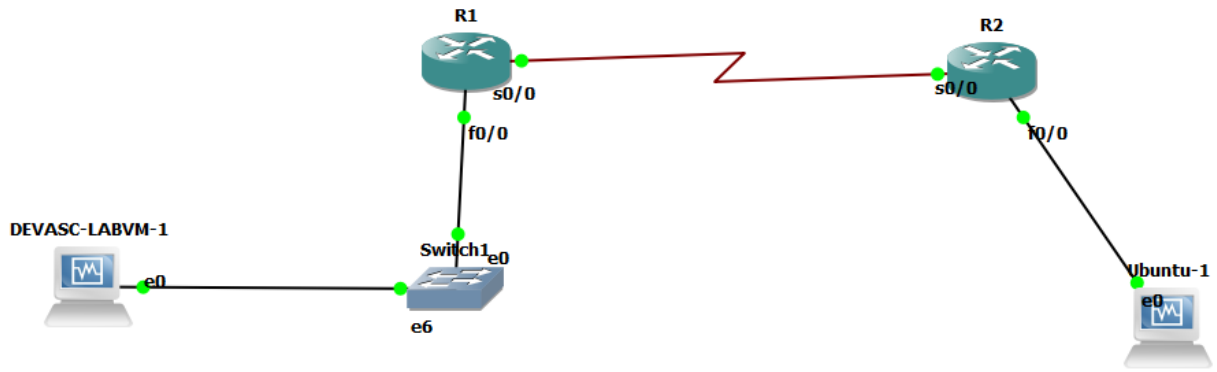
## Topology




## Addressing Table

| Device | Interface | Address | Subnet Mask |
|---|---|---|---|
| R1 | S0/0 | 10.0.0.1 | 255.255.255.252 |
| | F0/0 | 192.168.10.254 | 255.255.255.0 |
| R2 | S0/0 | 10.0.0.2 | 255.255.255.252 |
| | F0/0 | 192.168.20.254 | 255.255.255.0 |
| SW1 | Ethernet 0 | -- | -- |
| | Ethernet 6 | -- | -- |
| | Ethernet 7 | -- | -- |
| Ubuntu-1 | -- | 192.168.20.2 | 255.255.255.0 |
| DEVASC-LABVM-1 | -- | 192.168.10.2 | 255.255.255.0 |

## Objectives

Part 1: Launch the DEVASC VM

Part 2: Launch GNS3

Part 3: Configure Basic Device Setting

Part 4: Creating a YAML File

Part 5: Use the pyATS Testing Library

Part 6: Use Genie to Learn

## Background / Scenario

## Required Resources

- 1 PC with operating system of your choice
- Virtual Box or VMWare
- DEVASC Virtual Machine
- GNS3

## Instructions

## Part 1: Launch the DEVASC VM

If you have not already completed the **Lab - Install the Virtual Machine Lab Environment**, do so now. If you have already completed that lab, launch the DEVASC VM now

## Part 2: Launch GNS3

If you have not download GNS3, go to this website: https://gns3.com/software/download

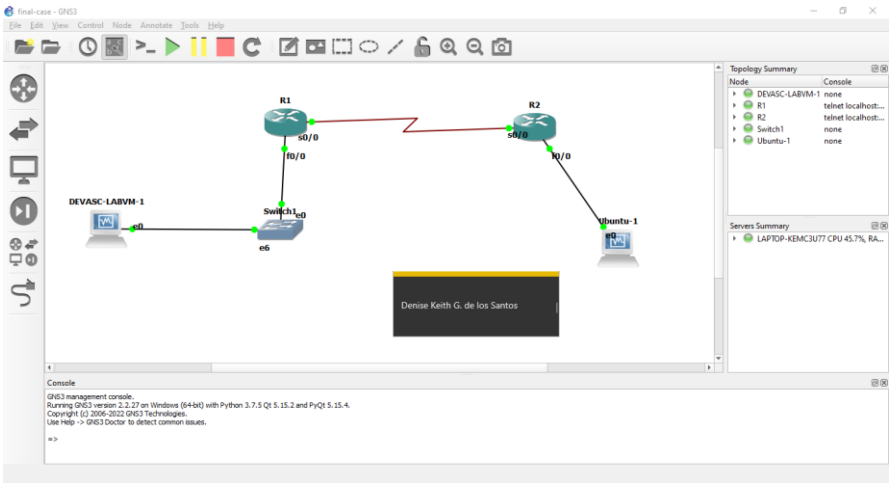
### Step 1: Create new Project.

a. Click File that can be seen on the upper screen.
b. Look and click New blank project.
c. Then click OK

## Part 3: Configure Basic Device Setting

### Step 1: Cable the network as shown in the topology

Attach the devices as shown in the topology diagram, and cable as necessary.




