**Objective:**

Deployment of wordpress environment there by setting up a standard installation procedure for it and its dependent components..

**Tools Used:**

|  |  |
| --- | --- |
| Tools | Description |
| Git Hub | Version control tool and repository |
| Terraform | For infrastructure provisioning |
| Ansible | For setting up wordpress and components |
| Shell Script | Controls program flow and automation |

**Steps Involved:**

**Prerequisites:**

1. Active AWS account with web console access, you should have your
   1. aws\_access\_key.
   2. aws\_secret\_key.
   3. aws\_key\_name (You need to add a key pair using the AWS web console.
   4. aws\_key\_path (Keep your private key inside your working directory).
   5. aws\_security\_token.

Graphical user interface, text, application, email

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1. Control Server (could be a simple VM with terraform/git installed), installation can be verified as below.

ankitchanpuriag@ip-172-31-25-167:~$ terraform --version

Terraform v1.1.9

on linux\_amd64

ankitchanpuriag@ip-172-31-25-167:~$ git --version

git version 2.34.1

ankitchanpuriag@ip-172-31-25-167:~$

1. Keep the public and private key pair used for git hub authentication in your working directory, this will be shipped to remote VM that we will provision , which in turn will be used for pulling ansible code there. (I have staged everything necessary in my git hub repo)

root@ip-172-31-25-167:/home/ankitchanpuriag/project\_2/wordpress\_installation# git clone git@github.com:ankitchanpuria/devops\_wordpress\_terraform.git

Cloning into 'devops\_wordpress\_terraform'...

remote: Enumerating objects: 11, done.

remote: Counting objects: 100% (11/11), done.

remote: Compressing objects: 100% (11/11), done.

remote: Total 11 (delta 0), reused 11 (delta 0), pack-reused 0

Receiving objects: 100% (11/11), 8.96 KiB | 8.96 MiB/s, done.

root@ip-172-31-25-167:/home/ankitchanpuriag/project\_2/wordpress\_installation# ls -lrt

total 4

drwxr-xr-x 3 root root 4096 May 17 19:53 devops\_wordpress\_terraform

root@ip-172-31-25-167:/home/ankitchanpuriag/project\_2/wordpress\_installation# cd devops\_wordpress\_terraform/

root@ip-172-31-25-167:/home/ankitchanpuriag/project\_2/wordpress\_installation/devops\_wordpress\_terraform# ls -lrt

total 48

-rw-r--r-- 1 root root 1257 May 17 19:53 vars.tf

-rw-r--r-- 1 root root 157 May 17 19:53 terraform.tfstate.backup

-rw-r--r-- 1 root root 12619 May 17 19:53 terraform.tfstate

-rw-r--r-- 1 root root 1625 May 17 19:53 shell\_handler.sh

-rw-r--r-- 1 root root 174 May 17 19:53 provider.tf

-rw-r--r-- 1 root root 1679 May 17 19:53 project\_2.pem

-rwxr-xr-x 1 root root 575 May 17 19:53 id\_rsa.pub

-rwxr-xr-x 1 root root 2610 May 17 19:53 id\_rsa

-rw-r--r-- 1 root root 2671 May 17 19:53 create.tf

root@ip-172-31-25-167:/home/ankitchanpuriag/project\_2/wordpress\_installation/devops\_wordpress\_terraform#

**INFRASTRUCTURE AUTOMATION USING TERRAFORM:**

1. **provider.tf**: Details regarding provider that we will be using, here we have used AWS.

provider "aws" {

access\_key = "${var.aws\_access\_key}"

secret\_key = "${var.aws\_secret\_key}"

region = "${var.aws\_region}"

token = "${var.aws\_security\_token}"

}

1. **vars.tf**: We have defined all the variables that we will be using in our terraform scripts.
2. **Create.tf:** This file controls all the resources that will be provisioned, we have used a remote-exec here to establish a connection to remote instance and setup our project dir and execute and the shell handler.
3. **Shell\_handler**: We have used a shell handler here that does 4 key operations for us:
   1. key\_manage
   2. install\_ansible
   3. git\_handler
   4. create\_inventory\_execute\_playbook
4. We do a git clone and fetch the terraform code(git clone git@github.com:ankitchanpuria/devops\_wordpress\_terraform.git)

as below

1. Then we do a terraform init and terraform validate to (configure plugin necessary for our provider and validate our terraform scripts syntactically)—Fig 2

Text

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Fig 2

1. Next we do a terraform plan as depicted in Fig 3

Text

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Fig 3

root@ip-172-31-25-167:/home/ankitchanpuriag/test\_project# terraform plan

1. And then a terraform apply.

Enter a value: yes

aws\_vpc.main\_vpc: Creating...

