Sirius Ansible Palo Alto Immersion Day Workshop

Abstract

This Sirius Ansible Immersion Day Workshop will introduce the use of Ansible for automation of Palo Alto firewalls.

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Overview Palo Alto Immersion Day Workshop

You will use Ansible commands and playbooks to explore and reconfigure a Palo Alto in a virtual environment. Note, that even though we are using a virtual environment, this is not a requirement, everything we do, can be done on physical devices.

The Immersion Day is meant as a follow on to the Network Automation Immersion Day. Some content will be review but in respect to using Ansible with Palo Alto. While you can go through these labs there may be concepts that were covered previously that we will not cover as it is expected that these concepts are already understood. Throughout the labs we hope to share some additional features, elements, good and bad practices, and patterns to using Ansible for Automation.

You will be required to modify some files during this workshop. You will not be required to write your own playbooks as this would require much more time. The playbooks used are open source and thus free to use and modify. Writing playbooks and running them in a test environment is one of the best ways to learn.

Note: The output shown in the examples may vary from yours.

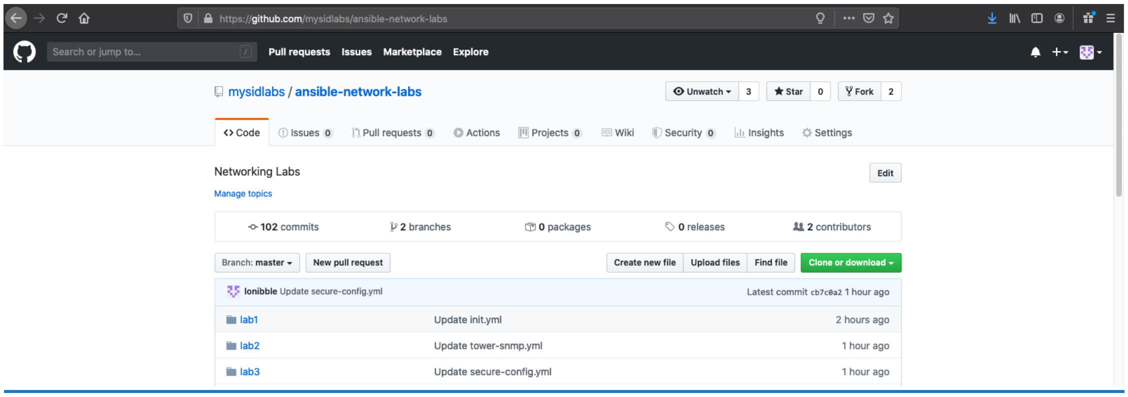
Part 1A - Initial Lab Setup

At the end of this section the lab github repo will be forked into your own github account. You will access the jump station and download the newly forked github repo.

1. Fork the lab github repository to your own repository so you can edit and modify.
2. Access the jump station
3. Download the forked repository to the jump station

Step 1 - Fork the Sirius ansible Pan Labs Github repository

- Login in to Github at https://github.com
- Go to https://github.com/mysidlabs/ansible-pan-labs
- Click on the Fork button in upper right.



Networking Labs

102 commits | 2 branches | 0 packages | 0 releases | 2 contributors

lonibble Update secure-config.yml		Latest commit cb7c0a2 1 hour ago
lab1	Update init.yml	2 hours ago
lab2	Update tower-snmp.yml	1 hour ago
lab3	Update secure-config.yml	1 hour ago

Note: Once forked you can now modify all files within your GitHub

Step 2 – Each user has a unique jump host with an address in the following format: `siduser<<ID>>.jump.mysidlab.com`

For MacOS or Linux users the following is an example using the terminal:

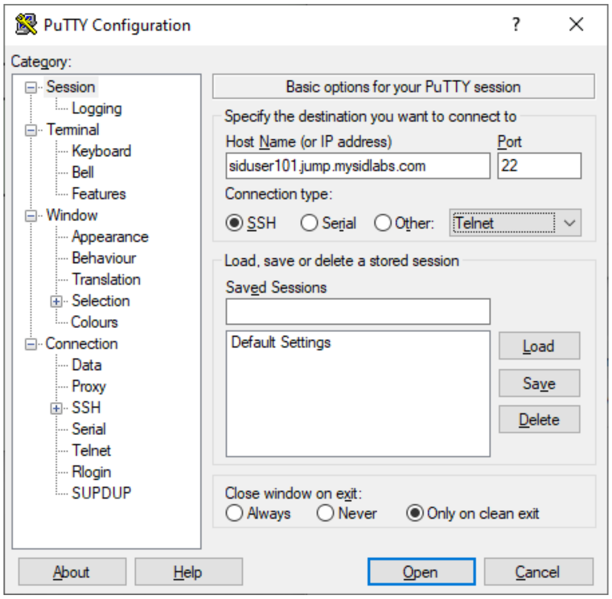
```
$ ssh siduser<<ID>>@siduser<<ID>>.jump.mysidlabs.com
Ex. $ssh siduser101@siduser101.jump.mysidlabs.com
```

