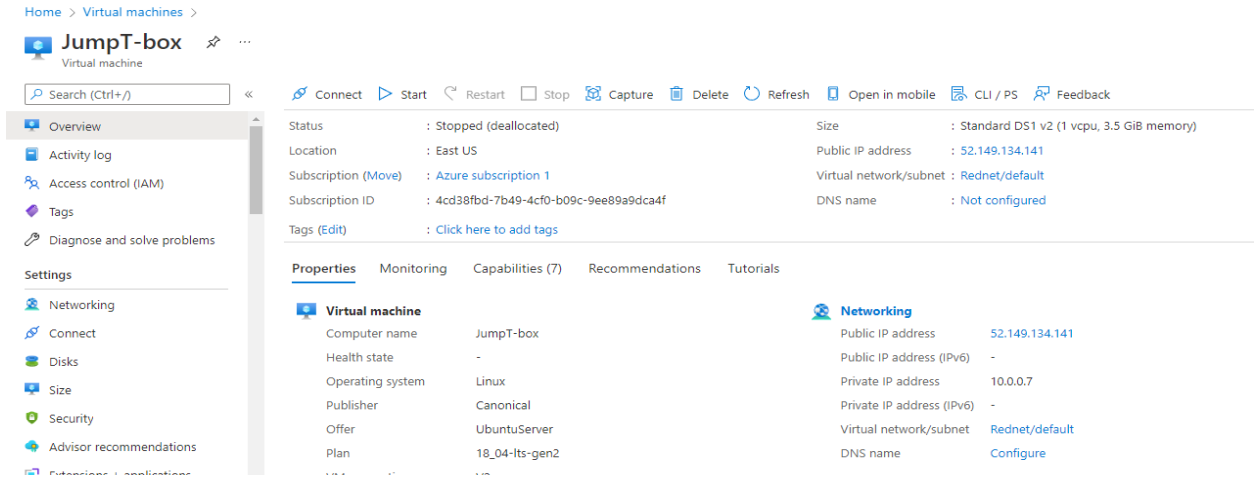
- Create a Network Security Group that is part of the Resource Group RedTeam.
- Named my NSG "Firewall".
- Make sure the NSG is in the same region as everything else we've created thus far.



2) Create the Virtual Machines

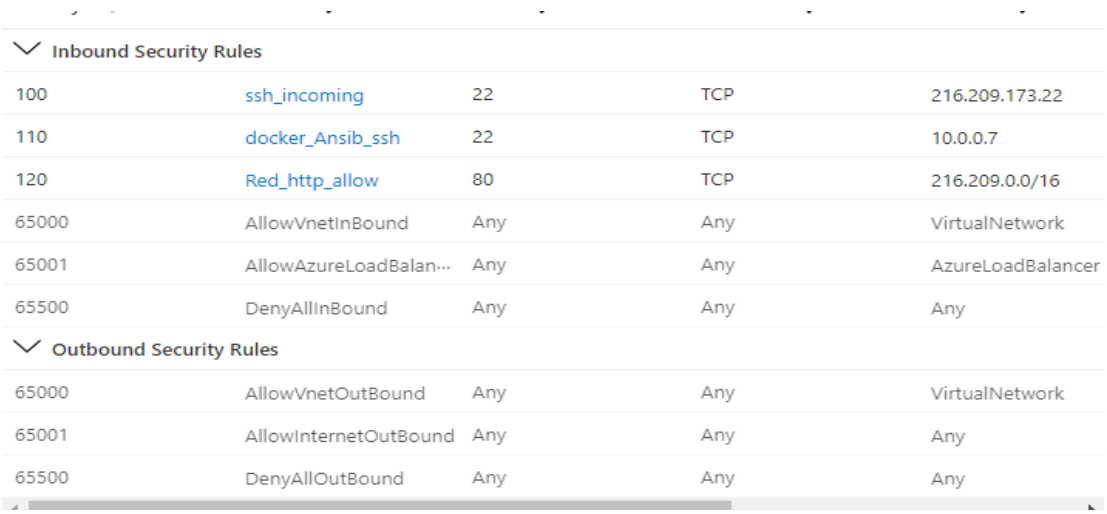
Create Jump Box VM

- Log in to Azure account.
- Click on the virtual machines box and then click new.
- Under the resource group, select the group RedTeam.
- Named the VM JumpT-Box.
- Use a Ubuntu server with at least 1GB of memory.
- Use a public SSH key from from local computer and give it a username
- Use "ssh-keygen" to create a public key that doesn't have one.
    - My username is sysadmin.



Network Security Group Rules

- This is an overview of all of the inbound and outbound rules for the Firewall NSG:



Set up Docker.io on the Jump Box VM

- SSH into your Jump-Box VM, turn on your machine on Azure before that:

  ```
  ssh sysadmin@[public IP]
  ```

- Once logged in, implement the following:
  - `sudo apt install docker.io`
  - `sudo docker pull cyberxsecurity/ansible`
  - Launch the ansible container: `docker run -ti cyberxsecurity/ansible:latest bash` to make sure it works
  - type `exit`

Config and Hosts File

- `cd` into the `/etc/ansible/` directory and `nano ansible.cfg` file
  - scroll to the remote_user section and update to include sysadmin instead of root. Save and exit.
- `nano /etc/ansible/hosts` file
  - Uncomment the [webservers] header
  - Under the header, add the internal IP address of the 3 VMs:
    - `10.0.0.11 ansible_python_interpreter=/usr/bin/python3`
    - `10.0.0.12 ansible_python_interpreter=/usr/bin/python3`
    - `10.0.0.13 ansible_python_interpreter=/usr/bin/python3`

