



Puppet Lab Guide

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SETTING UP LAB WITH VIRTUAL BOX

In this Lab we are going to use virtual box to setup our lab environment. In this Lab we will use 4 machines, following are the details

puppetmaster:

OS: CentOS 7 (Server installation)

Vcpu: 1

Ram: 2 GB

Disk: 40 GB

Puppet agent:

OS: CentOS 7 (Server installation)

Vcpu: 1

Ram: 1 GB

Disk: 25 GB

Puppet agent:

OS: Ubuntu 16.04.1 LTS

Vcpu: 1

Ram: 1 GB

Disk: 25 GB

INSTALL VIRTUAL BOX

VirtualBox allows you to run an entire operating system inside another operating system. You can download the latest version of virtual box for windows in below link

<https://www.virtualbox.org/wiki/Downloads>

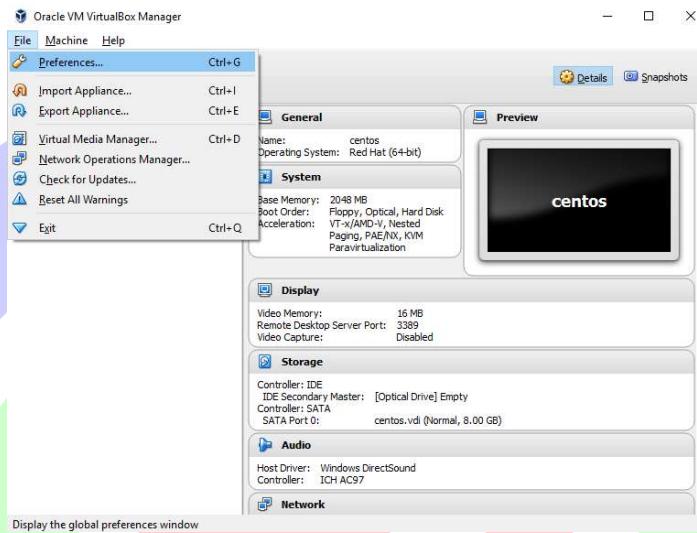
Install it the same way you would any normal Windows program

CONFIGURE HOST ONLY NETWORK

By using this type of adapter, you'll be able to access a private, virtual network consisting solely of your host and any guests. Any of the member machines can access each other, but nothing outside of this self-contained "network in a box" can get in.

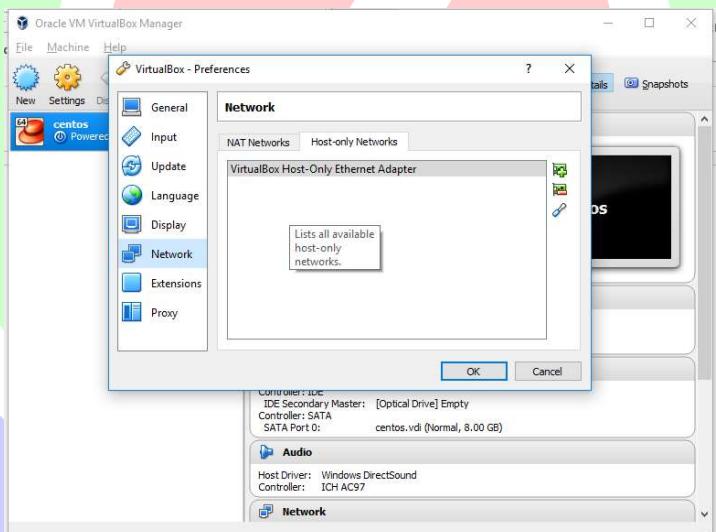
VirtualBox can create several of these virtual host-only networks. You can configure these in the VirtualBox Preferences.

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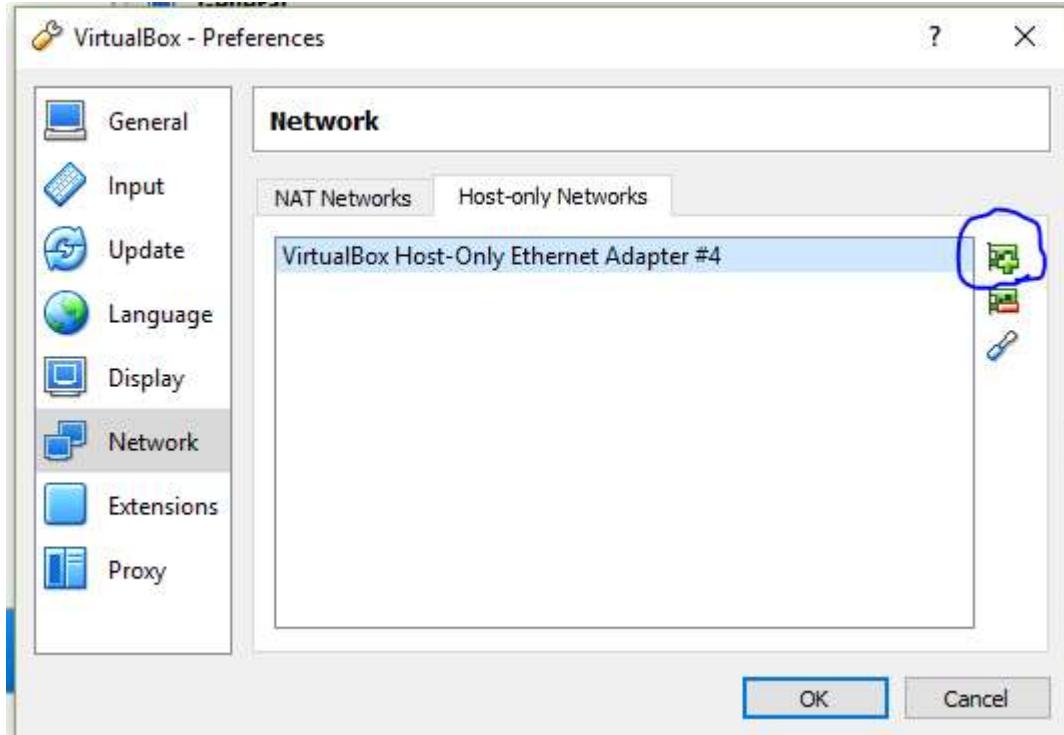
Display the global preferences window

In the preference window select “Network” and select “Host only Networks”

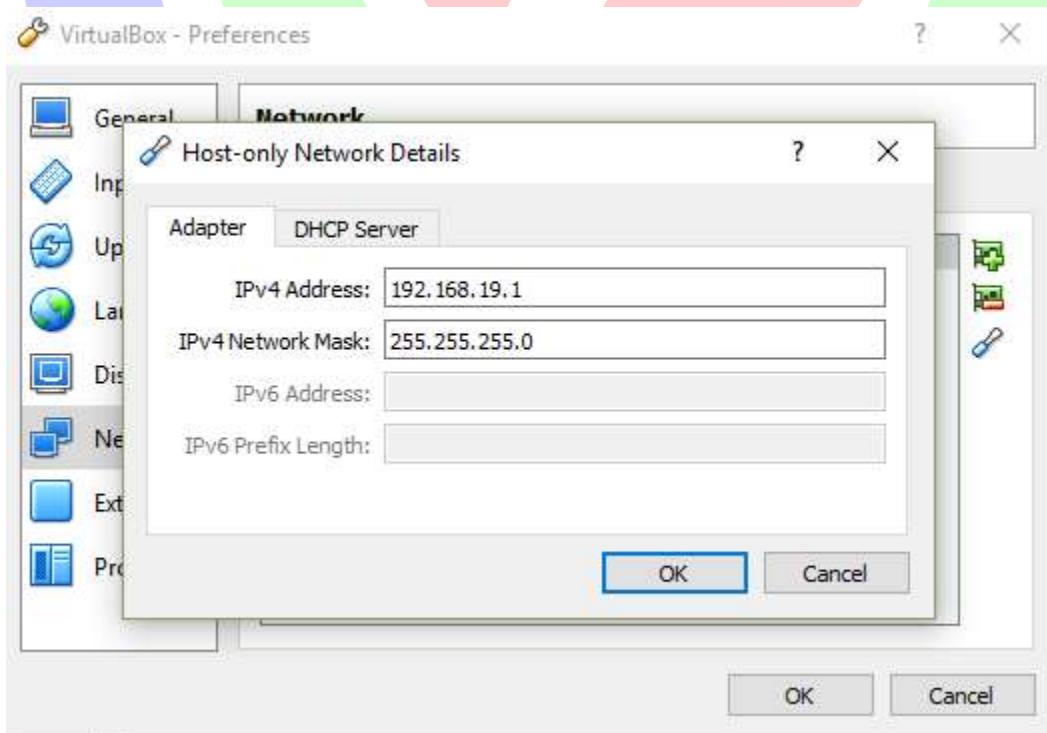


You should see the default “VirtualBox Host Only Ethernet Adapter”. If not click on the add network button and create one as shown below

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Select the network and click on screw driver icon in the window, you should see the below screen

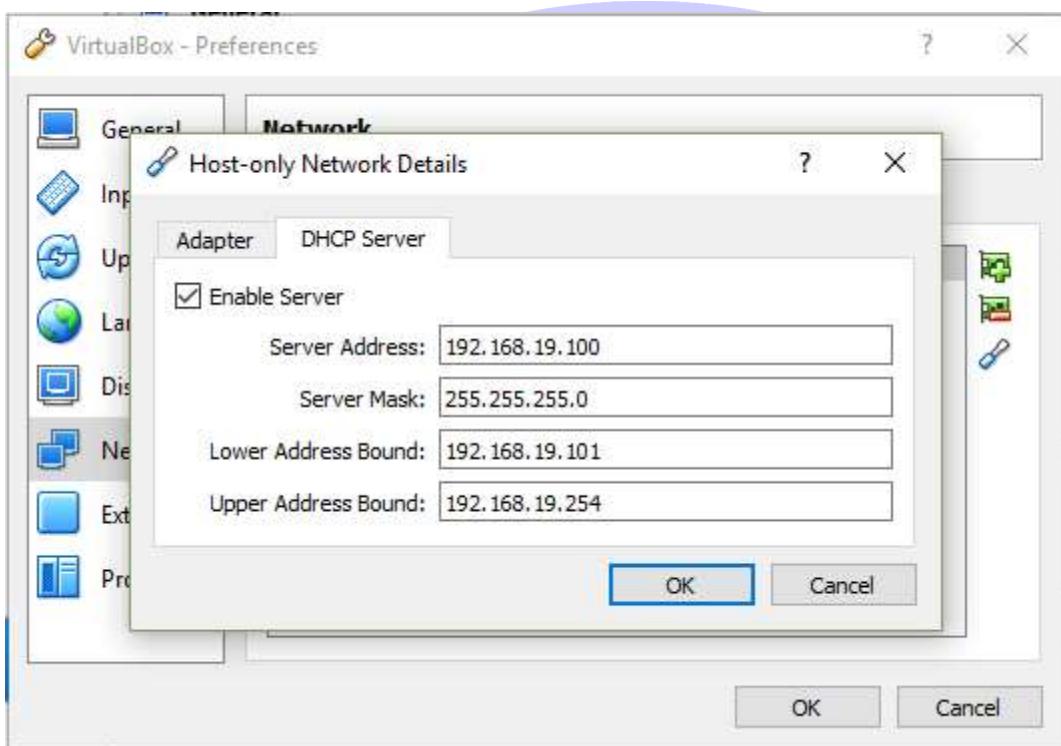


In the IPV4 address enter 192.168.19.1 and enter 255.255.255.0 as Network Mask.

Note: You can select any private IP range you are comfortable with.