You may get the following message, type yes **at the prompt:**

The authenticity of host 'siduser250.jump.mysidlabs.com (3.132.28.93)' can't be established.
ECDSA key fingerprint is SHA256: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Are you sure you want to continue connecting (yes/no/[fingerprint])? **Yes**
Warning: Permanently added 'jump.mysidlabs.com,3.132.28.93' (ECDSA) to the list of known hosts.
Note: You can remove from known hosts after workshop is completed.
When prompted for your password type in the password the instructor provides
password: *******

For Windows users the following is an example using Putty:
Type jump.mysidlabs.com in the Host Name box and click the Open button



Specify the destination you want to connect to

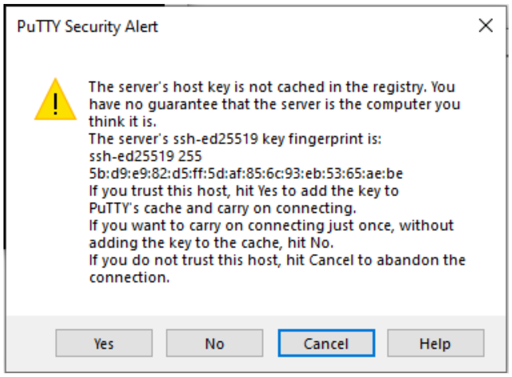
Host Name (or IP address): siduser101.jump.mysidlabs.com

Port: 22

Connection type: ● SSH ○ Serial ○ Other: Telnet

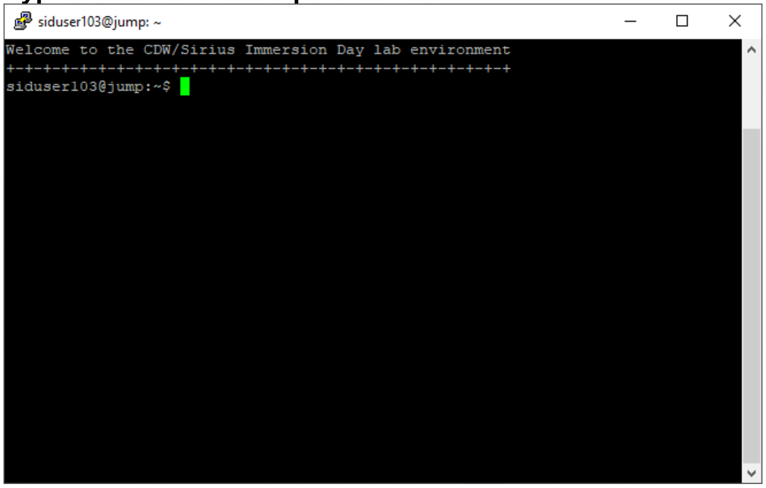
Close window on exit: ○ Always ○ Never ● Only on clean exit

Click the **Yes** button to accept the ssh key



The server's host key is not cached in the registry. You have no guarantee that the server is the computer you think it is.
The server's ssh-ed25519 key fingerprint is:
ssh-ed25519 255
5b:d9:e9:82:d5:ff:5d:af:85:6c:93:eb:53:65:ae:be
If you trust this host, hit Yes to add the key to PuTTY's cache and carry on connecting.
If you want to carry on connecting just once, without adding the key to the cache, hit No.
If you do not trust this host, hit Cancel to abandon the connection.

Type in username and password in the terminal screen at the appropriate prompts



```
Welcome to the CDW/Sirius Immersion Day lab environment
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
siduser103@jump:~$
```

Step 3 - Download forked repository to the jump station

1. Your terminal prompt should change to something like the following:
   siduser250@jump:~$

2. Clone your repository

```
 siduser250@jump:~$ git clone https://github.com/<<YOUR_GITHUB_USER>>/ansible-pan-labs
```

Tip	The usage of git becomes very important to “infrastructure as code”. Everything resides in github including your changes. If you lose connection from the jump box, the repository will be deleted automatically. All you need to do is clone your repository and you are back to where you were.

