DevOpsAnsibleProject2

- This is project 2 in course 2 of the CalTech DevOps post-graduate certificate program
- The objective of this project is to deploy a wordpress site on a target server using an ansible playbook

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Problem Space

DESCRIPTION

You are a DevOps engineer at XYZ Ltd. Your company is working mostly on WordPress projects. A lot of development hours are lost to perform WordPress setup with all dependencies like PHP, MySQL, etc. The Company wants to automate it with the help of a configuration management tool so that they can follow a standard installation procedure for WordPress and its components whenever a new requirement or client comes in. The below mentioned components should be included:

- PHP
- Nginx/Apache Web Server
- MySQL
- WordPress

Steps to Perform:

- Establish configuration management master connectivity with WordPress server
- Validate connectivity from master to slave machine
- Prepare IaaC scripts to install WordPress and its dependent components
- Execute scripts to perform installation of complete WordPress environment
- Validate installation using the public IP of VM by accessing WordPress application

System Configuration

Environemnt

- 2 Ubuntu 20.04.3 LTS VMs running on HyperV hypervisor
  - ansible-controller (192.168.1.140)
  - ansible-target (192.168.1.139)
    - Snapshot created after system initalization after ssh is enabled. This allows me to quickly revert the target for testing.
    - The following commands will install, enable and start ssh
      - `sudo apt install -y ssh`
      - `sudo systemctl enable ssh`
      - `sudo systemctl start ssh`
    - For ssh configuration issues, see `/etc/ssh/sshd_config`
    - The system defaults were not changed in my deployment
  - Personal repository hosted at https://github.com/RedOneLima/DevOpsAnsibleProject2
  - Host(s) Entires added to `C:\Windows\System32\drivers\etc\hosts`

Playbook description

- Installs the nessisary packages using apt
- Installs the nessisary PHP Extentions
- Sets up Apache2 server
- Sets up MySQL database
- Configures Wordpress install
- Configures Firewall
- Handler to restart the webserver

Configurations

- `mysql_root_password` - Specifies the new sql root pass
- `mysql_db` - The name of the database that wp will use
- `mysql_user` - The user that wp will use to access the database
- `mysql_password` - The wp database user password
- `http_host` - The name of the wordpress host. Note this is what needs to be set in /etc/hosts in order to access the correct path within the browser to access the page. If you don't want to use a hostname, make this the IP that will be used to access the wordpress page.
- `http_conf` - The name of the configuration file associated with the web host. Note this needs to be `http_host`.conf to work correctly.
- `http_port` - The port the server will listen to http requests on. Default web port is 80.

apache.conf.j2

- This is a Jinja2 template for the virtaul host definintion

wp-config.php.j2

- This is a Junja2 template for the wordpress PHP configuration
- This is where the MySQL database information is passed in for wp to be able to connect to the database.

Create Web Server

- First, exchange ssh keys with the desired host(s)

```
[khewitt@ansible-controller ~]:: ssh-copy-id ansible-target

/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed:
"/home/khewitt/.ssh/id_rsa.pub"
The authenticity of host 'ansible-target (192.168.1.139)' can't be
established.
ECDSA key fingerprint is
SHA256:78iHXb8a1Gn5wODf7Bf0Qdd+I5Qdpiip1lIKNo+Fcs0.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to
filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are
prompted now it is to install the new keys
khewitt@ansible-target's password:

Number of key(s) added: 1

Now try logging into the machine, with:   "ssh 'ansible-target'"
and check to make sure that only the key(s) you wanted were added.
```

- My hosts.yaml file specifies my target

```
###############################################################################
##
#               Invintory of hosts named ansibleTargets
###############################################################################
##
---
ansibleTargets:
  hosts:
    target01:
      ansible_host: ansible-target
```

- Now we will run the playbook to configure the webpress server

```
ansible-playbook playbook.yaml -i hosts.yaml -u khewitt --ask-become-pass
```

- `ansible-playbook`
  - The command to run a playbook
- `playbook.yaml`
  - The name of the playbook to run
- `-i hosts.yaml`
  - The specified inventory file

    - I prefer to specify my inventory instead of having it in a cfg so that there's no ambiguity in the targets. This is optional if the target hosts are specificed in the ansible.cfg
- `-u khewitt`
    - The user to run the playbook as
- `--ask-become-pass`
    - Promts for the sudo password when the command is ran so that the playbook can run PU commands as the specified user.

```
[khewitt@ansible-controller wordpress-ansible (main)]:: ansible-playbook playbook.yaml -i hosts.yaml -u khewitt --ask-become-pass
BECOME password:

PLAY [all] *********************************************************************************************************************************************

TASK [Gathering Facts] *********************************************************************************************************************************
ok: [target01]

TASK [Install LAMP Packages] ***************************************************************************************************************************
changed: [target01] => (item=apache2)
changed: [target01] => (item=mysql-server)
changed: [target01] => (item=python3-pymysql)
changed: [target01] => (item=php)
changed: [target01] => (item=php-mysql)
changed: [target01] => (item=libapache2-mod-php)

TASK [Install PHP Extensions] **************************************************************************************************************************
changed: [target01] => (item=php-curl)
changed: [target01] => (item=php-gd)
changed: [target01] => (item=php-mbstring)
changed: [target01] => (item=php-xml)
changed: [target01] => (item=php-xmlrpc)
changed: [target01] => (item=php-soap)
changed: [target01] => (item=php-intl)
changed: [target01] => (item=php-zip)

TASK [Create document root] ****************************************************************************************************************************
changed: [target01]

TASK [Set up Apache VirtualHost] ***********************************************************************************************************************
changed: [target01]

TASK [Enable rewrite module] ***************************************************************************************************************************
changed: [target01]

TASK [Enable new site] *********************************************************************************************************************************
changed: [target01]

TASK [Set the root password] ***************************************************************************************************************************
changed: [target01]

TASK [Creates database for WordPress] ******************************************************************************************************************
changed: [target01]

TASK [Create MySQL user for WordPress] *****************************************************************************************************************
changed: [target01]

TASK [UFW - Allow HTTP on port 80] *********************************************************************************************************************
changed: [target01]

TASK [Download/Unpack WordPress] ***********************************************************************************************************************
changed: [target01]

TASK [Set ownership and permissions recusively] ********************************************************************************************************
changed: [target01]

TASK [Set up wp-config] ********************************************************************************************************************************
changed: [target01]

RUNNING HANDLER [Reload Apache] ************************************************************************************************************************
changed: [target01]

PLAY RECAP *********************************************************************************************************************************************
target01                   : ok=15   changed=14   unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

Playbook run output

- We can see that each of our tasks in our playbook generated a change on the target system (in yellow)

Test

- We now have our server provisioned! Lets test our webserver.
- Lets make sure we have our hostname set in the **host of the browser** that will be accessing the site.
    - In my case, I will be accessing the web server through my Chrome browser on a Windows 11 desktop

- Windows hosts file is found at `C:\Windows\System32\drivers\etc\hosts`
- Linux hosts file is found at `/etc/hosts`

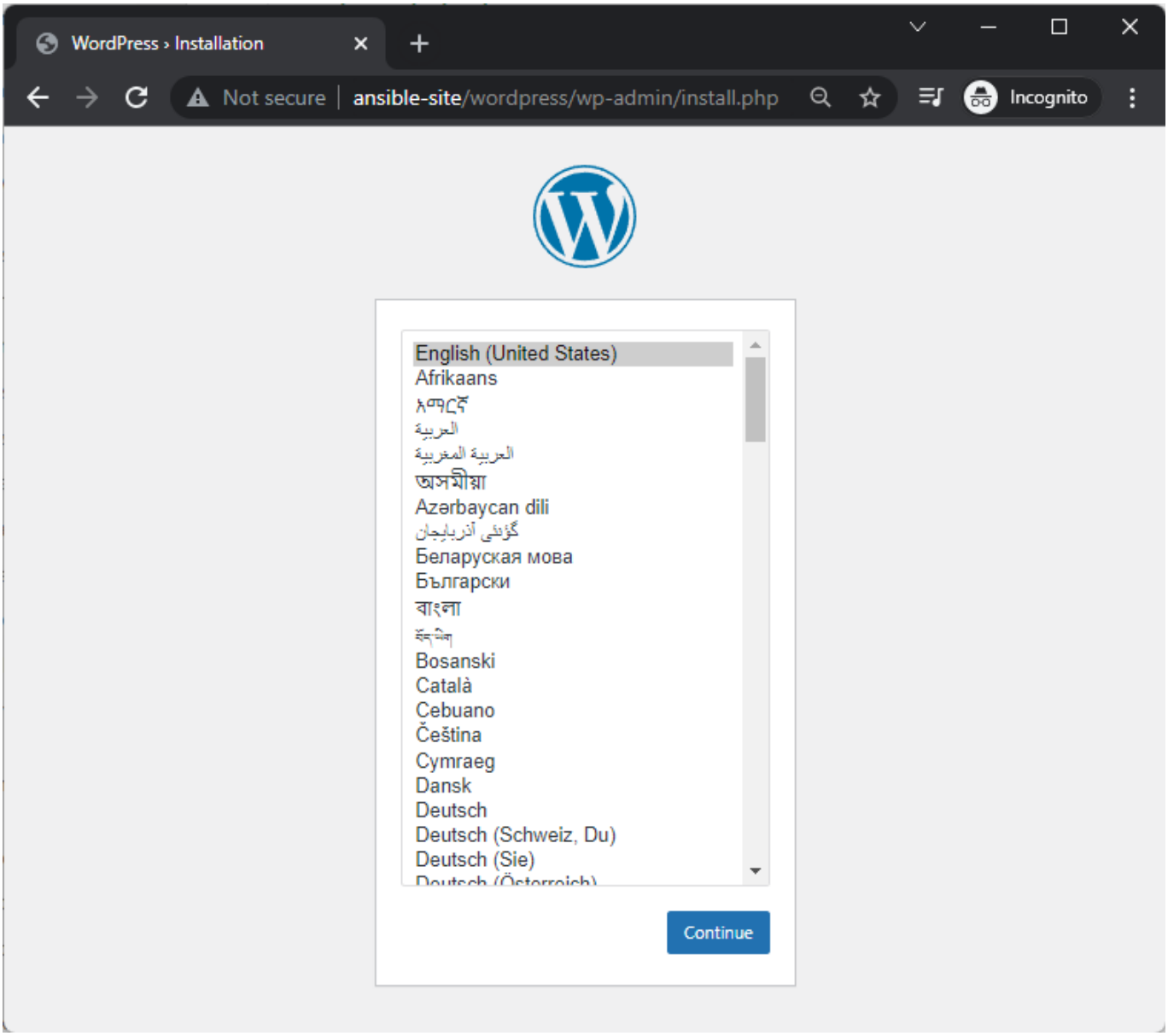
```
# Copyright (c) 1993-2009 Microsoft Corp.
#
# This is a sample HOSTS file used by Microsoft TCP/IP for Windows.
#
# This file contains the mappings of IP addresses to host names. Each
# entry should be kept on an individual line. The IP address should
# be placed in the first column followed by the corresponding host name.
# The IP address and the host name should be separated by at least one
# space.
#
# Additionally, comments (such as these) may be inserted on individual
# lines or following the machine name denoted by a '#' symbol.
#
# For example:
#
#      102.54.94.97     rhino.acme.com          # source server
#       38.25.63.10     x.acme.com              # x client host

# localhost name resolution is handled within DNS itself.
#   127.0.0.1       localhost
#   ::1             localhost

127.0.0.1 view-localhost # view localhost server

192.168.1.129 jenkins
192.168.1.130 k8smaster1
192.168.1.133 k8sworker1


192.168.1.139 ansible-site
```

C:\Windows\System32\drivers\etc\hosts

- This matches the http configuration set in the playbook

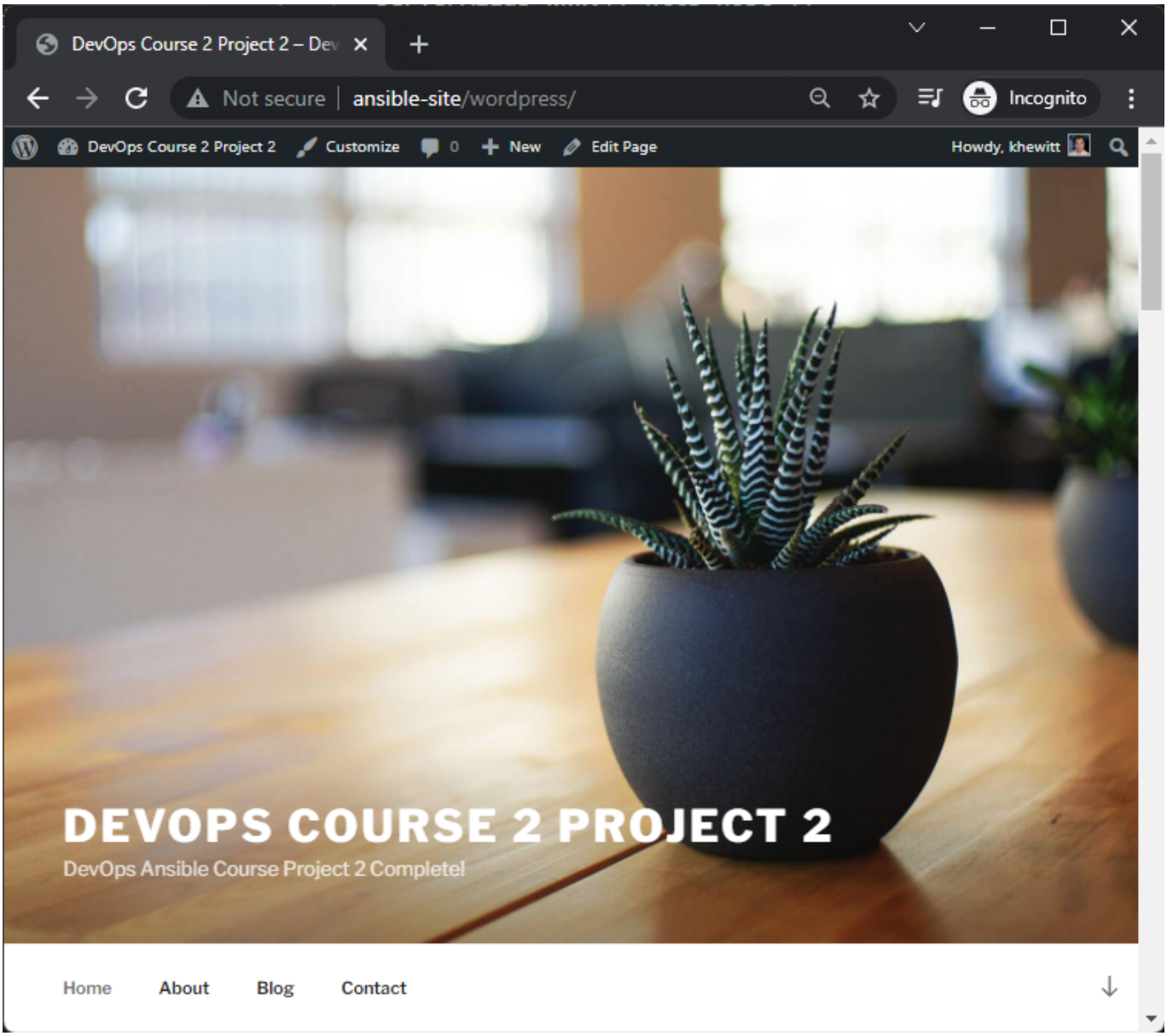
```
    http_host: "ansible-site"
    http_conf: "ansible-site.conf"
    http_port: "80"
```

- Now from our browser we can get to the WordPress setup portal at `http://ansible-site/wordpress` and be rereouted to the install page



http://ansible-site/wordpress/wp-admin/install.php

- We have a fully functioning wordpress site now. We can go through the website's admin UI to set up our website now.



http://ansible-site/wordpress