

# Lab Manual- Setup and Manage Ansible for Azure DevOps

**Prepared for:** TechPledge

**Date:** 18<sup>th</sup> Nov 2018

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Document Name: Lab Manual

**Document Number** DevOpsLab308

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## **1** OBJECTIVE

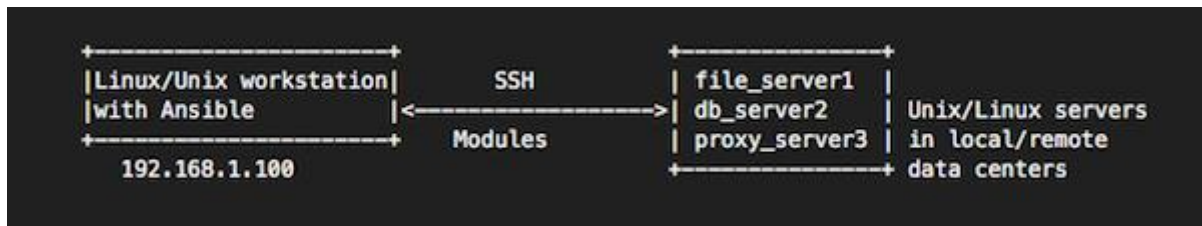
Ansible is a powerful configuration management solution written in python. There are many configuration management solutions available, all with pros and cons, ansible stands apart from many of them for its simplicity. What makes ansible different than many of the most popular configuration management systems is that its agent-less, no need to setup agents on every node you want to control. Deploying your software. In This Lab will cover the basics of using Ansible with Azure Cloud Shell.

- Active Azure Cloud Cell
- Create Ansible Playbook

- Run Ansible Playbook

## 2 PRE-REQUISISTE

- Prior knowledge of Linux
- Accounts in Azure



## 3 How Ansible Works

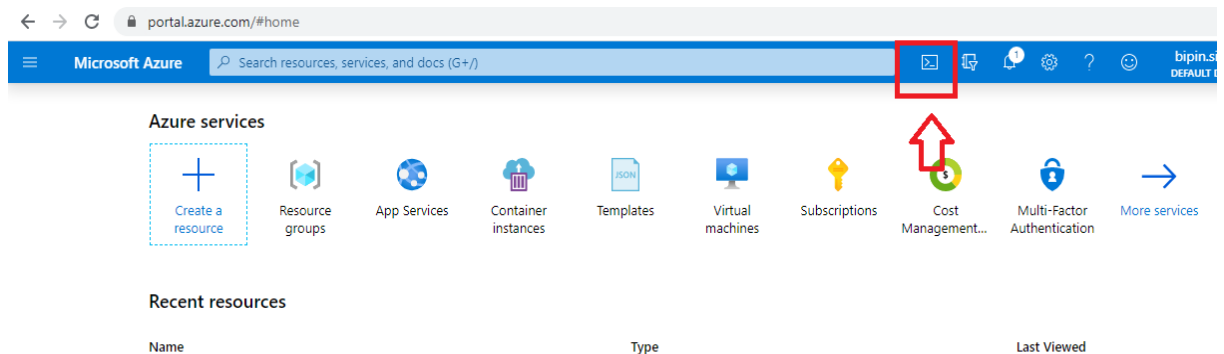
- There are many similar automation tools available like **Puppet, Capistrano, Chef, Salt, Space Walk** etc, but Ansible categorize into two types of server: **controlling machines** and **nodes**.
- The controlling machine, where Ansible is installed and Nodes are managed by this controlling machine over **SSH**. The location of nodes are specified by controlling machine through its **inventory**.
- The controlling machine (Ansible) deploys modules to nodes using SSH protocol and these modules are stored temporarily on remote nodes and communicate with the Ansible machine through a **JSON** connection over the standard output.
- Ansible is agent-less, that means no need of any agent installation on remote nodes, so it means there are no any background daemons or programs are executing for Ansible, when it's not managing any nodes.
- Ansible can handle **100's** of nodes from a single system over **SSH connection** and the entire operation can be handled and executed by one single command 'ansible'. But, in some cases, where you required to execute multiple commands for a deployment, here we can build playbooks.
- **Playbooks** are bunch of commands which can perform multiple tasks and each **playbooks** are in **YAML** file format.