3. You should now see the repository in your directory

```
  siduser250@jump:~$ ls
 ansible-pan-labs
```

4. Move into the ansible-pan-labs directory

```
  siduser250@jump:~$ cd ansible-pan-labs
  siduser250@jump :~/ansible-pan-labs$
```

Additional Information

You can now explore the labs directory

cd = change directory
ls = list contents
pwd = display current working directory
cat = display file
nano or vim = file editor
tree = display file structure from current directory

Note: At this point your jump host is setup is complete and is ready to use

Part 1B - Connect to Palo Alto firewall via SSH and set your username/password

This section will accomplish the following two tasks:

1. Connect to your firewall via SSH and add new admin user to use for ansible playbooks.
2. Connect to your firewall via HTTPS with your new admin username/password.

Your student Palo Alto Firewall does not have a username and password configured yet. Access the firewall and set a username and password. Replace <<ID>> with your student number.

Step 1 - Connect to FW via ssh from jump host.

1. **ssh -i ~/.ssh/network-key.pem admin@siduser<ID>.pan.mysidlabs.com**

```
load pubkey "/home/siduser101/.ssh/network-key.pem": invalid format
The authenticity of host 'siduser101.pan.mysidlabs.com (3.133.142.207)' can't be established.
RSA key fingerprint is SHA256:tfEPSNM5pDbgEOEKv5H059pu1uK8l5T2QjcLIDU03eE.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'siduser101.pan.mysidlabs.com,3.133.142.207' (RSA) to the list of
```

```
known hosts.

Welcome admin.
admin@PA-VM>
```

2. Go into configuration mode

```
admin@PA-VM> configure
```

3. Add a new user

```
admin@PA-VM# set mgt-config users siduser<ID> password
Enter password   :
Confirm password :
```

4. Give your new user admin permissions

```
admin@PA-VM# set mgt-config users siduser<ID> permissions role-based superuser yes
```

5. Commit Palo Alto changes

```
admin@PA-VM# commit

Commit job 2 is in progress. Use Ctrl+C to return to command prompt
.......55%98%.............100%
Configuration committed successfully
```

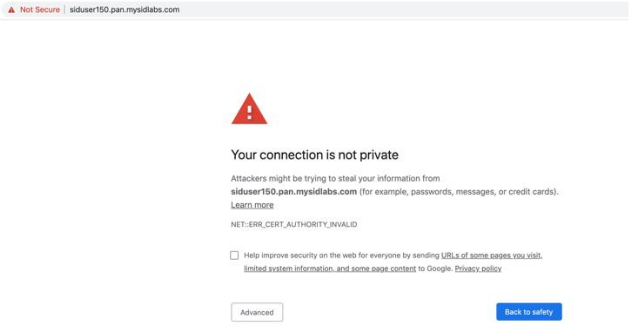
6. Exit from Firewall

Type **exit** twice to disconnect from your student Palo Alto Firewall

```
admin@PA-VM# exit
Exiting configuration mode
admin@PA-VM> exit
Connection to siduser101.pan.mysidlabs.com closed.
siduser101@toolkit :~/ansible-pan-labs$
```

Step 2 - Connect to Palo Alto via HTTPS with new username and password

1. Open a web browser and connect to https://siduser<<ID>>.pan.mysidlabs.com



Not Secure | siduser150.pan.mysidlabs.com

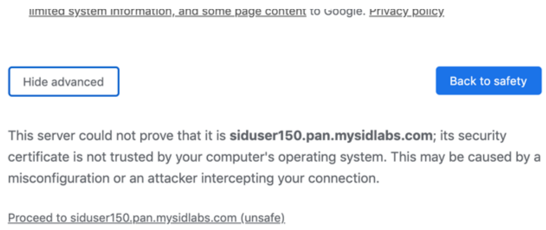
Your connection is not private

Attackers might be trying to steal your information from **siduser150.pan.mysidlabs.com** (for example, passwords, messages, or credit cards). Learn more

NET::ERR_CERT_AUTHORITY_INVALID

□ Help improve security on the web for everyone by sending URLs of some pages you visit, limited system information, and some page content to Google. Privacy policy

2. Click Advanced



limited system information, and some page content to Google. Privacy policy

This server could not prove that it is **siduser150.pan.mysidlabs.com**; its security certificate is not trusted by your computer's operating system. This may be caused by a misconfiguration or an attacker intercepting your connection.

