

# Lesson 7 Demo 7: Install PHP in Agent Node

This section will guide you to:

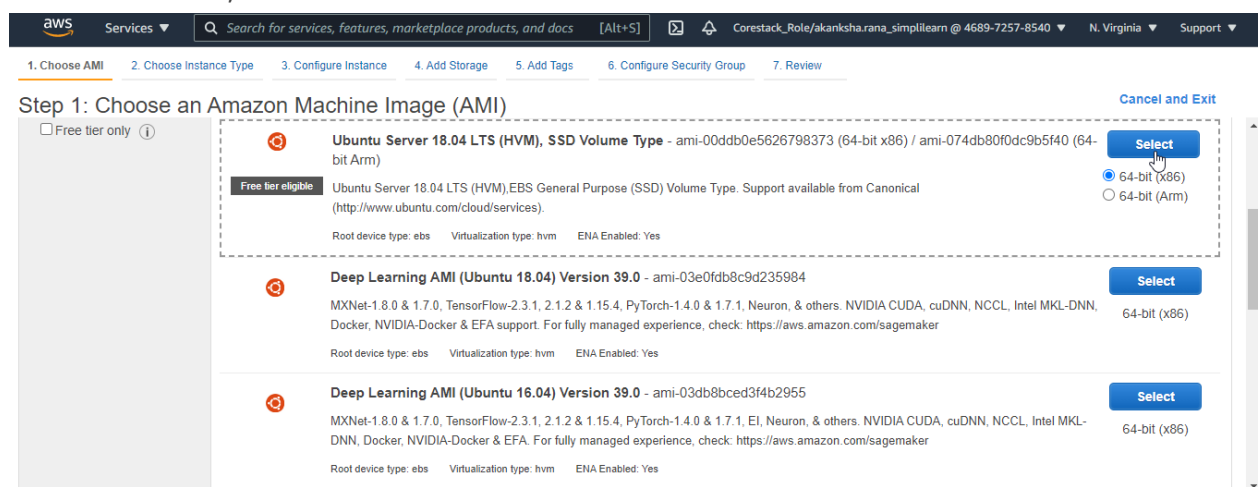
- Install PHP from Puppet master to Puppet agent using a manifest

This lab has six subsections, namely:

1. Launching AWS instances
2. Setting up the puppet master server
3. Setting up the puppet agent node
4. Establishing the connection between puppet master and agent node
5. Writing the puppet manifest
6. Pulling configuration in the agent node from puppet master

## Step 1: Launching AWS instances

- Launch the AWS lab
- Navigate to the EC2 dashboard and click on the launch instance button
- For the AMI, choose Ubuntu Server 18.04



- For instance type, choose **t2.micro** and click on the **Next: Configuration Instance Details** button

- Enter 2 in the number of instances field
- Go with the default settings for storage and tags
- On the Configure security group page, click on the **Add rule** button
- Add the **All tcp** rule and select the source as **anywhere**
- Click on the **Review and Launch** button

**Step 6: Configure Security Group**  
Amazon EC2 security groups.

Assign a security group: ☒ Create a new security group  
☐ Select an existing security group

Security group name:   
Description:

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop
All TCP	TCP	0 - 65535	Anywhere 0.0.0.0/0	e.g. SSH for Admin Desktop

**Add Rule**

**Warning**  
Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

[Cancel](#) [Previous](#) [Review and Launch](#)

- Click on the **Launch** button on the Review Instance Launch page
- Create a new key pair, download it, and click on the **Launch Instance** button

**Step 7: Review Instance Launch**  
Please review your instance launch details. You can't go back to the previous step.

**Improve your instances' security**  
Your instances may be accessible from anywhere on the Internet. You can also open additional ports in your security groups.

**AMI Details**  
Ubuntu Server 18.04 LTS (HVM), Free tier eligible  
Root Device Type: ebs Virtualization type: hvm

**Instance Type**  
Instance Type: EC2 Instance Type: t2.micro

**Select an existing key pair or create a new key pair**

A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about [removing existing key pairs from a public AMI](#).

