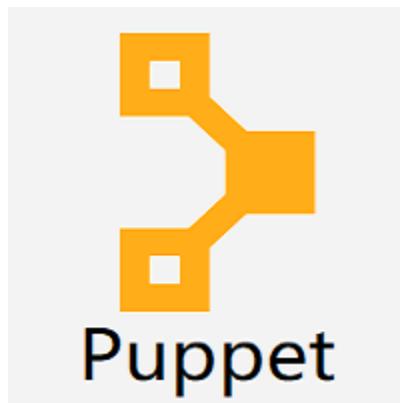


Experiment 10

Aim: To install and Configure Pull based Software Configuration Management and provisioning tools using Puppet.

Theory:

Puppet is an open-source DevOps system management tool. It is used to centralize and automate the configuration management procedure. This tool is developed using Ruby DSL (domain-specific language). Puppet tool deploys, configures, and manages the servers.



What is Puppet?

- Puppet is a DevOps configuration management tool. This is developed by Puppet Labs and is available for both open-source and enterprise versions. It is used to centralize and automate the procedure of configuration management.
- This tool is developed using Ruby DSL (domain-specific language), which allows you to change a complete infrastructure in code format and can be easily managed and configured.
- Puppet tool deploys, configures, and manages the servers. This is used particularly for the automation of hybrid infrastructure delivery and management.
- With the help of automation, Puppet enables system administrators to operate easier and faster.
- Puppet can also be used as a deployment tool as it can deploy software on the system automatically. Puppet implements infrastructure as a code, which means that you can test the environment for accurate deployment.

- puppet supports many platforms such as Microsoft Windows, Debian/Ubuntu, Red Hat/CentOS/Fedora, MacOS X, etc.
- Puppet uses the client-server paradigm, where one system in any cluster works as the server, called the puppet master, and other works as a client on nodes called a slave.

Features of Puppet

Following are the features of Puppet:

- **Platform Support** - Puppet is compatible with all platforms that support Ruby, like Microsoft Windows, Linux, MacOS X, etc.
- **Scalable** - The puppet was developed in 2005; therefore, many different organizations, including medium and large, have deployed Puppet, and hence its scalability is very large.\
- **Documentation** - Puppet provides a large number of well-developed wiki pages with detailed documentation.
- **Idempotency** - Unlike other configuration management tools, in Puppet, we can safely run the same set of configurations multiple times on the same machine. Means, after deploying a configuration on any machine, the puppet keeps verifying those configurations in certain intervals.
- **Open-Source** - A puppet is an open-source tool, and because of this feature, it is easy to extend it to build custom libraries and modules.
- **Reporting Compliance** - The enterprise version of the puppet supports graphical reporting with the help of this you can simply visualize the infrastructure, communicate, and quickly respond to the modifications. It provides you the real-time visibility into the effects of changes, which allows you to see what's going on your infrastructure.
- **Cost-Effective** - When you have many numbers of systems and want to make some minor code changes, then Puppet helps to reduce the effort and cost.
- **Faster** - Puppet allows DevOps professionals and System Administrators to work more quickly and effectively.

- **Growing Fast** - Today, many companies have adopted puppet to manage their infrastructure, such as Google, Red Hat, AT&T, Spotify, AON, US Air Force, etc.

Configuration Management

System administrators regularly execute repetitive tasks such as server installation, server configuration, etc. By writing some scripts, they can automate this function, but when you are operating on big infrastructure, it is a very difficult job. To solve this difficulty, configuration management came into the market. Configuration management is the process of maintaining software and computer systems like networks, servers, storage in configured, desired, and consistent state. Through configuration management, we can access the exact historical record of system position for project management and audit purposes.

By the help of Configuration Management, we can remove the following challenges:

- Finding out which components to modify when the needs change.
- Need for reimplementation because of the requirements changes in the last implementation.
- If any component is replaced with the new but flawed version, then it needs to revert the previous version.
- Need to replace the wrong component since the admin was unable to determine which component should be replaced.

Configuration Management Process

A **configuration item (CI)** is an infrastructure element or any service component or any component that needs to manage in order to ensure the successful delivery of services. Configuration items such as individual documents, model plans, etc.

Configuration management has different interdependent processes or activities. These activities are as follows:

- Configuration Identification
- Change Management
- Configuration Status Accounting
- Configuration Audits



Configuration Management Tool

There are many configuration management tools existing in the market. Some popular configuration management tools are:

- Ansible
- Puppet
- Chef
- Microsoft System Center Configuration manager
- HashiCorp Terraform
- CFEngine
- AWS OpsWorks
- Saltstack

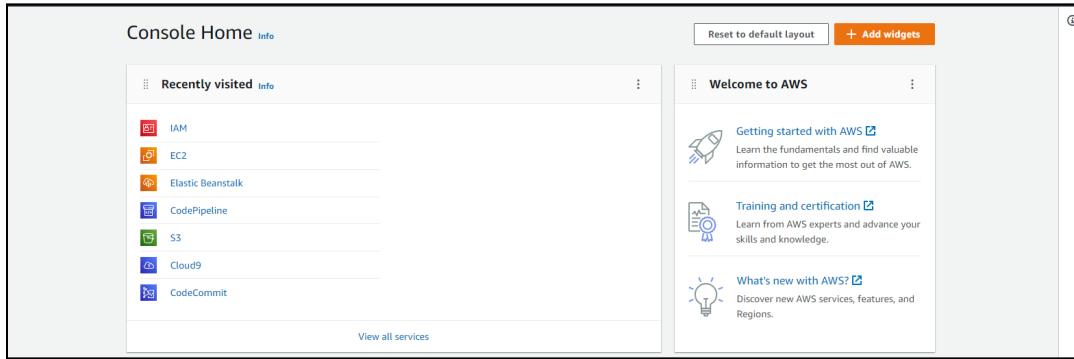
Puppet Components

Following are the key components of Puppet:

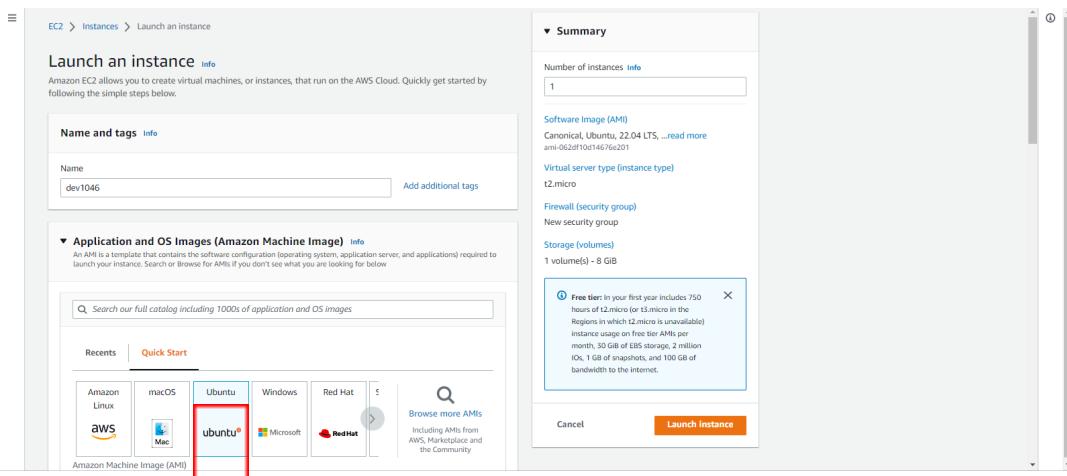
- Manifests
- Module
- Resource
- Factor
- M-collective
- Catalogs
- Class
- Nodes

STEPS TO PERFORM THIS EXPERIMENT:

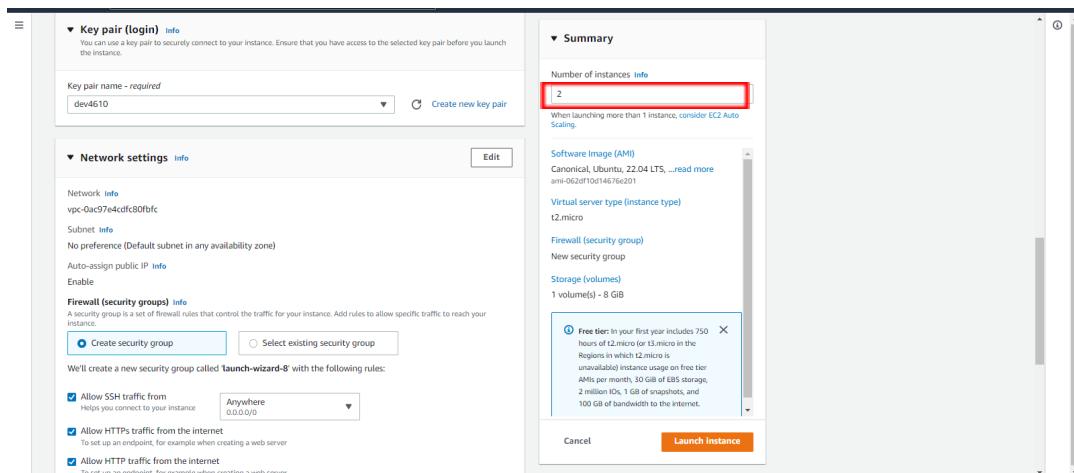
1. Login to your AWS Account



2.Create two instances



3.Create a new keypair and create two instances



Name: Mrunal Vaidya

XIE ID: 202003060

Roll : 68

Batch: C

Instances (2) Info									
Find instance by attribute or tag (case-sensitive)									
<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...
<input type="checkbox"/>	dev1046	i-0746584271c468f2e	Pending	t2.micro	-	No alarms	+ ap-south-1a	ec2-43-205-110-170.ap...	43.205.110.170
<input type="checkbox"/>	dev1046	i-07851a828cc68a1ee	Pending	t2.micro	-	No alarms	+ ap-south-1a	ec2-3-6-41-248.ap-sout...	3.6.41.248

Rename the two instances as master and slave

Instances (2) Info									
Find instance by attribute or tag (case-sensitive)									
<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...
<input type="checkbox"/>	master46	i-0746584271c468f2e	Running	t2.micro	-	No alarms	+ ap-south-1a	ec2-43-205-110-170.ap...	43.205.110.170
<input type="checkbox"/>	slave46	i-07851a828cc68a1ee	Running	t2.micro	-	No alarms	+ ap-south-1a	ec2-3-6-41-248.ap-sout...	3.6.41.248

Now connect master to the Ubuntu Machine and update

Instances (1/2) Info									
Find instance by attribute or tag (case-sensitive)									
<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...
<input checked="" type="checkbox"/>	master46	i-0746584271c468f2e	Running	t2.micro	-	No alarms	+ ap-south-1a	ec2-43-205-110-170.ap...	43.205.110.170
<input type="checkbox"/>	slave46	i-07851a828cc68a1ee	Running	t2.micro	-	No alarms	+ ap-south-1a	ec2-3-6-41-248.ap-sout...	3.6.41.248

```
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-1019-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

 System information as of Wed Oct 12 08:50:16 UTC 2022

 System load:  0.04443359375   Processes:          102
 Usage of /:   19.7% of 7.57GB  Users logged in:    0
 Memory usage: 21%           IPv4 address for eth0: 172.31.40.114
 Swap usage:   0%

 0 updates can be applied immediately.

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

Last login: Wed Oct 12 08:48:29 2022 from 13.233.177.3
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-40-114:~$ sudo su
root@ip-172-31-40-114:/home/ubuntu#
```

```
root@ip-172-31-40-114:/home/ubuntu# apt-get update
Get:1 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Hit:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [114 kB]
Get:4 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [370 kB]
Get:5 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [99.8 kB]
Get:6 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [14.1 MB]
Get:7 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [84.1 kB]
Get:8 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [334 kB]
Get:9 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [51.5 kB]
Get:10 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [290 kB]
Get:11 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [64.0 kB]
Get:12 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [2408 B]
Get:13 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [4192 B]
Get:14 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [900 B]
Get:15 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [228 B]
Get:16 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en [5652 kB]
Get:17 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 c-n-f Metadata [286 kB]
]
Get:18 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [217 kB]
Get:19 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [112 kB]
Get:20 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 c-n-f Metadata [8372 B]
Get:21 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [631 kB]
Get:22 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [146 kB]
Get:23 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [8964 B]
Get:24 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [373 kB]
Get:25 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [574 kB]
Get:26 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [428 kB]
Get:27 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [108 kB]

i-0746384271c468f2e (master46) X
Public IPs: 43.205.110.170 Private IPs: 172.31.40.114
```

Connect slave to Ubuntu Machine and update

Instances (1/2) Info									
C Connect Instance state Actions Launch instances									
<input type="text"/> Find Instance by attribute or tag (case-sensitive)									
Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	
master46	i-0746384271c468f2e	Running	t2.micro	2/2 checks passed	No alarms	+ ap-south-1a	ec2-43-205-110-170.ap...	43.205.110.170	
slave46	i-07851a828cc68a1ee	Running	t2.micro	2/2 checks passed	No alarms	+ ap-south-1a	ec2-3-6-41-248.ap-sout...	3.6.41.248	

```
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-1019-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

 System information as of Wed Oct 12 08:49:24 UTC 2022

 System load:  0.04248046875   Processes:          104
 Usage of /:   19.6% of 7.57GB  Users logged in:    0
 Memory usage: 20%            IPv4 address for eth0: 172.31.43.138
 Swap usage:   0%

 0 updates can be applied immediately.

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

Last login: Wed Oct 12 08:49:25 2022 from 13.233.177.4
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-43-138:~$ sudo su
root@ip-172-31-43-138:/home/ubuntu# 
```

```
root@ip-172-31-43-138:/home/ubuntu# apt-get update
Get:1 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Hit:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [114 kB]
Get:4 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [370 kB]
Get:5 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [99.8 kB]
Get:6 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [14.1 MB]
Get:7 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [84.1 kB]
Get:8 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [334 kB]
Get:9 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [51.5 kB]
Get:10 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [290 kB]
Get:11 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [64.0 kB]
Get:12 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [2408 B]
Get:13 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [4192 B]
Get:14 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [900 B]
Get:15 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [228 B]
Get:16 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en [5652 kB]
Get:17 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 c-n-f Metadata [286 kB]
]
Get:18 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [217 kB]
Get:19 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [112 kB]
Get:20 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 c-n-f Metadata [8372 B]
Get:21 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [631 kB]
Get:22 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [146 kB]
Get:23 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [8964 kB]
Get:24 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [373 kB]
Get:25 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [574 kB]
Get:26 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [428 kB]
Get:27 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [108 kB]
```

i-07851a828cc68a1ee (slave46)

PublicIPs: 3.6.41.248 PrivateIPs: 172.31.43.138

A. Master

Now, to download and unzip the Puppet file and install puppet-master

```
root@ip-172-31-40-114:/home/ubuntu# wget https://apt.puppetlabs.com/puppet-release-bionic.deb
--2022-10-12 08:54:03-- https://apt.puppetlabs.com/puppet-release-bionic.deb
Resolving apt.puppetlabs.com (apt.puppetlabs.com)... 108.159.80.88, 108.159.80.20, 108.159.80.32,
...
Connecting to apt.puppetlabs.com (apt.puppetlabs.com)|108.159.80.88|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 11710 (11K) [application/x-debian-package]
Saving to: 'puppet-release-bionic.deb'

puppet-release-bionic.de 100%[=====] 11.44K --.-KB/s   in 0s

2022-10-12 08:54:03 (106 MB/s) - 'puppet-release-bionic.deb' saved [11710/11710]

root@ip-172-31-40-114:/home/ubuntu#
```

i-0746384271c468f2e (master46)

PublicIPs: 43.205.110.170 PrivateIPs: 172.31.40.114

```
root@ip-172-31-40-114:/home/ubuntu# dpkg -i puppet-release-bionic.deb
Selecting previously unselected package puppet-release.
(Reading database ... 63663 files and directories currently installed.)
Preparing to unpack puppet-release-bionic.deb ...
Unpacking puppet-release (1.0.0-24bionic) ...
Setting up puppet-release (1.0.0-24bionic) ...
root@ip-172-31-40-114:/home/ubuntu#
```

i-0746384271c468f2e (master46)

PublicIPs: 43.205.110.170 PrivateIPs: 172.31.40.114

```
root@ip-172-31-40-114:/home/ubuntu# apt-get install puppet-master
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  augeas-lenses debconf-utils facter fonts-lato hiera javascript-common libaugeas0
  libboost-filesystem1.74.0 libboost-locale1.74.0 libboost-log1.74.0 libboost-nowide1.74.0
  libboost-program-options1.74.0 libboost-regex1.74.0 libboost-thread1.74.0 libcpp-hocon0.3.0
  libfacter3.14.12 libjs-jquery libleatherman1.12.1 libruby3.0 libyaml-cpp0.7 puppet rake ruby
  ruby-augeas ruby-deep-merge ruby-net-telnet ruby-rbtree ruby-rubygems ruby-selinux ruby-shadow
  ruby-sorted-set ruby-webrick ruby-xmlrpc ruby3.0 rubygems-integration unzip zip
Suggested packages:
  augeas-doc mcollective-common puppet-common apache2 | lighttpd | httpd augeas-tools ruby-rrd
  ruby-hocon ri ruby-dev bundler
The following NEW packages will be installed:
  augeas-lenses debconf-utils facter fonts-lato hiera javascript-common libaugeas0
  libboost-filesystem1.74.0 libboost-locale1.74.0 libboost-log1.74.0 libboost-nowide1.74.0
  libboost-program-options1.74.0 libboost-regex1.74.0 libboost-thread1.74.0 libcpp-hocon0.3.0
  libfacter3.14.12 libjs-jquery libleatherman1.12.1 libruby3.0 libyaml-cpp0.7 puppet
  puppet-master rake ruby ruby-augeas ruby-deep-merge ruby-net-telnet ruby-rbtree ruby-rubygems
  ruby-selinux ruby-shadow ruby-sorted-set ruby-webrick ruby-xmlrpc ruby3.0 rubygems-integration
  unzip zip
0 upgraded, 38 newly installed, 0 to remove and 45 not upgraded.
Need to get 14.8 MB of archives.
After this operation, 71.6 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 fonts-lato all 2.0-2.1 [26
96 kB]
Get:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libboost-filesystem1.74.0
  amd64 1.74.0-14ubuntu3 [264 kB]
Get:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libboost-thread1.74.0 amd6
  4 1.74.0-14ubuntu3 [262 kB]
Get:4 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libboost-locale1.74.0 amd6
  4 1.74.0-14ubuntu3 [413 kB]
```

During the installation check the status of the puppet master service (press q to exit)

```
No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@ip-172-31-40-114:/home/ubuntu# systemctl status puppet-master.service
● puppet-master.service - Puppet master
   Loaded: loaded (/lib/systemd/system/puppet-master.service; enabled; vendor preset: enabled)
     Active: active (running) since Wed 2022-10-12 08:59:22 UTC; 1min 37s ago
       Docs: man:puppet-master(8)
     Process: 3108 ExecStart=/usr/bin/puppet master (code=exited, status=0/SUCCESS)
      Main PID: 3118 (puppet)
        Tasks: 2 (limit: 1143)
       Memory: 60.0M
          CPU: 8.703s
         CGroup: /system.slice/puppet-master.service
                   └─3118 /usr/bin/ruby /usr/bin/puppet master

Oct 12 08:59:22 ip-172-31-40-114 puppet-master[3108]: Signed certificate request for ip-172-31-40-114
Oct 12 08:59:22 ip-172-31-40-114 puppet-master[3108]: Removing file Puppet::SSL::CertificateRequest
Oct 12 08:59:22 ip-172-31-40-114 puppet-master[3108]: Removing file Puppet::SSL::CertificateRequest
Oct 12 08:59:22 ip-172-31-40-114 puppet-master[3108]: The WEBrick Puppet master server is deprecated
Oct 12 08:59:22 ip-172-31-40-114 puppet-master[3108]: (location: /usr/lib/ruby/vendor_ruby/puppet/master.rb)
Oct 12 08:59:22 ip-172-31-40-114 puppet-master[3108]: Accessing 'bindaddress' as a setting is deprecated
Oct 12 08:59:22 ip-172-31-40-114 puppet-master[3108]: (location: /usr/lib/ruby/vendor_ruby/puppet/master.rb)
Oct 12 08:59:22 ip-172-31-40-114 puppet-master[3118]: Reopening log files
Oct 12 08:59:22 ip-172-31-40-114 puppet-master[3118]: Starting Puppet master version 5.5.22
Oct 12 08:59:22 ip-172-31-40-114 systemd[1]: Started Puppet master.
root@ip-172-31-40-114:/home/ubuntu# i-0746384271c468f2e (master46)
PublicIPs: 43.205.110.170 PrivateIPs: 172.31.40.114
```

Name: Mrunal Vaidya
Roll : 68

XIE ID: 202003060
Batch: C

Configure the puppet-master file

```
root@ip-172-31-40-114:/home/ubuntu# nano /etc/default/puppet-master
i-0746384271c468f2e (master46)
PublicIPs: 43.205.110.170 PrivateIPs: 172.31.40.114
```

```
GNU nano 6.2 /etc/default/puppet-master
# Defaults for puppetmaster - sourced by /etc/init.d/puppet-master
JAVA_OPTS="-Xms512m -Xz512m"
# Startup options.
DAEMON_OPTS=""
```

[Read 4 lines]

^G Help ^C Write Out ^W Where Is ^R Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line

i-0746384271c468f2e (master46)

PublicIPs: 43.205.110.170 PrivateIPs: 172.31.40.114

```
GNU nano 6.2 /etc/default/puppet-master
# Defaults for puppetmaster - sourced by /etc/init.d/puppet-master
JAVA_OPTS="-Xms512m -Xz512m"
# Startup options.
DAEMON_OPTS=""
```

Now restart the puppet-master

```
root@ip-172-31-40-114:/home/ubuntu# systemctl restart puppet-master.service
root@ip-172-31-40-114:/home/ubuntu#
```

i-0746384271c468f2e (master46)

PublicIPs: 43.205.110.170 PrivateIPs: 172.31.40.114

Now we open port 8140 through which the puppet communicates

```
root@ip-172-31-40-114:/home/ubuntu# ufw allow 8140/tcp
Rules updated
Rules updated (v6)
root@ip-172-31-40-114:/home/ubuntu#
```

i-0746384271c468f2e (master46)
PublicIPs: 43.205.110.170 PrivateIPs: 172.31.40.114

B. Slave

Setting up puppet-agent

```
root@ip-172-31-43-138:/home/ubuntu# wget https://apt.puppetlabs.com/puppet-release-bionic.deb
--2022-10-12 08:53:39-- https://apt.puppetlabs.com/puppet-release-bionic.deb
Resolving apt.puppetlabs.com (apt.puppetlabs.com)... 108.159.80.39, 108.159.80.88, 108.159.80.20,
...
Connecting to apt.puppetlabs.com (apt.puppetlabs.com)|108.159.80.39|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 11710 (11K) [application/x-debian-package]
Saving to: 'puppet-release-bionic.deb'

puppet-release-bionic.de 100%[=====] 11.44K --.-KB/s   in 0s

2022-10-12 08:53:40 (270 MB/s) - 'puppet-release-bionic.deb' saved [11710/11710]
root@ip-172-31-43-138:/home/ubuntu#
```

i-07851a828cc68a1ee (slave46)
PublicIPs: 3.6.41.248 PrivateIPs: 172.31.43.138

```
root@ip-172-31-43-138:/home/ubuntu# dpkg -i puppet-release-bionic.deb
Selecting previously unselected package puppet-release.
(Reading database ... 63663 files and directories currently installed.)
Preparing to unpack puppet-release-bionic.deb ...
Unpacking puppet-release (1.0.0-24bionic) ...
Setting up puppet-release (1.0.0-24bionic) ...
root@ip-172-31-43-138:/home/ubuntu#
```

i-07851a828cc68a1ee (slave46)
PublicIPs: 3.6.41.248 PrivateIPs: 172.31.43.138

```
root@ip-172-31-43-138:/home/ubuntu# apt-get update
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://apt.puppetlabs.com bionic InRelease [143 kB]
Hit:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Get:4 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Hit:5 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease
Get:6 http://apt.puppetlabs.com bionic/puppet amd64 Packages [28.0 kB]
Get:7 http://apt.puppetlabs.com bionic/puppet all Packages [14.1 kB]
Fetched 295 kB in 1s (223 kB/s)
Reading package lists... Done
root@ip-172-31-43-138:/home/ubuntu#
```

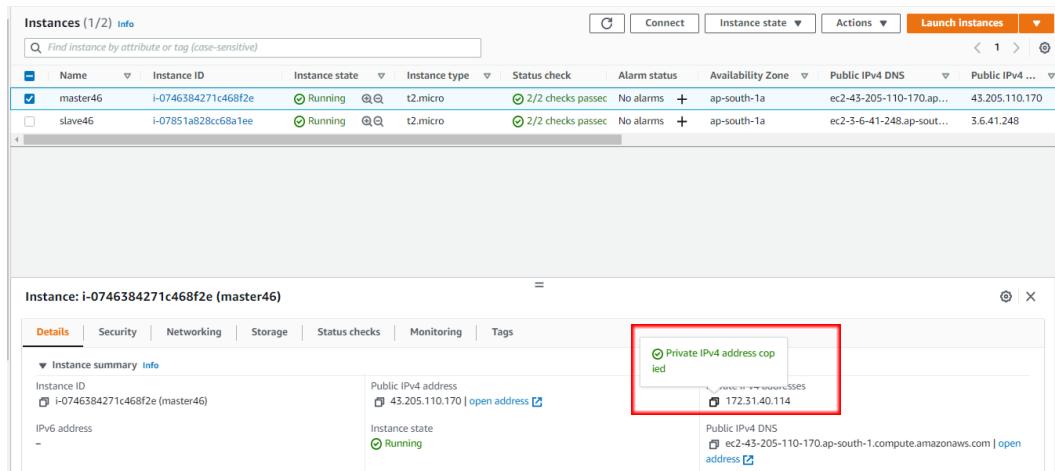
i-07851a828cc68a1ee (slave46)
PublicIPs: 3.6.41.248 PrivateIPs: 172.31.43.138

```
root@ip-172-31-43-138:/home/ubuntu# apt-get install puppet
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  augeas-lenses debconf-utils facter fonts-lato hiera javascript-common libaugeas0
  libboost-filesystem1.74.0 libboost-locale1.74.0 libboost-log1.74.0 libboost-nowide1.74.0
  libboost-program-options1.74.0 libboost-regex1.74.0 libboost-thread1.74.0 libcpp-hocon0.3.0
  libfacter3.14.12 libjs-jquery libleatherman1.12.1 libruby3.0 libyaml-cpp0.7 rake ruby
  ruby-augeas ruby-deep-merge ruby-net-telnet ruby-rbtree ruby-rubygems ruby-selinux ruby-shadow
  ruby-sorted-set ruby-webbrick ruby-xmlrpc ruby3.0 rubygems-integration unzip zip
Suggested packages:
  augeas-doc mcollective-common puppet-common apache2 | lighttpd | httpd augeas-tools ruby-rrd
  ruby-hocon ri ruby-dev bundler
The following NEW packages will be installed:
  augeas-lenses debconf-utils facter fonts-lato hiera javascript-common libaugeas0
  libboost-filesystem1.74.0 libboost-locale1.74.0 libboost-log1.74.0 libboost-nowide1.74.0
  libboost-program-options1.74.0 libboost-regex1.74.0 libboost-thread1.74.0 libcpp-hocon0.3.0
  libfacter3.14.12 libjs-jquery libleatherman1.12.1 libruby3.0 libyaml-cpp0.7 puppet rake ruby
  ruby-augeas ruby-deep-merge ruby-net-telnet ruby-rbtree ruby-rubygems ruby-selinux ruby-shadow
  ruby-sorted-set ruby-webbrick ruby-xmlrpc ruby3.0 rubygems-integration unzip zip
0 upgraded, 37 newly installed, 0 to remove and 45 not upgraded.
Need to get 14.7 MB of archives.
After this operation, 71.5 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 fonts-lato all 2.0-2.1 [26
96 kB]
Get:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libboost-filesystem1.74.0
  amd64 1.74.0-14ubuntu3 [264 kB]
Get:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libboost-thread1.74.0 amd6
4 1.74.0-14ubuntu3 [262 kB]
Get:4 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libboost-locale1.74.0 amd6
4 1.74.0-14ubuntu3 [413 kB]
Get:5 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libboost-program-options1.

i-07851a828cc68a1ee (slave46)

PublicIPs: 3.6.41.248 PrivateIPs: 172.31.43.138
```

Copy the Master's IP Address



Mention the Master's IP address in slave

```
root@ip-172-31-43-138:/home/ubuntu# nano /etc/hosts

i-07851a828cc68a1ee (slave46)

PublicIPs: 3.6.41.248 PrivateIPs: 172.31.43.138
```

```
GNU nano 6.2 /etc/hosts
127.0.0.1 localhost
172.31.40.114 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

[ Wrote 9 lines ]
^G Help      ^C Write Out    ^M Where Is    ^K Cut        ^T Execute    ^C Location
^X Exit      ^R Read File   ^V Replace    ^U Paste      ^J Justify    ^/ Go To Line
i-07851a828cc68a1ee (slave46)
PublicIPs: 3.6.41.248 PrivateIPs: 172.31.43.138
```

```
GNU nano 6.2 /etc/hosts
127.0.0.1 localhost
172.31.40.114 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
```

Mention the Master's IP address in master

```
root@ip-172-31-40-114:/home/ubuntu# nano /etc/hosts
root@ip-172-31-40-114:/home/ubuntu# i-0746384271c468f2e (master46)
PublicIPs: 43.205.110.170 PrivateIPs: 172.31.40.114
```

```
GNU nano 6.2                               /etc/hosts
127.0.0.1 localhost
172.31.40.114 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

[ Wrote 9 lines ]
^G Help      ^C Write Out    ^W Where Is     ^R Cut          ^T Execute    ^C Location
^X Exit      ^R Read File   ^V Replace      ^U Paste        ^J Justify    ^/ Go To Line
i-0746384271c468f2e (master46)
Public IPs: 43.205.110.170  Private IPs: 172.31.40.114
```

```
GNU nano 6.2                               /etc/hosts
127.0.0.1 localhost
172.31.40.114 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
```

Start and Enable the puppet on the slave machine

```
root@ip-172-31-43-138:/home/ubuntu# systemctl start puppet
root@ip-172-31-43-138:/home/ubuntu# 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
Created symlink /etc/systemd/system/multi-user.target.wants/puppet.service → /lib/systemd/system/puppet.service.
root@ip-172-31-43-138:/home/ubuntu# 
```

```
i-07851a828cc68a1ee (slave46)
Public IPs: 3.6.41.248  Private IPs: 172.31.43.138
```

Check for the certificate and sign the certificate

- a. Execute the command “puppet cert list --all”

```
root@ip-172-31-40-114:/home/ubuntu# puppet cert list --all
Warning: 'puppet cert' is deprecated and will be removed in a future release.
  (location: /usr/lib/ruby/vendor_ruby/puppet/application.rb:370:in `run')
+ "ip-172-31-40-114.ap-south-1.compute.internal" (SHA256) 98:39:03:B2:1C:99:7E:28:D8:B8:5B:C6:C1:
23:D7:67:9B:0A:50:C0:06:83:7A:1E:06:CE:62:53:5D:37:55:A3 (alt names: "DNS:ip-172-31-40-114.ap-sou
th-1.compute.internal", "DNS:puppet")
root@ip-172-31-40-114:/home/ubuntu#
```

i-0746384271c468f2e (master46)

PublicIPs: 43.205.110.170 PrivateIPs: 172.31.40.114

- b. Execute the command “puppet cert sign -all”

```
root@ip-172-31-40-114:/home/ubuntu# puppet cert sign; - all
Warning: 'puppet cert' is deprecated and will be removed in a future release.
  (location: /usr/lib/ruby/vendor_ruby/puppet/application.rb:370:in `run')
+ "ip-172-31-40-114.ap-south-1.compute.internal" (SHA256) 98:39:03:B2:1C:99:7E:28:D8:B8:5B:C6:C1:
23:D7:67:9B:0A:50:C0:06:83:7A:1E:06:CE:62:53:5D:37:55:A3 (alt names: "DNS:ip-172-31-40-114.ap-sou
th-1.compute.internal", "DNS:puppet")
root@ip-172-31-40-114:/home/ubuntu#
```

i-0746384271c468f2e (master46)

PublicIPs: 43.205.110.170 PrivateIPs: 172.31.40.114

Configuring the master and slave interaction by making changes in defined directory.

```
root@ip-172-31-40-114:/home/ubuntu# nano /etc/puppet/code/environments/productions/manifests/site
.pp
```

i-0746384271c468f2e (master46)

PublicIPs: 43.205.110.170 PrivateIPs: 172.31.40.114

```
GNU nano 6.2      /etc/puppet/code/environments/productions/manifests/sitte.pp *
file {'tmp/it_works.txt':
  ensure => 'present',
  mode => '0644',
  content => "Hello from ${ipaddress_rth0}!\n"

Error writing /etc/puppet/code/environments/productions/manifests/sitte.pp: No such file or directory
^C Help          ^C Write Out   ^W Where Is    ^R Cut        ^T Execute   ^C Location
^X Exit          ^R Read File   ^\ Replace     ^U Paste     ^J Justify   ^/ Go To Line
i-0746384271c468f2e (master46)
PublicIPs: 43.205.110.170  PrivateIPs: 172.31.40.114
```

```
GNU nano 6.2      /etc/puppet/code/environments/productions/
file {'tmp/it_works.txt':
  ensure => 'present',
  mode => '0644',
  content => "Hello from ${ipaddress_rth0}!\n"
```

Restart the puppet master by executing the command “systemctl restart puppet-master”

```
root@ip-172-31-40-114:/home/ubuntu# systemctl restart puppet-master
root@ip-172-31-40-114:/home/ubuntu# 
i-0746384271c468f2e (master46)
PublicIPs: 43.205.110.170  PrivateIPs: 172.31.40.114
```

The Agent or Slave will request for the changes because it is based on the pull mechanism. Execute “puppet agent --test”

```
root@ip-172-31-43-138:/home/ubuntu puppet agent --test ts
```

i-07851a828cc68a1ee (slave46)

Public IPs: 3.6.41.248 Private IPs: 172.31.43.138

Conclusion:

From the above Experiment, it is concluded that, we have successfully installed and configured pull – based Software Configuration Management and provisioning tools using Puppet. We studied the concept of Puppet, its features, and components to implement them in this experiment successfully. And hence with this experiment, we have achieved the Lab Outcome Six (LO6).

POs Achieved: PO1, PO5, PO12.