### Step 2: Configure basic configuration

a. Configure the username and password.

```
Username cisco password cisco123
```

b. Set the domain name of the router

```
Ip domain name www.abc.com
```

c. Generate a set of crypto keys with a 1024-bit modulus.

```
Crypto key gen rsa

Ip ssh ver 2
```

d. Configure the enable password and secret to "cisco"

```
Enable secret cisco123
```

e. Assign cisco as the vty password, configure the vty lines to accept SSH connections only and enable login using the local database.

```
Line vty 0 15
```

```
Login local

Transport input ssh
```

f. Configure all interfaces on the routers with IPv4 addressing information from the addressing table above.

For R1:

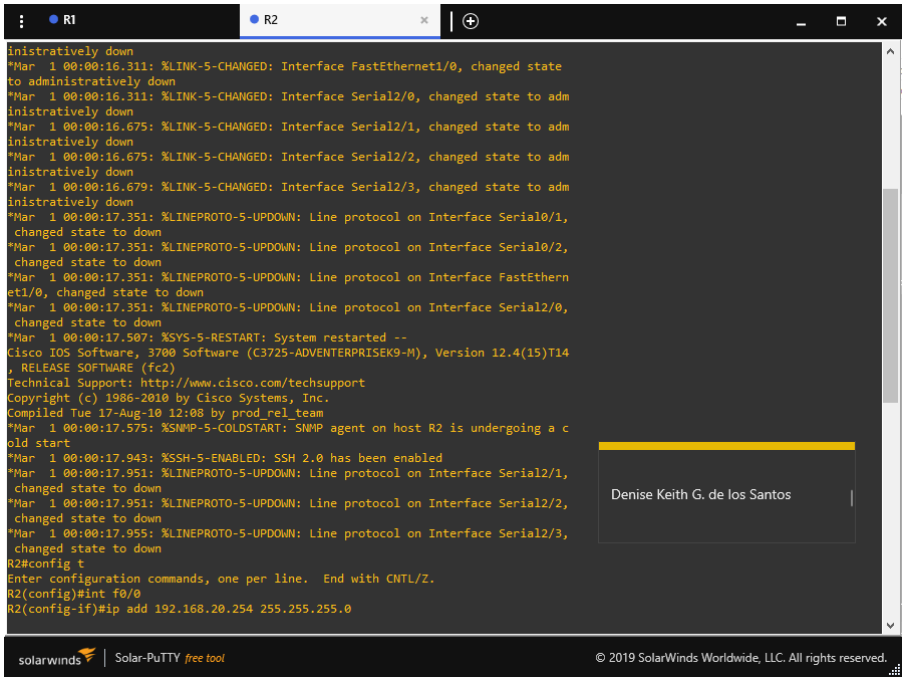
```
Int S0/0
Ip address 10.0.0.1 255.255.255.252
No shut
Int F0/0
Ip address 192.168.10.254 255.255.255.0
No shut
```

For R1:

```
Int S0/0
Ip address 10.0.0.2 255.255.255.252
No shut
Int F0/0
Ip address 192.168.20.254 255.255.255.0
No shut
```

