

IN730 Special Topic - Network Automation

Lab2 - Ansible Playbooks (Local Version)

Requirements

- VM Workstation
- Windows Machine
- Completion of lab 1

Disclaimer

If you stopped your virtual machine and you didnt make ip routes persistent then you will need to run the following command again to recreate them

```
sudo ip route add 192.168.1.0/30 via 192.168.0.128 dev ens33
```

Ansible playbook to pull device information

We will create an ansible playbook that will pull configuration from our routers that we can use as a backup

We will need to create a directory to be used to store the backups of the routers configuration

This will create a directory in our home directory

```
sudo mkdir ~/ansible
```

Create a playbook called backup.yaml

```
sudo vim /etc/ansible/backup.yaml
```

Insert the following

- Do note, make sure to edit the following

```
<YOUR HOME DIRECTORY> with the home directory of your user account your using
```

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

```

- name: Get Date/Time
  setup:
    filter: "ansible_date_time"
    gather_subset: "!all"

- name: Store Date/Time
  set_fact:
    DTG: "{{ansible_date_time.date }}"

- name: Create Directory {{hostvars.localhost.DTG}}
  file:
    path: /home/<YOUR HOME
    DIRECTORY>/ansible/{{hostvars.localhost.DTG}}
    state: directory

  run_once: true

- hosts: routers
  connection: local
  remote_user: admin
  gather_facts: false
  tasks:
    - name: backup running config
      block:
        - name:
          ios_command:
            commands: show running-config
            register: config

        - name: save running config to backup folder
          copy:
            content: "{{config.stdout[0]}}"
            dest: "/home/<YOUR HOME
    DIRECTORY>/ansible/{{hostvars.localhost.DTG}}/{{inventory_hostname}}-
    {{hostvars.localhost.DTG}}-config.txt"

```

You can run your ansible playbooks by being located in the directory where its located by using

```
ansible-playbook backup.yaml
```

Or you can provide the path to the playbook

```
ansible-playbook /etc/ansible/backup.yaml
```

Now that we have pulled the configuration and stored it on our machine lets confirm that it is there

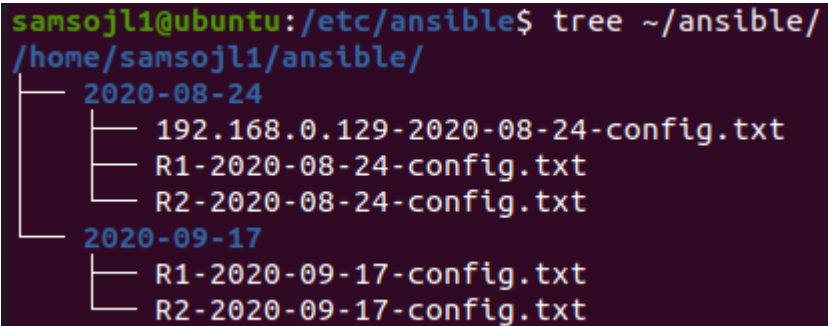
In order to do this we will download and install an application called tree which will help with displaying the contents of our directories

```
sudo apt-get install tree
```

we can now use the following command to list the home directory

```
tree ~/ansible/
```

you should have an output similar to the following



```
samsojl1@ubuntu:/etc/ansible$ tree ~/ansible/  
/home/samsojl1/ansible/  
├── 2020-08-24  
│   ├── 192.168.0.129-2020-08-24-config.txt  
│   ├── R1-2020-08-24-config.txt  
│   └── R2-2020-08-24-config.txt  
└── 2020-09-17  
    ├── R1-2020-09-17-config.txt  
    └── R2-2020-09-17-config.txt
```

Here we can see that ansible managed to pull configuration from the routers

Ansible playbooks to deploy configuration

We will create a playbook that will push configuration to our routers this will allow us to maintain a uniform environment

```
---  
- name: testbook  
  hosts: network  
  connection: local  
  remote_user: admin  
  gather_facts: false  
  tasks:  
    - name: configure login banner  
      ios_banner:  
        banner: login  
        text: |  
            Here  
            Is  
            A  
            Test  
            Configuration  
            Banner  
      state: present
```

Now lets connect to our router to see the change we made

- Do note that due to issues with gns3 and cloud we need to add a few additional options to our ssh command

```
ssh -oKexAlgorithms=+diffie-hellman-group1-sha1 -c 3des-cbc admin@<router IP>
```

If we now ssh onto the router we can see that ansible has configured a motd banner

run a check on your config backups to make sure that they are configured the same - the interface ip and such

az login will open a web browser

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ssh -oKexAlgorithms=+diffie-hellman-group1-sha1 -c 3des-cbc admin@<router IP>
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If we now ssh onto the router we can see that ansible has configured a motd banner

```
gns3server@gns3vm:/etc/ansible$ ssh -oKexAlgorithms+=diffie-hellman-group1-sha1 -c 3des-cbc admin@192.168.1.1
Here
Is
A
Test
Configuration
Banner
admin@192.168.1.1's password: █
```

run a check on your config backups to make sure that they are configured the same - except for the interface ip and such

Create additional VM's using Ansible

In order to create VM's in azure using ansible we need to download and install additional software

We will download curl which we require in order to get the azure command line

```
sudo apt install curl
```

Download and install azure command line

```
curl -sL https://aka.ms/InstallAzureCLIDeb | sudo bash
sudo apt install azure-cli
```

Now that we have downloaded and installed azure command line we need to connect to it

```
az login
```

```
gns3server@gns3vm:/etc/ansible$ az login
To sign in, use a web browser to open the page https://microsoft.com/devicelogin and enter the code PKZZS6HFN to authenticate.
```

Follow the on screen prompt and input the code it provides on the website then select your microsoft account that you used for the previous lab