## 4 Setup Up Ansible with Azure Cloud Shell

Cloud Shell is essentially a **browser based CLI** that you run from directly within the Azure portal.

## 4.1 Enable Cloud Shell

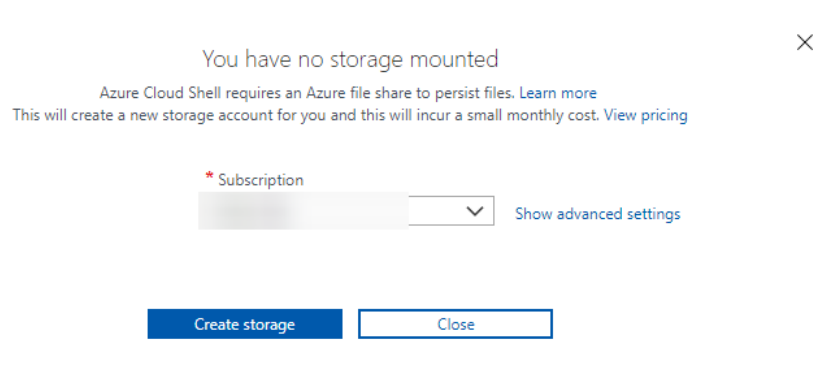
- Click the >\_ icon, located at the top right of the Azure portal.



- The browser will display a new frame at the bottom of the window.



- Click **Bash Shell**
- When you sign in using Cloud Shell for the first time you will have to create a storage account



- Click Show Advance Storage and defined all parameters, the regions you should choose **“EastUS”** and Create **Resource group**, **Storage Account** and **Fileshare** and Click **Create Storage**.

You have no storage mounted

\* Subscription: Access to Azure Active Directory

\* Cloud Shell region: East US

\* Resource group: mycloudshell-thomasmaurer-rg

\* Storage account: thomasmaurercloudshell01

\* File share: cloudshell01

Buttons: Create storage, Close

- Now You will see the prompt.

```
Bash
Requesting a Cloud Shell.Succeeded.
Connecting terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI 2.0
Type "help" to learn about Cloud Shell

thomas@Azure:~$
```

## 4.2 Create Ansible Playbook

### 4.2.1 Create Azure Resource Group

**Step1:** Create an YAML playbook

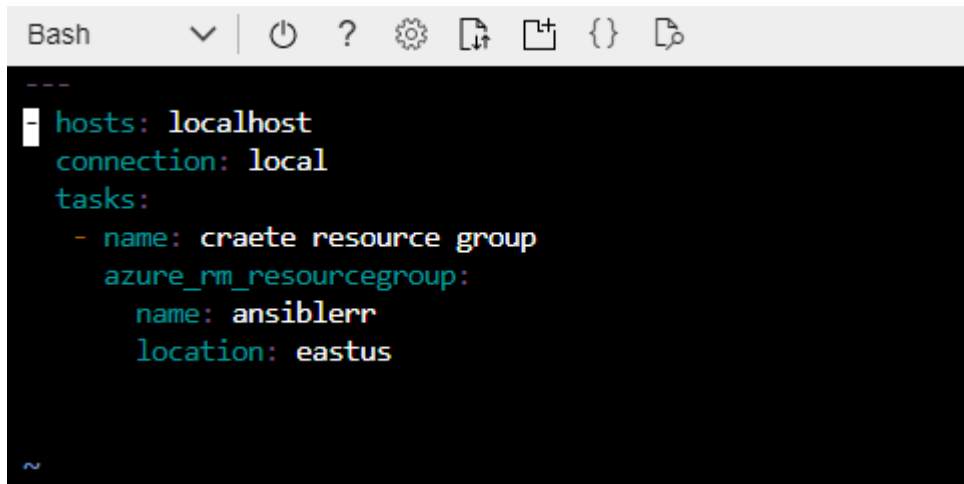
**\$ vi test.yaml**

```
bipeen@Azure:~$ vi test.yaml
```