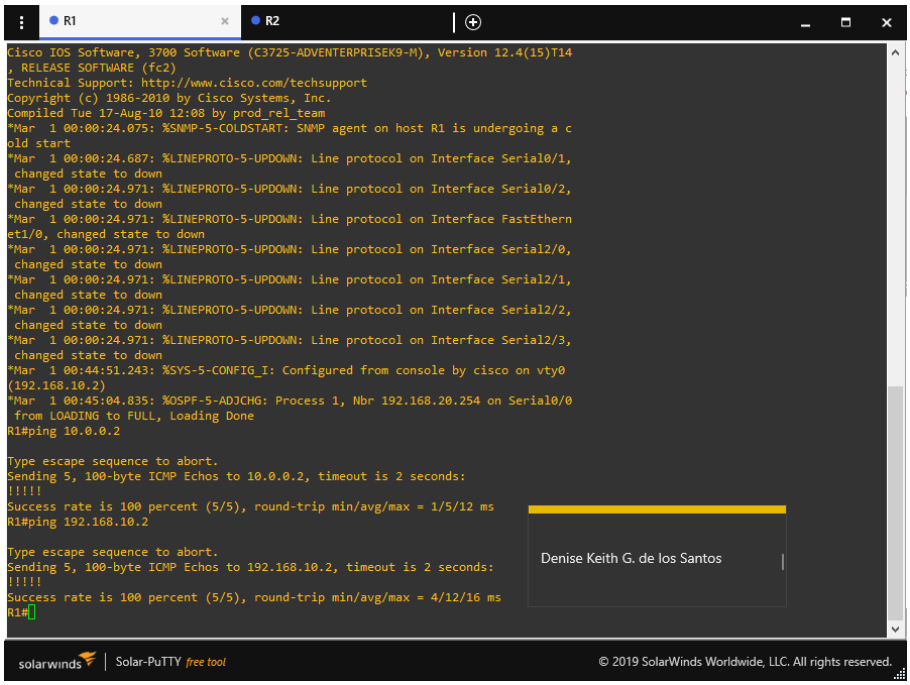
g. Save the running configuration to the startup configuration file.

```
Do copy run start
```




## Step 3: Verify network connectivity.

Ping in the terminal in each device the neighbor ip address.




## Part 4: Creating a YAML File

a. In the PC, create a new folder named FinalCase
b. Create file for hosts and ansible.

For ansible:

```
[defaults]

inventory = ./hosts

host_key_checking = false

timeout = 15

deprecation_warnings=False

remote_user = Den
```

For hosts:

```
[routers]

R1 ansible_host=10.0.0.1

R2 ansible_host=10.0.0.2


[routers:vars]

ansible_user=cisco

ansible_password=cisco123

ansible_connection=network_cli

ansible_network_os=ios
```

```
ansible_port=22
ansible_become=yes
ansible_become_method=enable
ansible_become_pass=cisco123

[ubuntu]
192.168.20.2 ansible_ssh_pass=qwerty ansible_ssh_user=den
ansible_password=qwerty ansible_port=22 ansible_become=yes
ansible_sudo_pass=qwerty
```

c. Create file YAML for OSPF and paste the given code.

```
---
- name: Configure OSPF on R1
  hosts: R1
  gather_facts: false
  connection: local

  vars:
    cli:
      username: cisco
      password: cisco123

  tasks:
    - name: Enable OSPF on R1
      ios_config:
        provider: "{{ cli }}"
        authorize: yes
        parents: router ospf 1
        lines:
          - network 0.0.0.0 255.255.255.255 area 0

      register: print_output
    - debug: var=print_output
```

```
- name: Configure OSPF on R2
  hosts: R2
  gather_facts: false
  connection: local

  vars:
    cli:
      username: cisco
      password: cisco123

  tasks:
    - name: Enable OSPF on R2
      ios_config:
        provider: "{{ cli }}"
        authorize: yes
        parents: router ospf 1
        lines:
          - network 0.0.0.0 255.255.255.255 area 0

      register: print_output
    - debug: var=print_output
```

d. Create file for YAML for ACL.

```
---
- name: Configure ACL on R2
  hosts: R2
  gather_facts: false
  connection: local

  tasks:
    - name: Configure ACL inbound
      ios_config:
        lines:
```

```
      - ip access-group 110 in
    parents: interface FastEthernet0/0

 - name: Create inbound ACL rules for R2
   ios_config:
     lines:
       - access-list 110 deny icmp any any echo-reply
       - access-list 110 permit ip any any
     before: no access-list 110
     match: exact
```