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Click on DHCP Server

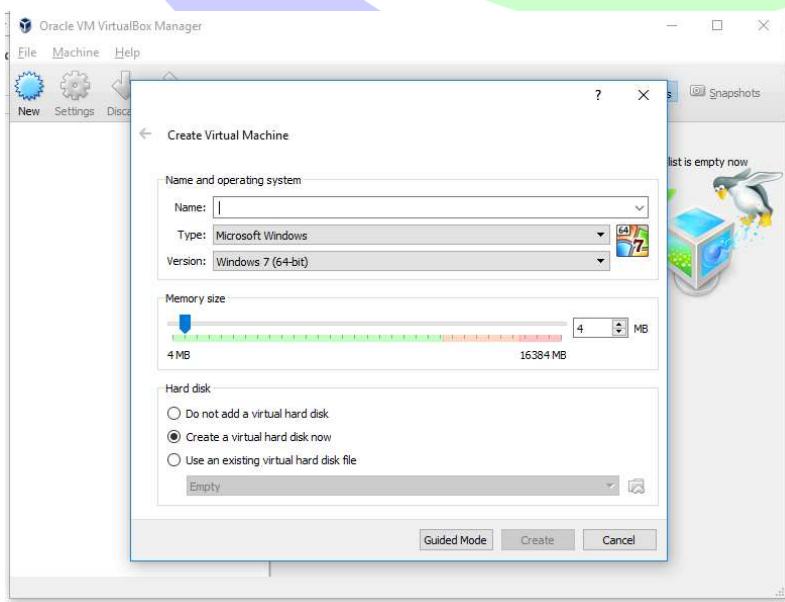


Enter the IP address mentioned in the screen shot. Click ok to save and close

Note: If you have chosen different IP range, enter the IP address appropriately.

CONFIGURATION BEFORE INSTALLATION

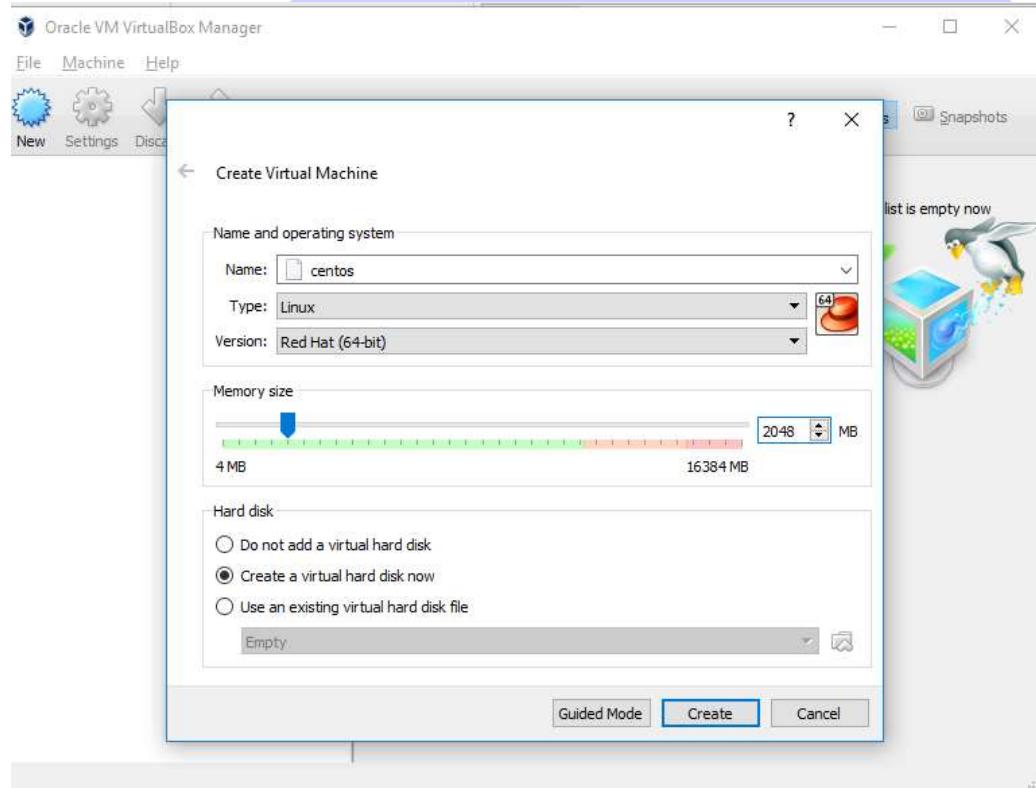
Click New to create a new server



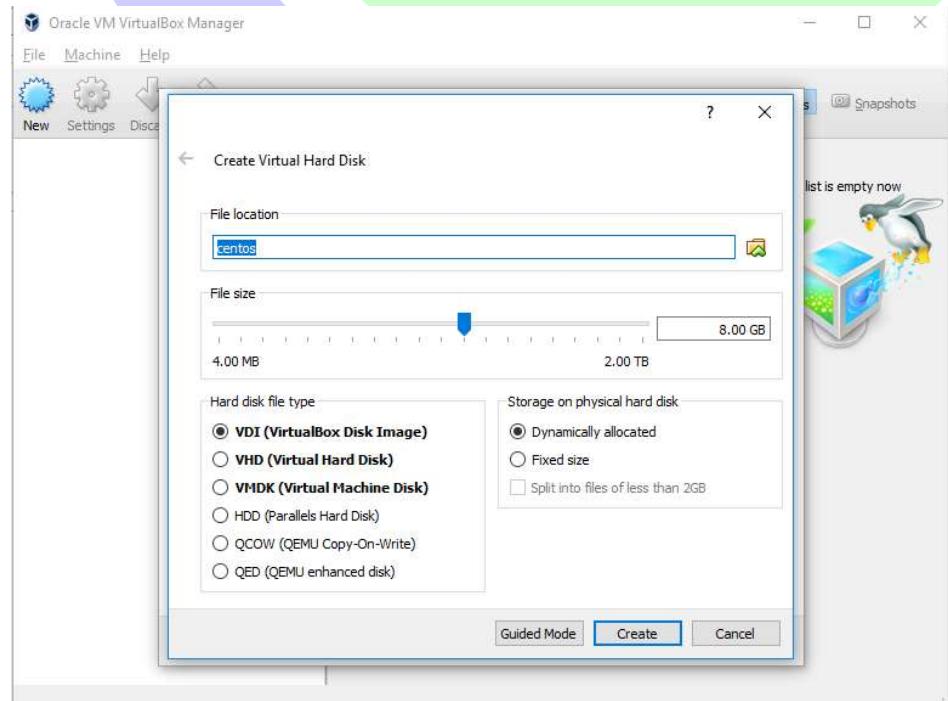
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Enter name as centos base, so that we can reuse the same to clone centos node. It will automatically select the type as RedHat, leave as it is.

Enter memory size as 2048 MB and click create



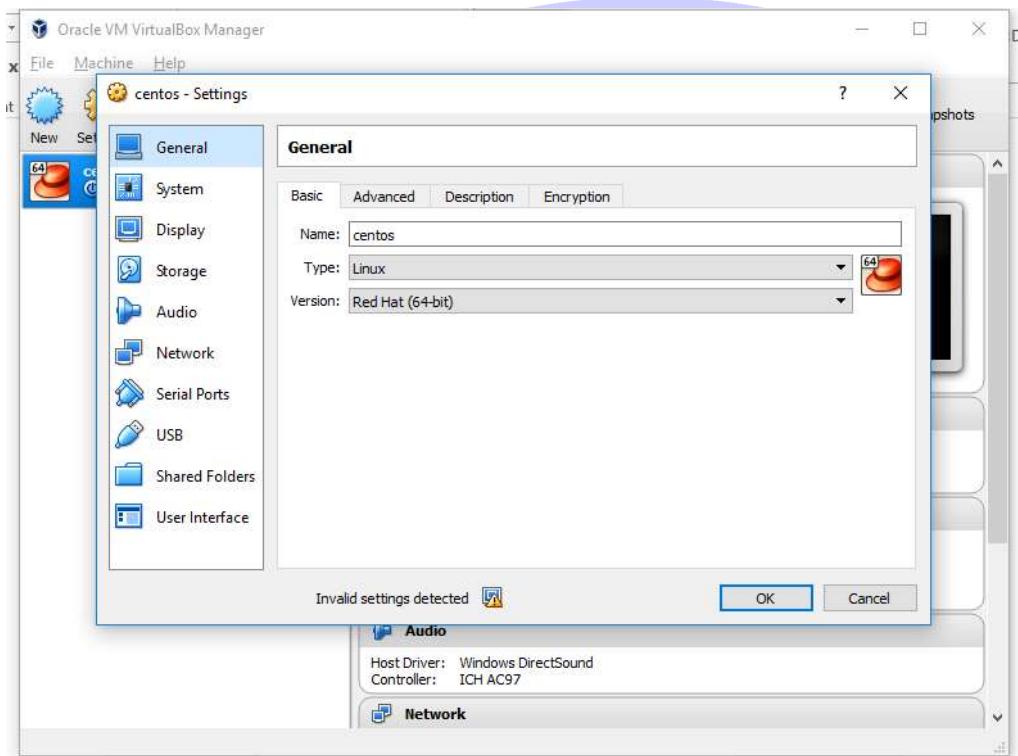
Select file size as 20 Gb



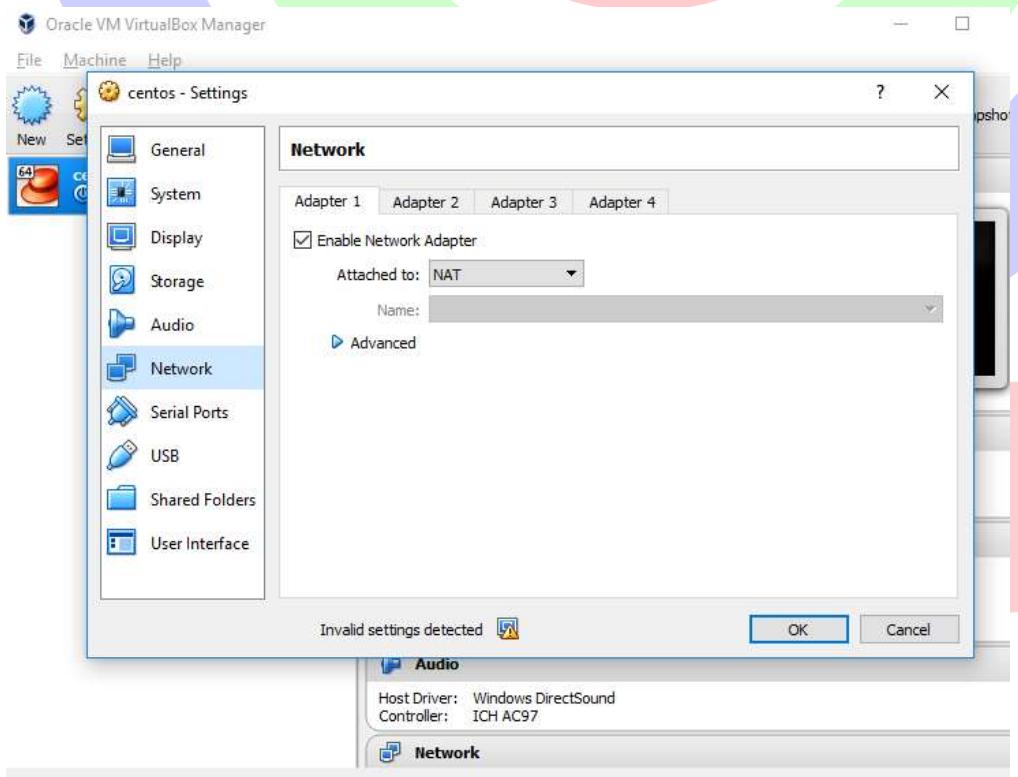
PS
n Work

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After created select the centos base, which is newly created and click on settings.