aws\_vpc.main\_vpc: Still creating... [10s elapsed]

aws\_vpc.main\_vpc: Creation complete after 12s [id=vpc-0a1cfc6248b324a52]

aws\_internet\_gateway.ig-main: Creating...

aws\_subnet.us-east-1a-public: Creating...

aws\_security\_group.allow-ssh: Creating...

aws\_internet\_gateway.ig-main: Creation complete after 1s [id=igw-0ffd69a4bf798f36f]

aws\_route\_table.us-east-1a-public: Creating...

aws\_route\_table.us-east-1a-public: Creation complete after 0s [id=rtb-036a8a873108f76cb]

aws\_security\_group.allow-ssh: Creation complete after 2s [id=sg-0e7e5cb464d5e521b]

aws\_subnet.us-east-1a-public: Still creating... [10s elapsed]

aws\_subnet.us-east-1a-public: Creation complete after 11s [id=subnet-03daf46a0d066f755]

aws\_route\_table\_association.us-east-1a-public: Creating...

aws\_instance.web-1: Creating...

aws\_route\_table\_association.us-east-1a-public: Creation complete after 0s [id=rtbassoc-069ed5a4fde60da05]

aws\_instance.web-1: Still creating... [10s elapsed]

aws\_instance.web-1: Still creating... [20s elapsed]

aws\_instance.web-1: Still creating... [30s elapsed]

aws\_instance.web-1: Still creating... [40s elapsed]

aws\_instance.web-1: Provisioning with 'file'...

aws\_instance.web-1: Still creating... [50s elapsed]

aws\_instance.web-1: Provisioning with 'file'...

aws\_instance.web-1: Provisioning with 'file'...

aws\_instance.web-1: Provisioning with 'remote-exec'...

aws\_instance.web-1 (remote-exec): Connecting to remote host via SSH...

aws\_instance.web-1 (remote-exec): Host: electing previously unselected package python3-xmltodict.

aws\_instance.web-1 (remote-exec): Preparing to unpack .../12-python3-xmltodict\_0.12.0-1\_all.deb ...

aws\_instance.web-1 (remote-exec): Unpacking python3-xmltodict (0.12.0-1) ...

aws\_instance.web-1 (remote-exec): Selecting previously unselected package python3-winrm.

aws\_instance.web-1 (remote-exec): Preparing to unpack .../13-python3-winrm\_0.3.0-2\_all.deb ...

aws\_instance.web-1 (remote-exec): Unpacking python3-winrm (0.3.0-2) ...

aws\_instance.web-1 (remote-exec): Selecting previously unselected package sshpass.

aws\_instance.web-1 (remote-exec): Preparing to unpack .../14-sshpass\_1.06-1\_amd64.deb ...

aws\_instance.web-1 (remote-exec): Unpacking sshpass (1.06-1) ...

aws\_instance.web-1 (remote-exec): Setting up python3-ntlm-auth (1.1.0-1) ...

aws\_instance.web-1 (remote-exec): Setting up python3-bcrypt (3.1.7-2ubuntu1) ...

aws\_instance.web-1 (remote-exec): Setting up python3-resolvelib (0.5.4-2ppa~focal) ...

aws\_instance.web-1 (remote-exec): Setting up python3-kerberos (1.1.14-3.1build1) ...

aws\_instance.web-1 (remote-exec): Setting up sshpass (1.06-1) ...

aws\_instance.web-1 (remote-exec): Setting up python3-xmltodict (0.12.0-1) ...

aws\_instance.web-1 (remote-exec): Setting up python3-pyparsing (2.4.6-1) ...

aws\_instance.web-1 (remote-exec): Setting up python3-jmespath (0.9.4-2ubuntu1) ...

aws\_instance.web-1 (remote-exec): Setting up python3-requests-kerberos (0.12.0-2) ...

aws\_instance.web-1 (remote-exec): Setting up python3-paramiko (2.6.0-2ubuntu0.1) ...

aws\_instance.web-1 (remote-exec): Setting up python3-requests-ntlm (1.1.0-1) ...

aws\_instance.web-1 (remote-exec): Setting up python3-packaging (20.3-1) ...

aws\_instance.web-1 (remote-exec): Setting up python3-winrm (0.3.0-2) ...

aws\_instance.web-1 (remote-exec): Setting up ansible-core (2.12.5-1ppa~focal) ...

aws\_instance.web-1 (remote-exec): Setting up ansible (5.7.1-1ppa~focal) ...

aws\_instance.web-1: Still creating... [1m40s elapsed]

aws\_instance.web-1: Still creating... [1m50s elapsed]

aws\_instance.web-1 (remote-exec): Processing triggers for man-db (2.9.1-1) ...