Create a new key pair  
Key pair name:   
**Download Key Pair**

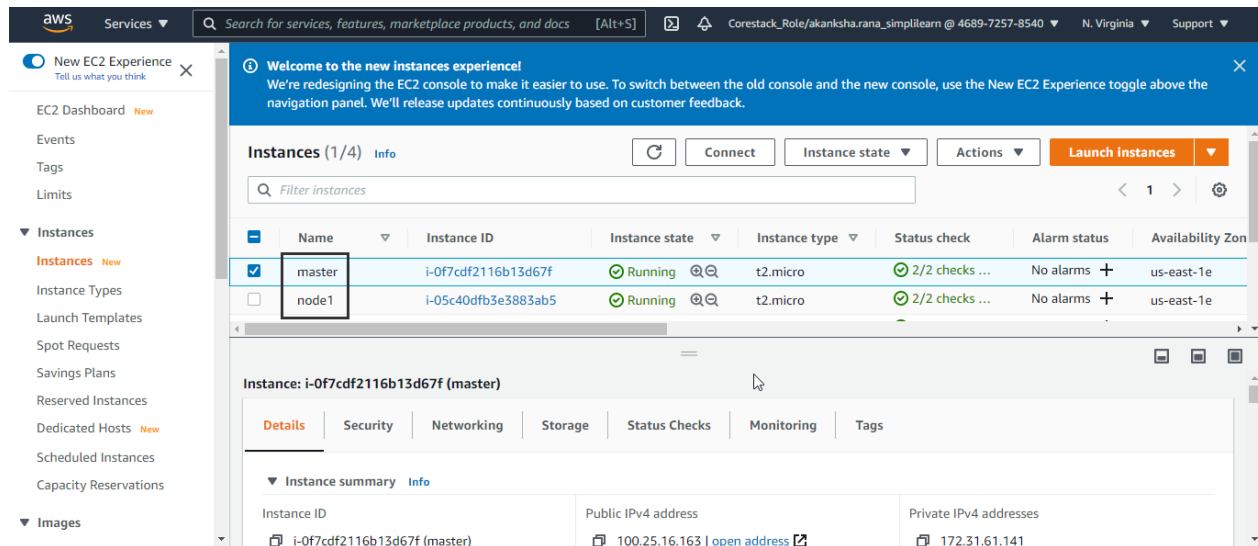
You have to download the **private key file** (\*.pem file) before you can continue. **Store it in a secure and accessible location.** You will not be able to download the file again after it's created.

[Cancel](#) [Launch Instances](#)

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demo.pem [Show all](#)

- Name the instances as master and node



- SSH into both the instances using putty

## Step 2: Setting up the puppet master server

- Type in the following command in the master instance to update the already existing modules and packages:

```
$ sudo apt-get update
```