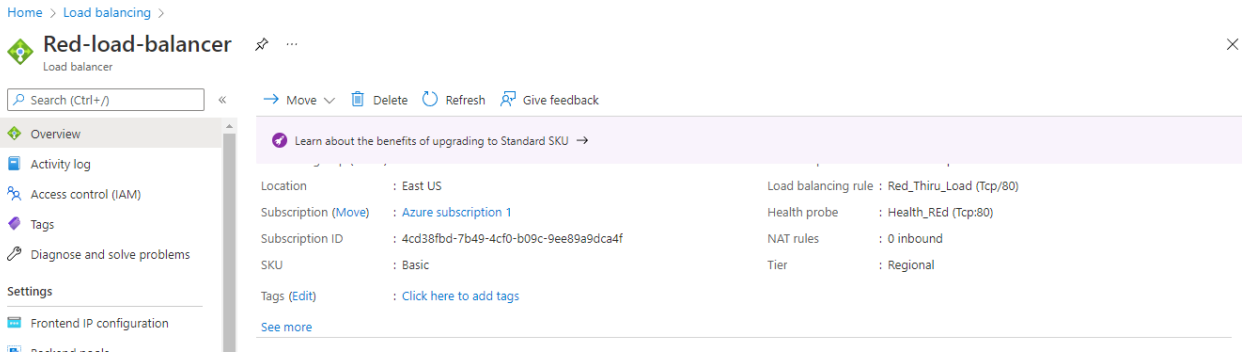
Create 3 Virtual Machines

- We will create 3 additional virtual machines that will be web servers.
- We will name them Web-1, Web-2, and Web-3.
- Follow this criteria:
  - Allow no public IP address.
  - Create new availability set, I called mine webset, set the 3 VMs to this.
  - Connect your VMs to the RedNet VNet and to the Firewall NSG.
- Use a public SSH key from the JumpT-Box VM docker container and give it a username .
  - Use "ssh-keygen" to create a public key if you don't have one.
  - username is sysadmin.
- To make sure it works:
  - SSH into the Jump Box VM
  - Start and attach your docker container: `sudo docker start “name of the container” && sudo docker attack “name of the container”`

- Once in the container, SSH into each VM to make sure they work:
  - `ssh sysadmin@10.0.0.12`
  - `ssh sysadmin@10.0.0.13`
  - `ssh sysadmin@10.0.0.14`

3) Load Balancer

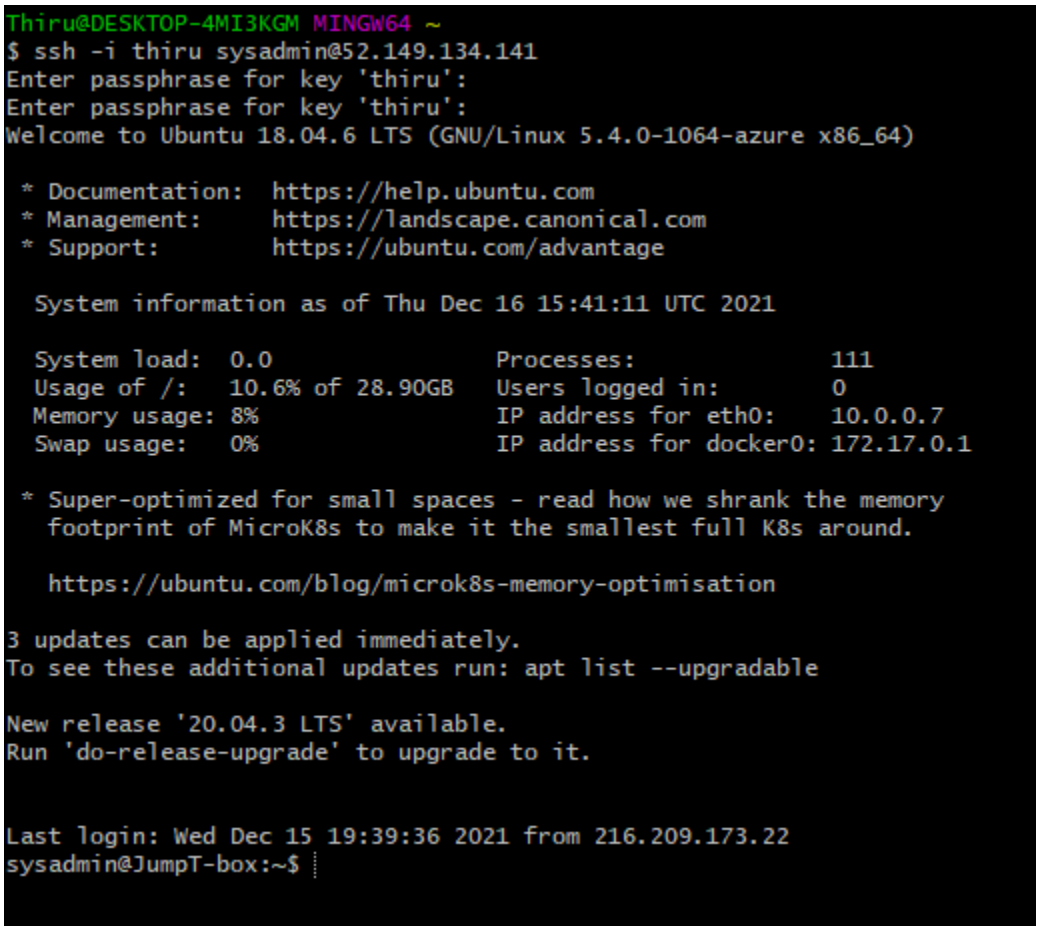
- Create a new Load Balancer in Azure.
- Select static IP address and select same Resource Group and region.
- Select create new public IP address.
- I named my Load Balancer: Red-Team-LB



- Create a new Backend Pool and add the 3 VMs to it.