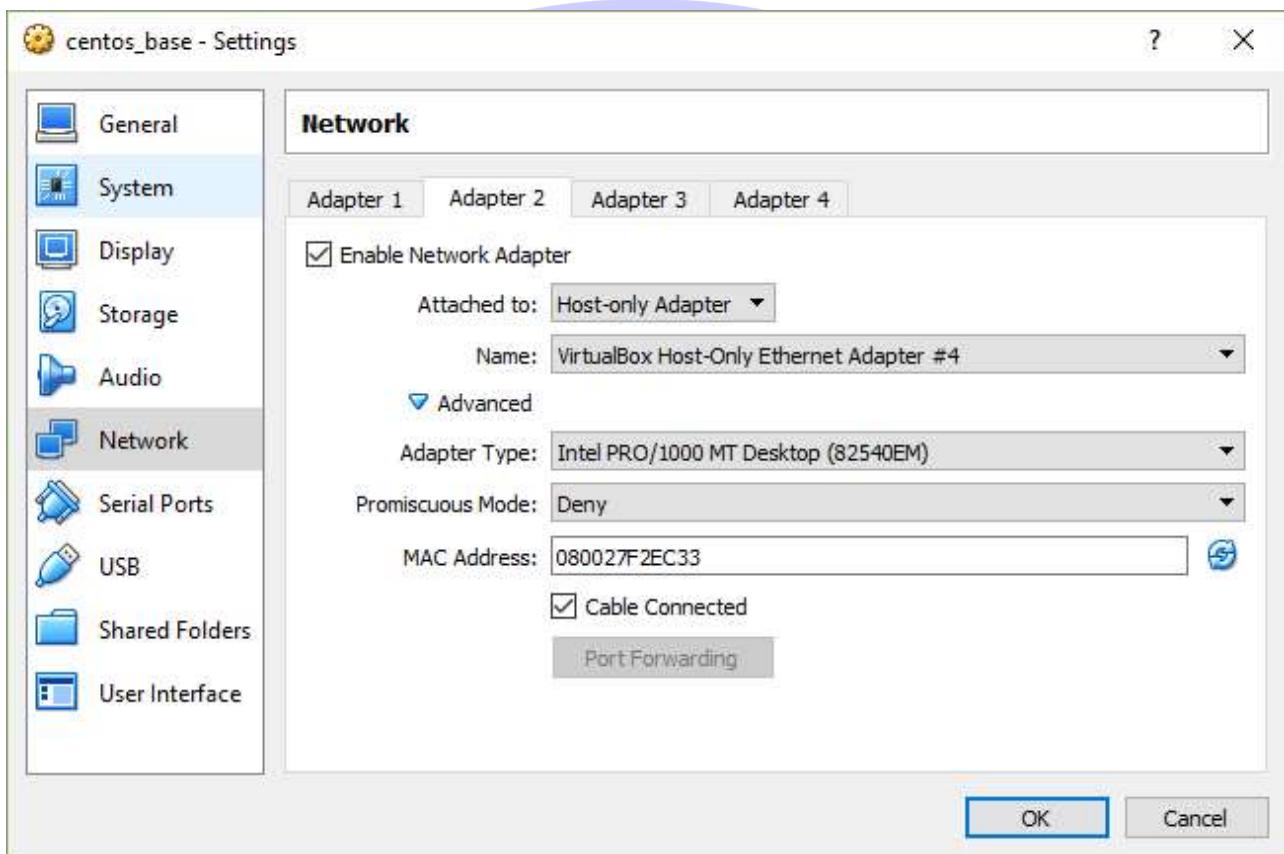


Select Network, in the adapter 1 leave default NAT. This network interface is used to connect to internet via Natting with the host.

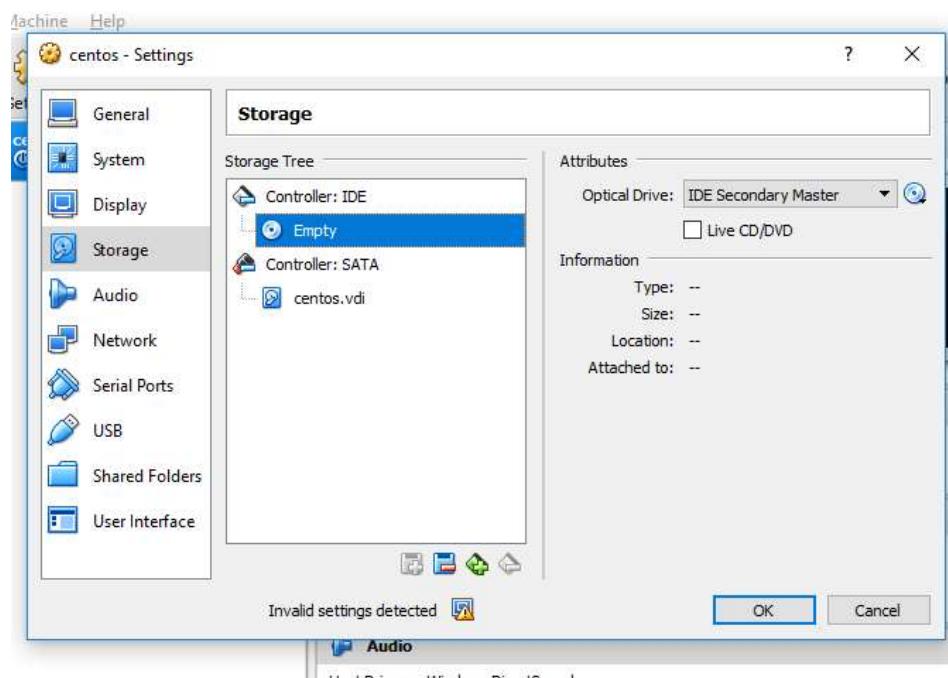


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In the Adapter 2, select enable and select the host only adapter we created early



Click on storage , under IDE select empty. Click on the CD icon on the Optical drive and select the OS image stored on the host



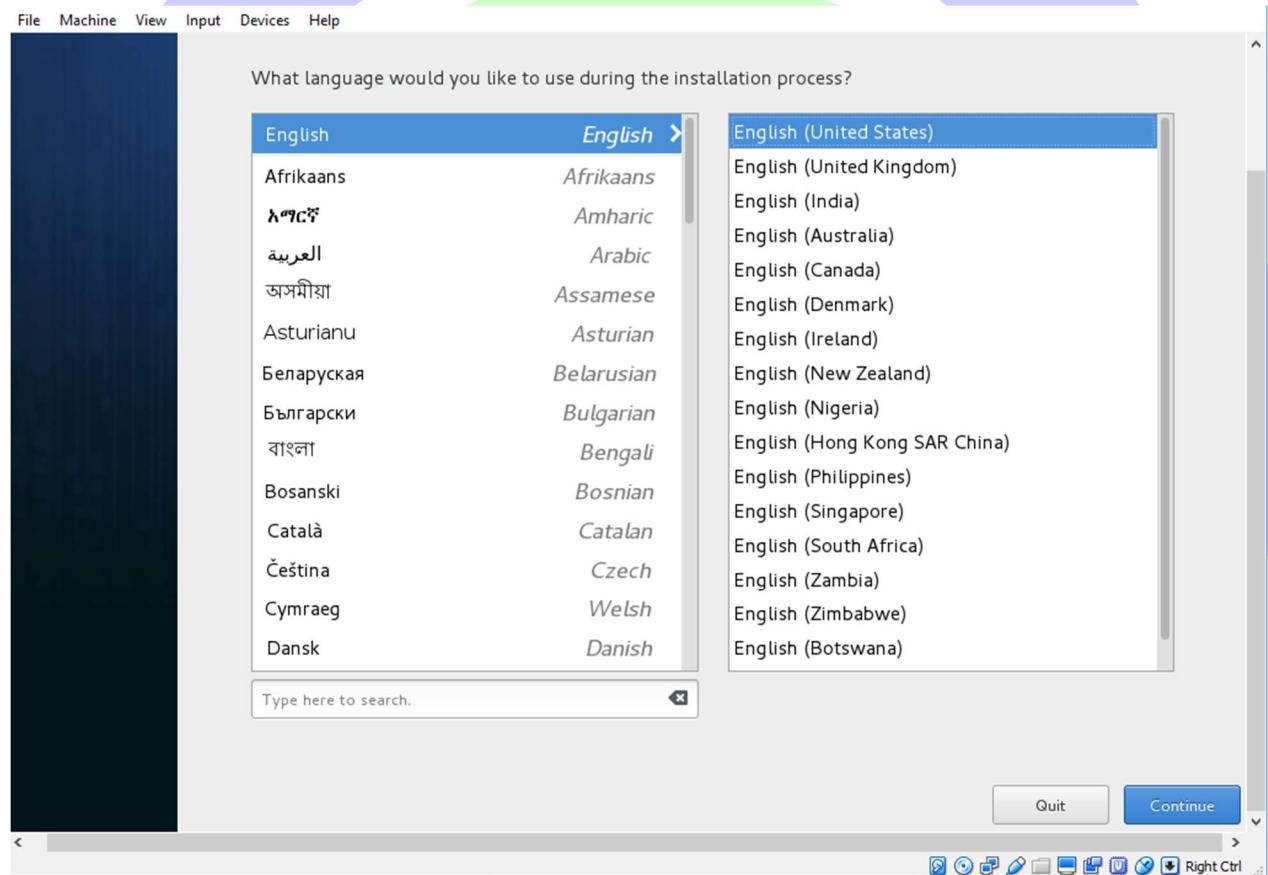
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INSTALL CENTOS

Double click on the new virtual machine to start the machine

Once booted, select install Centos

Select language for installation as English and click continue



If your mouse is trapped inside the virtual box, press “CTRL” key on the right hand side of the keyboard to release the same.

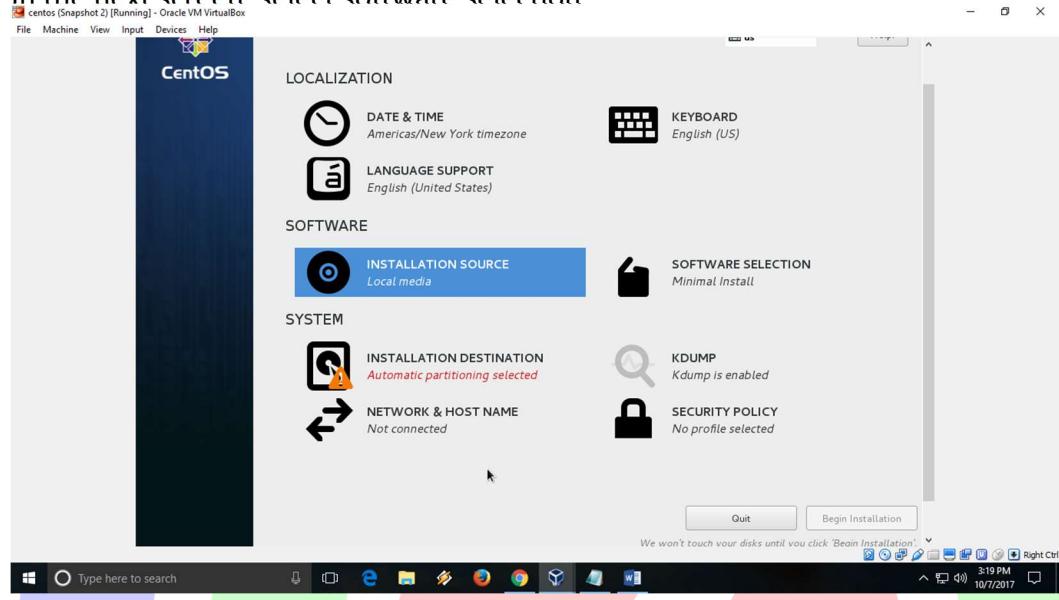
If you double click inside the virtual box, you will be able to use the mouse inside the guest machine.

