

## Experiment No. 10

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

**LO No. & Statement:** (LO6): Synthesize software configuration and provisioning using Ansible.

**Theory:**

In computing, Puppet is a software configuration management tool that includes its own declarative language to describe system configuration. It is a model-driven solution that requires limited programming knowledge to use.

Puppet is produced by Puppet, Inc, founded by Luke Kanies in 2005. Its primary product, Puppet Enterprise, is a proprietary and closed-source version of its open-source Puppet software. They use Puppet's declarative language to manage stages of the IT infrastructure lifecycle, including the provisioning, patching, configuration, and management of the operating system and application components in data centers and cloud infrastructures.

Puppet uses an open-core model; its free-software version was released under version 2 of the GNU General Public License (GPL) until version 2.7.0, and later releases use the Apache License, while Puppet Enterprise uses a proprietary license.

Puppet and Puppet Enterprise operate on multiple Unix-like systems (including Linux, Solaris, BSD, Mac OS X, AIX, and HP-UX) and have Microsoft Windows support. Puppet itself is written in Ruby, while Factor is written in C++, and Puppet Server and Puppet DB are written in Clojure.

**Installation of Puppet:**

Create two Instances of the name Master & Slave with the Platform Ubuntu

The screenshot displays the AWS Management Console interface for an EC2 instance. The left sidebar shows navigation options like EC2 Dashboard, EC2 Global View, Events, Tags, Limits, and Instances. The main content area shows the 'Instance summary for i-08171e8e046874a66 (master)'. The instance is in a 'Pending' state. Key details include: Public IPv4 address 44.207.0.121, Private IPv4 address 172.31.94.62, Hostname type IP name: ip-172-31-94-62.ec2.internal, Instance type t2.micro, VPC ID vpc-0b85da80f609082c9, and Subnet ID subnet-0a71a43ab7757ccdd. The bottom of the console shows a footer with '© 2022, Amazon Internet Services Private Ltd. or its affiliates.' and links for Privacy, Terms, and Cookie preferences.

New EC2 Experience

Tell us what you think

EC2 Dashboard

EC2 Global View

Events

Tags

Limits

Instances

Instances New

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances New

Dedicated Hosts

Scheduled Instances

Capacity Reservations

EC2 > Instances > i-01cd38c3f4b2decdd

Instance summary for i-01cd38c3f4b2decdd (slave) Info

Updated less than a minute ago

Instance ID

i-01cd38c3f4b2decdd (slave)

IPv6 address

-

Hostname type

IP name: ip-172-31-85-127.ec2.internal

Answer private resource DNS name

IPv4 (A)

Auto-assigned IP address

34.238.244.59 [Public IP]

IAM Role

-

Public IPv4 address

34.238.244.59 | [open address](#)

Instance state

Running

Private IP DNS name (IPv4 only)

ip-172-31-85-127.ec2.internal

Instance type

t2.micro

VPC ID

vpc-0b85da80f609082c9

Subnet ID

subnet-0a71a43ab7757ccdd

Private IPv4 addresses

172.31.85.127

Public IPv4 DNS

ec2-34-238-244-59.compute-1.amazonaws.com | [open address](#)

Elastic IP addresses

-

AWS Compute Optimizer finding

Opt-in to AWS Compute Optimizer for recommendations. [Learn more](#)

Auto Scaling Group name

-

Connect

Instance state

Actions

Feedback

Looking for language selection? Find it in the new Unified Settings

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Dedicated Hosts

Scheduled Instances

Capacity Reservations

Instances (2) Info

Find instance by attribute or tag (case-sensitive)

Launch Instances

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone
<input type="checkbox"/>	master	i-08171e8e046874a66	Running	t2.micro	2/2 checks passed	No alarms	us-east-1b
<input type="checkbox"/>	slave	i-01cd38c3f4b2decdd	Running	t2.micro	2/2 checks passed	No alarms	us-east-1b

Select an instance

Feedback

Looking for language selection? Find it in the new Unified Settings

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## Connect Each Instance using Putty