aws\_instance.web-1: Still creating... [2m0s elapsed]

aws\_instance.web-1 (remote-exec): Initialized empty Git repository in /home/ubuntu/project\_dir/.git/

aws\_instance.web-1 (remote-exec): Cloning into 'devops\_wordpress'...

aws\_instance.web-1 (remote-exec): Warning: Permanently added the ECDSA host key for IP address '140.82.114.4' to the list of known hosts.

aws\_instance.web-1 (remote-exec): remote: Enumerating objects: 9, done.

aws\_instance.web-1 (remote-exec): remote: Counting objects: 11% (1/9)

aws\_instance.web-1 (remote-exec): remote: Counting objects: 22% (2/9)

aws\_instance.web-1 (remote-exec): remote: Counting objects: 33% (3/9)

aws\_instance.web-1 (remote-exec): remote: Counting objects: 44% (4/9)

aws\_instance.web-1 (remote-exec): remote: Counting objects: 55% (5/9)

aws\_instance.web-1 (remote-exec): remote: Counting objects: 66% (6/9)

aws\_instance.web-1 (remote-exec): remote: Counting objects: 77% (7/9)

aws\_instance.web-1 (remote-exec): remote: Counting objects: 88% (8/9)

aws\_instance.web-1 (remote-exec): remote: Counting objects: 100% (9/9)

aws\_instance.web-1 (remote-exec): remote: Counting objects: 100% (9/9), done.

aws\_instance.web-1 (remote-exec): remote: Compressing objects: 14% (1/7)

aws\_instance.web-1 (remote-exec): remote: Compressing objects: 28% (2/7)

aws\_instance.web-1 (remote-exec): remote: Compressing objects: 42% (3/7)

aws\_instance.web-1 (remote-exec): remote: Compressing objects: 57% (4/7)

aws\_instance.web-1 (remote-exec): remote: Compressing objects: 71% (5/7)

aws\_instance.web-1 (remote-exec): remote: Compressing objects: 85% (6/7)

aws\_instance.web-1 (remote-exec): remote: Compressing objects: 100% (7/7)

aws\_instance.web-1 (remote-exec): remote: Compressing objects: 100% (7/7), done.

aws\_instance.web-1 (remote-exec): remote: Total 9 (delta 0), reused 9 (delta 0), pack-reused 0

aws\_instance.web-1 (remote-exec): Receiving objects: 11% (1/9)

aws\_instance.web-1 (remote-exec): Receiving objects: 22% (2/9)

aws\_instance.web-1 (remote-exec): Receiving objects: 33% (3/9)

aws\_instance.web-1 (remote-exec): Receiving objects: 44% (4/9)

aws\_instance.web-1 (remote-exec): Receiving objects: 55% (5/9)

aws\_instance.web-1 (remote-exec): Receiving objects: 66% (6/9)

aws\_instance.web-1 (remote-exec): Receiving objects: 77% (7/9)

aws\_instance.web-1 (remote-exec): Receiving objects: 88% (8/9)

aws\_instance.web-1 (remote-exec): Receiving objects: 100% (9/9)

aws\_instance.web-1 (remote-exec): Receiving objects: 100% (9/9), done.

aws\_instance.web-1 (remote-exec): PLAY [all] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): TASK [Gathering Facts] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1: Still creating... [2m10s elapsed]

aws\_instance.web-1 (remote-exec): ok: [localhost]

aws\_instance.web-1 (remote-exec): TASK [Install prerequisites] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1: Still creating... [2m20s elapsed]

aws\_instance.web-1 (remote-exec): changed: [localhost]

aws\_instance.web-1 (remote-exec): TASK [Install LAMP Packages] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1: Still creating... [2m30s elapsed]

aws\_instance.web-1: Still creating... [2m40s elapsed]

aws\_instance.web-1 (remote-exec): changed: [localhost] => (item=apache2)

aws\_instance.web-1: Still creating... [2m50s elapsed]

aws\_instance.web-1: Still creating... [3m0s elapsed]

aws\_instance.web-1: Still creating... [3m10s elapsed]

aws\_instance.web-1: Still creating... [3m20s elapsed]

aws\_instance.web-1: Still creating... [3m30s elapsed]

aws\_instance.web-1 (remote-exec): changed: [localhost] => (item=mysql-server)

aws\_instance.web-1: Still creating... [3m40s elapsed]

aws\_instance.web-1 (remote-exec): changed: [localhost] => (item=python3-pymysql)

aws\_instance.web-1: Still creating... [3m50s elapsed]

aws\_instance.web-1: Still creating... [4m0s elapsed]

aws\_instance.web-1 (remote-exec): changed: [localhost] => (item=php)