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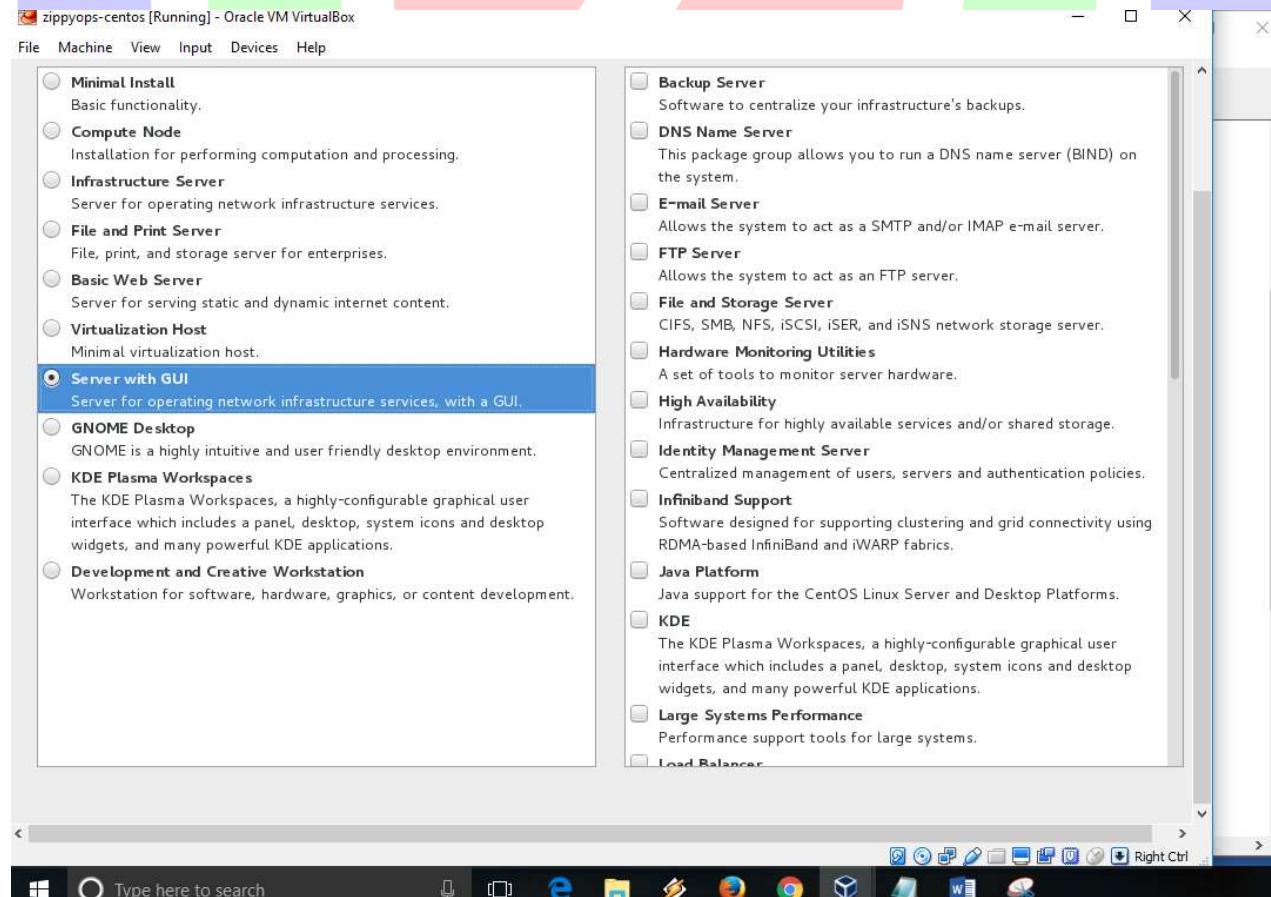
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In the next screen select software selection



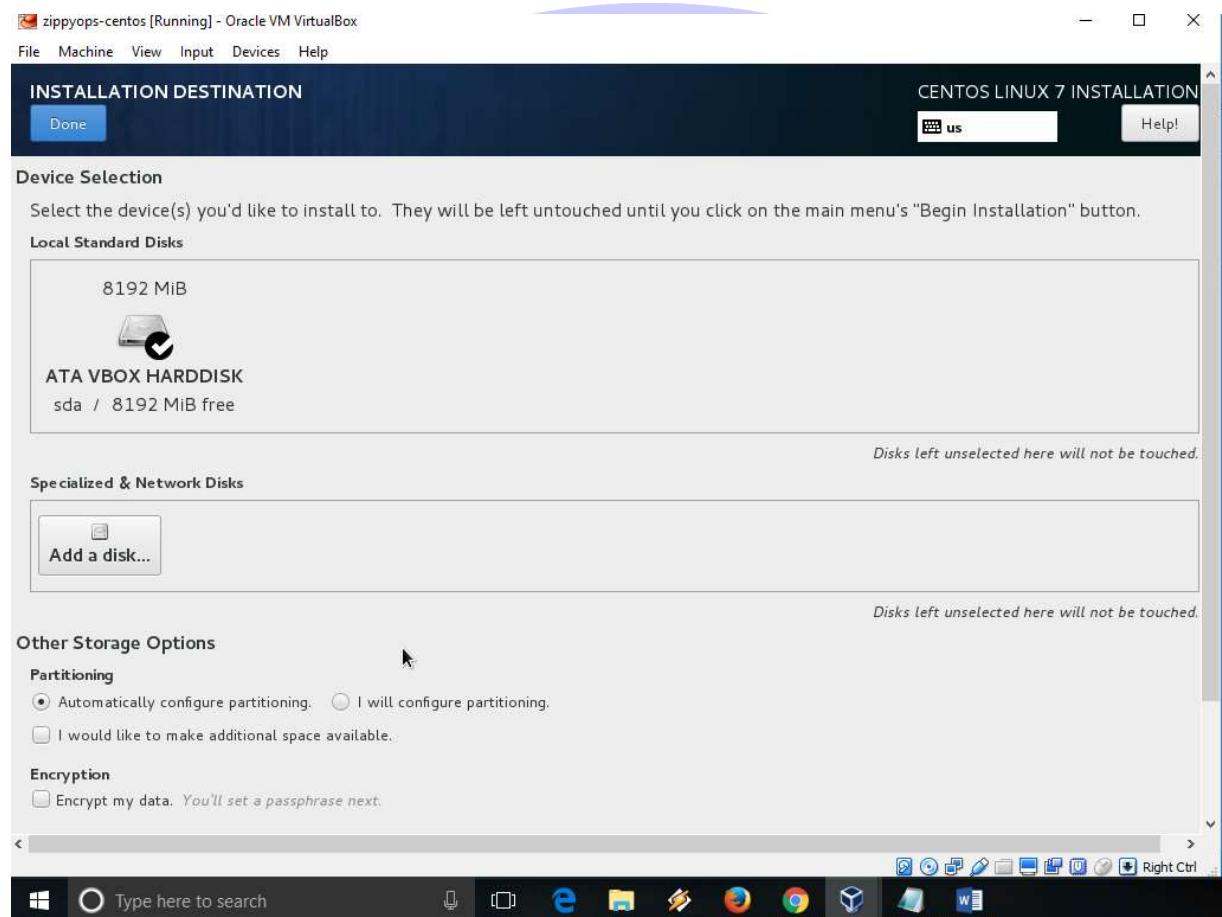
Select server with GUI



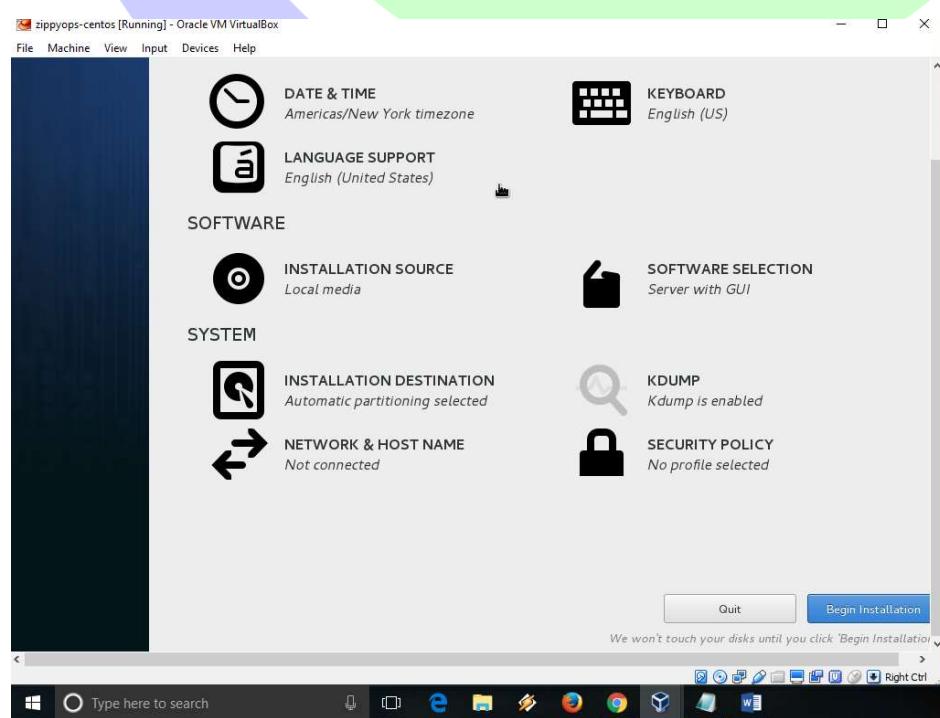
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Click on installation destination and click done