**Step2 :** Write YAML code as below:

```
---
- hosts: localhost
```

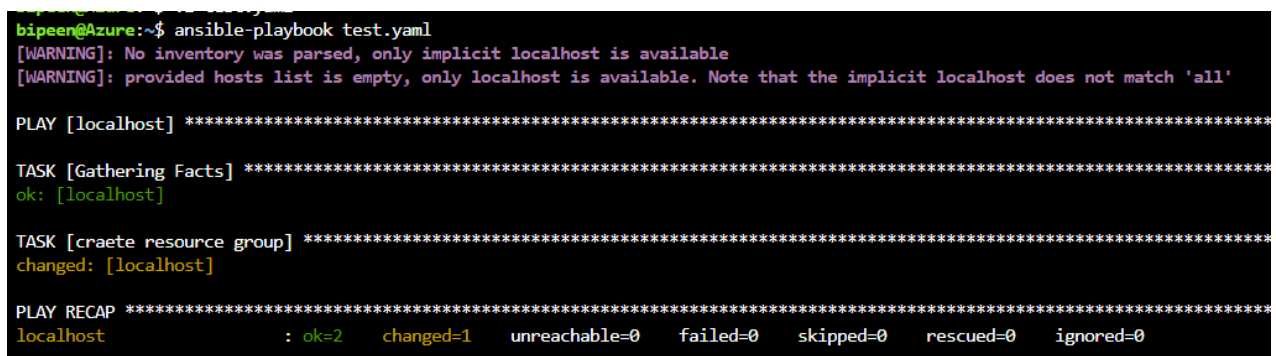
```
connection: local
tasks:
  - name: craete resource group
    azure_rm_resourcegroup:
      name: ansiblerr
      location: eastus
```

A screenshot of a terminal window with a dark background. The title bar shows 'Bash' and several icons. The terminal displays the same Ansible playbook content as the previous block, with syntax highlighting: 'hosts: localhost', 'connection: local', 'tasks:', '- name: craete resource group', 'azure\_rm\_resourcegroup:', 'name: ansiblerr', and 'location: eastus'. A cursor is visible at the bottom left.

**Step 3:** Type **CTRL+[** and type **shift+␣** and the **wq**

**Step 4 :** Type Below comkamnd to run the playbook

**\$ ansible-playbook test.yaml**

A screenshot of a terminal window showing the output of the command 'ansible-playbook test.yaml'. The output includes warnings about inventory and hosts, followed by the execution of the playbook on localhost. It shows the 'Gathering Facts' task as successful and the 'craete resource group' task as changed. A final 'PLAY RECAP' line shows 2 OK, 1 changed, and 0 failed, skipped, rescued, or ignored.

**Step 5:** Check the Azure Portal you will see the Resource group **ansiblerr** has been created

Microsoft Azure

Search resources, services, and docs (G+)

Home > Resource groups

Resource groups  
Default Directory (bipeensinh@hotmail.onmicrosoft.com)

+ Add Manage view Refresh Export to CSV Assign tags Feedback

ansiblerr Subscription == all Location == all Add filter

Showing 1 to 1 of 1 records.

Name ↑↓	Subscription ↑↓	Location ↑↓
ansiblerr	Microsoft Partner Network	East US

#### 4.2.2 Create Virtual Network

**Step1:** Create an YAML playbook

**\$ vi test1.yaml**

```
bipeen@Azure:~$ vi test1.yaml
```

**Step2 :** Write YAML code as below:

---

```
- hosts: localhost
  connection: local
  tasks:
    - name: Create Virtual Network
      azure_rm_virtualnetwork:
        resource_group: ansiblerr
        name: ansiblevnet
        address_prefixes: "10.0.0.0/16"
    - name: Add Subnet in Vnet
      azure_rm_subnet:
        name: techpledgesub
        resource_group: ansiblerr
        address_prefix: "10.0.1.0/24"
```