Proceed to siduser150.pan.mysidlabs.com (unsafe)

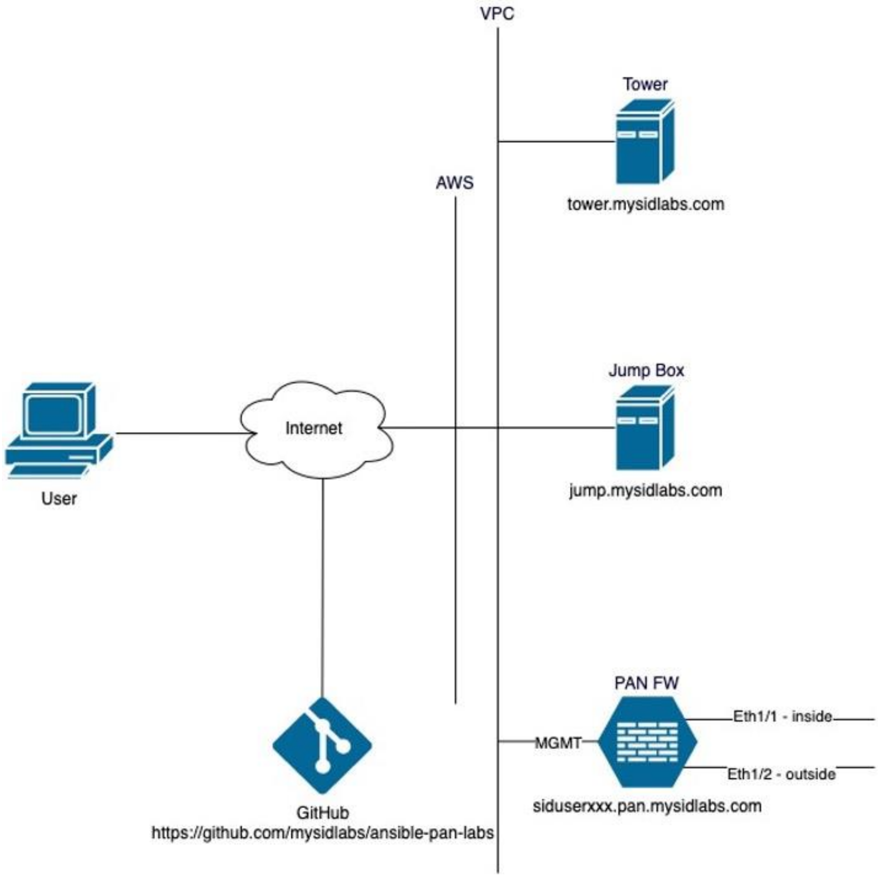
3. Click “Proceed to siduser<<ID>>.pan.mysidlabs.com (unsafe)

4. Login with your credentials, verify you can see the PAN dashboard

Part 2 - Ansible Labs

Lab Topology

The topology is simple for the sake of learning some ansible basics. The diagram below is an example, the XXX in the hostname is your Student ID. If you are student 199 then the hostname for the PaloAlto would be siduser199.pan.mysidlabs.com.



LABS

Lab 1.0: Explore your Lab Environment

Step 1 - Make sure you are in the ansible-pan-labs folder

```
siduser250@jump :~/ansible-pan-labs$ pwd
/home/siduser250/ansible-pan-labs
```

If you are not, change to the ansible-pan-labs directory

```
siduser250@jump:~$ cd ~/ansible-pan-labs/
```

Step 2 – Check Ansible Version

Run the ansible command with the --version command to look at what is configured:

```
siduser250@jump :~/ansible-pan-labs$ ansible --version
        ansible 2.9.13
                config file = /home/siduser250/ansible-pan-labs/ansible.cfg
                configured module search path = ['/home/siduser250/.ansible/plugins/modules',
                '/usr/share/ansible/plugins/modules']
                ansible python module location = /usr/lib/python3.8/site-packages/ansible
                executable location = /usr/bin/ansible
                python version = 3.8.5 (default, Aug 12 2020, 10:23:39) [GCC 9.2.1 20190827
        (Red Hat 9.2.1-1)]
```

This command gives you information about the version of Ansible, location of the executable, version of Python, search path for the modules and location of the ansible configuration file.