4) Logging into Jump Box Provisioner

- Log in to Azure and turn on your Jump Box Provisioner virtual machine.
- Open your personal computer terminal



5) Starting Docker

- Check to see which containers you have:

```
sysadmin@JumpT-box:~$  sudo docker container list -a
CONTAINER ID   IMAGE                          COMMAND                  CREATED       STATUS                      PORTS     NAMES
f94e263ae442   cyberxsecurity/ansible         "/bin/sh -c /bin/bash"   11 days ago   Exited (137) 20 hours ago             festive_hofstadter
4603f1cf89b5   cyberxsecurity/ansible         "/bin/sh -c /bin/bash"   11 days ago   Exited (0) 11 days ago                confident_hopper
9238e469483f   cyberxsecurity/ansible         "/bin/sh -c /bin/bash"   11 days ago   Exited (0) 11 days ago                admiring_chatterjee
1659993e1552   cyberxsecurity/ansible         "/bin/sh -c /bin/bash"   11 days ago   Exited (2) 11 days ago                competent_chandrasekhar
13060f548160   cyberxsecurity/ansible         "/bin/sh -c /bin/bash"   11 days ago   Exited (130) 11 days ago              serene_boyd
430c77bef5f1   cyberxsecurity/ansible         "/bin/sh -c /bin/bash"   11 days ago   Exited (0) 11 days ago                wonderful_volhard
5ca0e65e0983   cyberxsecurity/ansible         "/bin/sh -c /bin/bash"   11 days ago   Exited (0) 11 days ago                jolly_jackson
93306b6561e5   cyberxsecurity/ansible         "/bin/sh -c /bin/bash"   11 days ago   Exited (137) 11 days ago              hungry_bohr
e532ddc1d0dc   cyberxsecurity/ubuntu:bionic   "bash"                   11 days ago   Exited (0) 11 days ago                goofy_bardeen
```

- my container is: festive_hofstadter
- To start your container, use the following commands:

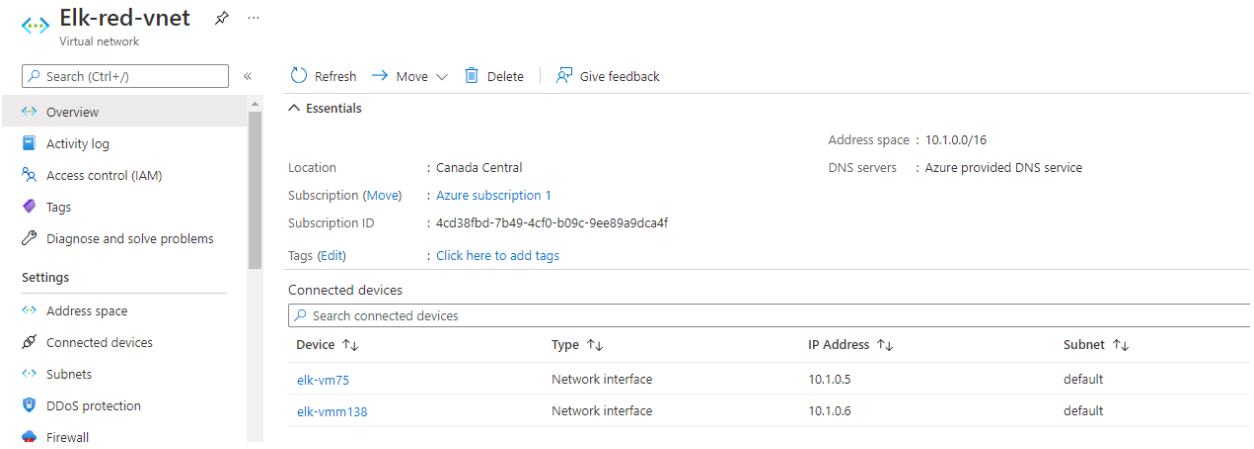
```
sysadmin@JumpT-box:~$ sudo docker attach festive_hofstadter
You cannot attach to a stopped container, start it first
sysadmin@JumpT-box:~$ sudo docker start festive_hofstadter
festive_hofstadter
sysadmin@JumpT-box:~$ sudo docker attach festive_hofstadter
```

- You can use the command: whoami to make sure you did it right.

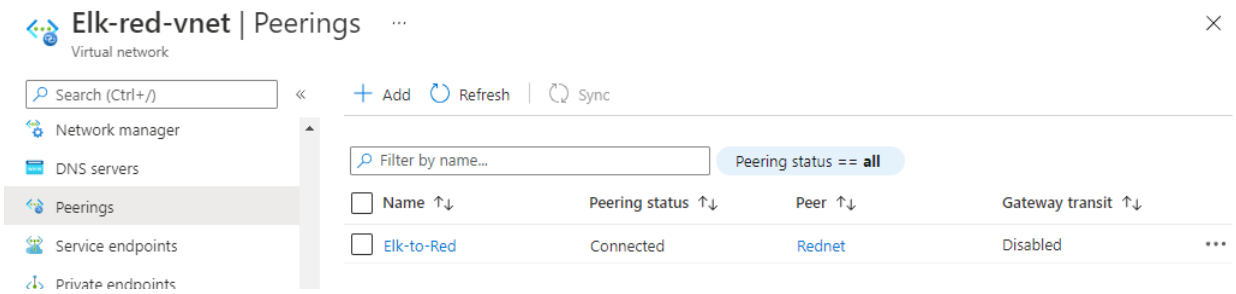
6) Install ELK Stack

Create a new VNet (Virtual Network)