## virtual\_network: ansiblevnet

```
Bash
---
- hosts: localhost
  connection: local
  tasks:
    - name: Create Virtual Network
      azure_rm_virtualnetwork:
        resource_group: ansiblerr
        name: ansiblevnet
        address_prefixes: "10.0.0.0/16"
    - name: Add Subnet in Vnet
      azure_rm_subnet:
        name: techpledgesub
        resource_group: ansiblerr
        address_prefix: "10.0.1.0/24"
        virtual_network: ansiblevnet
```

**Step 3:** Type **CTRL+[** and type **shift+;** and the **wq**

**Step 4 :** Type Below command to run the playbook

**\$ ansible-playbook test1.yaml**

```
bipeen@Azure:~$ ansible-playbook test1.yaml
[WARNING]: No inventory was parsed, only implicit localhost is available
[WARNING]: provided hosts list is empty, only localhost is available. Note that the implicit localhost does not match 'all'

PLAY [localhost] *****

TASK [Gathering Facts] *****
ok: [localhost]

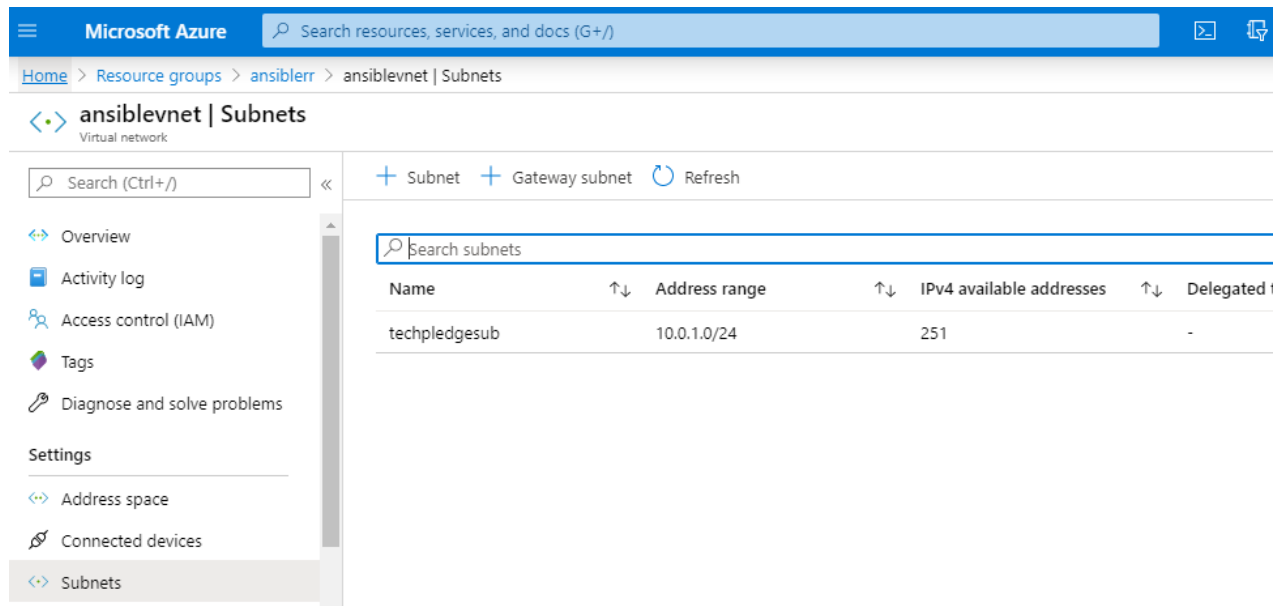
TASK [Create Virtual Network] *****
ok: [localhost]

TASK [Add Subnet in Vnet] *****
changed: [localhost]

PLAY RECAP *****
localhost                : ok=3    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

**Step 5:** Check the Azure Portal you will see the Resource group **ansiblerr** and notice the Virtual Network **ansiblevnet** and Subnet **techpledgesub** has been created.





### 4.2.3 Create Resource Group , Virtual Network and Linux Virtual Machine

**Step1:** First Generate the SSH key to be used for Linux

**\$ ssh-keygen -m PEM -t rsa -b 4096**