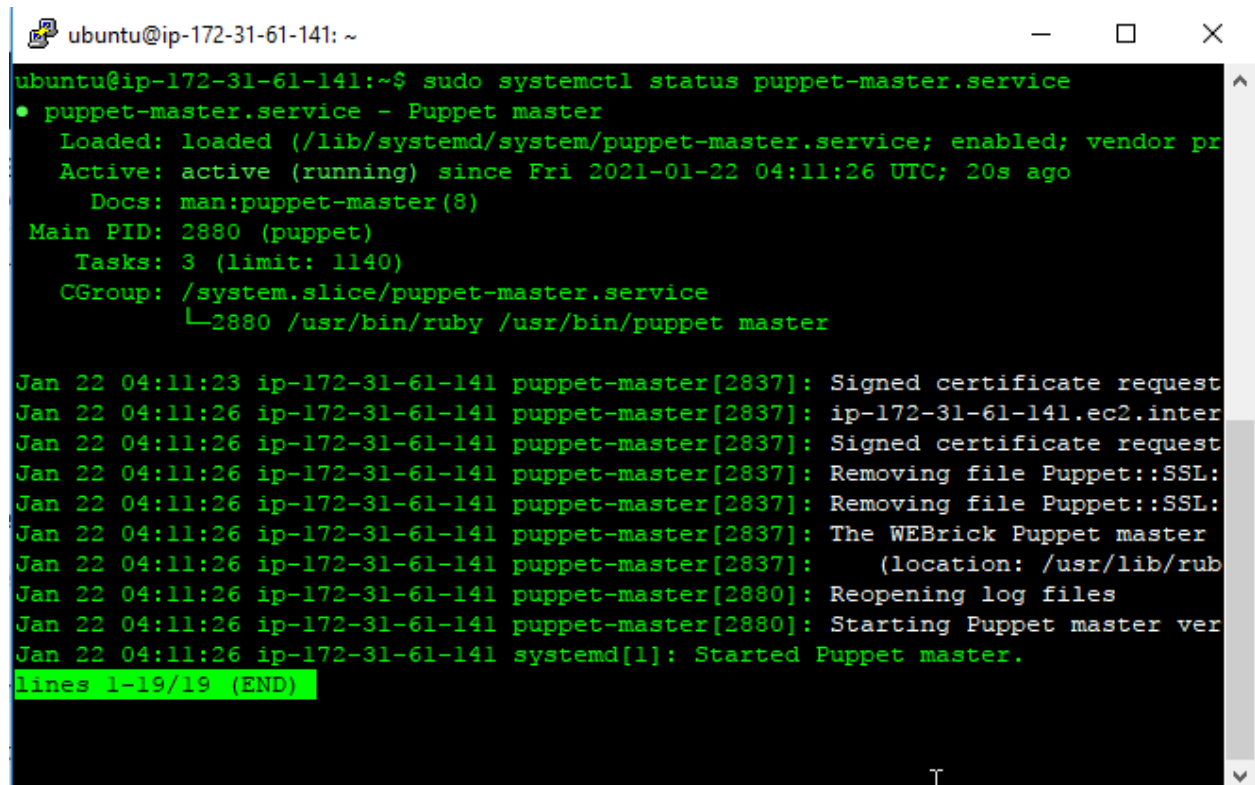
- Type in the following commands to install puppet master:

```
$ wget https://apt.puppetlabs.com/puppet-release-bionic.deb
$ sudo dpkg -i puppet-release-bionic.deb
$ sudo apt-get install puppetmaster
```

```
ubuntu@ip-172-31-61-141: ~  
ubuntu@ip-172-31-61-141:~$ wget https://apt.puppetlabs.com/puppet-release-bionic  
.deb  
--2021-01-22 04:09:51-- https://apt.puppetlabs.com/puppet-release-bionic.deb  
Resolving apt.puppetlabs.com (apt.puppetlabs.com)... 13.249.44.126, 13.249.44.10  
0, 13.249.44.85, ...  
Connecting to apt.puppetlabs.com (apt.puppetlabs.com)|13.249.44.126|:443... conn  
ected.  
HTTP request sent, awaiting response... 200 OK  
Length: 11736 (11K) [application/x-debian-package]  
Saving to: 'puppet-release-bionic.deb'  
  
puppet-release-bion 100%[=====>] 11.46K --.-KB/s in 0s  
  
2021-01-22 04:09:51 (29.3 MB/s) - 'puppet-release-bionic.deb' saved [11736/11736  
]  
  
ubuntu@ip-172-31-61-141:~$ sudo dpkg -i puppet-release-bionic.deb  
Selecting previously unselected package puppet-release.  
(Reading database ... 57090 files and directories currently installed.)  
Preparing to unpack puppet-release-bionic.deb ...  
Unpacking puppet-release (1.0.0-14bionic) ...  
Setting up puppet-release (1.0.0-14bionic) ...  
ubuntu@ip-172-31-61-141:~$
```