- Create a new VNet that is in the same resource group (RedTeam) but in a different region.
- I created one and named it Canadacentral:

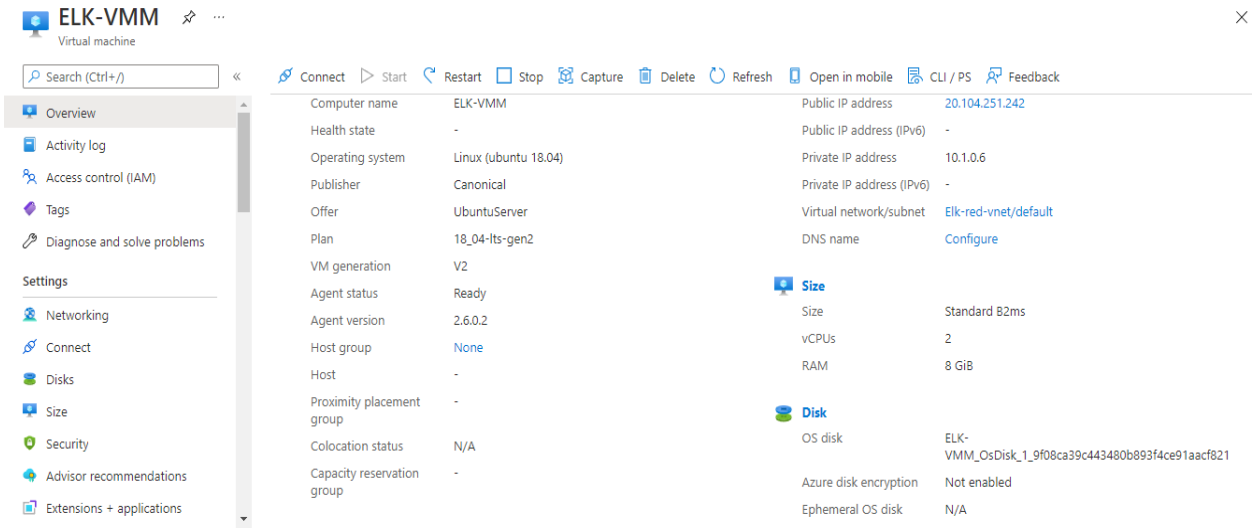


- Create a peer connection between the two VNets (RedNet and Elk-red-net)
- In my Elk-red-vnet page, I clicked on Peerings and added a new Peering with the following settings:
    - I created a new connection from EastNet to RedNet and called it: Elk-to-Red, connecting to my RedNet VNet.
    - I created another connection from RedNet to EastNet and called it: Red-to-Elk.



Create a new Virtual Machine

- Create a new Ubuntu VM with a 8GB minimum RAM size.
- The IP address will be public.
- The VNet will be Elk-red-vnet, and the resource group will be the one we have for the other VMs, which is RedTeam.
- I used the public key from the ansible container and my username as sysadmin.
- I named my VM: ELK.



- Once the VM is created, I ssh'd into the VM to make sure it works:

```
root@f94e263ae442:~# ssh -i thiruwx sysadmin@10.1.0.6
Welcome to Ubuntu 18.04.6 LTS (GNU/Linux 5.4.0-1064-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

  System information as of Thu Dec 16 15:57:32 UTC 2021

  System load:  0.0               Processes:             120
  Usage of /:   16.8% of 28.90GB  Users logged in:       0
  Memory usage: 34%               IP address for eth0:   10.1.0.6
  Swap usage:   0%                IP address for docker0: 172.17.0.1

 * Super-optimized for small spaces - read how we shrank the memory
   footprint of MicroK8s to make it the smallest full K8s around.

   https://ubuntu.com/blog/microk8s-memory-optimisation

3 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

New release '20.04.3 LTS' available.
Run 'do-release-upgrade' to upgrade to it.


Last login: Wed Dec 15 19:41:39 2021 from 10.0.0.7
sysadmin@ELK-VMM:~$
```

Download and Configure the Container

- We will add the new VM IP address to the hosts file in the ansible container
- Edited the hosts file and added the elk IP address under the [elk] group:

```
[webservers]
#alpha.example.org
#beta.example.org
#192.168.1.100
#192.168.1.110
10.0.0.12 ansible_python_interpreter=/usr/bin/python3
10.0.0.11 ansible_python_interpreter=/usr/bin/python3
10.0.0.13 ansible_python_interpreter=/usr/bin/python3

[elk]
10.1.0.6 ansible_python_interpreter=/usr/bin/python3
```