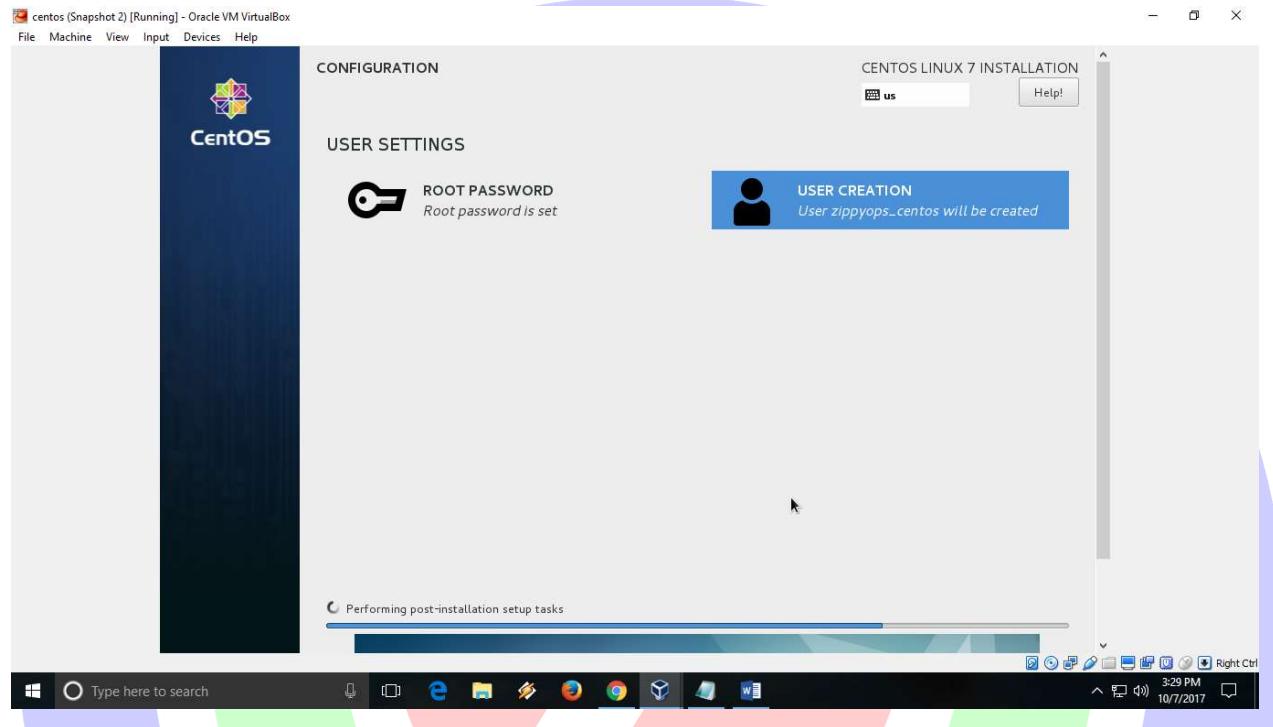


Click Begin installation

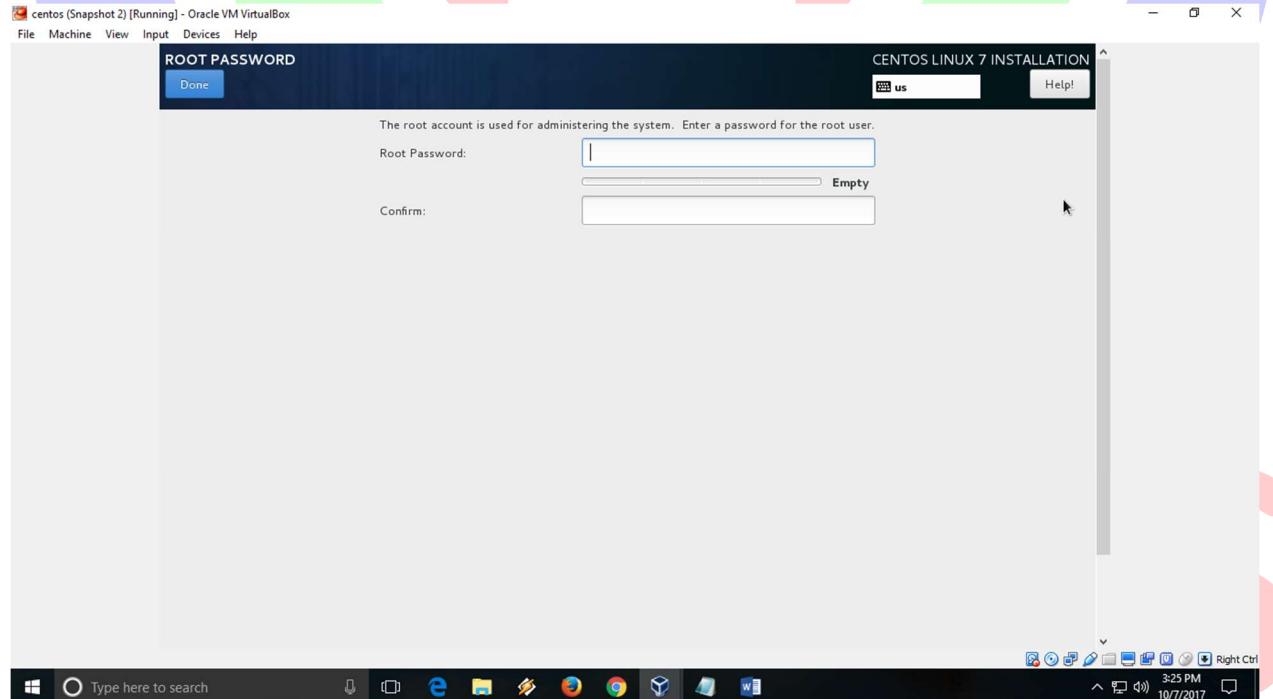


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During the installation, set the root password and create a user. Click on root password



Set a root password and write it somewhere safe.

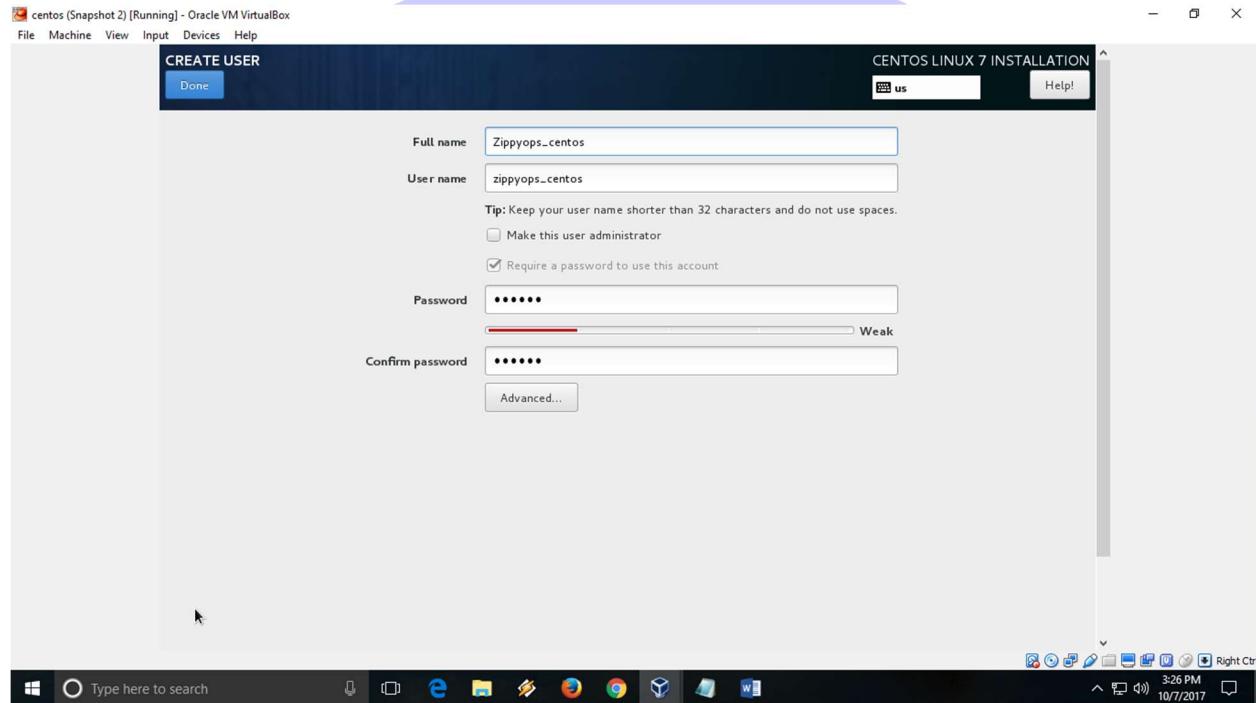


Note : If you have a simple password, you have to press done twice to use a simple password

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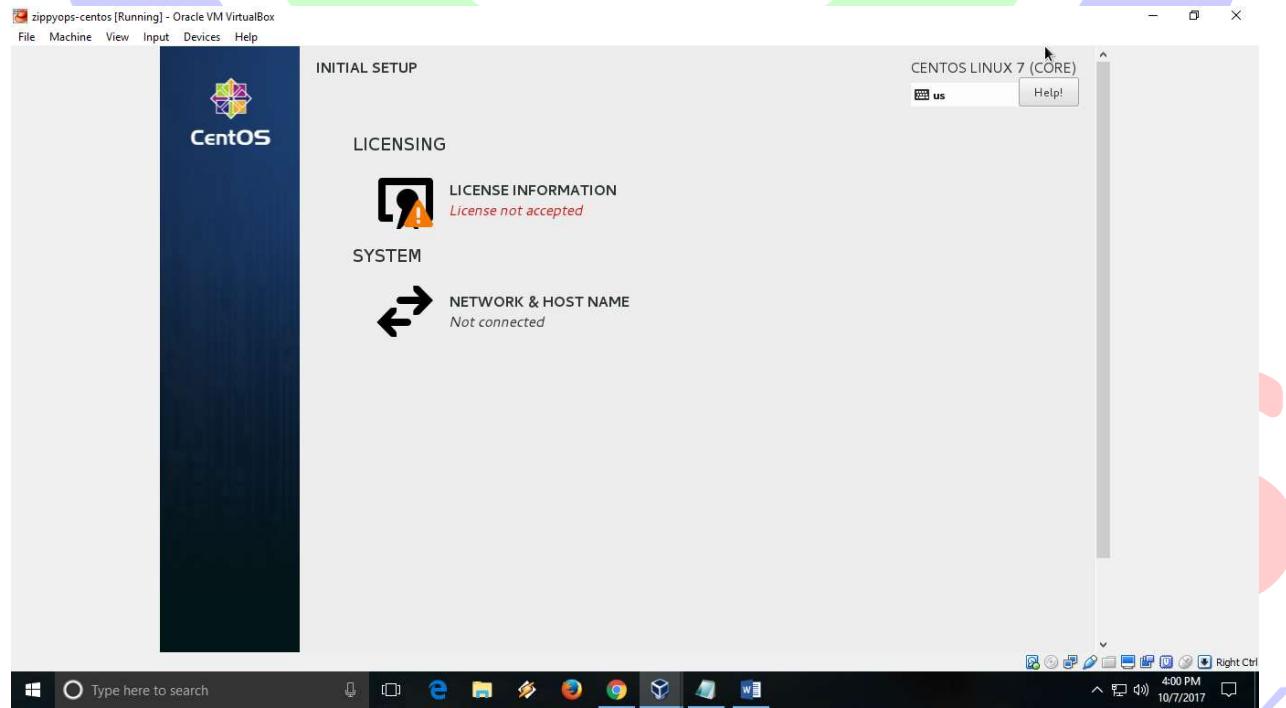
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Create a user by providing a full name, password. Make sure you select the “Make this user administrator”



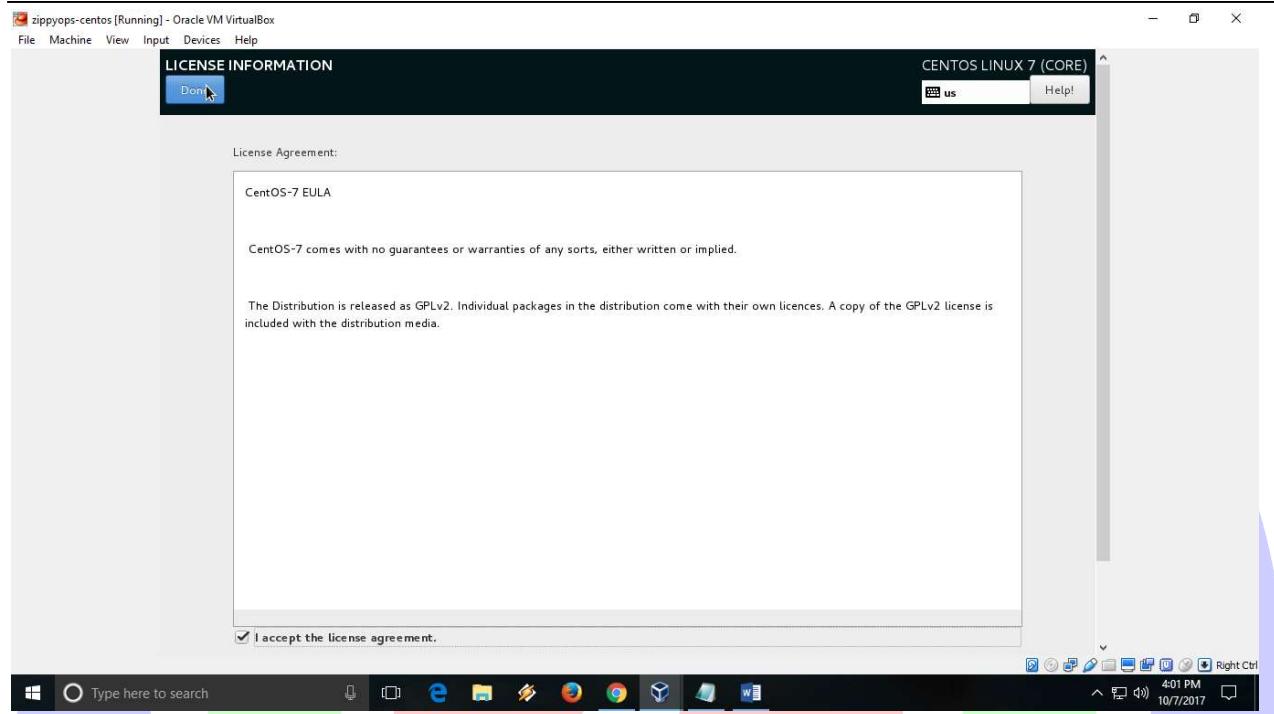
After installation is completed, it will ask you to restart. Click reboot to restart the server.

After reboot, you will see the below screen.