- Run the following command to verify the installation of puppet master:

```
$ sudo systemctl status puppet-master.service
```



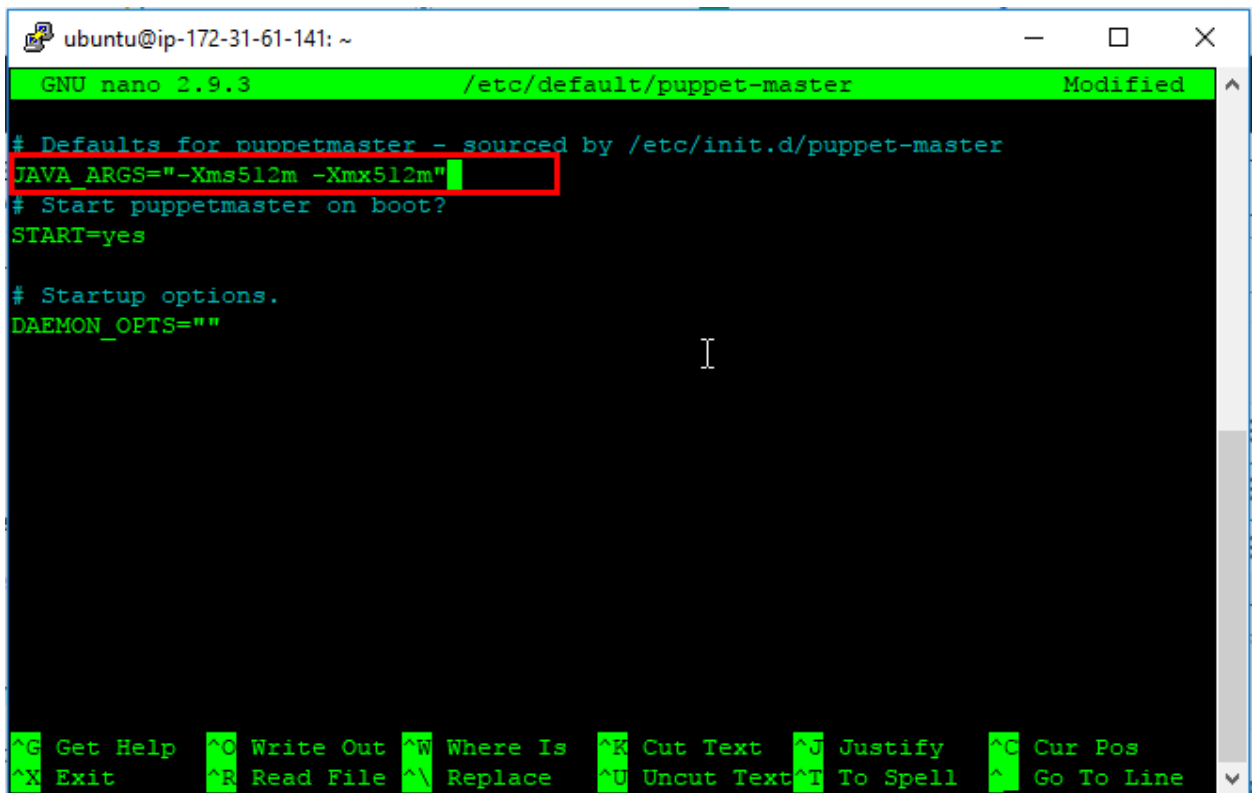
```
ubuntu@ip-172-31-61-141: ~  
ubuntu@ip-172-31-61-141:~$ sudo systemctl status puppet-master.service  
● puppet-master.service - Puppet master  
   Loaded: loaded (/lib/systemd/system/puppet-master.service; enabled; vendor pr  
   Active: active (running) since Fri 2021-01-22 04:11:26 UTC; 20s ago  
     Docs: man:puppet-master(8)  
  Main PID: 2880 (puppet)  
    Tasks: 3 (limit: 1140)  
   CGroup: /system.slice/puppet-master.service  
           └─2880 /usr/bin/ruby /usr/bin/puppet master  
  
Jan 22 04:11:23 ip-172-31-61-141 puppet-master[2837]: Signed certificate request  
Jan 22 04:11:26 ip-172-31-61-141 puppet-master[2837]: ip-172-31-61-141.ec2.inter  
Jan 22 04:11:26 ip-172-31-61-141 puppet-master[2837]: Signed certificate request  
Jan 22 04:11:26 ip-172-31-61-141 puppet-master[2837]: Removing file Puppet::SSL:  
Jan 22 04:11:26 ip-172-31-61-141 puppet-master[2837]: Removing file Puppet::SSL:  
Jan 22 04:11:26 ip-172-31-61-141 puppet-master[2837]: The WEBrick Puppet master  
Jan 22 04:11:26 ip-172-31-61-141 puppet-master[2837]:      (location: /usr/lib/rub  
Jan 22 04:11:26 ip-172-31-61-141 puppet-master[2880]: Reopening log files  
Jan 22 04:11:26 ip-172-31-61-141 puppet-master[2880]: Starting Puppet master ver  
Jan 22 04:11:26 ip-172-31-61-141 systemd[1]: Started Puppet master.  
lines 1-19/19 (END)
```