aws\_instance.web-1: Still creating... [4m10s elapsed]

aws\_instance.web-1: Still creating... [4m20s elapsed]

aws\_instance.web-1 (remote-exec): changed: [localhost] => (item=php-mysql)

aws\_instance.web-1: Still creating... [4m30s elapsed]

aws\_instance.web-1 (remote-exec): changed: [localhost] => (item=libapache2-mod-php)

aws\_instance.web-1 (remote-exec): TASK [Install PHP Extensions] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1: Still creating... [4m40s elapsed]

aws\_instance.web-1 (remote-exec): changed: [localhost] => (item=php-curl)

aws\_instance.web-1: Still creating... [4m50s elapsed]

aws\_instance.web-1 (remote-exec): changed: [localhost] => (item=php-gd)

aws\_instance.web-1: Still creating... [5m0s elapsed]

aws\_instance.web-1 (remote-exec): changed: [localhost] => (item=php-mbstring)

aws\_instance.web-1: Still creating... [5m10s elapsed]

aws\_instance.web-1 (remote-exec): changed: [localhost] => (item=php-xml)

aws\_instance.web-1: Still creating... [5m20s elapsed]

aws\_instance.web-1: Still creating... [5m30s elapsed]

aws\_instance.web-1 (remote-exec): changed: [localhost] => (item=php-xmlrpc)

aws\_instance.web-1: Still creating... [5m40s elapsed]

aws\_instance.web-1 (remote-exec): changed: [localhost] => (item=php-soap)

aws\_instance.web-1: Still creating... [5m50s elapsed]

aws\_instance.web-1 (remote-exec): changed: [localhost] => (item=php-intl)

aws\_instance.web-1: Still creating... [6m0s elapsed]

aws\_instance.web-1 (remote-exec): changed: [localhost] => (item=php-zip)

aws\_instance.web-1 (remote-exec): TASK [Create document root] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): changed: [localhost]

aws\_instance.web-1 (remote-exec): TASK [Set up Apache VirtualHost] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): changed: [localhost]

aws\_instance.web-1 (remote-exec): TASK [Enable rewrite module] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): changed: [localhost]

aws\_instance.web-1 (remote-exec): TASK [Enable new site] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): changed: [localhost]

aws\_instance.web-1 (remote-exec): TASK [Disable default Apache site] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): changed: [localhost]

aws\_instance.web-1 (remote-exec): TASK [Set the root password] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): changed: [localhost]

aws\_instance.web-1 (remote-exec): TASK [Remove all anonymous user accounts] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): ok: [localhost]

aws\_instance.web-1 (remote-exec): TASK [Remove the MySQL test database] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): ok: [localhost]

aws\_instance.web-1 (remote-exec): TASK [Creates database for WordPress] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): changed: [localhost]

aws\_instance.web-1 (remote-exec): TASK [Create MySQL user for WordPress] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): changed: [localhost]

aws\_instance.web-1 (remote-exec): TASK [UFW - Allow HTTP on port 80] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1: Still creating... [6m10s elapsed]

aws\_instance.web-1 (remote-exec): changed: [localhost]

aws\_instance.web-1 (remote-exec): TASK [Download and unpack latest WordPress] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): changed: [localhost]

aws\_instance.web-1 (remote-exec): TASK [Set ownership] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): changed: [localhost]

aws\_instance.web-1 (remote-exec): TASK [Set permissions for directories] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): changed: [localhost]

aws\_instance.web-1 (remote-exec): TASK [Set permissions for files] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): changed: [localhost]

aws\_instance.web-1 (remote-exec): TASK [Set up wp-config] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): changed: [localhost]

aws\_instance.web-1 (remote-exec): RUNNING HANDLER [Reload Apache] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1: Still creating... [6m20s elapsed]

aws\_instance.web-1 (remote-exec): changed: [localhost]

aws\_instance.web-1 (remote-exec): RUNNING HANDLER [Restart Apache] \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): changed: [localhost]

aws\_instance.web-1 (remote-exec): PLAY RECAP \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

aws\_instance.web-1 (remote-exec): localhost : ok=22 changed=19 unreachable=0 failed=0 skipped=0 rescued=0 ignored=0

aws\_instance.web-1: Creation complete after 6m21s [id=i-0c7c454b35e03add9]

Apply complete! Resources: 7 added, 0 changed, 0 destroyed.

root@ip-172-31-25-167:/home/ankitchanpuriag/test\_project#

1. We get the ip of our remote host , that is hosting our wordpress site from remote-exec output in the execution log above (34.228.215.2)
2. We validate wordpress site access using the web-browser using the same IP as mentioned in step 9 (Fig 4)

Graphical user interface, application

Description automatically generated

Fig 4