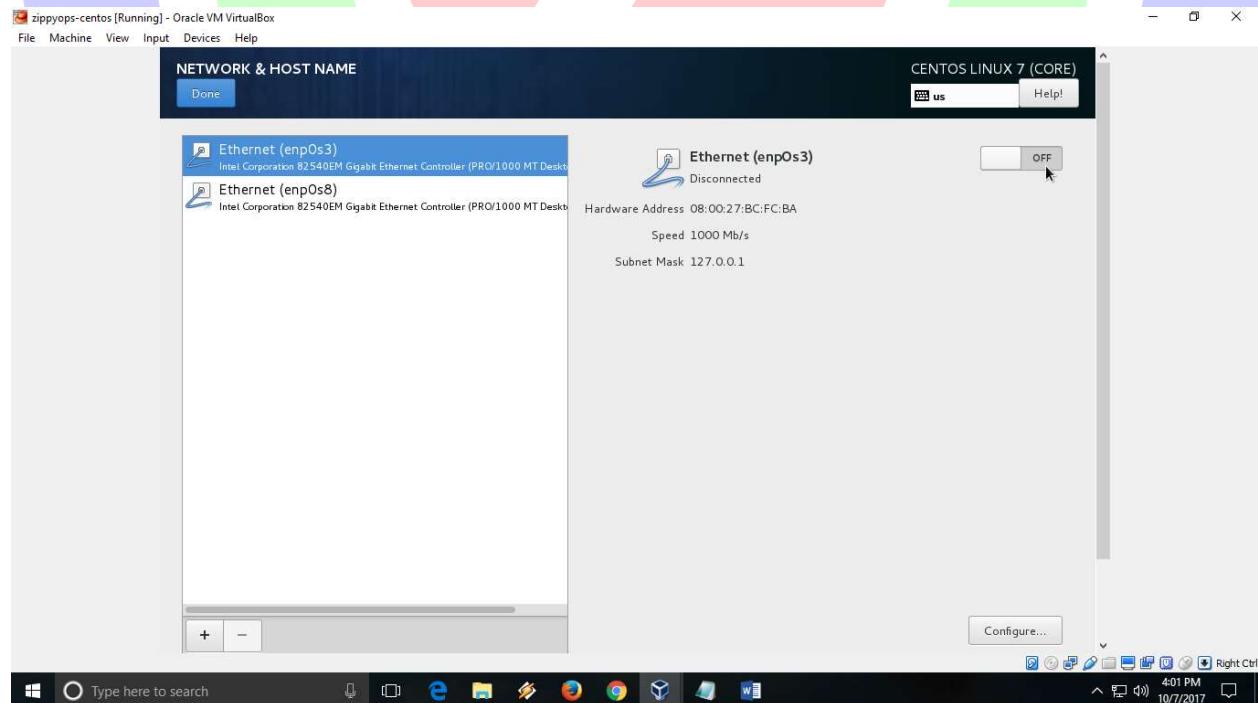


Click on License information and accept the EULA

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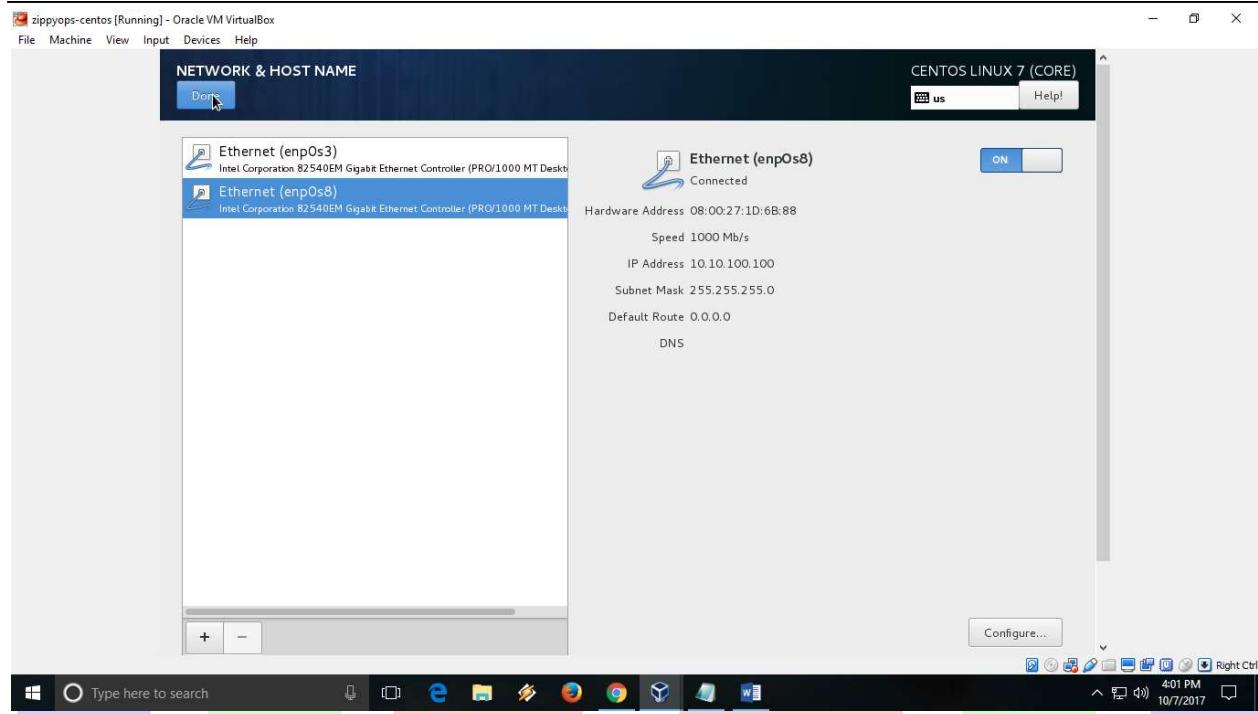
Select Network and HOST Name and enable both the network adapters



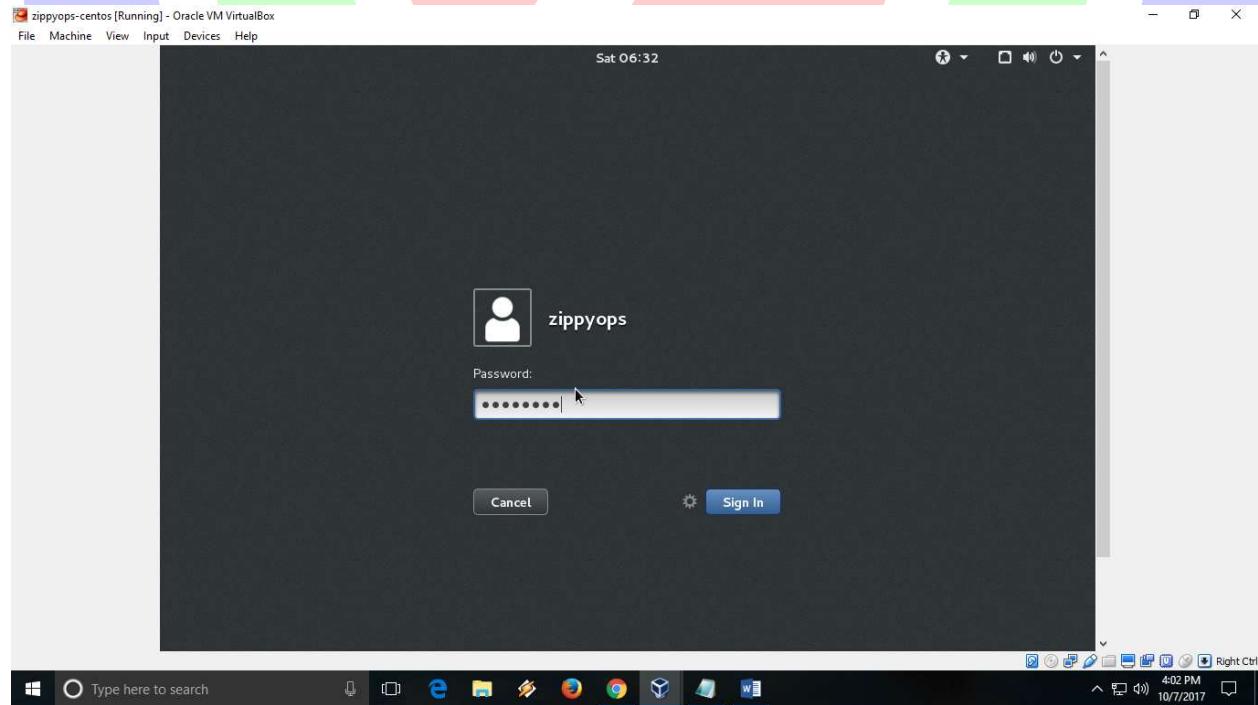
Toggle the switch to ON

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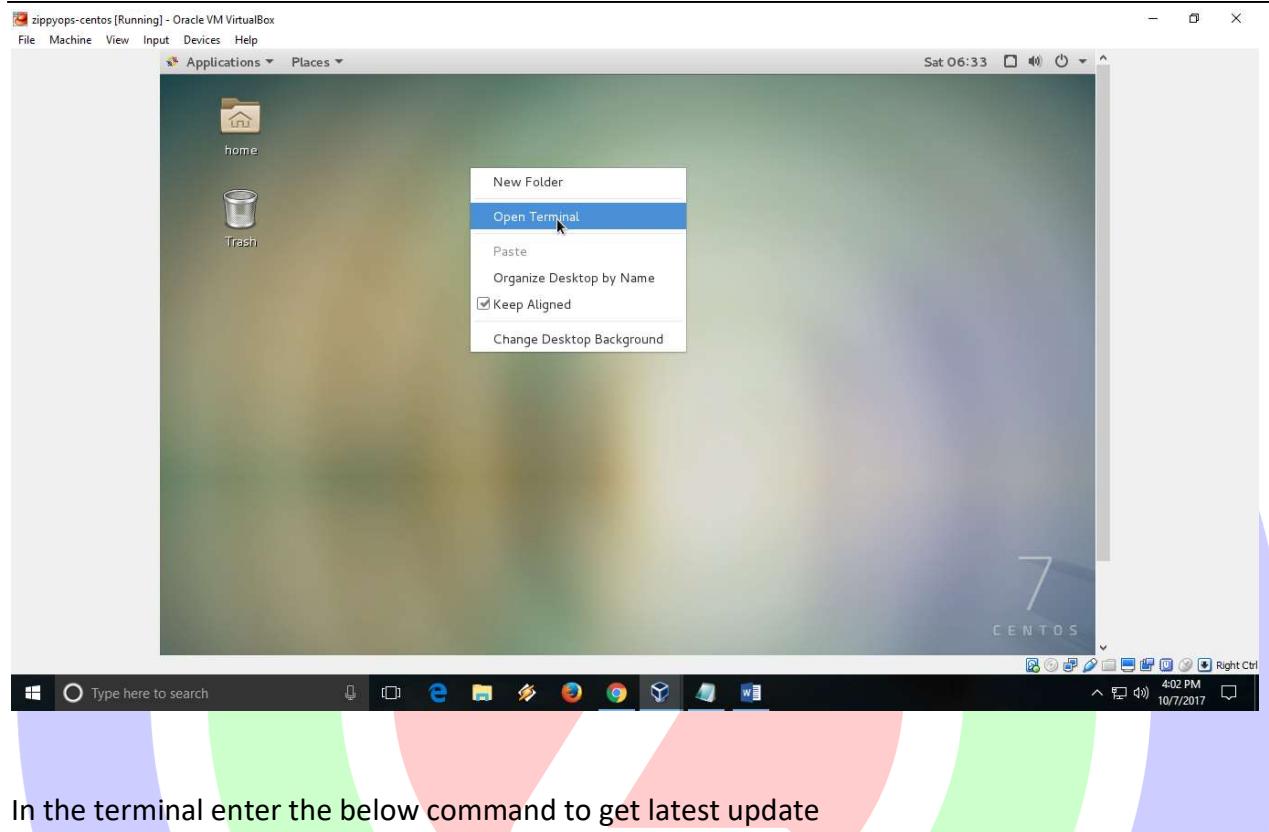
Click on the user created during installation and enter the password to login to the server.



Right click and select "Open Terminal"

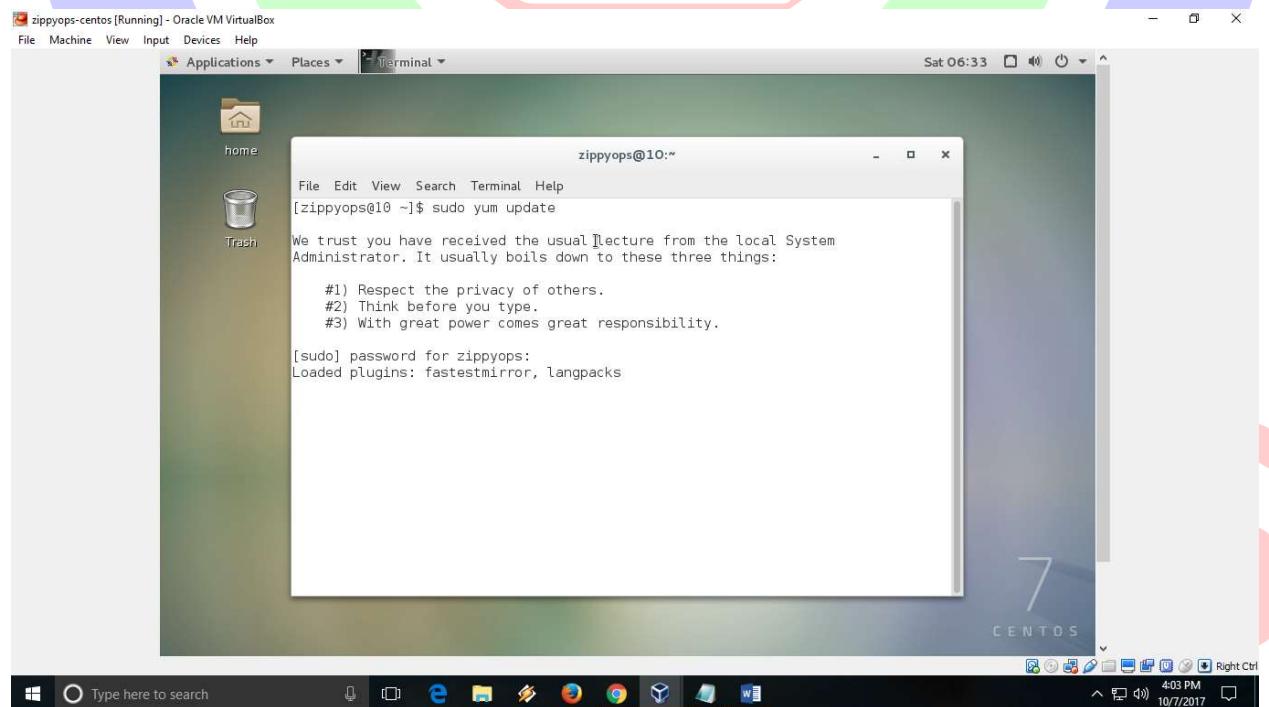
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In the terminal enter the below command to get latest update

```
sudo yum update
```



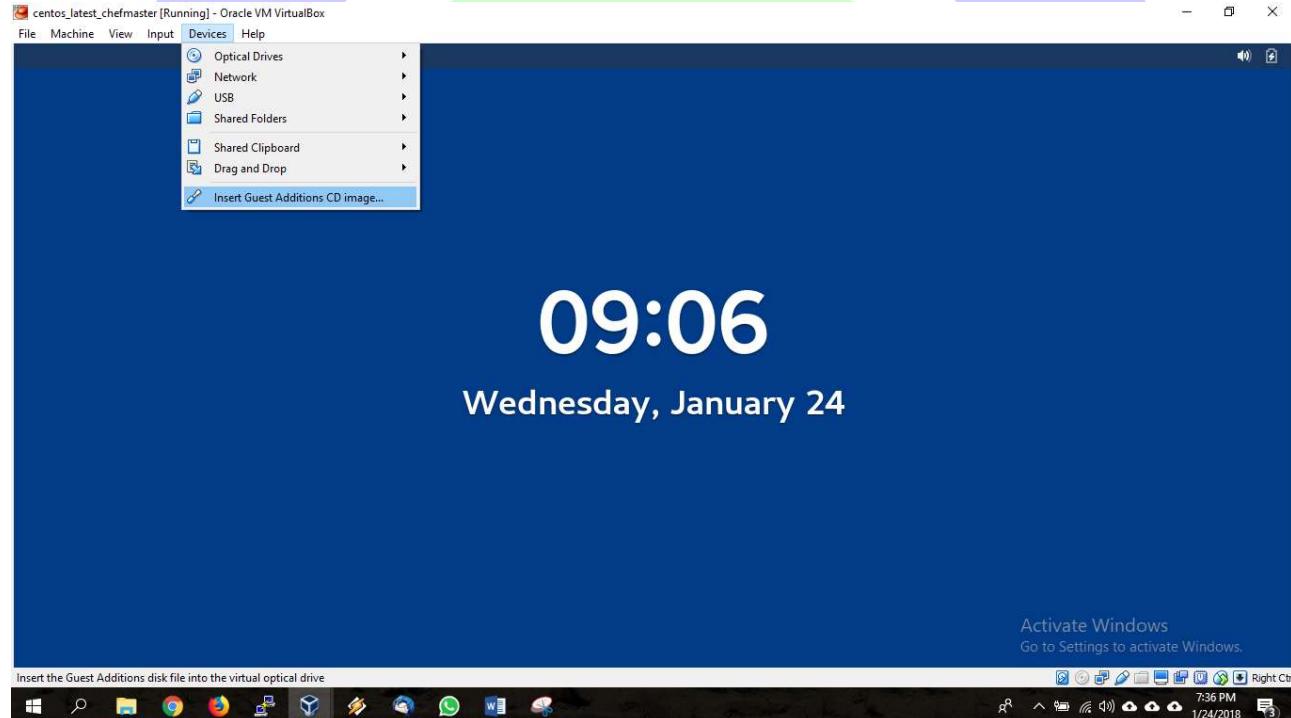
Enter the password of the user to get sudo permission

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Once update is completed, enter the below command to install developer tools and kernel packages

```
sudo yum group install "Development Tools"  
sudo yum install kernel*
```

Once the installation done, select “insert Guest Additional CD image” in devices menu as shown below.

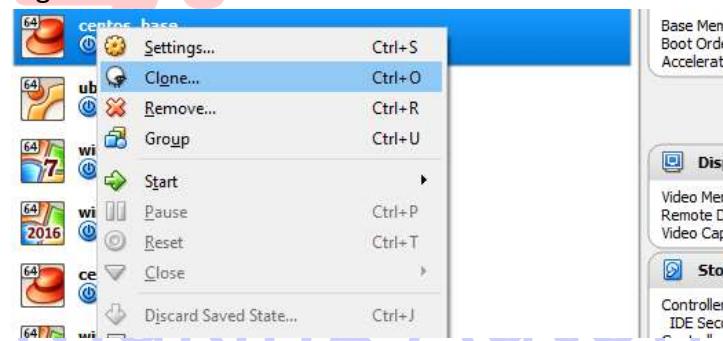


Once its mounted, it will prompt you to run a script and follow on screen instruction. After the installation you will be able to easily navigate between guest and host machines.

Shut down the machine.

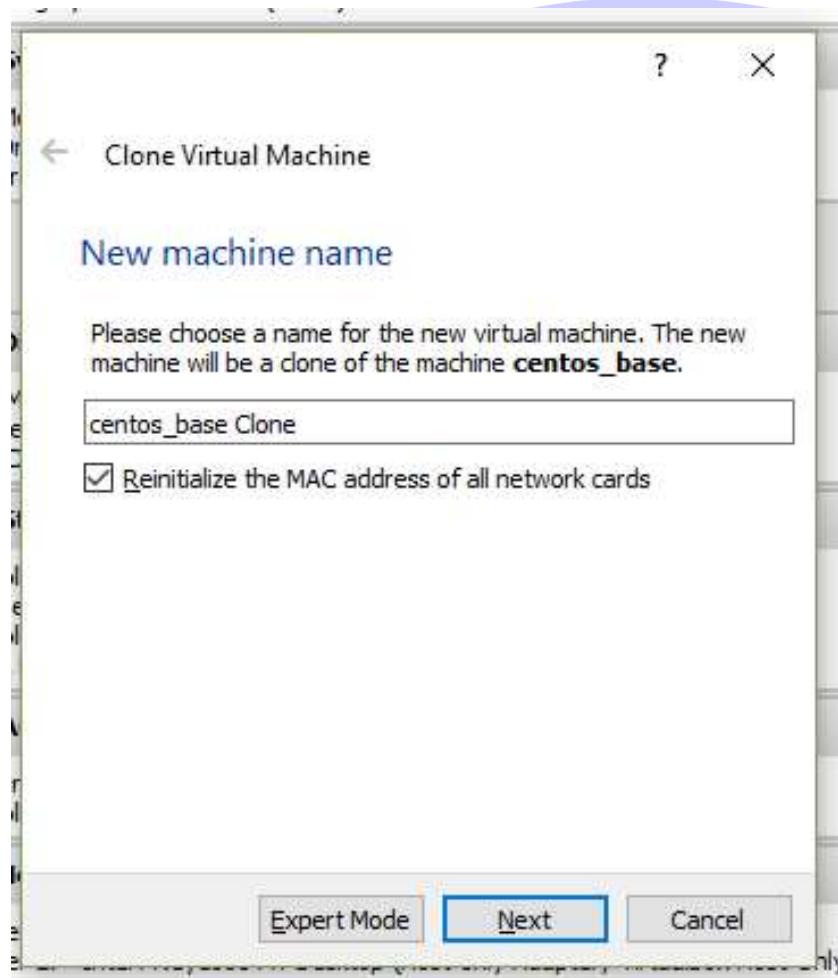
CLONE CENT OS MACHINE

Right click on the machine created and select clone.

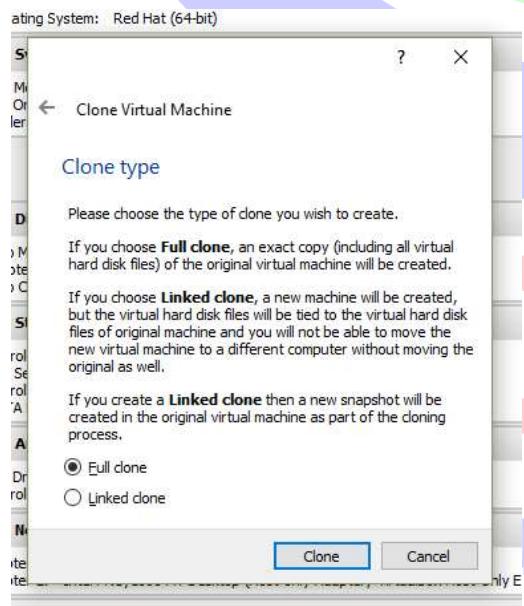


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Enter the name as chef server and select “reinitialize MAC address” and click next



Select “Full Clone” and click clone.