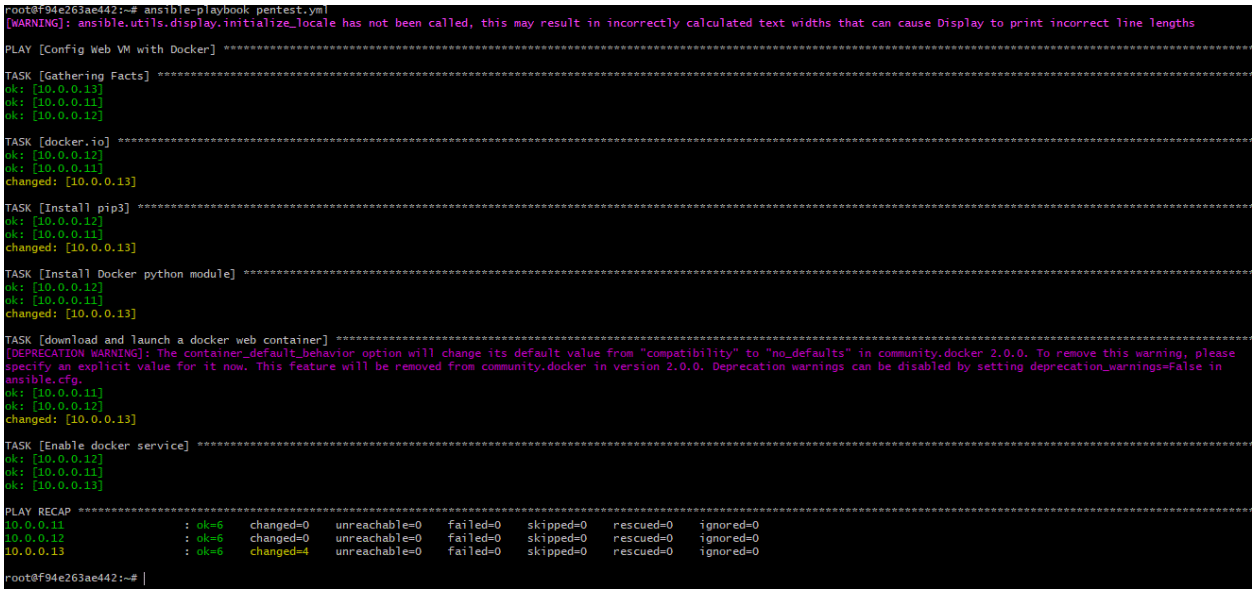
- Created a playbook that will configure the ELK server, named it "install-elk.yml":

```
---
- name: Configure Elk VM with Docker
  hosts: elk
  remote_user: sysadmin
  become: true
  tasks:

    # Use apt module
    - name: Install docker.io
      apt:
        update_cache: yes
        force_apt_get: yes
        name: docker.io
        state: present

      # Use apt module
    - name: Install python3-pip
      apt:
        force_apt_get: yes
        name: python3-pip
        state: present

      # Use pip module (It will default to pip3)
    - name: Install Docker module
      pip:
        name: docker
        state: present

      # Use command module
    - name: Increase virtual memory
      command: sysctl -w vm.max_map_count=262144

      # Use sysctl module
    - name: Use more memory
      sysctl:
        name: vm.max_map_count
        value: "262144"
        state: present
        reload: yes

      # Use docker_container module
    - name: download and launch a docker elk container
      docker_container:
        name: elk
        image: sebp/elk:761
        state: started
        restart_policy: always
```

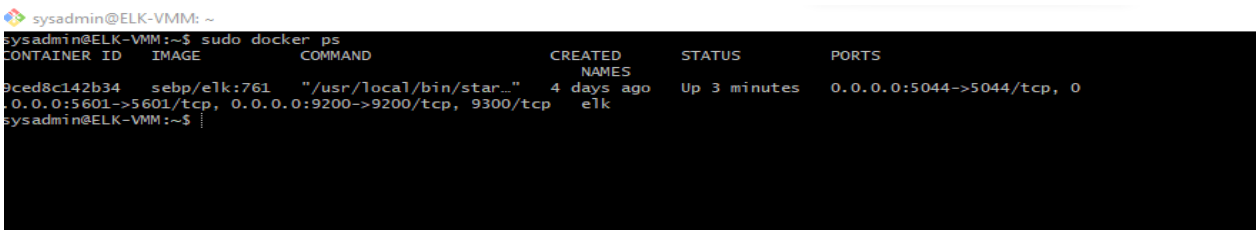
```
    # Please list the ports that ELK runs on
    published_ports:
      -  5601:5601
      -  9200:9200
      -  5044:5044

  # Use systemd module
- name: Enable service docker on boot
  systemd:
    name: docker
    enabled: yes
```

Launched and Exposed the Container

- Ran the yaml playbook, made sure it worked:

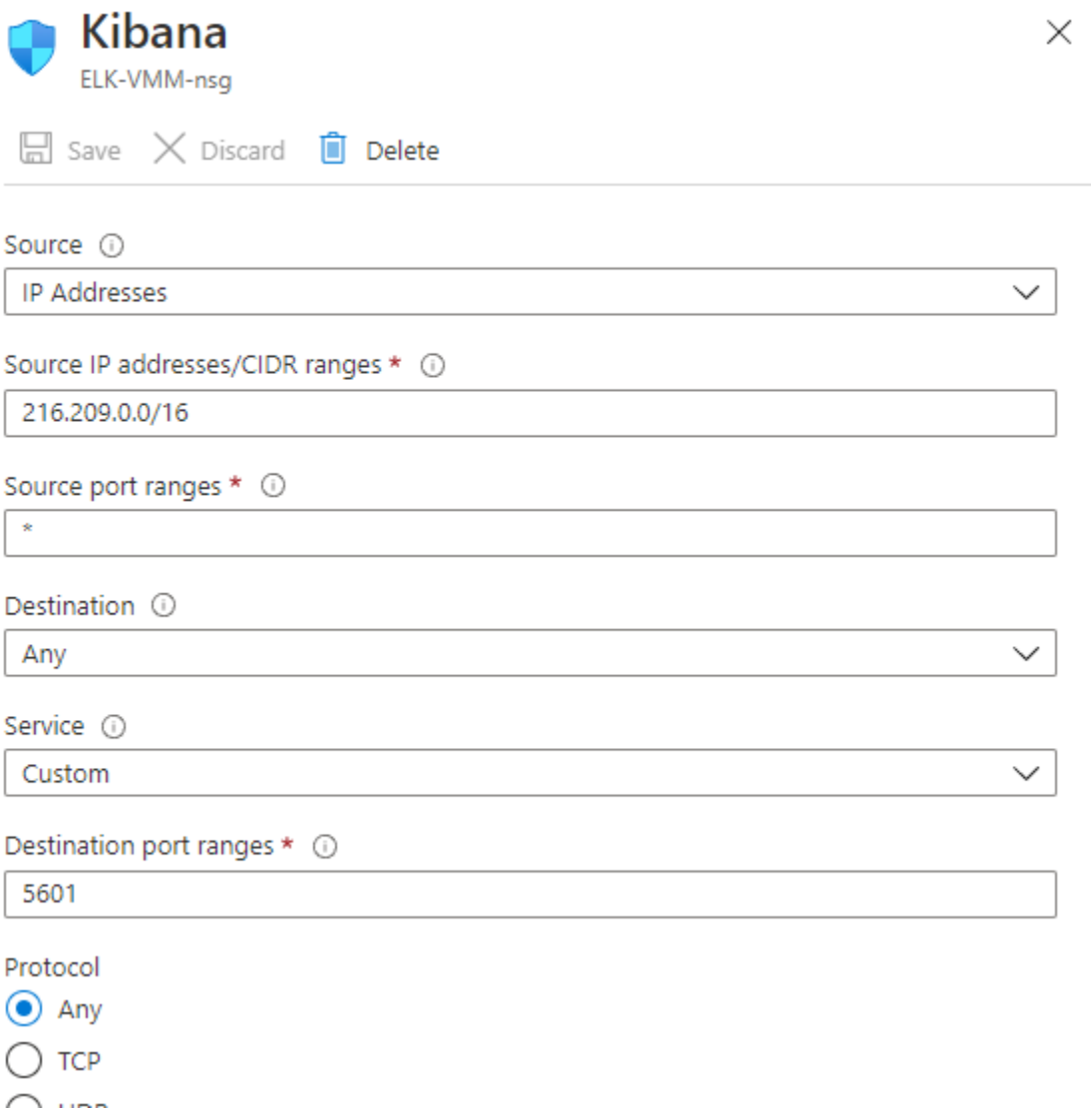


- As we can see from above, the container was successfully created, with the image "sebp/elk:761".

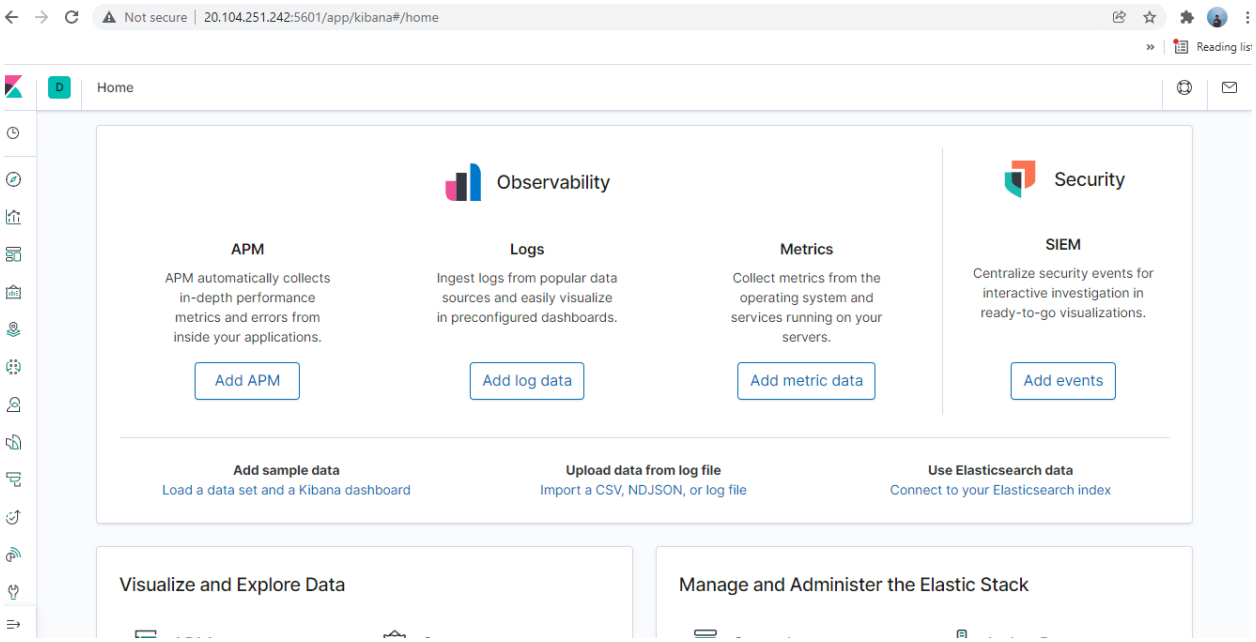


Identity and Access Management

- We are going to restrict access to the ELK-VMM through the ELK Network Security Group:
- Once in the NSG for ELK, we are going to add an inbound rule that will allow access from our computer to the ELK server on port 5601:



- Finally, we will verify that we can log into the server by accessing on our browser, [ELK-public-IP]:5601/app/kibana:
    - Note: the public IP will always change every time we restart it.



7) Install Filebeat

- We can use Filebeat to collect, parse, and visualize ELK logs in a single command. This will help us better track our organizational goals.

Install Filebeat on the container

- First, we will start the virtual machines (including the ELK server) on Azure.
- Then, we will access the kibana page and make sure it works.
- We will start the container within the jump box vm:

- I jumped back to the kibana page and found the DEB page for creating a system log and will use this guide to create our filebeat playbook.