```
bipeen@Azure:~$ ssh-keygen -m PEM -t rsa -b 4096
Generating public/private rsa key pair.
Enter file in which to save the key (/home/bipeen/.ssh/id_rsa):
Created directory '/home/bipeen/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/bipeen/.ssh/id_rsa.
Your public key has been saved in /home/bipeen/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:Q4tMzn/17JJTazSgyI/ivmSBPjWRH8CmF7X1ZDK0Hz0 bipeen@cc-110789f5-578b5d78b8-q4qj5
The key's randomart image is:
+----[RSA 4096]-----+
|  ..o= + |
|  +o X  |
|  o+.= o E |
|  .*.= + ... |
|  ..O.S.... |
|  . . +o... o+ |
|  o o .o. +oo |
|  +. ... +.o |
|  o+o      +. |
+-----[SHA256]-----+
```

**Step2:** Now view the key using cat command

\$ cat ~/.ssh/id\_rsa.pub

```
bipeen@Azure:~$ cat ~/.ssh/id_rsa.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQDDaUGp6z0Jc3vUlygcCbnkTXIoIC8e0kq5QQPe6kJicPHiPRLg3z
apjbgEVu7C1Q8XX2mI11jpwBNbNkiHkJ0l011XgjH6JDMSh+UijzpwTxqbREr4Ux934tiXB/EausLOY71GiEYHcOyp
i6MtngE4p4BA0NN0wi0zd4wIA1RxJQfkBkG1ML1hNybdAUkc5nm0HSOQuXU9lmeNH9euBBANWsl558iAa4UxMS1I
lyPTJCn3S9G0hOM/pxjqoGb6Wb1zaGiXDwfXemjY/5DmEJhS81MEbhGT4Aj7iCM/tjtPd7N50SU12lxUYuIuoM6Ck
PYs+esdD0K75BVhuHB4E8wAVW6BAcuUaP+e18pdfK+I3eer3lQ== bipeen@cc-110789f5-578b5d78b8-q4qj5
bipeen@Azure:~$
```

**Step3:** Now copy the key and paste it in notepad and without **word wrap**



Untitled - Notepad  
File Edit Format View Help  
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQDDaUGp6z0Jc3vUlygcCbnkTXIoIC8e0kq5QQPe6kJicPHiPRLg3z

**Step4:** Create an YAML playbook

\$ vi test2.yaml

**Step5:** Write below code , please replace the **key\_data:** from your own key (**copy and paste from notepad**)

\$ vi test2.yaml

- name: Create Azure VM  
hosts: localhost  
connection: local  
tasks:
  - name: Create resource group  
azure\_rm\_resourcegroup:  
name: myResourceGroup  
location: eastus
  - name: Create virtual network  
azure\_rm\_virtualnetwork:  
resource\_group: myResourceGroup  
name: myVnet  
address\_prefixes: "10.0.0.0/16"
  - name: Add subnet  
azure\_rm\_subnet:

```
    resource_group: myResourceGroup
    name: mySubnet
    address_prefix: "10.0.1.0/24"
    virtual_network: myVnet
- name: Create public IP address
  azure_rm_publicipaddress:
    resource_group: myResourceGroup
    allocation_method: Static
    name: myPublicIP
    register: output_ip_address
- name: Dump public IP for VM which will be
created
  debug:
    msg: "The public IP is {{
output_ip_address.state.ip_address }}"
- name: Create Network Security Group that
allows SSH
  azure_rm_securitygroup:
    resource_group: myResourceGroup
    name: myNetworkSecurityGroup
    rules:
      - name: SSH
        protocol: Tcp
        destination_port_range: 22
        access: Allow
        priority: 1001
        direction: Inbound
- name: Create virtual network interface card
  azure_rm_networkinterface:
    resource_group: myResourceGroup
    name: myNIC
    virtual_network: myVnet
    subnet: mySubnet
    public_ip_name: myPublicIP
    security_group: myNetworkSecurityGroup
- name: Create VM
  azure_rm_virtualmachine:
    resource_group: myResourceGroup
    name: myVM
    vm_size: Standard_DS1_v2
    admin_username: azureuser
```

```
ssh_password_enabled: false
ssh_public_keys:
  - path:
/home/azureuser/.ssh/authorized_keys
    key_data: ssh-rsa
AAAAB3NzaC1yc2EAAAADAQABAAQDDaUGp6z0Jc3vUlygcCbnkTXIoIC8e0kq5QQPe6kJicPHiPR
Lg3zJ8zijt32PRqpPoST+ljl3CZl1TKX/cgX00x7QZvy/C7Sxv9vMdLnNZ/xnzYwy0U5xxzFw6Uxp8
HvUzapjbgEVu7ClQ8XX2mI11jpwBNbnKihKJ0lo1lXgjh6JDMSH+UijzpwTxqbREr4Ux934tiXB/Ea
usLOY71GiEYHcOypLV6WX6pj9Bjuj+oSSkOKv7RxiIIViyX/Gw5ZZA1WjAp2uustX6h1HtzjywfNVC
rId1MDB8isId0ztui6MtngET4p4BA0NN0wiozd4wIA1rxJQfkBkg1ML1hNybdAUkc5nm0HSOQuXU9l
meNH9euBBANws1t558iAa4UxMS1ljkl8dRidkoIYnSckuawbjiRi/XP/TKk7ujR6p0wZ1ON+7PDKwN
f5ouukDuvmg7KYgZ+bAmtOCdQ0XslyPTJCn3S9GohOM/pxjqoGb6Wb1zaGiXDwfXemjY/5DmEJhs81
MEbGT4Aj7iCM/tjtPd7N5OSU12lxUYuIuom6ckXQJ9Mh807NE4lwEnsDP13R0ZeE46LgRFVJnpP+w
4q58IfmOfRDmyVLPwLyBp1K/hstYLVG6ZDmg0jzPYs+esdd0K7SBVhuHB4E8wAVW6BACuUaP+e18p
dfk+I3eer3lQ== bipeen@cc-110789f5-578b5d78b8-q4qj5
network_interfaces: myNIC
image:
  offer: CentOS
  publisher: OpenLogic
  sku: '7.5'
  version: latest
```

```

rules:
  - name: SSH
    protocol: Tcp
    destination_port_range: 22
    access: Allow
    priority: 1001
    direction: Inbound
  - name: Create virtual network interface card
    azure_rm_networkinterface:
      resource_group: myResourceGroup
      name: myNIC
      virtual_network: myVnet
      subnet: mySubnet
      public_ip_name: myPublicIP
      security_group: myNetworkSecurityGroup
  - name: Create VM
    azure_rm_virtualmachine:
      resource_group: myResourceGroup
      name: myVM
      vm_size: Standard_DS1_v2
      admin_username: azureuser
      ssh_password_enabled: false
      ssh_public_keys:
        - path: /home/azureuser/.ssh/authorized_keys
          key_data: ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQCAQDDaUGp6z0Jc3vUlygcCbnkTXIoIC8e0kq5QQPe6kJicPHiPRLg3z
YWy0U5xXzFw6Uxp8HvUzapjbgEVu7ClQ8XX2mI11jpwBNbNkihKJ0l0lIXgjH6JDMSh+UiJzpwTxqbREr4Ux934tiXB/EausLOY71GiEYHcOyp
fnVCrId1MDB8isId0ztui6MtngE4p4BA0NN0wi0zd4wIAIRxJQfKbKGLML1hNybdaUkc5nm0HSQQuXU9lmeNH9euBBANws1t558iAa4UxMS1l
Vmg7KYgZ+bAmtOCdQ0XslyPTJCN3S9G0hOM/pxjqoGb6Wb1zaGiXDwfXemjY/5DmEJhS81MEbhGT4Aj7iCM/tjtPd7N5OSU12lxUYuIuoM6CkX
  - name: Create Azure VM
    hosts: localhost
    connection: local
    tasks:
      - name: Create resource group
        azure_rm_resourcegroup:
          name: myResourceGroup
          location: eastus
      - name: Create virtual network
        azure_rm_virtualnetwork:
          resource_group: myResourceGroup
          name: myVnet
          address_prefixes: "10.0.0.0/16"
      - name: Add subnet
        azure_rm_subnet:
          resource_group: myResourceGroup
          name: mySubnet
          address_prefix: "10.0.1.0/24"
          virtual_network: myVnet
      - name: Create public IP address
        azure_rm_publicipaddress:
          resource_group: myResourceGroup
          allocation_method: Static
          name: myPublicIP
          register: output_ip_address
      - name: Dump public IP for VM which will be created
        debug:
          msg: "The public IP is {{ output_ip_address.state.ip_address }}."
      - name: Create Network Security Group that allows SSH

```