- Puppet master will be active and running as shown in the above screenshot
- Press **ctrl+z** and **Enter** to exit the status reading
- Type in the following command:

```
$ sudo nano /etc/default/puppet-master
```

- Add the following code snippet in the file, as shown in the screenshot:

```
JAVA_ARGS="-Xms512m -Xmx512m"
```



```
ubuntu@ip-172-31-61-141: ~
GNU nano 2.9.3 /etc/default/puppet-master Modified
# Defaults for puppetmaster - sourced by /etc/init.d/puppet-master
JAVA_ARGS="-Xms512m -Xmx512m"
# Start puppetmaster on boot?
START=yes

# Startup options.
DAEMON_OPTS=""

^G Get Help  ^O Write Out ^W Where Is  ^K Cut Text  ^J Justify   ^C Cur Pos
^X Exit      ^R Read File ^\ Replace   ^U Uncut Text ^T To Spell  ^_ Go To Line
```

- Use the following command to start the puppet master

```
$ sudo systemctl restart puppet-master.service
```

- Use the following command to open the port for tcp connection

```
$ sudo ufw allow 8140/tcp
```

```
ubuntu@ip-172-31-61-141: ~  
ubuntu@ip-172-31-61-141:~$ sudo nano /etc/default/puppet-master  
ubuntu@ip-172-31-61-141:~$ sudo systemctl restart puppet-master.service  
ubuntu@ip-172-31-61-141:~$  
ubuntu@ip-172-31-61-141:~$ sudo ufw allow 8140/tcp  
Rules updated  
Rules updated (v6)  
ubuntu@ip-172-31-61-141:~$
```

- Enter the following command to edit the host's file

```
$ sudo nano /etc/hosts
```

- Add the public IP address of puppet master in the file as shown in the following screenshot:

```
GNU nano 2.9.3 /etc/hosts Modified  
127.0.0.1 localhost  
100.25.16.163 puppet  
# The following lines are desirable for IPv6 capable hosts  
::1 ip6-localhost ip6-loopback  
fe00::0 ip6-localnet  
ff00::0 ip6-mcastprefix  
ff02::1 ip6-allnodes  
ff02::2 ip6-allrouters  
ff02::3 ip6-allhosts
```

- Save and exit the file

### Step 3: Setting up the puppet agent node

- Type in the following command in the agent node instance to update the already existing modules and packages:

```
$ sudo apt-get update
```

- Type in the following commands to install puppet agent:

```
$ wget https://apt.puppetlabs.com/puppet-release-bionic.deb  
$ sudo dpkg -i puppet-release-bionic.deb  
$ sudo apt-get install puppet
```

