Build Sonic Test Environment

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Introduction

Setting up the sonic-mgmt testbed from Github to your own environment can be a tedious process. There are 10+ files that need to be updated before you can run test cases.

However, this process can be automated with:

- testbed-new.yaml - https://github.com/delta46101/sonic-mgmt/blob/master/ansible/testbed-new.yaml
- TestbedProcessing.py - https://github.com/delta46101/sonic-mgmt/blob/master/ansible/TestbedProcessing.py

The testbed-new.yaml file is a configuration file that compiles all the data needed to run the test cases into one file. TestbedProcess.py works by pulling information from that configuration file and pushing the data into the files where they belong. This guide will outline and facilitate the testbed set up of sonic-mgmt.

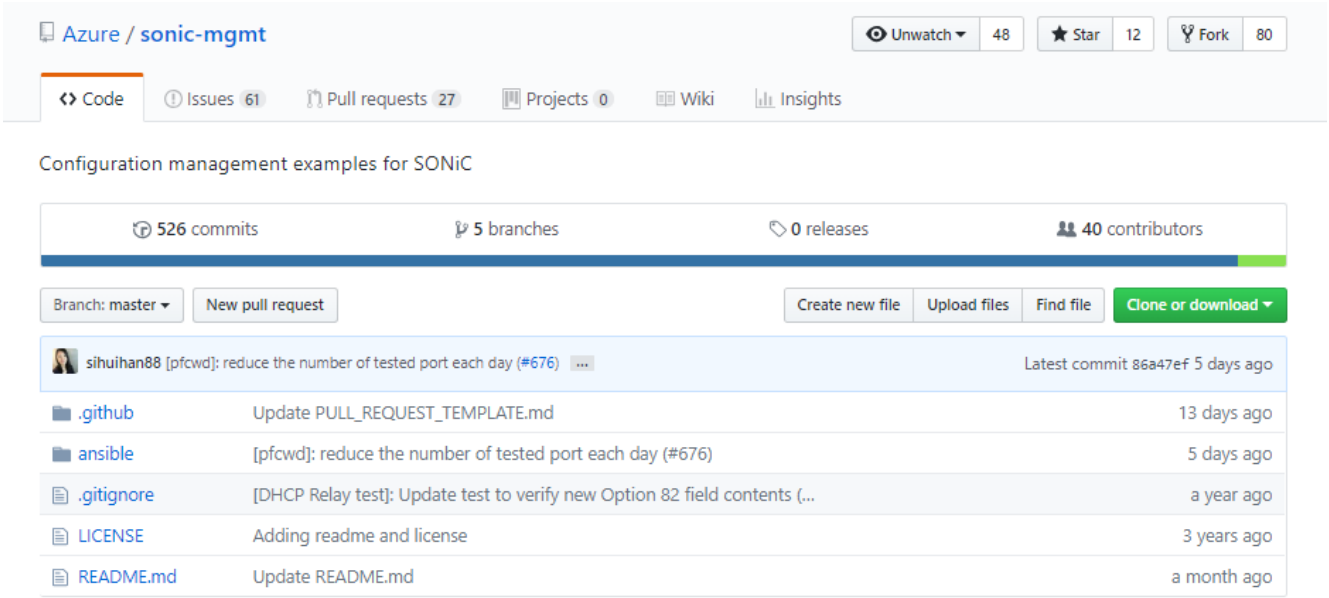
Objective

The objective of this guide is to outline and facilitate the process of using the testbed-new.yaml and TestbedProcessing.py files. At the end of this guide, you should be able to setup the sonic-mgmt testbed and run the testcases.

Information for basic set up can be referenced at Sonic-Mgmt Testbed Setup.

sonic-mgmt github

GitHub link: https://github.com/Azure/sonic-mgmt

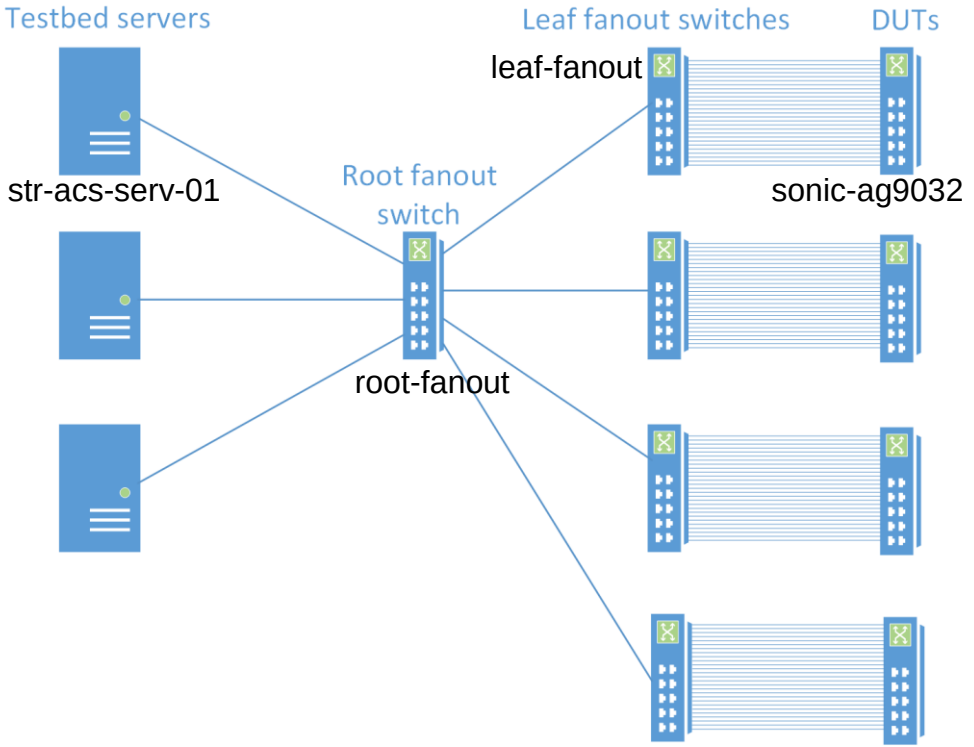


Pre-migration Setup

There are (at minimum) several devices needed to get sonic-mgmt up and running with the test cases:

- Lab Server
- Root Fanout
- Leaf Fanout
- DUT (Device Under Test)

Information for testbed and topology can be referenced at [Sonic-Mgmt Testbed Overview]



Set Up Docker with sonic-mgmt

Install Docker on Ubuntu Server 16.04

Procedure

- Add the GPG key for the official Docker repository to the system
  curl –fsSL https://download.docker.com/linux/Ubuntu/gpg | sudo apt-key add –

- Add the Docker repositories to APT sources:
  sudo add-apt-repository "deb [arch=amd64] https://download.docker.com/linux/ubuntu $(lsb_release -cs) stable“

- Update the package database with the Docker packages from the newly formed repo
  sudo apt-get update

- Make sure you are about to install from the Docker repo instead of the default Ubuntu 16.04 repo:
  apt-cache policy docker-ce

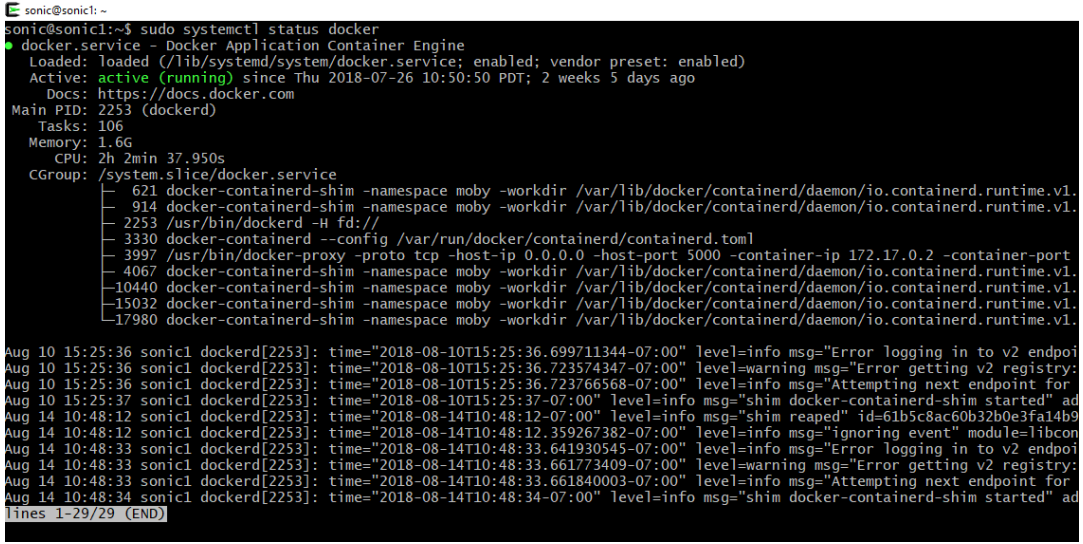
Source: https://medium.com/@Grigorkh/how-to-install-docker-on-ubuntu-16-04-3f509070d29c

Install Docker on Ubuntu Server 16.04

Procedure

- Finally, install Docker
  sudo apt-get install –y docker-ce

- Check that it is running.
  Sudo systemctl status docker



Source: https://medium.com/@Grigorkh/how-to-install-docker-on-ubuntu-16-04-3f509070d29c

Create the Docker Registry

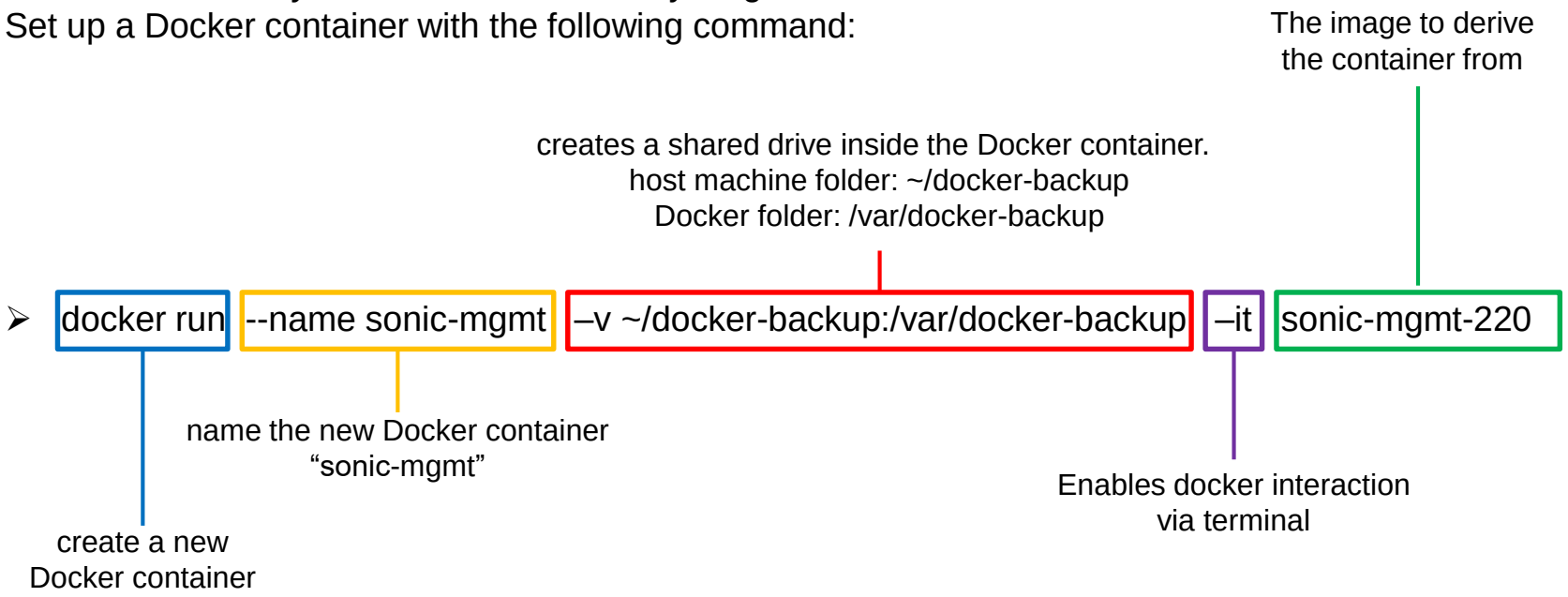
Follow these steps to create the Docker registry and load the docker-ptf image onto the local registry if you don't already have it set up:

- docker run -d -p 5000:5000 -v ~/docker-storage:/var/lib/registry --restart=always --name sonictest registry:2.6.2
- docker load -i ~/sonic-buildimage/docker-ptf.gz (docker-ptf.gz built from https://github.com/Azure/sonic-buildimage)
- docker tag docker-ptf localhost:5000/docker-ptf
- docker push localhost:5000/docker-ptf

```
sonic@sonic1:~$ docker images
REPOSITORY                  TAG                 IMAGE ID            CREATED             SIZE
sonic-mgmt                  Michael             3862a4bf912d        13 days ago         1.46GB
sonic-mgmt-220              latest              8e8219228c99        2 weeks ago         1.45GB
registry                    2.6.2               b2b03e9146e1        5 weeks ago         33.3MB
jenkins/sonic               latest              804870bc8b6d        6 weeks ago         1.61GB
localhost:5000/docker-ptf   latest              c269dca80dcb        5 months ago        617MB
docker-ptf                  latest              c269dca80dcb        5 months ago        617MB
docker-sonic-mgmt           latest              b29924a45f98        5 months ago        1.43GB
sonic@sonic1:~$
```

Start a Docker Container

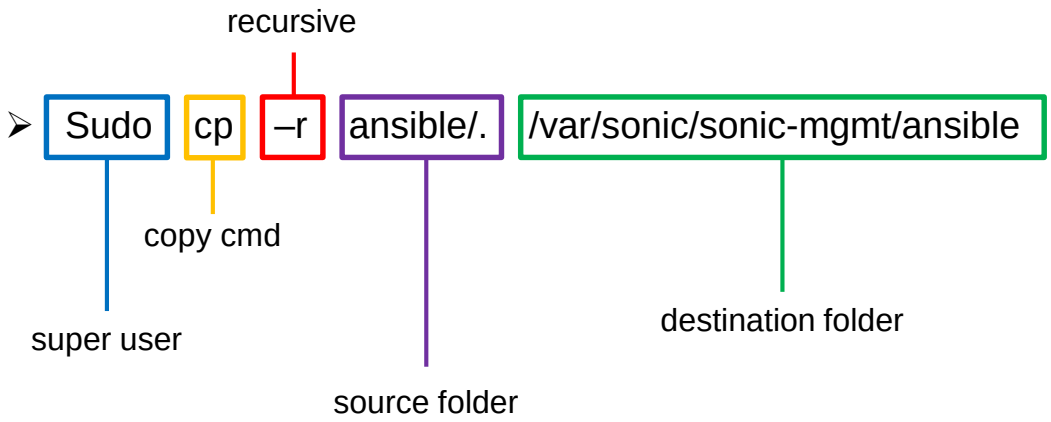
From here on out, you will need to run everything within a Docker container.
Set up a Docker container with the following command:



Source: https://www.docker.com/sites/default/files/Docker_CheatSheet_08.09.2016_0.pdf

Copy Github sonic-mgmt to Docker sonic-mgmt

- Download the sonic-mgmt Github repo to your host machine (either download and upload or git clone)
- Move the repo on your host machine (~/docker-backup/latest/) to the shared drive (/var/docker-backup)
- Move the repo from the shared drive to /var/sonic-mgmt/ansible

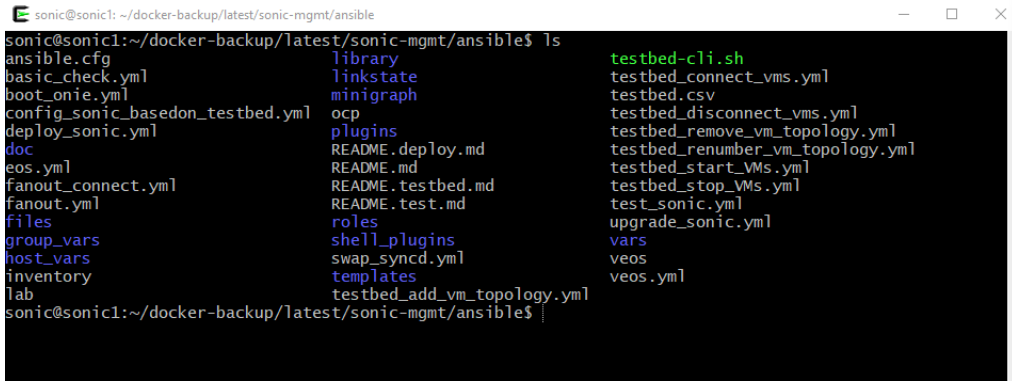


Source: https://www.docker.com/sites/default/files/Docker_CheatSheet_08.09.2016_0.pdf

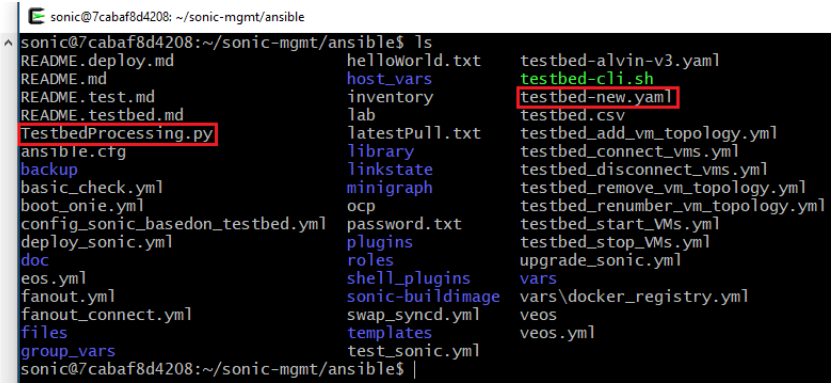
Transfer Script and Config file to /var/sonic/sonic-mgmt/ansible

Transfer the script and config file to /var/sonic/sonic-mgmt/ansible using the copy command

- sudo cp ansible/TestbedProcessing.py /var/sonic/sonic-mgmt/ansible
- sudo cp ansible/testbed-new.yaml /var/sonic/sonic-mgmt/ansible



Host machine
(without TestbedProcessing.py and testbed-new.yaml)



Docker Container
(with TestbedProcessing.py and testbed-new.yaml)

Working Docker Environment

Currently, there is a Docker image that contains a working environment. It can be loaded into an new environment. This image should be able to run test cases after editing the testbed-new.yaml, running TestbedProcessing.py, and checking credentials in labinfo.json.

Location: local Docker registry. Available upon request.

```
sonic@sonic1:~$ docker images
REPOSITORY                  TAG                 IMAGE ID            CREATED             SIZE
sonic-mgmt                  Michael             3862a4bf912d        13 days ago         1.46GB
sonic-mgmt-220              latest              8e8219228c99        2 weeks ago         1.45GB
registry                    2.6.2               b2b03e9146e1        5 weeks ago         33.3MB
jenkins/sonic               latest              804870bc8b6d        6 weeks ago         1.61GB
localhost:5000/docker-ptf   latest              c269dca80dcb        5 months ago        617MB
docker-ptf                  latest              c269dca80dcb        5 months ago        617MB
docker-sonic-mgmt           latest              b29924a45f98        5 months ago        1.43GB
sonic@sonic1:~$
```

Ready to Run Test Cases?

Limitation:

- The default root/leaf fanout switches are Arista switches. The test scripts are running on it.
- We have our own switches loading ICOS as fanout switches. **The scripts can't run on it.**

Solution:

1. Rewrite the scripts to bypass the configuration on fanout switch and configure it manually.
2. Files to update:
    - sonic-mgmt/ansible/group_vars/all/labinfo.json
    - sonic-mgmt/ansible/plugins/connection/switch.py
    - Add a new template at sonic-mgmt/ansible/roles/fanout/templates/icos_connect.j2
    - sonic-mgmt/ansible/roles/fanout/tasks/rootfanout_connect.yml
    - sonic-mgmt/ansible/roles/test/tasks/interface.yml
    - sonic-mgmt/ansible/roles/test/tasks/link_flap/link_flap_helper.yml
    - Add sonic-mgmt/ansible/roles/test/templates/neighbor_interface_no_shut_dni.j2

Quick Start

Step 1:

Option1 : Download the working docker image to create your container.
Option2 : copy working sonic-mgmt directory to your container.

Step 2:

Modify the testbed configuration file.
Run the script to push all configurations.

Step 3:

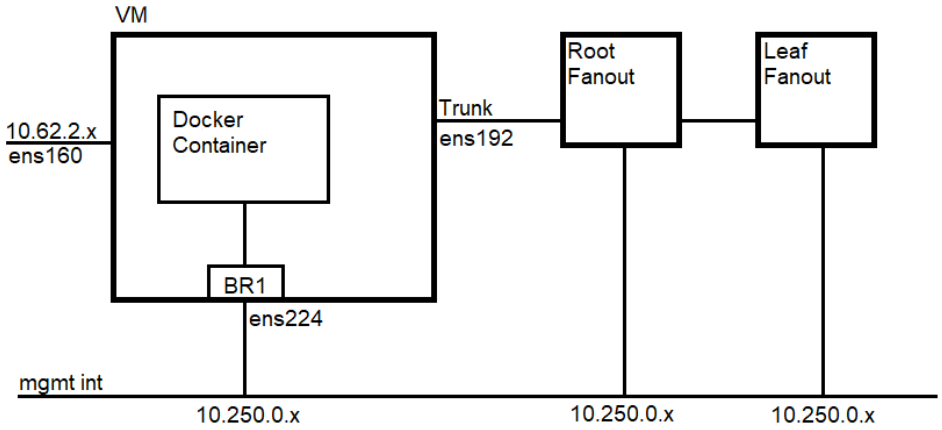
Configure the port between root fanout switch and test server as trunk mode.
Configure the port between root and leaf fanout switch as trunk mode.

Step 4:

Configure the port between leaf fanout switch and DUT as access mode.
Set vlan id and bandwidth based on sonic-mgmt/ansible/files/sonic_lab_links.csv .

Set Up Management Port Configuration

Testbed Server



- vm mgmt int: ens160
- sonic docker mgmt int: br1/ ens224
- interface to root fanout: ens192

Warning: the lab server (str-acs-serv-01) mgmt_bridge is the management port interface (br1 and ens224). The external_iface is actually the trunk to the switches. This was a source of confusion when modifying the testbed.

```
leaf-fanout:
    interfaces:
        0/25:
            EndDevice: str-acs-serv-01
            EndPort: ens192
            Bandwidth: 40000
            VlanID: 1781-1812
            VlanMode: Trunk
```

```
host_vars:
    str-acs-serv-01:
        mgmt_bridge: br1
        mgmt_prefixlen: 24
        mgmt_gw: 10.250.0.1
        external_iface: ens192
```

Modify /etc/network/interfaces

To edit the /etc/network/interfaces file:

- sudo nano /etc/network/interfaces
- Look for the line in the file that says “# The primary network interface” and directly beneath it, you’ll see the default DHCP configuration:
  auto ens160
  iface ens160 inet dhcp
- Comment out “iface ens160 inet dhcp”
- Replace with the following information below:
  iface ens160 inet static
  address <address>
  netmask <netmask>
  gateway <gateway>
  dns-nameservers <nameserver>

```
sonic@sonic1:~$ cat /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

#source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
auto ens160
#iface ens160 inet dhcp
iface ens160 inet static
    address 10.62.2.220
    netmask 255.255.255.0
    gateway 10.62.2.254
    dns-nameservers 10.62.2.1

# docker mgmt interface
auto ens224
iface ens224 inet manual

#
auto ens192
iface ens192 inet manual

auto br1
iface br1 inet static
    bridge_ports ens224
    bridge_stp off
    bridge_maxwait 0
    bridge_fd 0
    address 10.250.0.201
    netmask 255.255.255.0
    network 10.250.0.0
    #gateway 10.250.0.1
    #dns-nameservers 10.250.0.1 10.250.0.2

sonic@sonic1:~$
```

Modify /etc/network/interfaces

Continue editing the /etc/network/interfaces file:

Specify how to communicate with docker

- Identify the Docker interface to the mgmt interface:
  auto ens224
  iface ens224 inet manual
- Define br1, its members, and additional relevant detail:
  auto br1
  iface br1 inet static
  bridge_ports ens224
  bridge_stp off
  bridge_maxwait 0
  address <address>
  netmask <netmask>
  network <network>

```
sonic@sonic1:~$ cat /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

#source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
auto ens160
#iface ens160 inet dhcp
iface ens160 inet static
    address 10.62.2.220
    netmask 255.255.255.0
    gateway 10.62.2.254
    dns-nameservers 10.62.2.1

# docker mgmt interface
auto ens224
iface ens224 inet manual

#
auto ens192
iface ens192 inet manual

auto br1
iface br1 inet static
    bridge_ports ens224
    bridge_stp off
    bridge_maxwait 0
    bridge_fd 0
    address 10.250.0.201
    netmask 255.255.255.0
    network 10.250.0.0
    #gateway 10.250.0.1
    #dns-nameservers 10.250.0.1 10.250.0.2

sonic@sonic1:~$
```

Modify /etc/network/interfaces

Continue editing the /etc/network/interfaces file:

Finally, declare the trunk connection from the testbed server to the root fanout switch:

- auto ens192
  iface ens192 inet manual

When you are done editing the interfaces file:

- Save the file
- Restart the network or reboot

```
sonic@sonic1:~$ cat /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

#source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
auto ens160
#iface ens160 inet dhcp
iface ens160 inet static
    address 10.62.2.220
    netmask 255.255.255.0
    gateway 10.62.2.254
    dns-nameservers 10.62.2.1

# docker mgmt interface
auto ens224
iface ens224 inet manual

#
auto ens192
iface ens192 inet manual

auto br1
iface br1 inet static
    bridge_ports ens224
    bridge_stp off
    bridge_maxwait 0
    bridge_fd 0
    address 10.250.0.201
    netmask 255.255.255.0
    network 10.250.0.0
    #gateway 10.250.0.1
    #dns-nameservers 10.250.0.1 10.250.0.2

sonic@sonic1:~$
```

Install PyYAML (3.12)

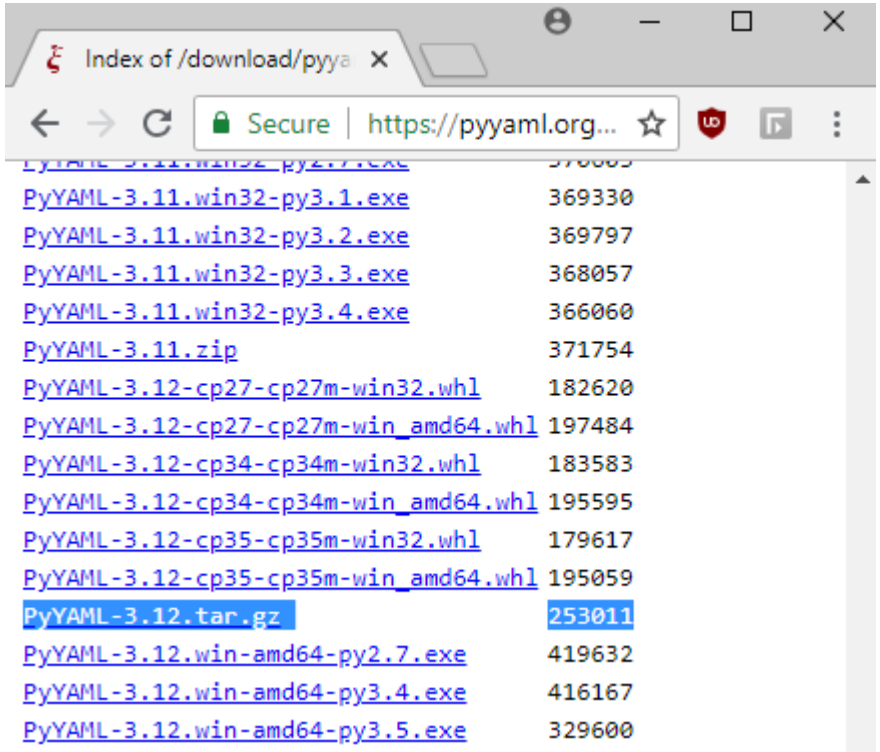
TestbedProcessing.py requires PyYAML.
PyYAML is a YAML parser and emitter for Python

Installation:

- To install from source, download the source package (we used PyYAML 3.12) and unpack it.
- Go to the directory, PyYAML-3.12
- Run “python setup.py install” to install
- Run “python setup.py test” to test for correct installation

References:

- https://pyyaml.org/download/pyyaml/
- https://pyyaml.org/wiki/PyYAMLDocumentation



Modify the (testbed-new.yaml) Configuration File

testbed-new.yaml sections

There are 8 main sections in testbed-new.yaml that need to be edited:

1. device_groups
2. devices
3. host_vars
4. veos_groups
5. veos
6. testbed
7. topology
8. docker_registry

Each of these sections above contribute to the files that need to be written into in order for the test cases to run. For more information about what each file does, please reference Sonic-Mgmt Testbed Configuration.

Files to Update

Base Directory: sonic/ansible/

```
sonic@7cabaf8d4208:~/sonic-mgmt/ansible$ ls
README.deploy.md                  ocp
README.md                         password.txt
README.test.md                    plugins
README.testbed.md                 roles
TestbedProcessing.py              shell_plugins
ansible.cfg                       sonic-buildimage
backup                            swap_syncd.yml
basic_check.yml                   templates
boot_onie.yml                     test_sonic.yml
config_sonic_basedon_testbed.yml  testbed-alvin-v3.yaml
deploy_sonic.yml                  testbed-cli.sh
doc                               testbed.csv
eos.yml                           testbed_add_vm_topology.yml
fanout.yml                        testbed_connect_vms.yml
fanout_connect.yml                testbed_disconnect_vms.yml
files                             testbed_remove_vm_topology.yml
group_vars                        testbed_renumber_vm_topology.yml
helloWorld.txt                    testbed_start_VMs.yml
host_vars                         testbed_stop_VMs.yml
inventory                         upgrade_sonic.yml
lab                               vars
latestPull.txt                    vars\docker_registry.yml
library                           veos
linkstate                         veos.yml
minigraph
sonic@7cabaf8d4208:~/sonic-mgmt/ansible$
```

Here is a list of files that will get updated:

- group_vars/vm_host/main.yml
- group_vars/vm_host/creds.yml
- files/sonic_lab_devices.csv
- testbed.csv
- files/sonic_lab_links.csv
- group_vars/eos/creds.yml
- group_vars/fanout/secrets.yml
- group_vars/lab/secrets.yml
- lab
- veos
- host variables (0 or more files will be generated)
- vars/docker_registry.yml

(OPTIONAL)
testbed_config section

- Name – choose a name for this testbed config file
- Alias – choose an alias for this testbed config file

```
testbed_config:
    name: sonic-mgmt-220 Testbed
    alias: topologyDeltaTestbed
    type: Physical # Physical or Virtual
```

device_groups section

USAGE: lab

The device_groups section generates the lab file which is the inventory file necessary for setting up the testbed. While the format in the configuration file is in yaml format, the script converts it to INI format. The device groups section includes all lab DUTs, fanout switches, and testbed server topologies. Group children are referenced from the devices section below. For the most part this section can be left alone.

```
device_groups:
    lab:
        children: [sonic-ag9032, fanout]
    sonic:
        children: [sonic-ag9032]
    sonic-ag9032:
        host: [sonic-ag9032]
        vars:
            hwsku: "Delta-ag9032v1"
            iface_speeds: "100000"
    fanout:
        host: [leaf-fanout]
        vars:
            hwsku: "ICOS"
            mgmt_subnet_mask_length: "24"
    ptf:
        host: [ptf32-1]
```

devices section

USAGE: files/sonic_lab_devices, group_vars/fanout/secrets, group_vars/lab/secrets, lab

The devices section is a dictionary that contains all devices and hosts. This section does not contain information on PTF containers. For more information on PTF containers, see the testbed.csv file.

The lab server section requires different fields to be entered:

- ansible_become_pass
- sonicadmin_user
- sonicadmin_password
- sonicadmin_initial_password

Sonicadmin_user is still just the username. The other fields is the password. These fields were selected because they are variables taken directly group_var/lab/secrets.yml. So for convenience, this section of the config file takes a copy of the variable labels.

devices section

For each device that you add, add the following (example given below):

hostname	ansible_ host	ansible_ ssh_user	ansible_ ssh_pass	hwSKU	device_type
str-acs-serv-01	10.250.0.201/24	sonic	[password]	TestServ	Server
leaf-fanout	10.250.0.36/24	admin	broadcom	ICOS	FanoutLeaf
root-fanout	10.250.0.47/24	admin	broadcom	ICOS	FanoutRoot
sonic-ag9032	10.250.0.45/24	admin	YourPaSsWoRd	Delta-ag9032v1	DevSonic

devices section

Header descriptions:

- hostname - names the devices you will use
- ansible_host - this is the managementIP where you can connect to the device
- ansible_ssh_user - this is your username to login to the device
- ansible_ssh_pass - this is your password to login to the device
- hwsku - this is the look up value for credentials in /group_vars/all/labinfo.json. Without this section, things will fail. Make sure this field is filled out and verify labinfo.json is accurate.
- device type - the type of device. If you only have 4 devices, you can leave the provided labels alone

```
devices:
    sonic-ag9032:
        device_type: DevSonic
        hwsku: Delta-ag9032v1
        alias:
        credentials:
            username:
            password:
            enable_password:
        ansible:
            ansible_host: 10.250.0.45/24
            ansible_ssh_user: admin
            ansible_ssh_pass: YourPaSsWoRd
```

host_vars section

USAGE: all host_var values

Define the host variables here. In this guide, we define the lab server (str-acs-serv-01) here.

For each host device that you add; define or verify the following:

- mgmt_bridge
- mgmt_prefixlen (this should match with the mgmt_subnet_mask_length)
- mgmt_gw
- external_iface

```
host_vars:
    str-acs-serv-01:
        mgmt_bridge: br1
        mgmt_prefixlen: 24
        mgmt_gw: 10.250.0.1
        external_iface: ens192
```

veos section

USAGE: group_vars/eos/creds, main.yml, group_vars/vm_host/creds

Like the veos_groups section, this section contains information about the servers and VMs within your testbed. There are two sets of tasks to perform.

```
veos:
    credentials:
        username:
        password:
    root_path: /home/sonic/sonic-mgmt/ansible/veos-vm/
    vm_images_url:
    cd_image_filename: Aboot-veos-serial-8.0.0.iso
    hdd_image_filename: vEOS-lab-4.15.10M.vmdk
    skip_image_downloading: true
    vm_console_base: 7000
    memory: 2097152
    max_fp_num: 4
    proxy_env:
        http_proxy:
        https_proxy:
    vm_host_ansible:
        ansible_user: sonic
        ansible_password:
        ansible_sudo_pass:
    eos_ansible:
        ansible_user: root
        ansible_password: 123456
    vms_1:
        VM0200:
            ansible_host: 10.250.0.50
        VM0201:
            ansible_host: 10.250.0.51
```

veos section

Confirm the following:

- root_path - server's root path to building the VMs
- cd_image_filename - you should be able to locate "Aboot-veos-serial-8.0.0.iso"
- hdd_image_file: you should also be able to locate "vEOS-lab-4.15.10M.vmdk"

Define:

- vm_console_base - if you are running multiple sets of sonic-mgmt VMs, define a conflict-free vm_console_base
- ansible_user - username to access VM
- ansible_password - password to access VM
- ansible_sudo_pass - same as password above
- vms_1
    - define the VMs that you want to bring up (i.e.: VM0200, VM0201, VM0202, etc...)
    - define the IPs of the VMs (i.e." 10.250.1.0, 10.250.1.1, 10.250.1.2, etc...)

testbed section

This is where the topology configuration file for the testbed will collect information from when running TestbedProcessing.py

#conf-name	group-name	topo	ptf_ image_ name	ptf_ip	server	vm_ base	dut	comment
ptf32-2	ptf32-2	ptf32	docker-ptf	10.250.0.191/24	server_1	VM0200	sonic-ag9032	Test ptf
t0-1	t0-1	t0	docker-ptf	10.250.0.192/24	server_1	VM0200	sonic-ag9032	Test ptf

testbed section

For each topology you use in your testbed environment, define the following:

- conf-name - to address row in table
- group-name - used in interface names, up to 8 characters. The variable can be anything but should be identifiable.
- topo - name of topology
- ptf_image_name - defines PTF image. In this guide, the docker-ptf was an image already on the local registry. If you don’t have docker-ptf from the sonic-buildimage github, follow the steps below:
    - git clone –recursive https://github.com/Azure/sonic-buildimage.git
    - make configure PLATFORM=generic
    - make target/docker-ptf.gz

```
testbed:
    ptf32-2:
        group-name: ptf32-2
        topo: ptf32
        ptf_image_name: docker-ptf
        ptf_ip: 10.250.0.191/24
        server: server_1
        vm_base: VM0200
        dut: sonic-ag9032
        comment: Test ptf
        ansible:
            ansible_host: 10.250.0.191/24
            ansible_ssh_user: root
            ansible_ssh_pass: root
```

testbed section

For each topology you use in your testbed environment, define the following (continued):

- ptf_ip - ip address for mgmt interface of PTF container. Choose an IP address that is available
- server - server where the testbed resides. Choose a veos_group to use that contains both the lab server and virtual machines
- vm_base - enter in the lowest ID value for the VMs you will be using to run the test cases. The lowest VM ID value can be found under the veos section of the testbed configuration file. IF empty, no VMs are used
- dut - enter in the target DUT that is used in the testbed environment
- comment - make a little note here
- ansible
    - ansible_host - IP address with port number
    - ansible_ssh_user - username to login to lab server
    - ansible_ssh_pass - password to login to lab server

Update docker_registry.yml

TestbedProcessing.py has a function called updateDockerRegistry() that will perform this task for you.

If the docker_registry.yml hasn't been updated already, the following data will be written into it:

- docker_registry_host: localhost:5000 <= ansible will load docker-ptf image from here
- docker_registry_username: root
- docker_registry_password: root

```
docker_registry:
    docker_registry_host: localhost:5000
    docker_registry_username: root
    docker_registry_password: root
```

topology section

USAGE: files/sonic_lab_links.csv

This section of the testbed configuration file defines the connection between the DUT to the leaf-fanout and the leaf-fanout to the lab server.

Static values: the bandwidth remains at 100000. VlanMode from the DUT to the leaf-fanout is always "Access." However, VlanMode from the leaf-fanout to the lab server is "Trunk".

topology section

From the DUT to the leaf-fanout, make sure to define:

- end ports – which DUT port is connected to which leaf-fanout (end) port
- vlanIDs - this is very important because the VlanIDs will bind to the ports

From the leaf-fanout to the server, make sure to define:

- lab device - the testbed server you will be using (probably str-acs-serv-01)
- endport - find this in ifconfig on your testbed server
- vlanID (range) - if you have 32 ports, the range is from the lowest VlanID you defined +31, totaling 32 ports

topology section

From leaf-fanout to DUT (sonic-ag9032)

```
sonic-ag9032:
    interfaces:
        Ethernet0:
            EndDevice: leaf-fanout
            EndPort: 0/1
            Bandwidth: 100000
            VlanID: 1781
            VlanMode: Access
        Ethernet4:
            EndDevice: leaf-fanout
            EndPort: 0/2
            Bandwidth: 100000
            VlanID: 1782
            VlanMode: Access
        Ethernet8:
            EndDevice: leaf-fanout
            EndPort: 0/3
            Bandwidth: 100000
            VlanID: 1783
            VlanMode: Access
        Ethernet12:
            EndDevice: leaf-fanout
            EndPort: 0/4
            Bandwidth: 100000
            VlanID: 1784
            VlanMode: Access
```

From leaf-fanout to str-acs-serv-01 (lab server)

```
leaf-fanout:
    interfaces:
        0/25:
            EndDevice: str-acs-serv-01
            EndPort: ens192
            Bandwidth: 40000
            VlanID: 1781-1812
            VlanMode: Trunk
```

docker_registry section

USAGE: vars/docker_registry.yml

The docker registry contains 3 pieces of information:

1. docker_registry_host
2. docker_registry_username
3. docker_registry_password

If you already have this information, you can choose to leave it blank and the script will skip this section.

```
docker_registry_host: localhost:5000

docker_registry_username: root
docker_registry_password: root
```

Running Test Cases

Run TestbedProcessing.py Script

Run the following command to automate the testbed configuration process:

- **python TestbedProcessing.py -i testbed-new.yaml**

Options:
-i = the testbed-new.yaml file to parse
-basedir = the basedir for the project
-backup = the backup directory for the files

TestbedProcessing.py conveniently backs up files that it will write into.

Backup directory location (within container):
/sonic-mgmt/ansible/backups/<timestamp>

```
sonic@df471490d97d:~/sonic-mgmt/ansible$ python TestbedProcessing.py -i testbed-alvin.yaml
PROCESS STARTED
BACKUP PROCESS STARTED
Error: could not backup vars/docker_registry.yml
BACKUP PROCESS COMPLETED
LOADING PROCESS STARTED
LOADING: testbed-alvin.yaml
LOADING PROCESS COMPLETED
GENERATING FILES FROM CONFIG FILE
        CREATING SONIC LAB LINKS: files/sonic_lab_links.csv
        CREATING SONIC LAB DEVICES: files/sonic_lab_devices.csv
        CREATING TEST BED: testbed.csv
        CREATING VM_HOST/CREDS: group_vars/vm_host/creds.yml
        CREATING EOS/CREDS: group_vars/eos/creds.yml
        CREATING FANOUT/SECRETS: group_vars/fanout/secrets.yml
        CREATING LAB SECRETS: group_vars/lab/secrets.yml
        CREATING MAIN.YML: group_vars/vm_host/main.yml
        CREATING LAB FILE: lab
        CREATING VEOS FILE: veos
        CREATING HOST VARS FILE(S): one or more files generated
UPDATING FILES FROM CONFIG FILE
        UPDATING DOCKER REGISTRY
PROCESS COMPLETED
sonic@df471490d97d:~/sonic-mgmt/ansible$
sonic@df471490d97d:~/sonic-mgmt/ansible$
```

Create lab_connect_graph.xml

The ansible/files/creategraph.py file is a helper script that helps you generate a lab_connection_graph.xml based on ansible/files/sonic_lab_devices.csv and ansible/files/sonic_lab_links.csv

- **python creategraph.py –o lab_connection_graph.xml**

The lab_connection_graph.xml is the lab graph file for library/conn_graph_facts.py to parse and get all the lab fanout switch connections information.

```
sonic@7cabaf8d4208:~/sonic-mgmt/ansible/files$ ls
creategraph.py                lab_connection_graph.xml.bak2  sonic_lab_devices.csv.old
lab_connection_graph.xml      sonic_lab_devices.csv          sonic_lab_links.csv
lab_connection_graph.xml.bak  sonic_lab_devices.csv.bak      sonic_lab_links.csv.bak
sonic@7cabaf8d4208:~/sonic-mgmt/ansible/files$
```

VMS Commands

Start VMS (using vms_1):

- **./testbed-cli.sh start-vms server_1 password.txt**

Stop VMS (using vms_1):

- **./testbed-cli.sh stop-vms server_1 password.txt**

Once the VMs have been successfully created, the VMs should be reachable on both the Docker container and the host machine.

```
sonic@7cabaf8d4208:~/sonic-mgmt/ansible$ ping 10.250.0.50
PING 10.250.0.50 (10.250.0.50) 56(84) bytes of data.
64 bytes from 10.250.0.50: icmp_seq=1 ttl=63 time=0.594 ms
64 bytes from 10.250.0.50: icmp_seq=2 ttl=63 time=0.674 ms
64 bytes from 10.250.0.50: icmp_seq=3 ttl=63 time=0.626 ms
^C
--- 10.250.0.50 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2026ms
rtt min/avg/max/mdev = 0.594/0.631/0.674/0.038 ms
sonic@7cabaf8d4208:~/sonic-mgmt/ansible$ ping 10.250.0.51
PING 10.250.0.51 (10.250.0.51) 56(84) bytes of data.
64 bytes from 10.250.0.51: icmp_seq=1 ttl=63 time=0.748 ms
64 bytes from 10.250.0.51: icmp_seq=2 ttl=63 time=0.439 ms
64 bytes from 10.250.0.51: icmp_seq=3 ttl=63 time=0.566 ms
^C
--- 10.250.0.51 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2046ms
rtt min/avg/max/mdev = 0.439/0.584/0.748/0.128 ms
sonic@7cabaf8d4208:~/sonic-mgmt/ansible$ ping 10.250.0.52
PING 10.250.0.52 (10.250.0.52) 56(84) bytes of data.
64 bytes from 10.250.0.52: icmp_seq=1 ttl=63 time=0.666 ms
64 bytes from 10.250.0.52: icmp_seq=2 ttl=63 time=0.564 ms
64 bytes from 10.250.0.52: icmp_seq=3 ttl=63 time=0.538 ms
^C
--- 10.250.0.52 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2026ms
rtt min/avg/max/mdev = 0.538/0.589/0.666/0.058 ms
sonic@7cabaf8d4208:~/sonic-mgmt/ansible$ ping 10.250.0.53
PING 10.250.0.53 (10.250.0.53) 56(84) bytes of data.
64 bytes from 10.250.0.53: icmp_seq=1 ttl=63 time=0.659 ms
64 bytes from 10.250.0.53: icmp_seq=2 ttl=63 time=0.558 ms
64 bytes from 10.250.0.53: icmp_seq=3 ttl=63 time=0.556 ms
^C
--- 10.250.0.53 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2037ms
rtt min/avg/max/mdev = 0.556/0.591/0.659/0.048 ms
sonic@7cabaf8d4208:~/sonic-mgmt/ansible$
```

Deploy Topology Container (PTF32)

In this guide, ptf32-1 will be added using the testbed-cli.sh script as an example. However, other topologies can be added as well.

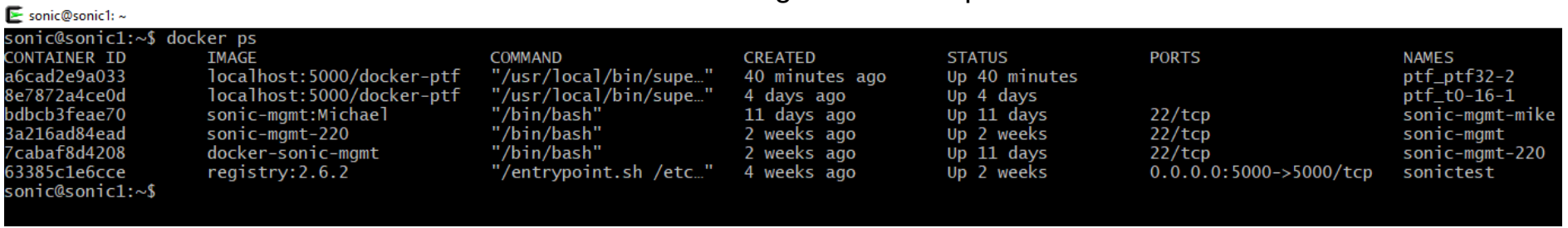
Remove topology ptf32-1:

- **./testbed-cli.sh remove-topo ptf32-1 password.txt**

Add topology ptf32-1:

- **./testbed-cli.sh add-topo ptf32-1 password.txt**

You can check to see if it was removed or added using the "docker ps" or "docker container ls"



Running the First Test Case (Neighbour)

When VMs and ptf32-1 topology is successfully added, the first test case, “neighbour” can be run. The testbed name and test case name need to be exported first. Check to see if they were exported properly. Afterwards, the playbook can be run.

Run the following commands:

- ➢ export TESTBED_NAME=ptf32-1
- ➢ export TESTCASE_NAME=neighbour
- ➢ echo $TESTBED_NAME
- ➢ echo $TESTCASE_NAME
- ➢ ansible-playbook -i lab -l sonic-ag9032 test_sonic.yml -e testbed_name=$TESTBED_NAME -e testcase_name=$TESTCASE_NAME

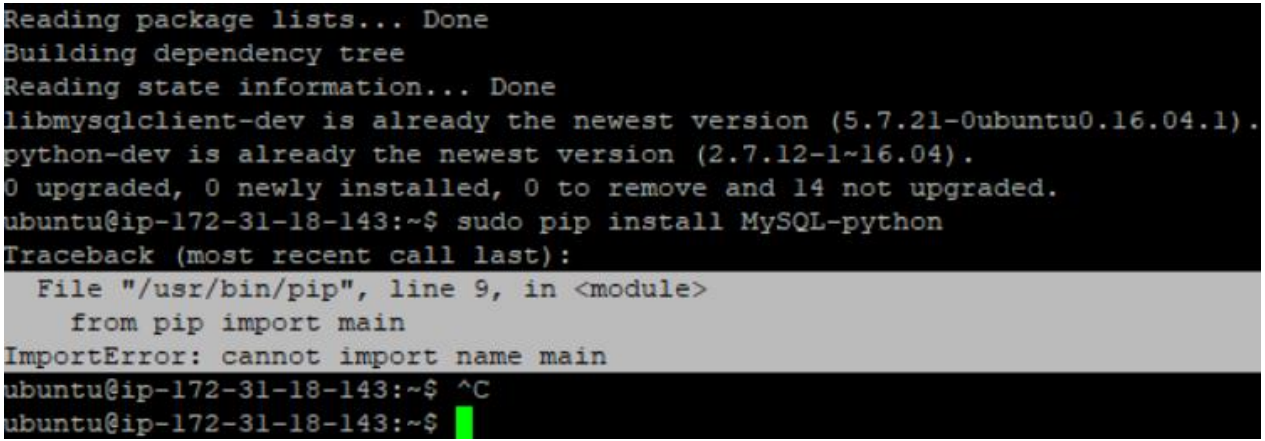
```
TASK [test : debug] ***********************************************************************
Friday 27 July 2018  18:47:02 +0000 (0:00:00.049)       0:01:08.612 ***********
ok: [sonic-ag9032] => {
    "msg": [
        "!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!",
        "!!!!!!!!!!!!!!!!!!!! end running test neighbour !!!!!!!!!!!!!!!!!!!!!",
        "!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!"
    ]
}

TASK [test : include] *********************************************************************
Friday 27 July 2018  18:47:02 +0000 (0:00:00.057)       0:01:08.669 ***********
skipping: [sonic-ag9032]

PLAY ***************************************************************************************
skipping: no hosts matched

PLAY RECAP *********************************************************************************
sonic-ag9032               : ok=55    changed=18    unreachable=0    failed=0

Friday 27 July 2018  18:47:02 +0000 (0:00:00.048)       0:01:08.718 ***********
===============================================================================
TASK: test : include -------------------------------------------------- 21.97s
TASK: test : include -------------------------------------------------- 13.17s
TASK: test : Ping DUT to populate neighbour ---------------------------- 2.69s
TASK: test : Ping DUT to populate neighbour ---------------------------- 2.62s
TASK: setup ------------------------------------------------------------ 2.02s
TASK: test : Get interface facts --------------------------------------- 1.97s
TASK: test : Get interface facts --------------------------------------- 1.96s
TASK: test : validate all interfaces are up after test ----------------- 1.36s
TASK: test : Set host MAC to pretend neighbour ------------------------- 0.99s
TASK: test : do basic sanity check after each test --------------------- 0.91s
TASK: test : Get process information in syncd docker ------------------- 0.75s
TASK: test : validate all interfaces is up ----------------------------- 0.68s
TASK: test : gather system version information ------------------------- 0.66s
TASK: test : Change host interface IP to test IP address --------------- 0.66s
TASK: test : Get the SONiC DB key holding neighbour MAC for {{ host_ip }} --- 0.62s
TASK: test : Get host MAC ---------------------------------------------- 0.59s
TASK: test : Gathering testbed information ----------------------------- 0.59s
TASK: test : Set host MAC to pretend neighbour ------------------------- 0.59s
TASK: test : Check neighbour MAC1 on DUT. Should be {{ nei_mac1 }} ------ 0.56s
TASK: test : Get orchagent process information ------------------------- 0.52s
```

Troubleshooting

Troubleshooting

Issue: Trying to update some libraries and packages but pip (version 10) throw “import error: cannot import name main”

Resolution: The ideal solution is to uninstall pip 10. Use “**python –m pip uninstall pip**” to uninstall the latest pip version but retain the patched pip version 8



Source: https://stackoverflow.com/questions/49964093/file-usr-bin-pip-line-9-in-module-from-pip

Troubleshooting

Issue: Trying to run start-vms CLI command but receiving error “No hosts matched”

Resolution: Check to see if the server group you are bringing up actually contains a host device (str-acs-serv-01). You can check this in the sonic-mgmt/ansible/veos file

```
sonic@7cabaf8d4208:~/sonic-mgmt/ansible$ cat veos
[eos:children]
vms_1

[vm_host_1]
STR-ACS-SERV-01 ansible_host=10.250.0.201

[servers:children]
server_1

[servers:vars]
topologies=[t1, t1-lag, t1-64-lag, t0, t0-52, ptf32, ptf64, t0-64, t0-64-32, t0-116]

[vm_host:children]
vm_host_1

[vms_1]
VM0200  ansible_host=10.250.0.50
VM0201  ansible_host=10.250.0.51
VM0202  ansible_host=10.250.0.52
VM0203  ansible_host=10.250.0.53

[server_1:children]
vm_host_1
vms_1

[server_1:vars]
host_var_file=host_vars/STR-ACS-SERV-01.yml

sonic@7cabaf8d4208:~/sonic-mgmt/ansible$
```

Troubleshooting

Issue: Testbed Command Line complains there is no password file available

Resolution: You can bypass this issue by creating an empty password file. CLI should be able to run afterwards

```
sonic@7cabaf8d4208:~/sonic-mgmt/ansible$ ./testbed-cli.sh remove-topo ptf32-2 password.txt
Removing topology 'ptf32-2'
reading
Found topology ptf32-2
ERROR! The vault password file /var/sonic/sonic-mgmt/ansible/password.txt was not found
```

Troubleshooting

Issue: Fails on task [Read dut minigraph]. Error message: “Can not find lab graph file lab_connection_graph.xml”

Resolution: To generate the lab_connection_graph.xml:

- Within your docker container, cd into /sonic-mgmt/ansible/files
- Run the following command: “python creategraph.py -o lab_connection_graph.xml”

```
TASK [Read dut minigraph] ******************************************************
Tuesday 14 August 2018  17:46:47 +0000 (0:00:00.057)       0:00:00.400 ********
fatal: [STR-ACS-SERV-01]: FAILED! => {"changed": false, "failed": true, "msg": "Can not find lab graph file lab_connection_graph.xml"}
```

Troubleshooting

Issue: The IPs I want to use are unavailable even after running the stop-vms command.

Resolution: If you ran the stop-vms command and still face this issue, you can run the following (outside your docker container)

- **virsh**
- **list**
- **destroy <VM_NAME> #delete the VM that is occupying the IP**
- **exit #exit out of virsh**

```
sonic@cord01:~$ virsh
Welcome to virsh, the virtualization interactive terminal.

Type:  'help' for help with commands
       'quit' to quit

virsh # list
 Id    Name                           State
----------------------------------------------------
 45    VM0102                         running
 46    VM0103                         running
 48    VM0100                         running

virsh #
```

Troubleshooting

Issue: Task setup failure. SSH Error: data could not be sent to the remote host.

Resolution: There are a plethora of things that could be wrong here. Here are some potential issues:

1. Make sure this host can be reached over SSH
2. Does your group_vars/all/lab_info.json file contain the correct credentials?
3. Does your device have the correct hwsku in files/sonic_lab_devices.csv?
4. Confirm that your lab file does not have “/”s after the Ips. “/”s are a way to denote port numbers which INI files do not recognize.
5. Recheck your testbed-new.yaml configuration file to see if you go the IPs and credentials correct.

Troubleshooting

Issue: After importing the docker image, run returns error message “no command specified.”

Resolution: An image imported via docker import won’t know what command to run. Any image will lose all of its associated metadata on export, so the default command won’t be available after importing it somewhere else

Definitions:

1. docker import – Creates an empty file system and imports the contents of the tarball (so you only get the file system but none of the image metadata)
2. docker load – loads the tarred repo (since “docker save” can save multiple images in a tarball)

Source: https://forums.docker.com/t/docker-save-or-import-losing-labels-and-entrypoints/25588

Troubleshooting

Issue: Error message: “Network auto configuration failed. Your network is probably not using the DHCP protocol. Alternatively, the DHCP server may be slow or some network HW is not working properly”

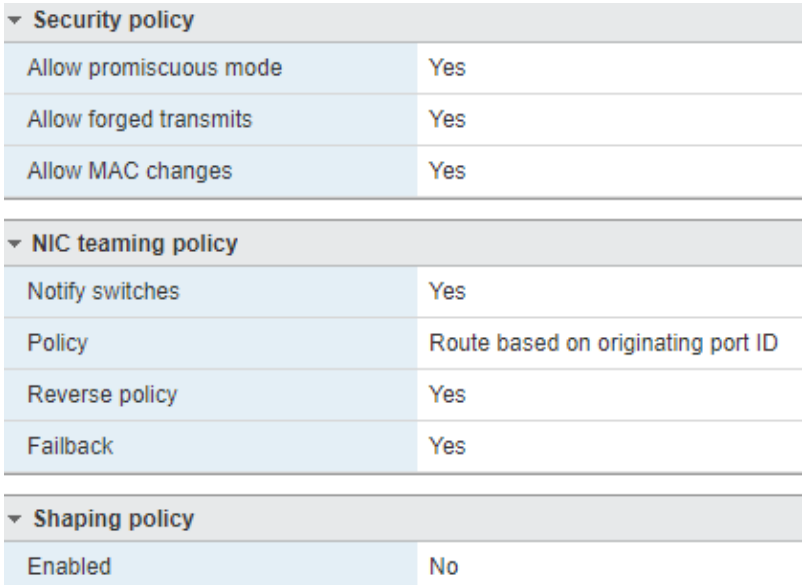
Resolution:
Configure the network manually.

- IP address: 10.62.2.221
- Netmask: 255.255.255.0
- Gateway: 10.62.2.1
- Name Server Address: 10.62.2.1
- Hostname: sonic1
- Domain name: none

Troubleshooting

VMWARE ESXi ISSUE
Issue: The traffic cannot reach the root fanout switch from the lab server

Resolution: Edit your virtual network's security policy to:
- allow promiscuous mode
- all forged transmits
- allow MAC changes



Security policy	
Allow promiscuous mode	Yes
Allow forged transmits	Yes
Allow MAC changes	Yes

NIC teaming policy	
Notify switches	Yes
Policy	Route based on originating port ID
Reverse policy	Yes
Failback	Yes

Shaping policy	
Enabled	No

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or scan the QR code

English

Traditional Chinese

Simplified Chinese