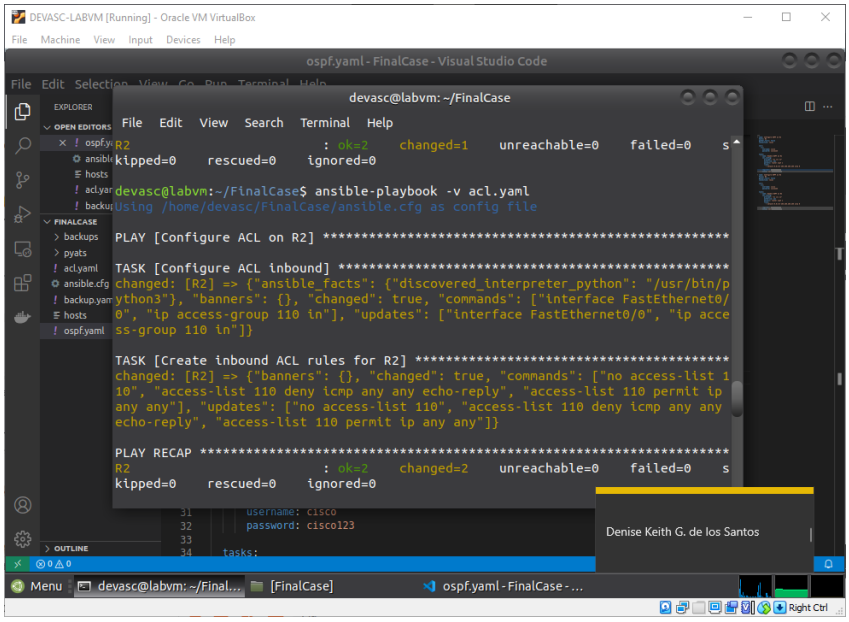
e. Create file for Backup

```
---
- name: Backup for R1
  hosts: R1
  gather_facts: false
  connection: local

  tasks:
   - name: Show the Startup Configuration
     ios_command:
       commands:
         - show startup-config
     register: startupconfig

   - name: SAVE OUTPUT TO ./backups/
     copy:
       content: "{{ startupconfig.stdout[0] }}"
       dest: "backups/R1_startup.txt"

   - name: Show the Running Configuration
     ios_command:
       commands:
```

```
      - show running-config
    register: config


  - name: SAVE OUTPUT TO ./backups/
    copy:
      content: "{{ config.stdout[0] }}"
      dest: "backups/R1_run.txt"
```

f. Run the YAML file. Change the highlighted text to the name of the file.

```
ansible-playbook -v filename.yaml
```




## Part 5: Use the pyATS Testing Library

In this part, you will use pyATS, a python testing library and genie.