- Enter the following command to edit the hosts file:

```
$ sudo nano /etc/hosts
```

- Add the public IP address of puppet master in the file as shown in the following screenshot:



```

ubuntu@ip-172-31-60-189: ~
GNU nano 2.9.3 /etc/hosts Modified
127.0.0.1 localhost
100.25.16.163 puppet
# The following lines are desirable for IPv6 capable hosts
::1 ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
ff02::3 ip6-allhosts

```

- Save and exit the file

#### Step 4: Establishing the connection between puppet master and agent node

- Run the following command on the agent node to start and enable the puppet agent:

```

$ sudo systemctl start puppet
$ sudo systemctl enable puppet

```

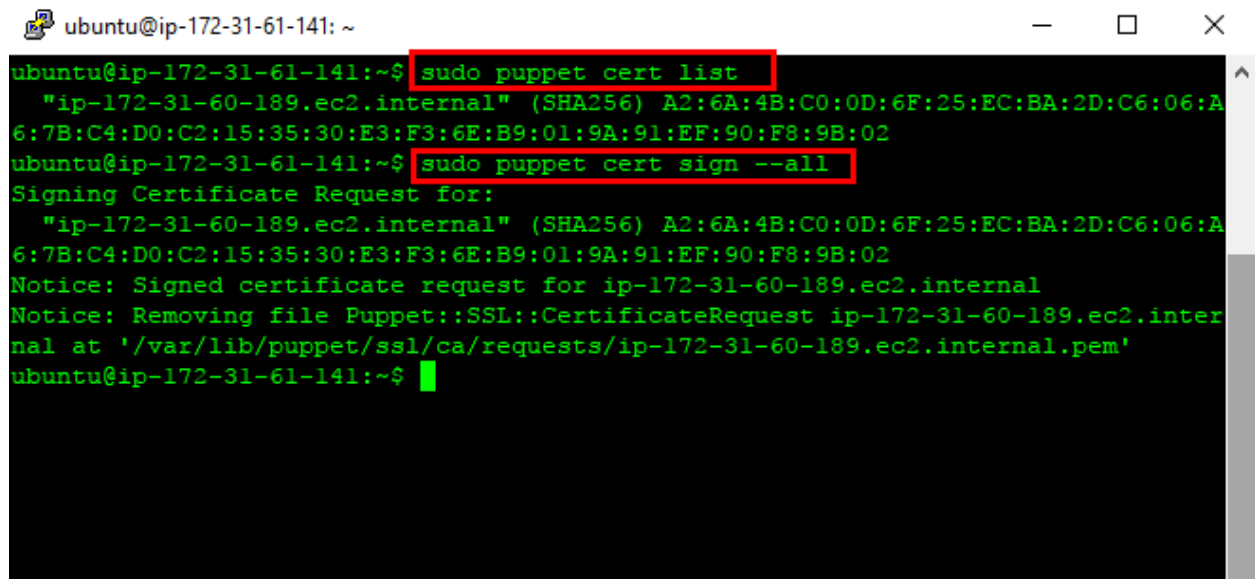
```

ubuntu@ip-172-31-60-189: ~
ubuntu@ip-172-31-60-189:~$ sudo nano /etc/hosts
ubuntu@ip-172-31-60-189:~$ sudo systemctl start puppet
ubuntu@ip-172-31-60-189:~$ sudo systemctl enable puppet
Synchronizing state of puppet.service with SysV service script with /lib/systemd
/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable puppet
ubuntu@ip-172-31-60-189:~$

```

- Use the following command on the puppet master to accept and sign the certificate sent by the puppet agent:

```
$ sudo puppet cert list
$ sudo puppet cert sign --all
```



```
ubuntu@ip-172-31-61-141: ~
ubuntu@ip-172-31-61-141:~$ sudo puppet cert list
"ip-172-31-60-189.ec2.internal" (SHA256) A2:6A:4B:C0:0D:6F:25:EC:BA:2D:C6:06:A
6:7B:C4:D0:C2:15:35:30:E3:F3:6E:B9:01:9A:91:EF:90:F8:9B:02
ubuntu@ip-172-31-61-141:~$ sudo puppet cert sign --all
Signing Certificate Request for:
"ip-172-31-60-189.ec2.internal" (SHA256) A2:6A:4B:C0:0D:6F:25:EC:BA:2D:C6:06:A
6:7B:C4:D0:C2:15:35:30:E3:F3:6E:B9:01:9A:91:EF:90:F8:9B:02
Notice: Signed certificate request for ip-172-31-60-189.ec2.internal
Notice: Removing file Puppet::SSL::CertificateRequest ip-172-31-60-189.ec2.inter
nal at '/var/lib/puppet/ssl/ca/requests/ip-172-31-60-189.ec2.internal.pem'
ubuntu@ip-172-31-61-141:~$
```

## Step 5: Writing the puppet manifest on *puppetmaster*

- Use the following command to create a directory for a manifest:

```
$ sudo mkdir -p /etc/puppet/code/environments/production/manifests/
```

- Use the following command to create a the manifest:

```
$ sudo vi /etc/puppet/code/environments/production/manifests/file.pp
```

- Add the following content in the file:

```
# execute 'apt-get update'
exec { 'apt-update':          # exec resource named 'apt-update'
  command => '/usr/bin/apt-get update' # command this resource will run
}

# install apache2 package
package { 'apache2':
  require => Exec['apt-update'], # require 'apt-update' before installing
  ensure => installed,
}

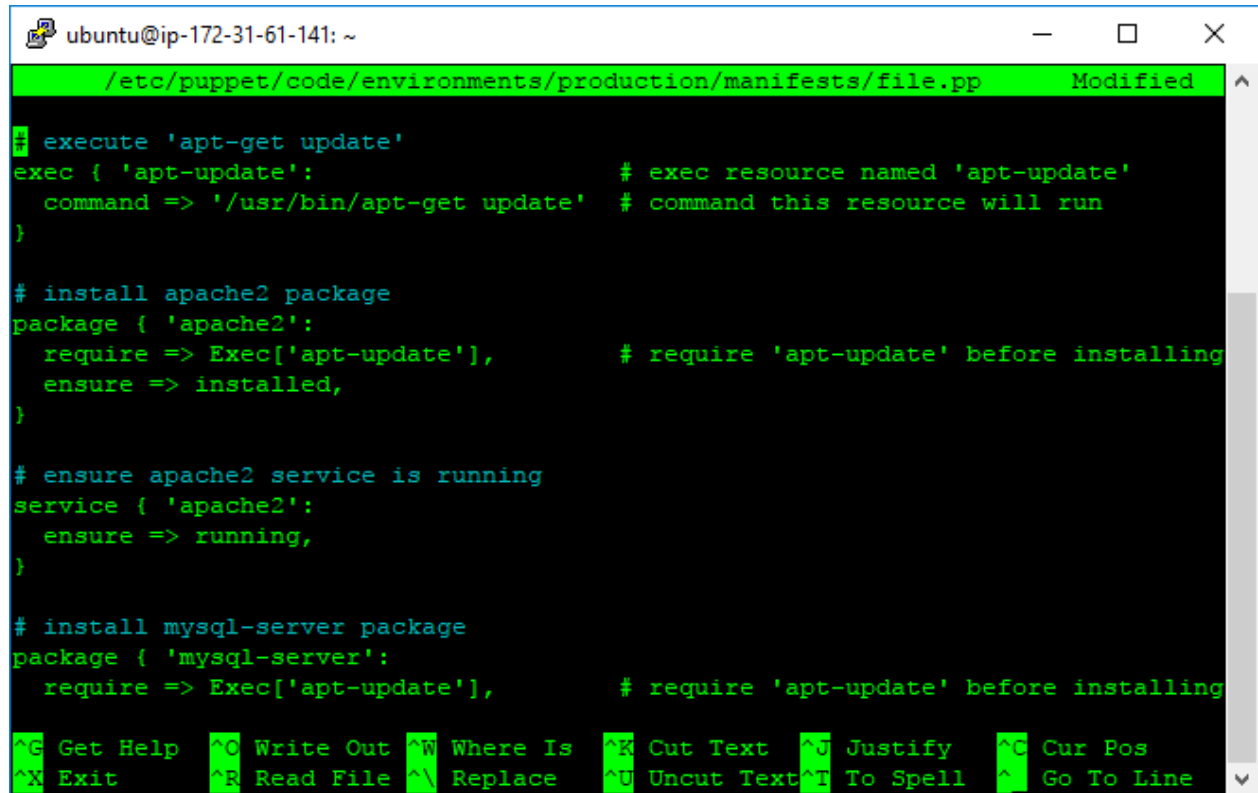
# ensure apache2 service is running
service { 'apache2':
  ensure => running,
}

# install mysql-server package
package { 'mysql-server':
  require => Exec['apt-update'], # require 'apt-update' before installing
  ensure => installed,
}

# ensure mysql service is running
service { 'mysql':
  ensure => running,
}

# install php package
package { 'php':
  require => Exec['apt-update'], # require 'apt-update' before installing
  ensure => installed,
}
```

- Save and exit the file



```

/etc/puppet/code/environments/production/manifests/file.pp Modified
# execute 'apt-get update'
exec { 'apt-update':
  command => '/usr/bin/apt-get update' # exec resource named 'apt-update'
                                     # command this resource will run
}

# install apache2 package
package { 'apache2':
  require => Exec['apt-update'],      # require 'apt-update' before installing
  ensure => installed,
}

# ensure apache2 service is running
service { 'apache2':
  ensure => running,
}

# install mysql-server package
package { 'mysql-server':
  require => Exec['apt-update'],      # require 'apt-update' before installing
}

^G Get Help  ^O Write Out ^W Where Is  ^K Cut Text  ^J Justify  ^C Cur Pos
^X Exit      ^R Read File ^\ Replace  ^U Uncut Text ^T To Spell ^_ Go To Line
  
```

## Step 6: Pulling configuration in the agent node from puppet master

- Run the following command on the agent node to pull the configurations from puppet master:

```
$ sudo puppet agent --test
```

```
ubuntu@ip-172-31-60-189: ~  
ubuntu@ip-172-31-60-189:~$ sudo puppet agent --test  
Info: Using configured environment 'production'  
Info: Retrieving pluginfacts  
Info: Retrieving plugin  
Info: Retrieving locales  
Info: Caching catalog for ip-172-31-60-189.ec2.internal  
Info: Applying configuration version '1611293170'  
Notice: /Stage[main]/Main/Exec[apt-update]/returns: executed successfully  
Notice: /Stage[main]/Main/Package[apache2]/ensure: created  
Notice: /Stage[main]/Main/Package[mysql-server]/ensure: created  
Notice: /Stage[main]/Main/Package[php]/ensure: created  
Notice: /Stage[main]/Main/File[/var/www/html/info.php]/ensure: defined content as '{md5}d9c0c977ee96604e48b81d795236619a'  
Notice: Applied catalog in 44.92 seconds  
ubuntu@ip-172-31-60-189:~$
```

- Run the following command on the agent node to verify the installation of php on the agent node:

```
$ php -v
```

```
ubuntu@ip-172-31-60-189:~$ php -v  
PHP 7.2.24-0ubuntu0.18.04.7 (cli) (built: Oct 7 2020 15:24:25) ( NTS )  
Copyright (c) 1997-2018 The PHP Group  
Zend Engine v3.2.0, Copyright (c) 1998-2018 Zend Technologies  
with Zend OPcache v7.2.24-0ubuntu0.18.04.7, Copyright (c) 1999-2018, by Zend Technologies  
ubuntu@ip-172-31-60-189:~$
```