On Master Instance Run the following Commands:

```
login as: ubuntu
Authenticating with public key "puppetmaster"
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 Thu Oct 13 15:47:01 UTC 2022

System load:  0.0               Processes:            102
Usage of /:   19.7% of 7.57GB   Users logged in:     1
Memory usage: 20%              IPv4 address for eth0: 172.31.94.62
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: Thu Oct 13 15:46:00 2022 from 27.106.16.123
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-94-62:~$ sudo su
root@ip-172-31-94-62:/home/ubuntu# sudo apt-get update
Reading package lists... Done
E: Could not get lock /var/lib/apt/lists/lock. It is held by process 1422 (apt-get
)
N: Be aware that removing the lock file is not a solution and may break your syste
m.
E: Unable to lock directory /var/lib/apt/lists/
root@ip-172-31-94-62:/home/ubuntu# sudo apt-get update wget
E: The update command takes no arguments
root@ip-172-31-94-62:/home/ubuntu# sudo apt-get install wget
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
wget is already the newest version (1.21.2-2ubuntu1).
wget set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 45 not upgraded.
root@ip-172-31-94-62:/home/ubuntu# wget https://apt.puppetlabs.com/puppet-release-
```

```

root@ip-172-31-94-62:/home/ubuntu# sudo dpkg -i puppet-release-bionic.deb
Selecting previously unselected package puppet-release.
(Reading database ... 68749 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-172-31-94-62:/home/ubuntu# sudo apt-get install puppet-master
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
puppet-master is already the newest version (5.5.22-4ubuntu0.2).
0 upgraded, 0 newly installed, 0 to remove and 45 not upgraded.
root@ip-172-31-94-62:/home/ubuntu# sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease
Get:4 http://apt.puppetlabs.com bionic InRelease [143 kB]
Hit:5 http://security.ubuntu.com/ubuntu jammy-security 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 185 kB in 1s (338 kB/s)
Reading package lists... Done
root@ip-172-31-94-62:/home/ubuntu# apt policy puppetmaster
puppetmaster:
  Installed: (none)
  Candidate: (none)
  Version table:
root@ip-172-31-94-62:/home/ubuntu# sudo systemctl status puppet-master.service
● puppet-master.service - Puppet master
   Loaded: loaded (/lib/systemd/system/puppet-master.service; enabled; vendor p
   Active: active (running) since Thu 2022-10-13 15:55:26 UTC; 3min 45s ago
     Docs: man:puppet-master(8)
   Process: 3108 ExecStart=/usr/bin/puppet master (code=exited, status=0/SUCCESS)
   Main PID: 3116 (puppet)

```

```

root@ip-172-31-94-62:/home/ubuntu# vim /etc/default/puppet-master

```

```

# Defaults for puppetmaster - sourced by /etc/init.d/puppet-master
JAVA_ARGS="-Xms512m -Xmx512m"
# Startup options.
DAEMON_OPTS=""
~
~
~
~
~
~
~

```

Next, open nano/ etc/hosts and write the Ipv4 private address\_\_puppet under the localhost and save and exit

```

root@ip-172-31-94-62:/home/ubuntu# vim /etc/default/puppet-master
root@ip-172-31-94-62:/home/ubuntu# sudo systemctl restart puppet-master.service
root@ip-172-31-94-62:/home/ubuntu# sudo nano /etc/hosts
root@ip-172-31-94-62:/home/ubuntu# sudo nano /etc/hosts
root@ip-172-31-94-62:/home/ubuntu# sudo ufw allow 8140/tcp
Rules updated
Rules updated (v6)
root@ip-172-31-94-62:/home/ubuntu# sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu jammy-security InRelease
Hit:5 http://apt.puppetlabs.com bionic InRelease
Reading package lists... Done

```

## For Slave Instance:

```
root@ip-172-31-85-127: /tmp
login as: ubuntu
Authenticating with public key "puppetmaster"
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 Thu Oct 13 16:09:04 UTC 2022

System load:  0.080078125      Processes:           98
Usage of /:   19.7% of 7.57GB   Users logged in:    0
Memory usage: 20%              IPv4 address for eth0: 172.31.85.127
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

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-85-127:~$ sudo su
root@ip-172-31-85-127:/home/ubuntu# sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [114
kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [99
.8 kB]
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages
[14.1 MB]
Get:5 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en
[5652 kB]
```

```

root@ip-172-31-85-127: /tmp
Fetches 23.7 MB in 4s (6307 kB/s)
Reading package lists... Done
root@ip-172-31-85-127:/home/ubuntu# wget https://apt.puppetlabs.com/puppet-release-bionic.deb
--2022-10-13 16:10:26-- https://apt.puppetlabs.com/puppet-release-bionic.deb
Resolving apt.puppetlabs.com (apt.puppetlabs.com)... 13.249.39.21, 13.249.39.24, 13.249.39.30, ...
Connecting to apt.puppetlabs.com (apt.puppetlabs.com)[13.249.39.21]:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 11710 (11K) [application/x-debian-package]
Saving to: 'puppet-release-bionic.deb'

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

2022-10-13 16:10:26 (311 MB/s) - 'puppet-release-bionic.deb' saved [11710/11710]

root@ip-172-31-85-127:/home/ubuntu# sudo apt-get install puppet-release-bionic.deb
sudo: apt-get: command not found
root@ip-172-31-85-127:/home/ubuntu# sudo 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-172-31-85-127:/home/ubuntu# sudo nano /etc/hosts
root@ip-172-31-85-127:/home/ubuntu# sudo systemctl start puppet
Failed to start puppet.service: Unit puppet.service not found.
root@ip-172-31-85-127:/home/ubuntu# sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu jammy-security InRelease
Get:5 http://apt.puppetlabs.com bionic InRelease [143 kB]
Get:6 http://apt.puppetlabs.com bionic/puppet all Packages [14.1 kB]
Get:7 http://apt.puppetlabs.com bionic/puppet amd64 Packages [28.0 kB]
Fetched 185 kB in 1s (317 kB/s)
Reading package lists... Done
root@ip-172-31-85-127:/home/ubuntu# sudo systemctl start puppet
Failed to start puppet.service: Unit puppet.service not found.
root@ip-172-31-85-127:/home/ubuntu# sudo systemctl start puppet
Failed to start puppet.service: Unit puppet.service not found.
root@ip-172-31-85-127:/home/ubuntu# wget https://apt.puppetlabs.com/puppet-release-bionic.deb