After you have logged in you will be given an output that contains the information about your microsoft azure account

```
gns3server@gns3vm:/etc/ansible$ az account list
A few accounts are skipped as they don't have 'Enabled' state. Use '--all' to display them.
[
  {
    "cloudName": "AzureCloud",
    "homeTenantId": "450e6824-88ab-4ad2-914d-b0f385da600c",
    "id": "6a427bda-65a1-4134-9fbe-d7f5b0c57db4",
    "isDefault": false,
    "managedByTenants": [
      {
        "tenantId": "2f4a9838-26b7-47ee-be60-ccc1fdec5953"
      }
    ],
    "name": "Enterprise",
    "state": "Enabled",
    "tenantId": "450e6824-88ab-4ad2-914d-b0f385da600c",
    "user": {
      "name": "SAMS0JL1@student.op.ac.nz",
      "type": "user"
    }
  },
  {
    "cloudName": "AzureCloud",
    "homeTenantId": "450e6824-88ab-4ad2-914d-b0f385da600c",
    "id": "ee67cd86-3ab6-4382-81f9-9e62f569ffc6",
    "isDefault": true,
    "managedByTenants": [],
    "name": "Azure School of ICT",
    "state": "Enabled",
    "tenantId": "450e6824-88ab-4ad2-914d-b0f385da600c",
    "user": {
      "name": "SAMS0JL1@student.op.ac.nz",
      "type": "user"
    }
  }
]
```

When you use azure cli it will assign anything you create to your default subscription so if you have multiple subscriptions on your account we will need to set this

To change your default subscription is a quick task

```
az account set --subscription <ID>
```

After changing your subscription you wont be given a notification so you will need to verify that it has changed by using the following command

```
az account list
```

- sudo apt-get install python-pip
- pip install packaging
- pip install msrestazure
- pip install ansible[azure]

We can now create a playbook that will create a virtual machine

```
- name: Create Azure VM
hosts: localhost
connection: local

vars:
  vm_offer: "UbuntuServer"
  vm_pub: "Canonical"
  vm_sku: "18.04-LTS"

  vm_size: "Standard_E2s_v3"

  az: "australiaeast"
  net: "Ansible"
  vm_net: "AnsibleVNet"
  vm_subnet: "AnsibleSubnet"

  vm_publicIP: "AnsiblePublicIP"
  vm_NSG: "AnsibleNSG"
  vm_NIC: "AnsibleNIC"
  vm_Name: "ansibletest"

  resource_group: "ansible"

  vm_peer: "AnsiblePeer"

  os_user: "ansible"
  os_pass: "ansible@ssw0rd"

tasks:

- name: Create virtual network
  azure_rm_virtualnetwork:
    resource_group: "{{ resource_group }}"
    name: "{{ vm_net }}"
    address_prefixes: "10.0.0.0/16"

- name: Add subnet
  azure_rm_subnet:
    resource_group: "{{ resource_group }}"
    name: "{{ vm_subnet }}"
    address_prefix: "10.0.1.0/24"
    virtual_network: "{{ vm_net }}"

- name: Create public IP address
  azure_rm_publicipaddress:
    resource_group: "{{ resource_group }}"
    allocation_method: Static
    name: "{{ vm_publicIP }}"
    domain_name: gitlab-test
    register: reg_publicIP

- debug: var=reg_publicIP
```

```

- name: Create Network Security Group that allows SSH
  azure_rm_securitygroup:
    resource_group: "{{ resource_group }}"
    name: "{{ vm_NSG }}"
    rules:
      - name: SSH
        protocol: Tcp
        destination_port_range: 22
        access: Allow
        priority: 1001
        direction: Inbound
      - name: HTTP
        protocol: Tcp
        destination_port_range: 80
        access: Allow
        priority: 1002
        direction: Inbound
      - name: HTTPS
        protocol: Tcp
        destination_port_range: 443
        access: Allow
        priority: 1003
        direction: Inbound

- name: Create virtual network interface card
  azure_rm_networkinterface:
    resource_group: "{{ resource_group }}"
    name: "{{ vm_NIC }}"
    virtual_network: "{{ vm_net }}"
    subnet: "{{ vm_subnet }}"
    public_ip_name: "{{ vm_publicIP }}"
    security_group: "{{ vm_NSG }}"

- name: Create VM
  azure_rm_virtualmachine:
    resource_group: "{{ resource_group }}"
    name: "{{ vm_Name }}"
    vm_size: "{{ vm_size }}"
    admin_username: "{{ os_user }}"
    admin_password: "{{ os_pass }}"
    ssh_password_enabled: true
    network_interfaces: "{{ vm_NIC }}"
    image:
      offer: "{{ vm_offer }}"
      publisher: "{{ vm_pub }}"
      sku: "{{ vm_sku }}"
      version: latest

- name: Peer Old To New
  azure_rm_virtualnetworkpeering:
    resource_group: "{{ resource_group }}"
    virtual_network: "{{ net }}"
    name: "{{ vm_peer }}"
    remote_virtual_network:

```



```
        resource_group: "{{ resource_group }}"
        name: "{{ vm_net }}"
    allow_virtual_network_access: true
    allow_forwarded_traffic: true

- name: Peer New To Old
  azure_rm_virtualnetworkpeering:
    resource_group: "{{ resource_group }}"
    virtual_network: "{{ vm_net }}"
    name: "{{ net }}"
    remote_virtual_network:
      resource_group: "{{ resource_group }}"
      name: "{{ net }}"
    allow_virtual_network_access: true
    allow_forwarded_traffic: true
```

At the end of this playbook we added the `azure_rm_virtualnetworkpeering` module, this will allow devices in different networks to communicate with each other