### Step 1: Create python file for script and job

a. Python file for script

```
# To get a logger for the script
import logging
# Needed for aetest script
from pyats import aetest
# Get your logger for your script
log = logging.getLogger(__name__)
```

```
##################################################################
##

###                   COMMON SETUP SECTION
###

##################################################################
##

# This is how to create a CommonSetup

# You can have one of no CommonSetup

# CommonSetup can be named whatever you want

class common_setup(aetest.CommonSetup):

    """ Common Setup section """

    # CommonSetup have subsection.

    # You can have 1 to as many subsection as wanted

    # here is an example of 2 subsections

    # First subsection

    @aetest.subsection

    def sample_subsection_1(self):

        """ Common Setup subsection """

        log.info("Aetest Common Setup ")

    # If you want to get the name of current section,

    # add section to the argument of the function.

    # Second subsection

    @aetest.subsection

    def sample_subsection_2(self, section):

        """ Common Setup subsection """

        log.info("Inside %s" % (section))

        # And how to access the class itself ?

        # self refers to the instance of that class, and remains
consistent

        # throughout the execution of that container.

        log.info("Inside class %s" % (self.uid))

##################################################################
##
```

```
###                      TESTCASES SECTION
###
#####################################################################
##
# This is how to create a testcase
# You can have 0 to as many testcase as wanted
# Testcase name : tc_one
class tc_one(aetest.Testcase):
    """ This is user Testcases section """
    # Testcases are divided into 3 sections
    # Setup, Test and Cleanup.
    # This is how to create a setup section
    @aetest.setup
    def prepare_testcase(self, section):
        """ Testcase Setup section """
        log.info("Preparing the test")
        log.info(section)
    # This is how to create a test section
    # You can have 0 to as many test section as wanted

    # First test section
    @ aetest.test
    def simple_test_1(self):
        """ Sample test section. Only print """
        log.info("First test section ")
    # Second test section
    @ aetest.test
    def simple_test_2(self):
        """ Sample test section. Only print """
        log.info("Second test section ")
    # This is how to create a cleanup section
    @aetest.cleanup
    def clean_testcase(self):
```

```
        """ Testcase cleanup section """
        log.info("Pass testcase cleanup")
# Testcase name : tc_two
class tc_two(aetest.Testcase):
    """ This is user Testcases section """
    @ aetest.test
    def simple_test_1(self):
        """ Sample test section. Only print """
        log.info("First test section ")
        self.failed('This is an intentional failure')
    # Second test section
    @ aetest.test
    def simple_test_2(self):
        """ Sample test section. Only print """
        log.info("Second test section ")
    # This is how to create a cleanup section
    @aetest.cleanup
    def clean_testcase(self):
        """ Testcase cleanup section """
        log.info("Pass testcase cleanup")
##################################################################
####
####                        COMMON CLEANUP SECTION
###
##################################################################
####
# This is how to create a CommonCleanup
# You can have 0 , or 1 CommonCleanup.
# CommonCleanup can be named whatever you want :)
class common_cleanup(aetest.CommonCleanup):
    """ Common Cleanup for Sample Test """
    # CommonCleanup follow exactly the same rule as CommonSetup
regarding
    # subsection
```

```
        # You can have 1 to as many subsection as wanted
        # here is an example of 1 subsections
        @aetest.subsection
        def clean_everything(self):
            """ Common Cleanup Subsection """
            log.info("Aetest Common Cleanup ")
if __name__ == '__main__': # pragma: no cover
    aetest.main()
```

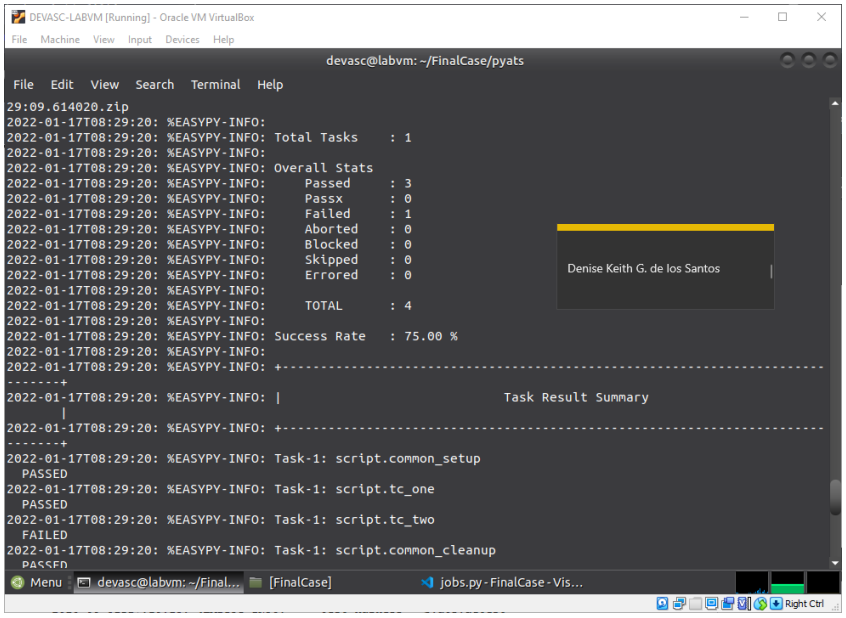
b. Python file for jobs

```
import os
from pyats.easypy import run
# All run() must be inside a main function
def main():
 # Find the location of the script in relation to the job file
 test_path = os.path.dirname(os.path.abspath(__file__))
 testscript = os.path.join(test_path, 'script.py')
 # Execute the testscript
 run(testscript=testscript)
```

### Step 2: Run pyATS manually

a. Using the pyATS job and script files, run pyATS manually to invoke the basic test case. This will verify the pyATS job and script files work properly.

```
pyats run job jobs.py
```




# Part 6: Use Genie to Learn

## Step 1: Create Virtual Environment

a. Enter the Virtual Environment

```
python3 -m venv Name of the Environment
```

b. Activate the Virtual Environment

```
source bin/activate
```

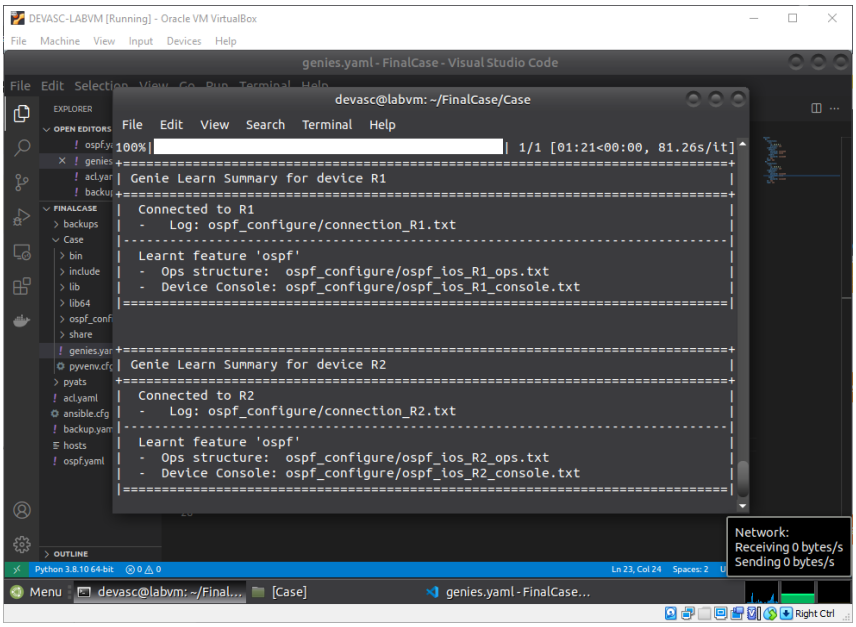
## Step 2: Create a testbed YAML file

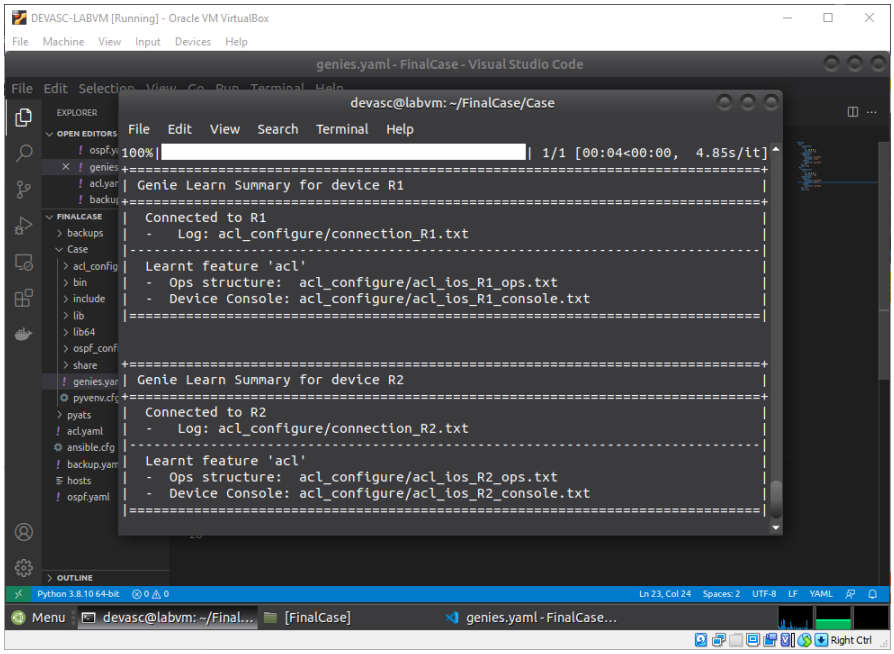
a. To create your testbed YAML file, enter the command below.

```
genie create testbed interactive --output filename.yaml
```

b. Using your testbed YAML file, invoke Genie to learn

```
genie learn acl --testbed-file filename.yaml --output Name of the folder
```




“I affirm that I have not given or received any unauthorized help on this assignment, and that this work is my own."