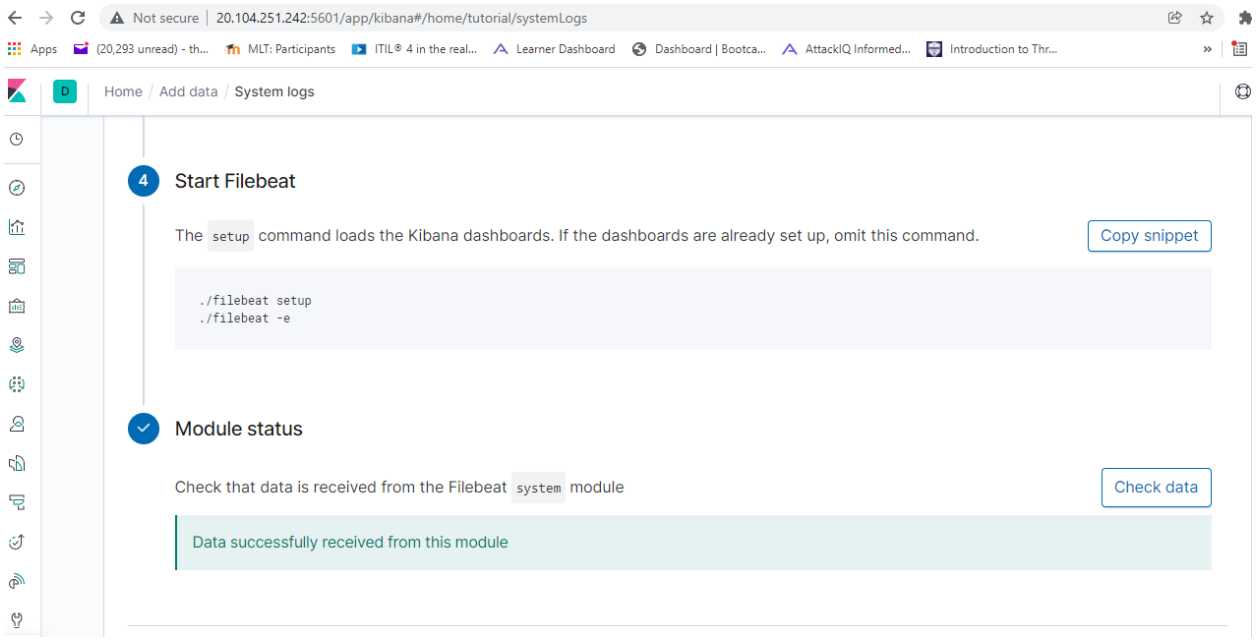
Create Filebeat configuration file

- Once the folder is created, I will download the filebeat-config.yml:
- I opened the filebeat-confi.yml file and added the ELK server private IP address in two areas:

```
output.elasticsearch:
  hosts: ["10.1.0.6:9200"]
  username: "elastic"
  password: "changeme"

setup.kibana:
  host: "10.1.0.6:5601"
```

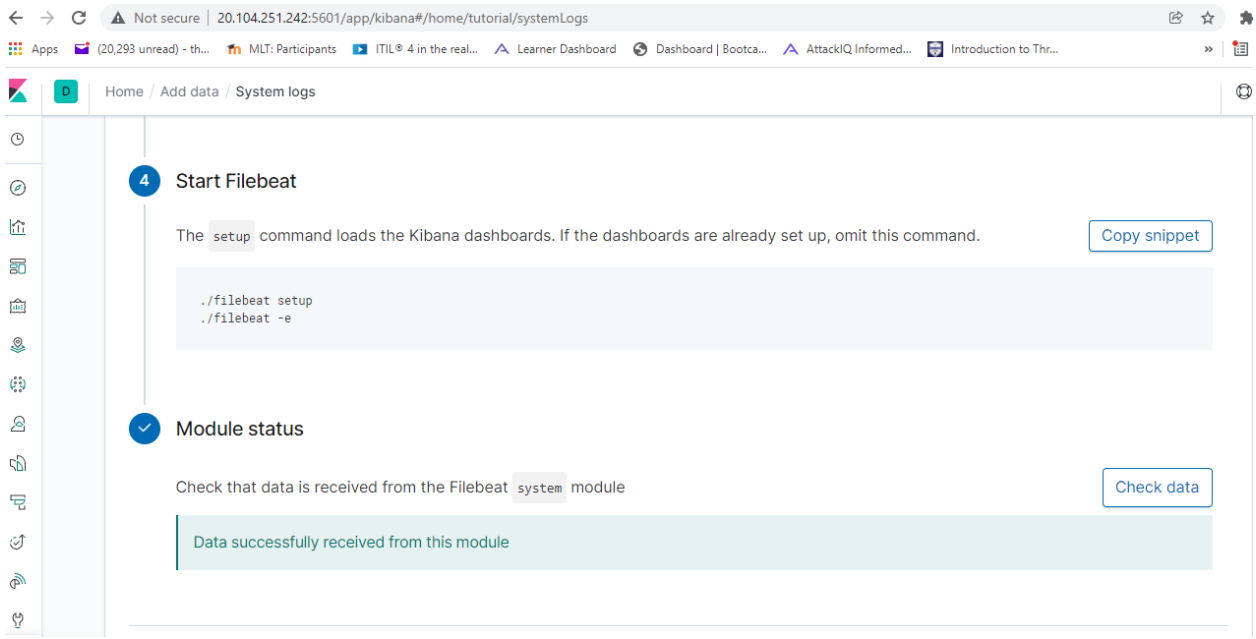
Create Filebeat Installation Playbook

- I created the filebeat-playbook.yml under /etc/ansible/files.
- Once created, using the DEB page, I added the needed commands:

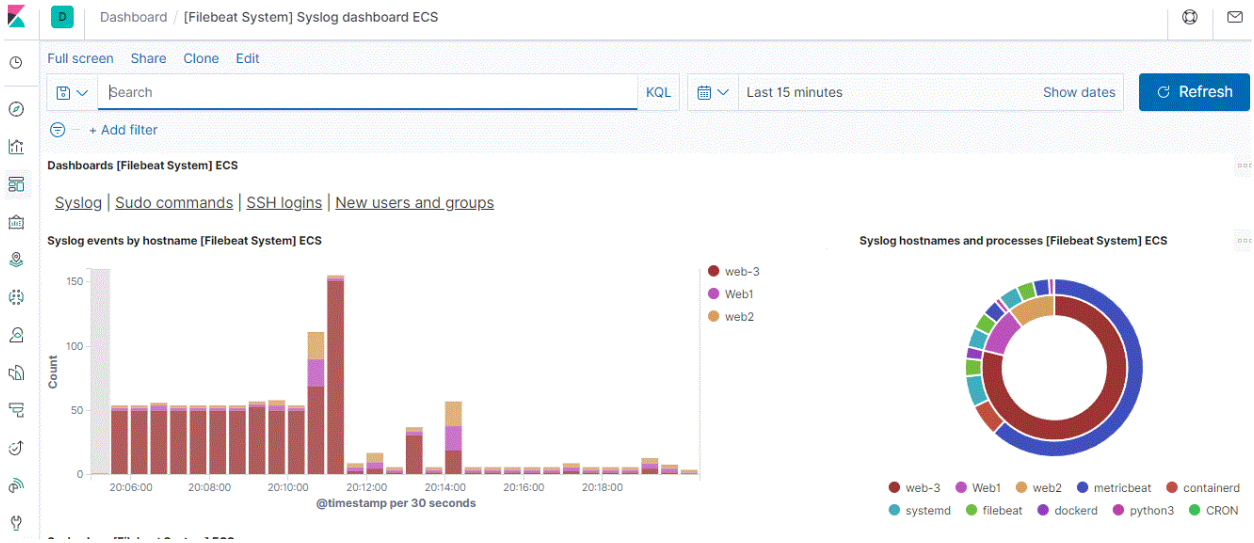


Verify Installation and Playbook

- Back on the kibana page, I will check the data on the instruction page:



- Finally, I checked the dashboard to make sure things are running:



Create a play to install Metricbeat

- Using the same steps for Filebeat, I created a config file for Metricbeat and added ELK's private IP in two areas:

```
output.elasticsearch:
  hosts: ["10.1.0.6:9200"]
  username: "elastic"
  password: "changeme"

setup.kibana:
  host: "10.1.0.6:5601"
```

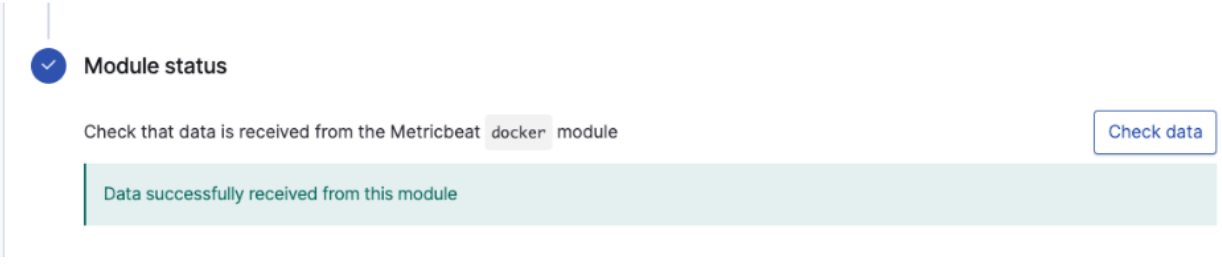
- Under the files folder, I will create the metricbeat-playbook.yml:

- Once both playbooks were created, I ran the metribeat-playbook.yml:

```
[WARNING]: ansible.utils.display.initialize_locale has not been called, this may result in incorrectly calculated text widths that can caus

PLAY [Install metric beat] ***************************************************************************************************************

TASK [Gathering Facts] *******************************************************************************************************************
ok: [10.0.0.13]
ok: [10.0.0.12]
ok: [10.0.0.11]

TASK [Download metricbeat] ***************************************************************************************************************
changed: [10.0.0.13]
changed: [10.0.0.12]
changed: [10.0.0.11]

TASK [install metricbeat] ****************************************************************************************************************
changed: [10.0.0.11]
changed: [10.0.0.13]
changed: [10.0.0.12]

TASK [drop in metricbeat config] *********************************************************************************************************
changed: [10.0.0.13]
changed: [10.0.0.11]
changed: [10.0.0.12]

TASK [enable and configure docker module for metric beat] ********************************************************************************
changed: [10.0.0.13]
changed: [10.0.0.12]
changed: [10.0.0.11]

TASK [setup metric beat] *****************************************************************************************************************
changed: [10.0.0.12]
changed: [10.0.0.13]
changed: [10.0.0.11]

TASK [start metric beat] *****************************************************************************************************************
changed: [10.0.0.13]
changed: [10.0.0.12]
changed: [10.0.0.11]

TASK [enable service metricbeat on boot] *************************************************************************************************
changed: [10.0.0.13]
changed: [10.0.0.12]
changed: [10.0.0.11]

PLAY RECAP *******************************************************************************************************************************
10.0.0.11                  : ok=8    changed=7    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
10.0.0.12                  : ok=8    changed=7    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
10.0.0.13                  : ok=8    changed=7    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

T

- Now that the playbook ran successfully, I will check the data on the kibana page:



- Finally, we will check the dashboard, to make sure it works: