

Automate the installation and configuration of Nginx web server

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Table of Contents

1 Objective.....	4
2 Implementation Steps	6
2.1 Step-1 Create the directory structure and copy all necessary files. Repo- All files are available on - https://github.com/prvnmali2017/puppet_nginx . You can clone via git clone and get them easily if you want to be quick or create the below files manually on your host.	6
2.2 Step-2 Once the directory structure is ready with necessary files, Boot the Vagrant VM (with of your choice inside the Vagrantfile) Make sure the puppet agent runs inside the guest machine	13
2.3 Step-3 Apply the nginx Module using by logging into the Vagrant provisioned guest instance	19
2.4 Update the index.html `webpage into the Gitrepo (https://github.com/puppetlabs/exercise-webpage) on Master branch and run the puppet apply nginx again to reflect the latest changes.....	20

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1 Objective

Automate the Installation and configuration of Nginx web server using any configuration management tool.

NOTE - We will be using Puppet Version 4.10 and We will be using on Ubuntu 14.04 or Ubuntu 16.04 as It works on both versions.

NOTE - Make sure that no process will be running on Port 8000 on your local machine.

NOTE - we are not running master-client setup, so I have made it work only on standalone with puppet agent running (Masterless Puppet), so no certificate authentication at port 8140 will happen.

So we cannot run agent which communicates to puppetmaster using, puppet agent -t , we need to apply the nginx module using puppet apply <<module>>

Vagrant or Amazon EC2, wherever we can create the server running with proper ports open.

We can try various vagrant ubuntu Images listed from the vagrant cloud (<https://app.vagrantup.com/boxes/search>) to achieve the requirements mentioned below.

I have tested working with following images

`ubuntu-16.04-64-nocm`

`puppetlabs/ubuntu-14.04-64-puppet`

`puppetlabs/ubuntu-16.04-64-puppet`

`puppetlabs/ubuntu-14.04-64-nocm`

`puppetlabs/ubuntu-16.04-64-puppet`

`ubuntu/trusty64`

Requirements

Technical:

The nginx server must:

(a) serve requests over port 8000

(b) serve a page with the content of the following repository: <https://github.com/puppetlabs/exercise-webpage>

(a page from the repository must be served locally)

Your solution should:

(i) ensure that the required configuration is completed reliably when all the steps are completed

(ii) ensure that subsequent applications of the solution do not cause failures or repeat redundant configuration tasks

(iii) ensure that each execution of the solution results in nginx serving the latest available content from the repository linked above

Please perform this exercise on one of the following operating systems: CentOS/RHEL (6 or 7), Ubuntu (14.04 or 16.04), or Windows Server 2012R2.

We will likely use a vagrant box to review your solution. If you prefer, you can use one of the vagrant boxes located here:

<https://atlas.hashicorp.com/boxes/search>

<https://atlas.hashicorp.com/puppetlabs>

You can complete this exercise using your choice of automation tool or language. You do not need to produce a Puppet language solution. The emphasis should be on a working solution that satisfies the requirements.

Please attach:

1. **Your code solution in the file format in which it is expected to run. Submissions that cannot be executed as delivered will likely be disqualified.**

2. ***A brief paragraph explaining the steps required to apply your solution. Please explicitly state all assumptions (e.g. Only runs on RHEL6)***
3. ***Answers to the following questions. Limit your answers to 1-2 Pages.***

Reasoning:

- **Describe the most difficult/painful hurdle you had to overcome in implementing your solution.**
- **Please explain why requirement (ii) above might be important.**
- **Where did you go to find information to help you in the build process?**
- **Briefly explain what automation means to you, and why it is important to an organization's infrastructure design strategy.**

2 Implementation Steps

2.1 Step-1

Create the directory structure and copy all necessary files.

Repo- All files are available on - https://github.com/prvnmali2017/puppet_nginx . You can clone via git clone and get them easily if you want to be quick or create the below files manually on your host.

1. **Create the directory structure as shown below and copy all the files required to accomplish the task.**
2. **Commands to create the directory structure and files as shown**

```
##Create all required directories
malipr@malipr ~/D/C/Assignment>mkdir -p puppet_nginx/module/nginx/{examples,files,manifests}

malipr@malipr ~/D/C/Assignment>cd puppet_nginx; // cd into the directory - change directory

##Create two empty files
malipr@malipr ~/D/C/Assignment/puppet_nginx>touch Vagrantfile puppet_deploy.sh;

##Create empty files under module/nginx/examples/
malipr@malipr ~/D/C/Assignment/puppet_nginx>touch module/nginx/examples/init.pp;

##Create empty files under module/examples/nginx/files
malipr@malipr ~/D/C/Assignment/puppet_nginx>touch module/nginx/files/default.conf;
malipr@malipr ~/D/C/Assignment/puppet_nginx>touch module/nginx/files/nginx.conf;
malipr@malipr ~/D/C/Assignment/puppet_nginx>touch module/nginx/files/index.html;

##Create empty files under module/examples/nginx/manifests //In here reside the original puppet code
malipr@malipr ~/D/C/Assignment/puppet_nginx>touch module/nginx/manifests/init.pp;
malipr@malipr ~/D/C/Assignment/puppet_nginx>touch module/nginx/manifests/repo.pp;
```

3. **Directory Structure should look as shown below when you execute the tree command.**

```
malipr@malipr ~/D/C/Assignment> tree puppet_nginx
puppet_nginx
├── Vagrantfile
├── puppet_deploy.sh
├── module
│   └── nginx
│       ├── examples
│       │   └── init.pp
│       ├── files
│       │   ├── default.conf
│       │   ├── index.html
│       │   └── nginx.conf
│       └── manifests
│           ├── init.pp
│           └── repo.pp
└── __
```

4. Populate all the files by editing using VI Editor

puppet_nginx/Vagrantfile

```
# -*- mode: ruby -*-
# vi: set ft=ruby :
Vagrant.configure("2") do |config|
  config.vm.box = "puppetlabs/ubuntu-16.04-64-nocm"
  config.vm.provision :shell, path: "puppet_deploy.sh"
  config.vm.provision "file", source: "module", destination: "/etc/puppetlabs/code/environments/production/modules"
  config.vm.network "forwarded_port", guest: 8000, host: 8000
end

##Expose the ports 8000 on guest and expose the same on host
##so that I can access the webpage on my local machine on
##port 8000 using ##http://localhost:8000

###List of available VMs that we can use
#ubuntu-16.04-64-nocm
#puppetlabs/ubuntu-14.04-64-puppet
#puppetlabs/ubuntu-16.04-64-puppet
#puppetlabs/ubuntu-14.04-64-nocm
#puppetlabs/ubuntu-16.04-64-puppet
#ubuntu/trusty64
```

puppet_nginx/module/nginx/manifests/init.pp

```
class nginx {
  require nginx::repo
  File {
    owner   => 'root',
    group   => 'root',
    mode    => '0644',
  }
  package { ['nginx']:
    ensure => present,
  }
  file { ['/var/www']:
    ensure => directory,
  }
  file { ['/var/www/index.html']:
    ensure => file,
    source => 'file:/etc/puppetlabs/code/exercise-webpage/index.html',
  }
  file { ['/etc/nginx/nginx.conf']:
    ensure => file,
    source => 'puppet:///modules/nginx/nginx.conf',
    require => Package['nginx'],
    notify  => Service['nginx'],
  }
  file { ['/etc/nginx/sites-enabled/default']:
    ensure => file,
    source => 'puppet:///modules/nginx/default.conf',
    require => Package['nginx'],
    notify  => Service['nginx'],
  }
  service { ['nginx']:
    ensure => running,
    enable => true,
  }
}
```

puppet_nginx/module/nginx/manifests/repo.pp


```

class nginx::repo {

  exec { "apt-get update":
    command      => "/usr/bin/apt-get update",
    refreshonly => true,
  }

  package { 'git':
    ensure  => installed,
    require => Exec['apt-get update'],
  }

  vcsrepo { '/etc/puppetlabs/code/exercise-webpage':
    ensure  => latest,
    provider => git,
    source  => 'https://github.com/puppetlabs/exercise-webpage',
    revision => 'master',
  }
}

```

module/nginx/files/default.conf

```

# Default server configuration
server {
    listen 8000 default_server;
    listen [::]:8000 default_server;
    root /var/www;
    index index.html index.htm index.nginx-debian.html;
    server_name _;
    location / {
        # First attempt to serve request as file, then
        # as directory, then fall back to displaying a 404.
        try_files $uri $uri/ =404;
    }
}

```

module/nginx/files/nginx.conf

```

user www-data;
worker_processes auto;
pid /run/nginx.pid;
events {
    worker_connections 768;
    # multi_accept on;
}
http {
    sendfile on;
    tcp_nopush on;
    tcp_nodelay on;
    keepalive_timeout 65;
    types_hash_max_size 2048;
    include /etc/nginx/mime.types;
    default_type application/octet-stream;
    ##
    # SSL Settings
    ##
    ssl_protocols TLSv1 TLSv1.1 TLSv1.2; # Dropping SSLv3, ref: POODLE
    ssl_prefer_server_ciphers on;
    # Logging Settings
    ##
    access_log /var/log/nginx/access.log;
    error_log /var/log/nginx/error.log;
    # Gzip Settings
    ##
    gzip on;
    gzip_disable "msie6";
    include /etc/nginx/conf.d/*.conf;
    include /etc/nginx/sites-enabled/*;
}

```

puppet_nginx/module/nginx/files/index.html

```

##index.html served inside puppet module, not mandate in the requirement as we will pull from git
and server it locally
Default Index file for Nginx- Served inside the puppet module

```

puppet_nginx/module/nginx/examples/init.pp

```

include nginx
include nginx::repo

```

puppet_nginx/puppet_deploy.sh

// I Use the my below script to provision puppet on vagrant boxes, it will overwrite existing config files and gets the puppet running, Also

NOTE - I have used VCS puppet module installation and permission changes along with script at the bottom.

```
#!/bin/bash
set +e

ENVIRONMENT="production"
MAJOR_REL="4.10"
RHEL_RELEASE="6"

# Automatically get Ubuntu OS release
ReleaseName=`cat /etc/lsb-release | grep DISTRIB_CODENAME | awk -F '=' '{print($2)}'`
if [ "$ReleaseName" == "trusty" ]; then
    RELEASEPKG="puppetlabs-release-pci-trusty.deb"
elif [ "$ReleaseName" == "xenial" ]; then
    RELEASEPKG="puppetlabs-release-pci-xenial.deb"
else
    echo "FAILURE: Cannot find an acceptable match for OS release [$ReleaseName]... exiting"
    logger "FAILURE: Cannot find an acceptable match for OS release [$ReleaseName]... exiting"
    exit
fi

### MAIN ###
logger "puppet_deploy: Starting Puppet deployment script"

is_Puppet4=`awk -v n1=$MAJOR_REL -v n2=4 'BEGIN {if (n1>=n2) printf ("true"); else printf ("false");}'`

is_Rhel=`cat /etc/*release* | grep -i centos || cat /etc/*release* | grep -i rhel`
is_Rhel=`echo $?`

is_Debian=`cat /etc/*release* | grep -i debian`
is_Debian=`echo $?`

# If this is a Amazon Linux AMI OS
if [ "$is_Amazon" == "0" ]; then

# Confirm is not rhel
    is_Rhel=1

# Install puppet and it's dependancies
    yum install puppet3 -y
    yum install augeas -y

# Lock the puppet version so can't be updated
    yum install yum-plugin-versionlock -y
    rpm -qa | grep -i puppet3 | head -1 >> /etc/yum/pluginconf.d/versionlock.list

else
    if [ "$is_Debian" == "0" ]; then
# This is for Debian based OS's
# Set Puppet version requirement so it stays inline with Puppet master
        if [ "$is_Puppet4" == "true" ]; then
            echo "Package: puppet-agent" > /etc/apt/preferences.d/00-puppet.pref
        else
            echo "Package: puppet puppet-common" > /etc/apt/preferences.d/00-puppet.pref
        fi
    fi
fi
```

```

fi
echo "Pin: version $MAJOR_REL"*" >> /etc/apt/preferences.d/00-puppet.pref
echo "Pin-Priority: 501" >> /etc/apt/preferences.d/00-puppet.pref

# Install Puppet
cd ~
wget https://apt.puppetlabs.com/$RELEASEPKG
dpkg -i $RELEASEPKG
apt-get update
logger "Installing puppet agent now..."
echo "Installing puppet agent now..."
if [ "$is_Puppet4" == "true" ]; then
    apt-get install puppet-agent -y
else
    apt-get install puppet -y
fi

# Install configure tool
apt-get install Augeas-Tools -y
else
    if [ "$is_Rhel" == "0" ]; then
        # Install repo for this OS:
        rpm -Uvh http://yum.puppetlabs.com/puppetlabs-release-el-$RHEL_RELEASE.noarch.rpm

        # Find latest minor version for required major
        install_version=`yum --showduplicates list puppet | grep $MAJOR_REL | tail -1 | awk
'{print($2)}'`
        echo "Installing puppet version: $install_version"
        sleep 3

        # Install puppet and it's dependencies
        yum install puppet-$install_version
        yum install Augeas

        # Lock the puppet version so can't be updated
        yum install yum-plugin-versionlock
        rpm -qa | grep -i puppet >> /etc/yum/pluginconf.d/versionlock.list

        # install extra yum repository that no longer come as default in #7
        if [ "$RHEL_RELEASE" == "7" ]; then
            yum install epel-release
        fi
    else
        echo "no suitable OS found, so exit"
        logger "no suitable OS found, so exit"
        exit
    fi
fi
fi

##### START AUGTOOL INTERACTIVE
cat <<EOF | augtool
# Set Agent start
set /files/etc/default/puppet/START yes

```

```

# Set Environment
set /files/etc/puppetlabs/puppet/puppet.conf/agent/environment $ENVIRONMENT
save
EOF
#####END  AUGTOOL INTERACTIVE

if [ "$is_Puppet4" == "true" ]; then
    /opt/puppetlabs/bin/puppet agent -t &> /dev/null
    sleep 1
    /opt/puppetlabs/bin/puppet agent -t &> /dev/null
else
    puppet agent -t &> /dev/null
    sleep 1
    puppet agent -t &> /dev/null
fi
service puppet restart
echo ""
echo "# puppet agent -t (puppet 4: /opt/puppetlabs/bin/puppet agent -t)"

# If this is a RHEL OS
if [ "$is_Rhel" == "0" ]; then
    chkconfig puppet on
fi

# If this is a Amazon Linux AMI OS
if [ "$is_Amazon" == "0" ]; then
    chkconfig puppet on
fi

###Exporting the Environment Variables
export PATH=/opt/puppetlabs/bin:$PATH

###Downloading the module from puppet forge for vcs
puppet module install puppetlabs-vcsrepo --version 2.3.0

###Changing the permissions on destination directory
###to copy the nginx module from local host to vagrant machine
chmod 777 /etc/puppetlabs/code/environments/production/modules
echo "Puppet agent is running"
exit 0

```

2.2 Step-2

**Once the directory structure is ready with necessary files,
Boot the Vagrant VM (with of your choice inside the Vagrantfile)
Make sure the puppet agent runs inside the guest machine**

1. **Change to the current working directory which is puppet_nginx and perform vagrant up**

```

malipr@malipr ~/D/C/Assignment> cd puppet_nginx
malipr@malipr ~/D/C/A/puppet_nginx> ls -l
total 24
-rw-r--r--  1 malipr  staff   778 14 Sep 23:09 Vagrantfile
drwxr-xr-x  3 malipr  staff  102 14 Sep 11:48 module
-rw-r--r--  1 malipr  staff  4431 14 Sep 14:23 puppet_deploy.sh

malipr@malipr ~/D/C/A/puppet_nginx> tree
.
├── Vagrantfile
├── module
│   └── nginx
│       ├── examples
│       │   └── init.pp
│       ├── files
│       │   ├── default.conf
│       │   ├── index.html
│       │   └── nginx.conf
│       └── manifests
│           ├── init.pp
│           └── repo.pp
└── puppet_deploy.sh

5 directories, 8 files
## Run vagrant up command
malipr@malipr ~/D/C/A/puppet_nginx> vagrant up

```

2. We can now see that, vagrant initializes and boots the new VM guest instance and Deploys the puppet and starts running agent along with additional repos and permissions being made.
3. If we use the Puppet Based VM, It re-writes the configuration files and makes sure it works with the exact puppet version of V4.10
4. We might see some RED log debug messages comment which we can ignore as it is replacing some files when puppet provision is in progress.

```

malipr@malipr ~/D/C/A/puppet_nginx> vagrant up
Bringing machine 'default' up with 'virtualbox' provider...
==> default: Checking if box 'puppetlabs/ubuntu-16.04-64-nocm' is up to date...
==> default: Preparing network interfaces based on configuration...
    default: Adapter 1: nat
==> default: Forwarding ports...
    default: 8000 (guest) => 8000 (host) (adapter 1)
    default: 22 (guest) => 2222 (host) (adapter 1)
==> default: Booting VM...
==> default: Waiting for machine to boot. This may take a few minutes...
    default: SSH address: 127.0.0.1:2222
    default: SSH username: vagrant
    default: SSH auth method: private key
    default:
    default: Vagrant insecure key detected. Vagrant will automatically replace
    default: this with a newly generated keypair for better security.
    default:
    default: Inserting generated public key within guest...
    default: Removing insecure key from the guest if it's present...
    default: Key inserted! Disconnecting and reconnecting using new SSH key...
==> default: Machine booted and ready!
==> default: Checking for guest additions in VM...
    default: The guest additions on this VM do not match the installed version of
    default: VirtualBox! In most cases this is fine, but in rare cases it can
    default: prevent things such as shared folders from working properly. If you see
    default: shared folder errors, please make sure the guest additions within the
    default: virtual machine match the version of VirtualBox you have installed on
    default: your host and reload your VM.
    default:
    default: Guest Additions Version: 5.0.20
    default: VirtualBox Version: 5.2
==> default: Mounting shared folders...
    default: /vagrant => /Users/malipr/Desktop/CV/Assignment/puppet_nginx
==> default: Running provisioner: shell...
    default: Running: /var/folders/qr/k53n0b_j183bjs3b_4tf0vhh000gn/T/vagrant-
shell20180914-82609-1haew6o.sh
    default: --2018-09-14 06:20:15-- https://apt.puppetlabs.com/puppetlabs-release-pci-xenial.deb
    default: Resolving apt.puppetlabs.com (apt.puppetlabs.com)...
    default: 54.230.245.147
    default: ,
    default: 54.230.245.116
    default: ,
    default: 54.230.245.194
    default: , ...
    default: Connecting to apt.puppetlabs.com (apt.puppetlabs.com)|54.230.245.147|:443...
    default: connected.
    default: HTTP request sent, awaiting response...
    default: 200 OK
    default: Length: 13662 (13K) [application/x-debian-package]
    default: Saving to: 'puppetlabs-release-pci-xenial.deb'
    default:
    default:      OK ..... 100% 271M=0s
    default:

```

```

default: 2018-09-14 06:20:16 (271 MB/s) - 'puppetlabs-release-pc1-xenial.deb' saved [13662/
13662]
default: Selecting previously unselected package puppetlabs-release-pc1.
default: (Reading database ... 61673 files and directories currently installed.)
default: Preparing to unpack puppetlabs-release-pc1-xenial.deb ...
default: Unpacking puppetlabs-release-pc1 (1.1.0-2xenial) ...
default: Setting up puppetlabs-release-pc1 (1.1.0-2xenial) ...
default: Ign:1 http://apt.puppetlabs.com xenial InRelease
default: Get:2 http://apt.puppetlabs.com xenial Release [57.5 kB]
default: Get:3 http://apt.puppetlabs.com xenial Release.gpg [819 B]
default: Get:4 http://security.ubuntu.com/ubuntu xenial-security InRelease [107 kB]
default: Get:5 http://apt.puppetlabs.com xenial/PC1 amd64 Packages [23.9 kB]
default: Get:6 http://apt.puppetlabs.com xenial/PC1 i386 Packages [21.2 kB]
default: Get:7 http://apt.puppetlabs.com xenial/PC1 all Packages [8,432 B]
default: Hit:8 http://us.archive.ubuntu.com/ubuntu xenial InRelease
default: Get:9 http://us.archive.ubuntu.com/ubuntu xenial-updates InRelease [109 kB]
default: Get:10 http://security.ubuntu.com/ubuntu xenial-security/main amd64 Packages [554 kB]
default: Get:11 http://us.archive.ubuntu.com/ubuntu xenial-backports InRelease [107 kB]
default: Get:12 http://us.archive.ubuntu.com/ubuntu xenial-updates/main amd64 Packages [849 kB]
default: Get:13 http://security.ubuntu.com/ubuntu xenial-security/main i386 Packages [479 kB]
default: Get:14 http://security.ubuntu.com/ubuntu xenial-security/main Translation-en [234 kB]
default: Get:15 http://security.ubuntu.com/ubuntu xenial-security/restricted amd64 Packages
[7,204 B]
default: Get:16 http://security.ubuntu.com/ubuntu xenial-security/restricted i386 Packages
[7,224 B]
default: Get:17 http://security.ubuntu.com/ubuntu xenial-security/restricted Translation-en
[2,152 B]
default: Get:18 http://security.ubuntu.com/ubuntu xenial-security/universe amd64 Packages [370
kB]
default: Get:19 http://security.ubuntu.com/ubuntu xenial-security/universe i386 Packages [317
kB]
default: Get:20 http://us.archive.ubuntu.com/ubuntu xenial-updates/main i386 Packages [763 kB]
default: Get:21 http://security.ubuntu.com/ubuntu xenial-security/universe Translation-en [141
kB]
default: Get:22 http://security.ubuntu.com/ubuntu xenial-security/multiverse amd64 Packages
[3,460 B]
default: Get:23 http://security.ubuntu.com/ubuntu xenial-security/multiverse i386 Packages
[3,628 B]
default: Get:24 http://security.ubuntu.com/ubuntu xenial-security/multiverse Translation-en
[1,744 B]
default: Get:25 http://us.archive.ubuntu.com/ubuntu xenial-updates/main Translation-en [347 kB]
default: Get:26 http://us.archive.ubuntu.com/ubuntu xenial-updates/restricted amd64 Packages
[7,556 B]
default: Get:27 http://us.archive.ubuntu.com/ubuntu xenial-updates/restricted i386 Packages
[7,524 B]
default: Get:28 http://us.archive.ubuntu.com/ubuntu xenial-updates/restricted Translation-en
[2,272 B]
default: Get:29 http://us.archive.ubuntu.com/ubuntu xenial-updates/universe amd64 Packages [683
kB]
default: Get:30 http://us.archive.ubuntu.com/ubuntu xenial-updates/universe i386 Packages [625
kB]
default: Get:31 http://us.archive.ubuntu.com/ubuntu xenial-updates/universe Translation-en [276
kB]

```



```

default: Get:32 http://us.archive.ubuntu.com/ubuntu xenial-updates/multiverse amd64 Packages
[16.4 kB]
default: Get:33 http://us.archive.ubuntu.com/ubuntu xenial-updates/multiverse i386 Packages
[15.5 kB]
default: Get:34 http://us.archive.ubuntu.com/ubuntu xenial-updates/multiverse Translation-en
[8,344 B]
default: Get:35 http://us.archive.ubuntu.com/ubuntu xenial-backports/main amd64 Packages [6,756
B]
default: Get:36 http://us.archive.ubuntu.com/ubuntu xenial-backports/main i386 Packages [6,752
B]
default: Get:37 http://us.archive.ubuntu.com/ubuntu xenial-backports/main Translation-en [4,180
B]
default: Get:38 http://us.archive.ubuntu.com/ubuntu xenial-backports/universe amd64 Packages
[7,420 B]
default: Get:39 http://us.archive.ubuntu.com/ubuntu xenial-backports/universe i386 Packages
[7,104 B]
default: Get:40 http://us.archive.ubuntu.com/ubuntu xenial-backports/universe Translation-en
[3,996 B]
default: Fetched 6,191 kB in 4s (1,312 kB/s)
default: Reading package lists...
default: Installing puppet agent now...
default: Reading package lists...
default: Building dependency tree...
default: Reading state information...
default: The following NEW packages will be installed:
default:  puppet-agent
default: 0 upgraded, 1 newly installed, 0 to remove and 231 not upgraded.
default: Need to get 16.2 MB of archives.
default: After this operation, 92.7 MB of additional disk space will be used.
default: Get:1 http://apt.puppetlabs.com xenial/PC1 amd64 puppet-agent amd64 1.10.14-1xenial
[16.2 MB]
default: dpkg-preconfigure: unable to re-open stdin: No such file or directory
default: Fetched 16.2 MB in 3s (5,298 kB/s)
default: Selecting previously unselected package puppet-agent.
default: (Reading database ...
default: (Reading database ... 5%
default: (Reading database ... 10%
default: (Reading database ... 15%
default: (Reading database ... 20%
default: (Reading database ... 25%
default: (Reading database ... 30%
default: (Reading database ... 35%
default: (Reading database ... 40%
default: (Reading database ... 45%
default: (Reading database ... 50%
default: (Reading database ... 55%
default: (Reading database ... 60%
default: (Reading database ... 65%
default: (Reading database ... 70%
default: (Reading database ... 75%
default: (Reading database ... 80%
default: (Reading database ... 85%
default: (Reading database ... 90%
default: (Reading database ... 95%

```

```

default: (Reading database ... 100%
default: (Reading database ...
default: 61678 files and directories currently installed.)
default: Preparing to unpack .../puppet-agent_1.10.14-1xenial_amd64.deb ...
default: Unpacking puppet-agent (1.10.14-1xenial) ...
default: Processing triggers for libc-bin (2.23-0ubuntu3) ...
default: Setting up puppet-agent (1.10.14-1xenial) ...
default: Created symlink from /etc/systemd/system/multi-user.target.wants/puppet.service to /
lib/systemd/system/puppet.service.
default: Created symlink from /etc/systemd/system/multi-user.target.wants/mcollective.service
to /lib/systemd/system/mcollective.service.
default: Created symlink from /etc/systemd/system/multi-user.target.wants/pxp-agent.service to /
lib/systemd/system/pxp-agent.service.
default: Removed symlink /etc/systemd/system/multi-user.target.wants/pxp-agent.service.
default: Processing triggers for libc-bin (2.23-0ubuntu3) ...
default: Reading package lists...
default: Building dependency tree...
default: Reading state information...
default: The following additional packages will be installed:
default:  augeas-lenses libaugeas0
default: Suggested packages:
default:  augeas-doc
default: The following NEW packages will be installed:
default:  augeas-lenses augeas-tools libaugeas0
default: 0 upgraded, 3 newly installed, 0 to remove and 231 not upgraded.
default: Need to get 439 kB of archives.
default: After this operation, 2,058 kB of additional disk space will be used.
default: Get:1 http://us.archive.ubuntu.com/ubuntu xenial-updates/main amd64 augeas-lenses all
1.4.0-0ubuntu1.1 [263 kB]
default: Get:2 http://us.archive.ubuntu.com/ubuntu xenial-updates/main amd64 libaugeas0 amd64
1.4.0-0ubuntu1.1 [154 kB]
default: Get:3 http://us.archive.ubuntu.com/ubuntu xenial-updates/main amd64 augeas-tools amd64
1.4.0-0ubuntu1.1 [21.9 kB]
default: dpkg-preconfigure: unable to re-open stdin: No such file or directory
default: Fetched 439 kB in 2s (149 kB/s)
default: Selecting previously unselected package augeas-lenses.
default: (Reading database ...
default: (Reading database ... 5%
default: (Reading database ... 10%
default: (Reading database ... 15%
default: (Reading database ... 20%
default: (Reading database ... 25%
default: (Reading database ... 30%
default: (Reading database ... 35%
default: (Reading database ... 40%
default: (Reading database ... 45%
default: (Reading database ... 50%
default: (Reading database ... 55%
default: (Reading database ... 60%
default: (Reading database ... 65%
default: (Reading database ... 70%
default: (Reading database ... 75%
default: (Reading database ... 80%
default: (Reading database ... 85%

```

```

default: (Reading database ... 90%
default: (Reading database ... 95%
default: (Reading database ... 100%
default: (Reading database ...
default: 69962 files and directories currently installed.)
default: Preparing to unpack .../augeas-lenses_1.4.0-0ubuntu1.1_all.deb ...
default: Unpacking augeas-lenses (1.4.0-0ubuntu1.1) ...
default: Selecting previously unselected package libaugeas0.
default: Preparing to unpack .../libaugeas0_1.4.0-0ubuntu1.1_amd64.deb ...
default: Unpacking libaugeas0 (1.4.0-0ubuntu1.1) ...
default: Selecting previously unselected package augeas-tools.
default: Preparing to unpack .../augeas-tools_1.4.0-0ubuntu1.1_amd64.deb ...
default: Unpacking augeas-tools (1.4.0-0ubuntu1.1) ...
default: Processing triggers for libc-bin (2.23-0ubuntu3) ...
default: Processing triggers for man-db (2.7.5-1) ...
default: Setting up augeas-lenses (1.4.0-0ubuntu1.1) ...
default: Setting up libaugeas0 (1.4.0-0ubuntu1.1) ...
default: Setting up augeas-tools (1.4.0-0ubuntu1.1) ...
default: Processing triggers for libc-bin (2.23-0ubuntu3) ...
default: Saved 2 file(s)
default:
default: # puppet agent -t (puppet 4: /opt/puppetlabs/bin/puppet agent -t)
default: Notice: Preparing to install into /etc/puppetlabs/code/environments/production/
modules ...
default: Notice: Downloading from https://forgeapi.puppet.com ...
default: Notice: Installing -- do not interrupt ...
default: /etc/puppetlabs/code/environments/production/modules
default: └─ puppetlabs-vcsrepo (v2.3.0)
==> default: Running provisioner: file...
default: puppet agent is running

```

2.3 Step-3

Apply the nginx Module using by logging into the Vagrant provisioned guest instance

- Login to the instance using `vagrant ssh`.
- Make sure you are inside the `puppet_nginx` folder where the vagrant guest instance was provisioned.
- change the directory by switching to root - `/etc/puppetlabs/code/environments/production/modules`
- Apply Puppet Nginx module using the command `puppet apply nginx`
- Verify the current webpage running on `http://localhost:8000`

```
malipr@malipr ~/D/C/A/puppet_nginx> pwd
/Users/malipr/Desktop/CV/Assignment/puppet_nginx

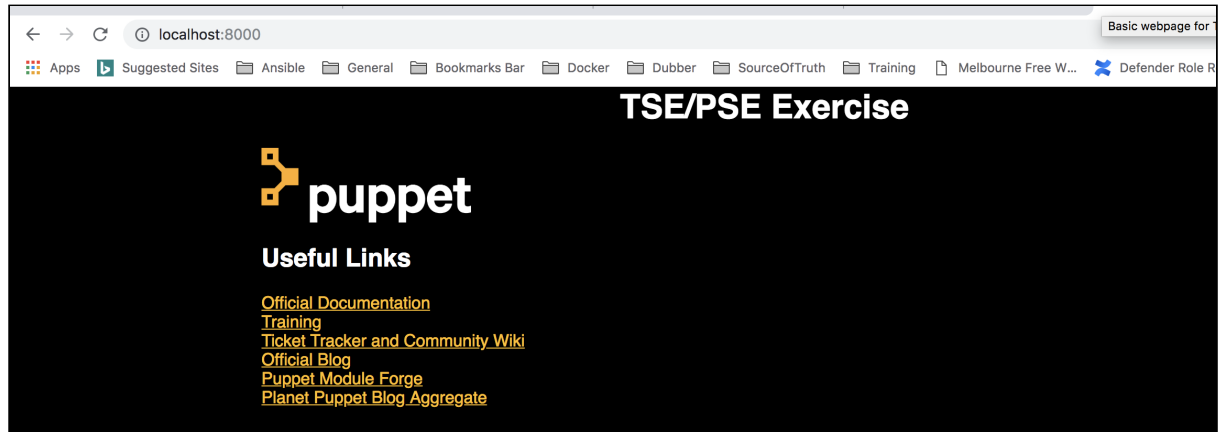
malipr@malipr ~/D/C/A/puppet_nginx> vagrant ssh
Welcome to Ubuntu 16.04 LTS (GNU/Linux 4.4.0-21-generic x86_64)
Last login: Fri Sep 14 23:52:08 2018 from 10.0.2.2
vagrant@localhost:~$ sudo su -
root@localhost:~# cd /etc/puppetlabs/code/environments/production/modules/

root@localhost:/etc/puppetlabs/code/environments/production/modules# ls -l
total 8
drwxr-xr-x 5 vagrant vagrant 4096 Sep 14 06:20 nginx
drwxr-xr-x 6 root root 4096 Jan 19 2018 vcsrepo

root@localhost:/etc/puppetlabs/code/environments/production/modules# puppet apply nginx

Notice: Compiled catalog for localhost.gateway in environment production in 1.39 seconds
Notice: /Stage[main]/Nginx::Repo/Vcsrepo[/etc/puppetlabs/code/exercise-webpage]/ensure: Creating repository from latest
Notice: /Stage[main]/Nginx::Repo/Vcsrepo[/etc/puppetlabs/code/exercise-webpage]/ensure: created
Notice: /Stage[main]/Nginx/File[/var/www/index.html]/content: content changed '{md5}eb0d966a5e1218052a2d5904e684a46a' to '{md5}1ec250959f60528d5a81474d81529ede'
Notice: Applied catalog in 2.28 seconds
Notice: Applied catalog in 12.79 seconds
```

- Check the output on a local web browser on PORT - 8000



Step-4

2.4 Update the index.html `webpage into the Gitrepo (<https://github.com/puppetlabs/exercise-webpage>) on Master branch and run the `pupply apply nginx` again to reflect the latest changes.

- Push the latest code to index.html to the GitHub repo and perform the same steps as before to
- Login to the instance using `vagrant ssh` , perform `vagrant ssh` on folder `puppet_nginx`

- **change the directory by switching to root - /etc/puppetlabs/code/environments/production/modules**
- **Apply Puppet Nginx module using the command `puppet apply nginx`**
- **Verify the current webpage running on `http://localhost:8000`**
- **Update the `index.html` on the Github Repo.**

Git push after updating the index.html on repo <https://github.com/puppetlabs/exercise-webpage>

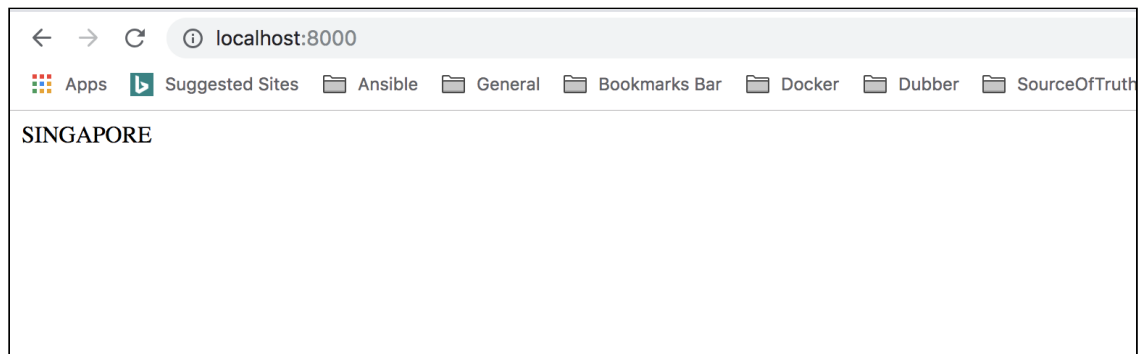
```
malipr@malipr ~/D/exercise-webpage> vi index.html
master
malipr@malipr ~/D/exercise-webpage> git add index.html
master!
malipr@malipr ~/D/exercise-webpage> git commit -m "Updated
index.html"
master+
[master 33c8fc6] Updated index.html
 1 file changed, 1 insertion(+), 1 deletion(-)
malipr@malipr ~/D/exercise-webpage> git push
malipr@malipr ~/D/exercise-webpage> git push
master
Counting objects: 3, done.
Delta compression using up to 4 threads.
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 271 bytes | 0 bytes/s, done.
Total 3 (delta 1), reused 0 (delta 0)
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To https://github.com/puppetlabs/exercise-webpage
   d7da4aa..33c8fc6  master -> master
malipr@malipr ~/D/puppet_nginx>
```

- **Apply Puppet module on NGINX**

```
root@localhost:/etc/puppetlabs/code/environments/production/modules# puppet apply nginx

Notice: Compiled catalog for localhost.gateway in environment production in 1.38 seconds
Notice: /Stage[main]/Nginx::Repo/Vcsrepo[/etc/puppetlabs/code/exercise-webpage]/ensure:
Updating to latest 'master' revision
Notice: /Stage[main]/Nginx::Repo/Vcsrepo[/etc/puppetlabs/code/exercise-webpage]/ensure:
ensure changed 'present' to 'latest'
Notice: /Stage[main]/Nginx/File[/var/www/index.html]/content: content changed '{md5}
ff023a75fe9787d7e4334be96239fd43' to '{md5}eb0d966a5e1218052a2d5904e684a46a'
Notice: Applied catalog in 12.91 seconds
```

- **Check the output on a web browser on PORT -8000**



- **Frequent puppet applies will not create repetitive and redundant tasks and puppet will apply the changes only when we update the GitHub repo.**

Thank you