```
network_interfaces: myNIC
image:
  offer: CentOS
  publisher: OpenLogic
  sku: '7.5'
  version: latest
SERT --
```

**Step 6:** Type **CTRL+[** and type **shift+;** and the **wq**

**Step 7 :** Type Below command to run the playbook

**\$ ansible-playbook test2.yaml**

```
TASK [Create virtual network interface card] *****
[DEPRECATION WARNING]: Setting ip_configuration flatten is deprecated and will be removed. Using ip_configurations list to
will be removed in version 2.9. Deprecation warnings can be disabled by setting deprecation_warnings=False in ansible.cfg.
ok: [localhost]

TASK [Create VM] *****
[WARNING]: Module did not set no_log for ssh_password_enabled
changed: [localhost]

PLAY RECAP *****
localhost                : ok=9    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

bipeen@Azure:~$ ansible-playbook test2.yaml
[WARNING]: No inventory was parsed, only implicit localhost is available
[WARNING]: provided hosts list is empty, only localhost is available. Note that the implicit localhost does not match 'all'

PLAY [Create Azure VM] *****

TASK [Gathering Facts] *****
ok: [localhost]

TASK [Create resource group] *****
ok: [localhost]

TASK [Create virtual network] *****
ok: [localhost]

TASK [Add subnet] *****
ok: [localhost]

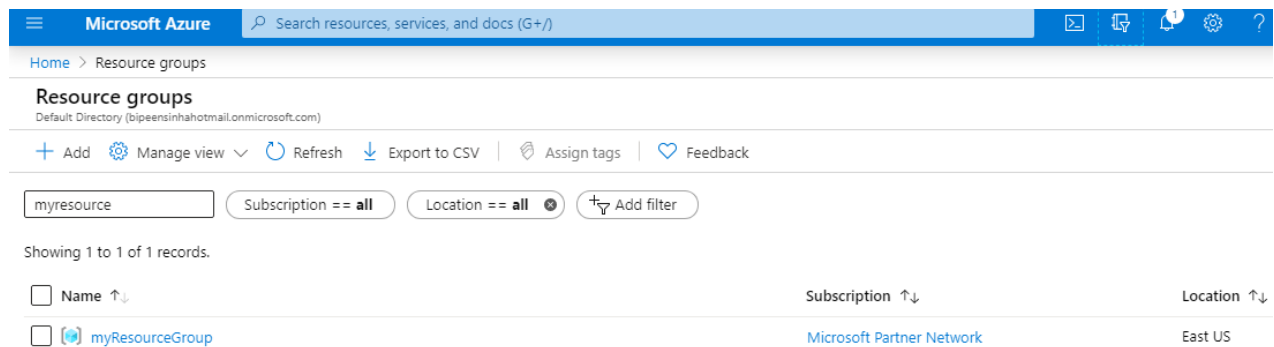
TASK [Create public IP address] *****
ok: [localhost]

TASK [Dump public IP for VM which will be created] *****
ok: [localhost] => {
  "msg": "The public IP is 52.226.68.231."
}

TASK [Create Network Security Group that allows SSH] *****
ok: [localhost]

TASK [Create virtual network interface card] *****
```

**Step 5:** Check the Azure Portal you will see the Resource group **myresourcegroup** and Virtual Machine , Storage in that resource group.



Microsoft Azure Search resources, services, and docs (G+)

Home > Resource groups

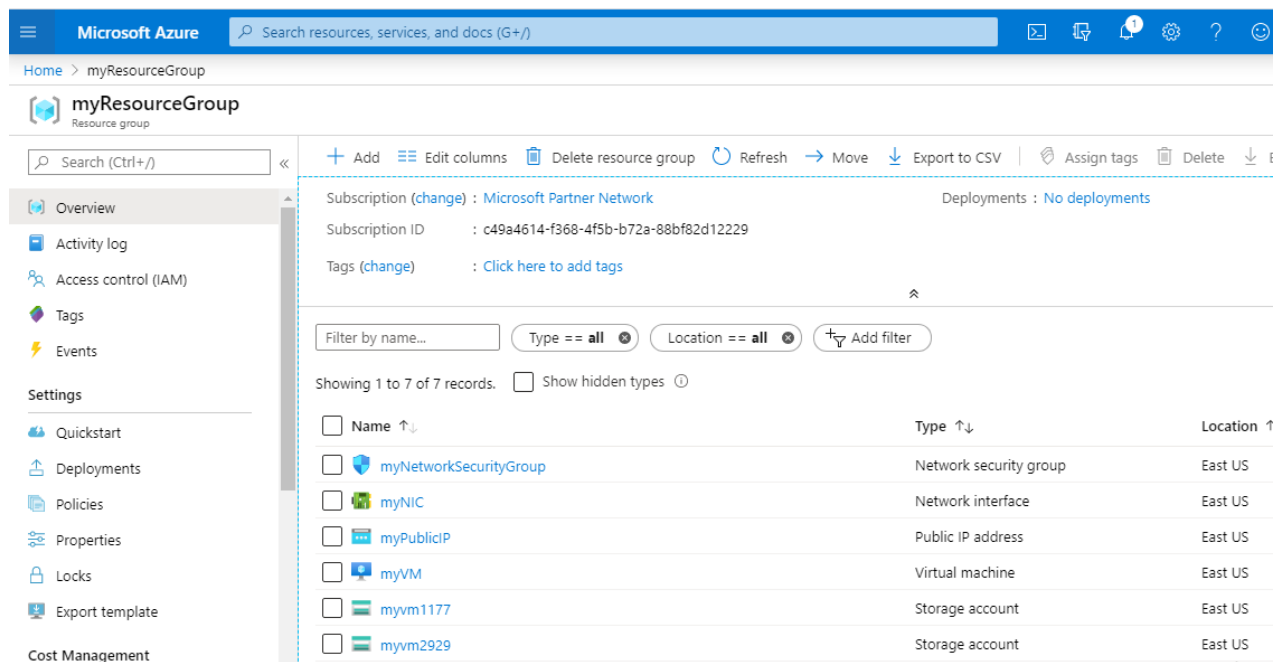
**Resource groups**  
Default Directory (dipeensinhahotmail.onmicrosoft.com)

+ Add Manage view Refresh Export to CSV Assign tags Feedback

myresource Subscription == all Location == all Add filter

Showing 1 to 1 of 1 records.

Name ↑↓	Subscription ↑↓	Location ↑↓
myResourceGroup	Microsoft Partner Network	East US



Microsoft Azure Search resources, services, and docs (G+)

Home > myResourceGroup

**myResourceGroup**  
Resource group

Search (Ctrl+/) « + Add Edit columns Delete resource group Refresh Move Export to CSV Assign tags Delete

Subscription (change) : Microsoft Partner Network Deployments : No deployments

Subscription ID : c49a4614-f368-4f5b-b72a-88bf82d12229

Tags (change) : Click here to add tags

Filter by name... Type == all Location == all Add filter

Showing 1 to 7 of 7 records. Show hidden types ⓘ

Name ↑↓	Type ↑↓	Location ↑
myNetworkSecurityGroup	Network security group	East US
myNIC	Network interface	East US
myPublicIP	Public IP address	East US
myVM	Virtual machine	East US
myvm1177	Storage account	East US
myvm2929	Storage account	East US