```

```

root@ip-172-31-85-127:/home/ubuntu# sudo nano /etc/hosts
root@ip-172-31-85-127:/home/ubuntu# sudo systemctl start puppet
root@ip-172-31-85-127:/home/ubuntu# 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
Created symlink /etc/systemd/system/multi-user.target.wants/puppet.service → /lib/systemd/system/puppet.service.
root@ip-172-31-85-127:/home/ubuntu# sudo nano /etc/hosts
root@ip-172-31-85-127:/home/ubuntu# sudo nano /etc/hosts
root@ip-172-31-85-127:/home/ubuntu# sudo systemctl start puppet
root@ip-172-31-85-127:/home/ubuntu# 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

```

In Master Instance

```

root@ip-172-31-94-62:/home/ubuntu# vim /etc/default/puppet-master
root@ip-172-31-94-62:/home/ubuntu# sudo systemctl restart puppet-master.service
root@ip-172-31-94-62:/home/ubuntu# sudo puppet cert list
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-172-31-85-127.ec2.internal" (SHA256) 21:AC:84:31:FC:D3:D7:E6:28:FA:35:44:F
E:2C:E5:40:85:57:64:7F:D5:DE:5E:EF:F1:AA:A6:FC:E7:38:A3:CF
root@ip-172-31-94-62:/home/ubuntu# sudo 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')
Signing Certificate Request for:
"ip-172-31-85-127.ec2.internal" (SHA256) 21:AC:84:31:FC:D3:D7:E6:28:FA:35:44:F
E:2C:E5:40:85:57:64:7F:D5:DE:5E:EF:F1:AA:A6:FC:E7:38:A3:CF
Notice: Signed certificate request for ip-172-31-85-127.ec2.internal
Notice: Removing file Puppet::SSL::CertificateRequest ip-172-31-85-127.ec2.inter
nal at '/var/lib/puppet/ssl/ca/requests/ip-172-31-85-127.ec2.internal.pem'
root@ip-172-31-94-62:/home/ubuntu# sudo mkdir -p /etc/puppet/code/environments/p
roduction/manifests/

```

```

root@ip-172-31-94-62:/home/ubuntu# sudo nano etc/puppet/code/environments/production/manifests/site.pp

```

Insert it after running the above command

```

GNU nano 6.2 /etc/puppet/code/environments/production/manifests/site.pp
file {'/tmp/it works.txt':
    #resource type file and filename
    ensure => present,          #make sure it exists
    mode   => '0644',           #file permissions
    content => "It works on ${ipaddress_ethe}!\n", # Print the ethe IP fact
}

```

In Slave Instance:

```

root@ip-172-31-85-127:/home/ubuntu# cat /tmp
cat: /tmp: Is a directory
root@ip-172-31-85-127:/home/ubuntu# cd /tmp
root@ip-172-31-85-127:/tmp# ls
snap.lxd
systemd-private-486fbef8adf147378f7ebfe2854dd589-ModemManager.service-e3LUQm
systemd-private-486fbef8adf147378f7ebfe2854dd589-chrony.service-tuQLTm
systemd-private-486fbef8adf147378f7ebfe2854dd589-systemd-logind.service-6CjoSU
systemd-private-486fbef8adf147378f7ebfe2854dd589-systemd-resolved.service-7lvwp7

```

The Certificate is verified with the master.

Conclusion:

From this experiment, I have learned about installing and Configuring Pull based Software Configuration Management and provisioning tools using Puppet.

We have achieved LO6 from this Experiment.

The Program Outcomes achieved from this experiment are PO1, PO2, PO3, PO4, PO5, PO8, PO9, PO10, PO12.