Step 3 – Review Ansible.cfg

Use the cat command to view the contents of the ansible.cfg file.

```
siduser250@jump :~/ansible-pan-labs$ cat ansible.cfg
[defaults]
deprecation_warnings     = False
gathering                = explicit
retry_files_enabled          = False
inventory                = ~/ansible-pan-labs/hosts
connection               = smart
timeout                  = 60
forks                    = 50
host_key_checking          = False
collections_paths            = ~/.ansible/collections

[ssh_connection]
ssh_args                 = -o ControlMaster=auto -o ControlPersist=30m
scp_if_ssh               = True

[paramiko_connection]
host_key_auto_add          = True

[persistent_connection]
connect_timeout              = 60
command_timeout          = 60
```

Note: the following parameters within the ansible.cfg file:

inventory: shows the location of the ansible inventory being used
collections_paths: shows the location of any installed non default collections

Step 4 – Install the Palo Alto Ansible Module Collection

Many ansible playbooks contain modules that are not included in Ansible Engine by default. Palo Alto firewalls are one such set of modules. (Starting in version 2.10 all modules will need to be installed as collections. This allows for a slimmed down codebase using only modules you need reducing bloat.)

Go to the docs site for the Palo Alto Ansible Galaxy Collection:
https://galaxy.ansible.com/paloaltonetworks/panos

Install the collection:

```
ansible-galaxy collection install paloaltonetworks.panos:2.7.0
Process installs dependency map
Starting collection install process
Installing 'paloaltonetworks.panos:2.7.0' to
'/home/siduser150/.ansible/collections/ansible_collections/paloaltonetworks/panos'
siduser150@toolkit :~/ansible-pan-labs$
```

If desired explore the collection, which is a list of module names coded in python.

```
siduser150@toolkit :~/ansible-pan-labs$ tree ~/.ansible/collections
```

```
siduser150@toolkit :~/ansible-pan-labs$ cat
~/.ansible/collections/ansible_collections/paloaltonetworks/panos/plugins/modules/panos_facts.p
y
```

Tip	Modules are just python code created by the community. If you cannot locate a module, you could write your own if you had the inclination to do so.

Using Ansible Vault

Step 1 – View the all.yml variable file
Look at the all.yml group variable file. Notice it is encrypted.

```
siduser150@toolkit :~/ansible-pan-labs$ cat group_vars/all.yml
$ANSIBLE_VAULT;1.1;AES256
37646633316539343132663961316431323234383262653935393939343161366466333262626134
3939396462623137643934316165653865393131643763390a393039306337323638323362613830
34313765343462383533363936316231346231303030373830646638353066373632373766623537
6634636330663663640a6537303434336364313533646261386535326261313665666363643966646
66653732653764616436306439363165656265306336653063343465313235393237323938653938
33356633633130626663663264643030336261363339616433363134336538636237303532633262
65396433643062326136383633343733383164633939643465623834663932366632396136303066
33626334386436323031306336303135323337626432633863313431396431353639383933383563
39643665653733633035653132633831393539386166613933323736633164643063
```

Step 2 – Decrypt the all.yml variable file
Decrypt the all.yml file and look at it again. Notice it is a variables file containing passwords.

```
siduser150@toolkit :~/ansible-pan-labs$ ansible-vault decrypt group_vars/all.yml
Vault password:  password
Decryption successful
siduser150@toolkit :~/ansible-pan-labs$ cat group_vars/all.yml
```

```
provider:
  username: 'siduser250'
  password: 'Spa2010!'
  ip_address: 'siduser250.pan.mysidlabs.com'
```

Step 3 – Modify the all.yml variable file for your lab
Modify the username, password, and address with the appropriate settings for your lab using nano or vi.
siduser101@toolkit :~/ansible-pan-labs$ **nano group_vars/all.yml**

Tip	Using Nano: arrow keys move the cursor. Make edits normally. When done, “<control>X” will exit, “Y” will save and enter will accept the default file name. Using VI: arrow keys move the cursor. Press “i” to make edits, make edits normally. Press “<esc>” to exit edit mode. Type “:wq!” to save and exit. Pro Tip: ansible-vault edit command will default to VI text editor

Step 4 – Encrypt the all.yml file
Encrypt the all.yml file. Enter a new password.

```
siduser150@toolkit :~/ansible-pan-labs$ ansible-vault encrypt group_vars/all.yml
New Vault password:
Confirm New Vault password:
Encryption successful
```

Step 5 – Review the re-encrypted all.yml file
Check the file is encrypted.

```
siduser150@toolkit :~/ansible-pan-labs$ cat group_vars/all.yml
$ANSIBLE_VAULT;1.1;AES256
66653734323765386638666135373238653237333966656638366536356266303533393031316163
6436636631393239316131636231313862313866643635360a653637663734646336353839316362
66353661633732383463363532373462626663323764356365346565383062383836646538373163
3764373364336161320a653563626139616139383232663731393432666236636165643434666263
36333764626462323061613738336536323661336331636339643561353363646538313066396264
30613434303637343136353233623466656233613661373037623032303935633334623365636337
35363632666434333030343137373439363163323232393930653764613762346463393562356639
30613030666264346563646665336639386664346132646136306231633538646239343735613137
36313862653966323936666239333363663432336434333732343663373036613139
```

Step 6 – Review the unencrypted all.yml file
Use view command to view the file while still encrypted

```
siduser150@toolkit :~/ansible-pan-labs$ ansible-vault view group_vars/all.yml
provider:
  username: 'siduser118'
  password: 'P2ssw0r>!'
  ip_address: 'siduser118.pan.mysidlabs.com'
```

Step 7 – Review the Ansible vault command options
Use the “- - help” command to see what other options are available. Also review the ansible-vault documentation. https://docs.ansible.com/ansible/latest/user_guide/vault.html#vault-ids-and-multiple-vault-passwords

```
siduser150@toolkit :~/ansible-pan-labs$ ansible-vault --help
```

Lab 1.1: Gather Facts from your Palo Alto Firewall

Lab Goals:

1. Show how to gather facts from a Palo Alto firewall. It will introduce the use of roles which will be used for most playbooks in this lab.
2. We will review the JSON output from the panos_facts module and show how to filter and display specific information.

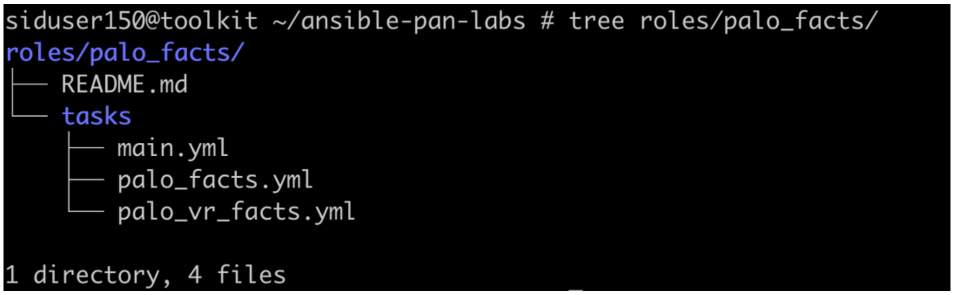
Step 1 – Review the first playbook
Look at the file (ansible playbook) called 1.1_palo_facts.yml.

```
siduser250@jump :~/ansible-pan-labs$ cat 1.1_palo_facts.yml
        ---
        - hosts: localhost
          connection: local
          gather_facts: False

          tasks:
            - include_role:
                name: palo_facts
        ...
```

Step 2 – Take a look at the roles playbook for gathering Palo Alto firewall facts
Ansible playbooks are YAML files. YAML is a structured encoding format that is also extremely human readable. In this case we are using “include_role:” explor the role palo_facts.

siduser150@toolkit :~/ansible-pan-labs$ **tree roles/palo_facts/**



```
siduser150@toolkit ~/ansible-pan-labs # tree roles/palo_facts/
roles/palo_facts/
├── README.md
└── tasks
    ├── main.yml
    ├── palo_facts.yml
    └── palo_vr_facts.yml

1 directory, 4 files
```

siduser150@toolkit :~/ansible-pan-labs$ **cat roles/palo_facts/tasks/main.yml**
<< output omitted >>
siduser150@toolkit :~/ansible-pan-labs$ **cat roles/palo_facts/tasks/palo_facts.yml**
<< output omitted >>

Tip	Notice the FQCN or fully qualified collection name paloaltonetworks.panos.panos_facts. This format is required when using roles with collections that are not installed in engine by default such as Palo Alto collections used in this lab.

siduser150@toolkit :~/ansible-pan-labs$ **cat roles/palo_facts/tasks/palo_vr_facts.yml**
<< output omitted >>

Step 3 – Run the gather facts playbook
Run the playbook:

```
siduser250@jump :~/ansible-pan-labs$ ansible-playbook 1.1_palo_facts.yml --ask-vault-pass
<< output omitted >>
```

Step 4 – Review the output of the playbook
Review the output.

Can you think of some use cases for this role?

Lab 1.2: Preform a Palo Alto Firewall Base Configuration

Lab Goals:

1. Review and use role variables in a role
2. Complete the initial configuration setup using Ansible for a Palo Alto firewall.

Step 1 – Review the Palo Alto Initial Setup Ansible Playbook
Review the file called 1.2_palo_initial_setup.yml

```
siduser250@jump :~/ansible-pan-labs$ cat 1.2_palo_initial_setup.yml
<< output omitted >>
```

explore the role

```
siduser150@toolkit :~/ansible-pan-labs$ tree roles/initial_palo_setup/
<< output omitted >>
```

Note: Notice that there is a vars directory. This is known as roles vars

```
siduser150@toolkit :~/ansible-pan-labs$ cat roles/initial_palo_setup/vars/main.yml
<< output omitted >>
```

Tip	When a variable file exists in the roles directory structure in the vars folder and is called “main.yml” it will be called into the playbook by default, there is no need to reference a specific vars file in the playbook. This is useful because all the vars required for the specific role are located with the role. This can make modular playbook design using roles easier.

Step 2 – Run the Initial Setup Playbook
Run the playbook:

```
siduser250@jump :~/ansible-pan-labs$ ansible-playbook 1. 2_palo_initial_setup.yml --ask-vault-pass
<< output omitted >>
```

Step 3 – Verify the Palo Alto Configuration
Verifying that the playbook did what you expected. Login to the Palo Alto with your web browser to see what was configured. https://siduser<<ID>>.pan.mysidlabs.com

Lab 1.3: Add logging server profile

Lab Goals:

1. Add a logging server profile to the firewall

Step 1- Review the Palo Alto Logging Setup Ansible Playbook
Look at the file called 1.3_logging_setup.yml

```
siduser150@toolkit :~/ansible-pan-labs$ cat 1.3_logging_setup.yml
<< output omitted >>
```

```
siduser150@toolkit :~/ansible-pan-labs$ tree roles/palo_log_server/
<< output omitted >>
```

```
siduser150@toolkit :~/ansible-pan-labs$ tree roles/palo_syslog/
<< output omitted >>
```

Note: Use GitHub to look at the roles and roles vars

Step 2 – Run the Palo Alto Logging Setup Playbook

Run the playbook:

```
siduser250@jump :~/ansible-pan-labs$ ansible-playbook 1.3_logging_setup.yml --ask-vault-pass
<< output omitted >>
```

Step 3 – Complete Verification

Verifying that the playbook did what you expected. Login to the Palo Alto with your web browser to see what was configured.

Lab 1.4: Add a Simple Security Rule

Note: This lab is required prior to lab 1.5. It adds a deny all rule to the end of the security policy which is referenced in the next playbook.

Lab Goals:

1. Add a Deny All rule to the end of the security policy.

Step 1 – Review the Playbook

Look at the file called 1.4_simple_security_rule_add.yml

```
siduser250@jump :~/ansible-pan-labs$ cat 1.4_simple_security_rule_add.yml
```

Note: This playbook does not use a role. We did this to illustrate how to use collections in a playbook where roles are not included.

Step 2 – Run the Playbook

Run the playbook:

```
siduser250@jump :~/ansible-pan-labs$ ansible-playbook 1.4_simple_security_rule_add.yml --ask-vault-pass
<< output omitted >>
```

Step 3 – Complete Verification

Verifying that the playbook did what you expected. Login to the Palo Alto with your web browser to see what was configured.

Lab 1.5: Adding Bulk Security Rules from a CSV file

Lab Goals:

1. *Use a CSV file to add a bulk set of security rules to the firewall*

Step 1 - Review the Playbook

Look at the file called 1.5_add_rules_csv.yml

```
siduser250@jump :~/ansible-pan-labs$ cat 1.5_add_rules_csv.yml
```

Step 2- Review the Playbook Files

Use cat or github to review the roles tasks, roles variables and the roles files.

Note: This playbook pulls variables from a CSV file.

Step 3 – Run the Playbook

Run the playbook:

```
siduser250@jump :~/ansible-pan-labs$ ansible-playbook 1.5_add_rules_csv.yml --ask-vault-pass
<< output omitted >>
```

Step 4 - Complete Verification

Verifying that the playbook did what you expected. Login to the Palo Alto with your web browser to see what was configured.

Bonus Task!

Edit the CSV file and add additional rules by running the playbook again.

Lab 1.6: Remove Address Object

Lab Goals:

1. *Remove an address object from the firewall.*

Step 1 – Review the Playbook

Look at the file called 1.6_remove_address_object.yml

```
siduser250@jump :~/ansible-pan-labs$ cat 1.6_remove_address_object.yml
```

Step 2 - Review the Playbook Associated Files

Use cat or github to review the roles tasks and roles variables

Step 3 - Edit Variable File

Modify the variable file to a server of your choosing using nano, vi or github

Example

```
remove_addr: 'server_6'
```

Step 4 – Run the Playbook

Run the playbook:

```
siduser250@jump :~/ansible-pan-labs$ ansible-playbook 1.6_remove_address_object.yml --ask-vault-pass
<< output omitted >>
```

Step 5 – Complete Playbook Verification

Verifying that the playbook did what you expected. Login to the Palo Alto with your web browser to see what was configured.

Why is the rule greyed out?

Can you think of some use cases for this role?

Lab 1.7: Backup Palo Alto Firewall Configuration

Lab Goals:

1. Complete a backup of the current Palo Alto configuration.

Step 1 - Review the Playbook

Look at the file called 1.7_palo_backup_configuration.yml

```
siduser250@jump :~/ansible-pan-labs$ cat 1.7_palo_backup_configuration.yml
```

Step 2 - Review the Playbook Associated Files

Review the roles tasks and roles variables with cat or GitHub. The variable file should look like below.

```
---
## Be sure path is writable
backup_path : '~/ansible-pan-labs/'
...
```

Step 3 – Run the Backup Playbook

Run the playbook:

```
siduser250@jump :~/ansible-pan-labs$ ansible-playbook 1.7_palo_backup_configuration.yml --ask-vault-pass
        << output omitted >>
```

Step 4 – Review the Backup File

Ensure that the backup file exists. Copy the backup file name

Can you think of some use cases for this role?

Lab 1.8: Restore the configuration

Lab Goals:

1. Restore a previously backed up configuration to the firewall.

Step 1 - Review the Playbook

Look at the file called 1.8_palo_restore_configuration.yml

```
siduser250@jump :~/ansible-pan-labs$ cat 1.8_palo_restore_configuration.yml
```

Step 2 - Review the Playbook Associated Files

Review the roles variables with cat or github. The variable file should look like below.

```
---
backup_path : 'home/siduser<ID>/ansible-pan-labs/'
restore_file: 'backup-2021-01-01-00-01.xml'
...
```

Edit the backup_path variable to have your siduser ID.

Edit the restore_file variable to be your saved backup file name.

Step 3 – Run the Restore Playbook

Run the playbook:

```
siduser250@jump :~/ansible-pan-labs$ ansible-playbook 1.8_palo_restore_configuration.yml --ask-vault-pass
        << output omitted >>
```

Success – Congratulations for Completing!

Key Lab Takeaways

1. Remember YAML is very sensitive to correct indentation.
2. The use of an Ansible role is best practice when there is a well-defined scope with a high possibility of re-use.
3. Plan to the location of variables carefully. Never have a single variable in more than one location.
4. If you copy and paste text for a playbook you may get indentation issues. Ansible provides a simple syntax checker, try ansible-playbook --syntax-check backup.yml to verify. A Best Practice is to use a linter, for example ansible-review.
5. Ansible provides excellent online documentation, which is also available from the command line, for example ansible-doc ansible.netcommon.cli_command. For a full list of modules try ansible-doc —-list

Appendix A:

Useful resource links and information

Links:

Ansible Best Practices:
https://docs.ansible.com/ansible/latest/user_guide/playbooks_best_practices.html

Variable precedence:
https://docs.ansible.com/ansible/latest/user_guide/playbooks_variables.html#variable-precedence-where-should-i-put-a-variable

Ansible Modules
https://docs.ansible.com/ansible/2.9/modules/modules_by_category.html

Ansible Galaxy
https://galaxy.ansible.com/home

Ansible Palo Alto Module Reference
https://ansible-pan.readthedocs.io/en/latest/modules/index.html