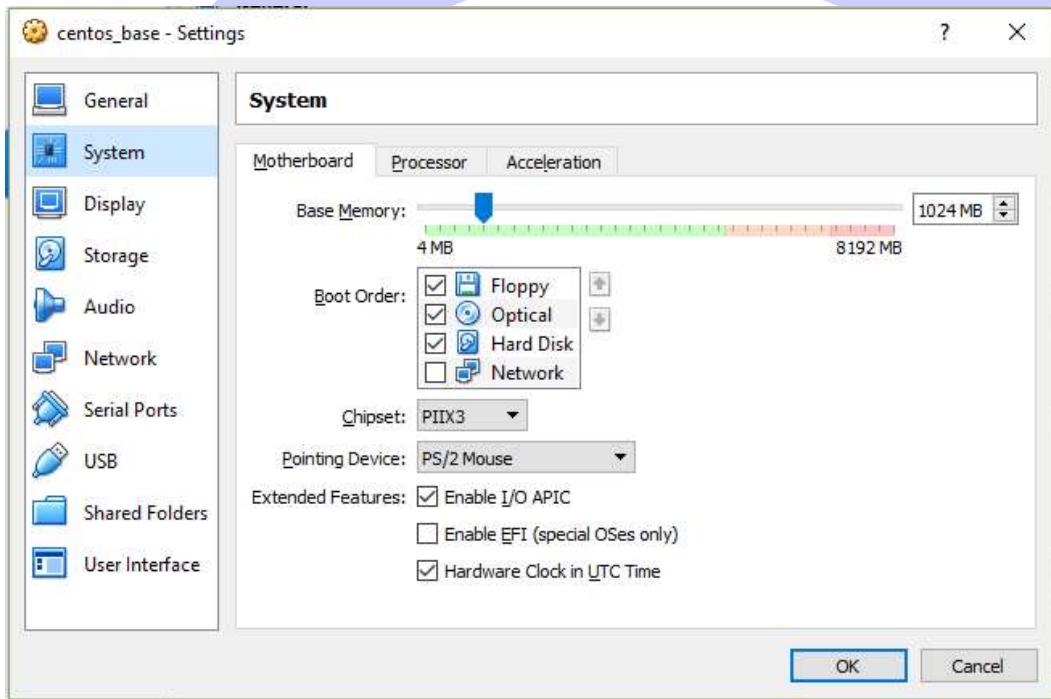


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CREATE CENTOS NODE

Repeat the above step to create a new machine with “centos node” as name

Change the memory to 1 GB in the system tab of guest machine settings



CREATE UBUNTU NODE

Configure NEW installation and select Ubuntu image and follow the on screen installation instruction with below configuration

Vcpu: 1

Ram: 1 GB

Disk: 20 GB

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INTRODUCTION TO PUPPET

WHAT ARE COMMON ISSUES MANAGING TRADITIONAL INFRASTRUCTURE?

- Provisioning of new nodes (servers)
- Configuring nodes is time consuming
- Managing configuration drift
- Using custom scripts is not a solution
- So many servers so little system administrators

WHAT IS PUPPET?

- Software configuration management tool
- Define a configuration once and apply it to thousands of nodes
- Remediate configuration drift
- Get details about your hardware and software configurations
- Orchestrate change to thousands of nodes
- The Puppet's language is declarative
- Puppet code is written to express desired end state of the node
- Management of node resource are abstracted from the operating system
- Code is written inside of classes, classes are assigned to nodes
- Puppet was founded by Luke Kanies in 2005
- Written in Ruby and Clojure

MORE ABOUT PUPPET

- The Puppet Forge (forge.puppet.com)
- PXE boot provisioning using Razor
- Testing Puppet code with RSpec
- Serverspec testing with Beaker
- Extend Puppet modules with Ruby

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INSTALL PUPPET:

Before we go on install puppet , we need to do first disable or permissive selinux ,

```
[root@puppetmaster zippyops]# setenforce 0
[root@puppetmaster zippyops]# sestatus
SELinux status:                 enabled
SELinuxfs mount:                /sys/fs/selinux
SELinux root directory:         /etc/selinux
Loaded policy name:              targeted
Current mode:                   permissive
Mode from config file:          disabled
Policy MLS status:              enabled
Policy deny_unknown status:     allowed
Max kernel policy version:      31
[root@puppetmaster zippyops]#
```

After that stop the firewall , give a command to service firewalld stop ,

```
[root@puppetmaster zippyops]# systemctl stop firewalld
[root@puppetmaster zippyops]# systemctl status firewalld
● firewalld.service - firewalld - dynamic firewall daemon
  Loaded: loaded (/usr/lib/systemd/system/firewalld.service; enabled; vendor preset: enabled)
  Active: inactive (dead) since Fri 2018-07-06 06:58:57 EDT; 3h 12min ago
    Docs: man:firewalld(1)
  Process: 750 ExecStart=/usr/sbin/firewalld --nofork --nopid $FIREWALLD_ARGS (code=exited,
  Status: 0/SUCCESS)
 Main PID: 750 (code=exited, status=0/SUCCESS)

Jul 06 06:52:08 localhost.localdomain systemd[1]: Starting firewalld - dynami...
Jul 06 06:52:12 localhost.localdomain systemd[1]: Started firewalld - dynamic...
Jul 06 06:58:56 puppetmaster systemd[1]: Stopping firewalld - dynamic firewa....
Jul 06 06:58:57 puppetmaster systemd[1]: Stopped firewalld - dynamic firewal....
Hint: Some lines were ellipsized, use -l to show in full.
```

We can download, puppet enterprise on this link: <https://puppet.com/download-puppet-enterprise> and register email address and get download it tar file

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EL (RHEL, CentOS, Scientific Linux, Oracle Linux) ver. 7 (x86_64)

https://pm.puppet.com/cgi-bin/download.cgi?dist=el&rel=7&arch=x86_64&ver=la...[Download \(469M\)](#)[Also see: GPG Signature](#)

EL (RHEL, CentOS, Scientific Linux, Oracle Linux) ver. 6 (x86_64)

https://pm.puppet.com/cgi-bin/download.cgi?dist=el&rel=6&arch=x86_64&ver=la...[Download \(477M\)](#)[Also see: GPG Signature](#)

```
[root@puppetmaster Downloads]# ls
puppet-enterprise-2018.1.2-el-7-x86_64.tar.gz
[root@puppetmaster Downloads]# tar xvf puppet-enterprise-2018.1.2-el-7-x86_64.tar.gz
puppet-enterprise-2018.1.2-el-7-x86_64/VERSION
puppet-enterprise-2018.1.2-el-7-x86_64/LICENSE.txt
puppet-enterprise-2018.1.2-el-7-x86_64/puppet-enterprise-installer
puppet-enterprise-2018.1.2-el-7-x86_64/puppet-enterprise-uninstaller
puppet-enterprise-2018.1.2-el-7-x86_64/README.markdown
puppet-enterprise-2018.1.2-el-7-x86_64/packages/bootstrap-metadata
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64-package-versions.json
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/pe-activemq-2018.1.5.15.3-
1.pe.el7.noarch.rpm
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/pe-backup-tools-1.0.2-
1.el7.x86_64.rpm
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/pe-client-tools-18.1.2-
1.el7.x86_64.rpm
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/pe-console-services-1.10.266-
1.el7.noarch.rpm
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/pe-console-services-termini-1.10.266-
1.el7.noarch.rpm
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1.el7.x86_64.rpm
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/pe-java-2018.1.1.8.0.171-
1.b11.pe.el7.x86_64.rpm
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1.b11.pe.el7.x86_64.rpm
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1.b15.pe.el7.x86_64.rpm
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/pe-modules-2018.1.1.3-
1.el7.x86_64.rpm
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/pe-nginx-2018.1.1.12.1-
1.pe.el7.x86_64.rpm
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/pe-orchestration-services-0.12.45-
1.el7.noarch.rpm
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/pe-postgresql-2018.1.9.6.8-
1.pe.el7.x86_64.rpm
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/pe-postgresql-contrib-2018.1.9.6.8-
1.pe.el7.x86_64.rpm
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/pe-postgresql-devel-2018.1.9.6.8-
1.pe.el7.x86_64.rpm
```

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```
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/pe-postgresql-pglogical-2018.1.1.2.1-1.pe.el7.x86_64.rpm
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/pe-postgresql-server-2018.1.9.6.8-1.pe.el7.x86_64.rpm
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puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/pe-razor-server-1.9.2.0-1.el7.noarch.rpm
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/pe-tasks-0.1.1-1.el7.x86_64.rpm
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/puppet-agent-5.5.3-1.el7.x86_64.rpm
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/repoadata/
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/repoadata/eb77dc342d93d9f6492f42cbe00561699913e9f9-other.sqlite.bz2
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/repoadata/288a059d7e943e893e4f692939ded9205bb78d04-other.xml.gz
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/repoadata/be707a2e4ad01436bf4bc0fe72e25e78b52190cd-filelists.sqlite.bz2
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/repoadata/ba5d2b5571a3973dffcede0e391c738e7cd40231c-filelists.xml.gz
puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/repoadata/d18b02cdd8fa79f1c780bcc3105ab8f3ac90e3d-primary.sqlite.bz2
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puppet-enterprise-2018.1.2-el-7-x86_64/packages/el-7-x86_64/repoadata/repoemd.xml.asc
puppet-enterprise-2018.1.2-el-7-x86_64/packages/GPG-KEY-puppetlabs
puppet-enterprise-2018.1.2-el-7-x86_64/packages/GPG-KEY-puppet
puppet-enterprise-2018.1.2-el-7-x86_64/packages/windows-x86_64/puppet-agent-5.5.3-x64.msi
puppet-enterprise-2018.1.2-el-7-x86_64/conf.d/global_hiera.yaml
puppet-enterprise-2018.1.2-el-7-x86_64/conf.d/pe.conf
puppet-enterprise-2018.1.2-el-7-x86_64/conf.d/pe.conf.2.0
puppet-enterprise-2018.1.2-el-7-x86_64/locales/ja/
puppet-enterprise-2018.1.2-el-7-x86_64/locales/ja/LC_MESSAGES/
puppet-enterprise-2018.1.2-el-7-x86_64/locales/ja/LC_MESSAGES/.gitignore
puppet-enterprise-2018.1.2-el-7-x86_64/locales/ja/LC_MESSAGES/.gitignore
puppet-enterprise-2018.1.2-el-7-x86_64/locales/ja/LC_MESSAGES/README.md
puppet-enterprise-2018.1.2-el-7-x86_64/locales/ja/LC_MESSAGES/puppet-enterprise.mo
puppet-enterprise-2018.1.2-el-7-x86_64/locales/ja/puppet-enterprise.po
puppet-enterprise-2018.1.2-el-7-x86_64/locales/pseudo/
puppet-enterprise-2018.1.2-el-7-x86_64/locales/pseudo/LC_MESSAGES/
puppet-enterprise-2018.1.2-el-7-x86_64/locales/pseudo/LC_MESSAGES/puppet-enterprise.mo
puppet-enterprise-2018.1.2-el-7-x86_64/locales/pseudo/puppet-enterprise.po
puppet-enterprise-2018.1.2-el-7-x86_64/locales/puppet-enterprise.pot
[root@puppetmaster Downloads]#
```

Here , Download that tar file after that extract tar file .

Making Automation Work

ZippyOPS

PE.CONF

The pe.conf file is a HOCON-formatted file that declares parameters and values needed to install and configure Puppet Enterprise.

Found in /etc/puppetlabs/enterprise/conf.d.

Sample pe.conf file:

```
{  
  "console_admin_password": "password",  
  "puppet_enterprise::puppet_master_host": "<puppet-master-fqdn>",  
  "pe_install::puppet_master_dnsaltnames": [ "puppet"  
 ]  
}
```

We have add this pe.conf file in root directory ,

```
[root@puppetmaster puppet-enterprise-2018.1.2-el-7-x86_64]# vi /root/pe.conf  
[root@puppetmaster puppet-enterprise-2018.1.2-el-7-x86_64]# cat /root/pe.conf  
{  
  "console_admin_password": "password_goes_here",  
  "puppet_enterprise::puppet_master_host": "puppetmaster.zippyops.com"  
  "pe_install::puppet_master_dnsaltnames": [  
    "puppet",  
    "master",  
    "puppetmaster"  
  ],  
  "puppet_enterprise::use_application_services": true  
}
```

Now we can start install puppet ,

```
[root@puppetmaster puppet-enterprise-2018.1.2-el-7-x86_64]# ls  
conf.d      locales      puppet-enterprise-installer      README.markdown  
LICENSE.txt  packages     puppet-enterprise-uninstaller  VERSION  
[root@puppetmaster puppet-enterprise-2018.1.2-el-7-x86_64]#
```

Start , installation

```
[root@puppetmaster puppet-enterprise-2018.1.2-el-7-x86_64]# ./puppet-enterprise-installer -c  
/root/pe.conf
```

Where , C – directory for pe.conf file .

```
* returned: 2
```

```
## Puppet Enterprise configuration complete!
```

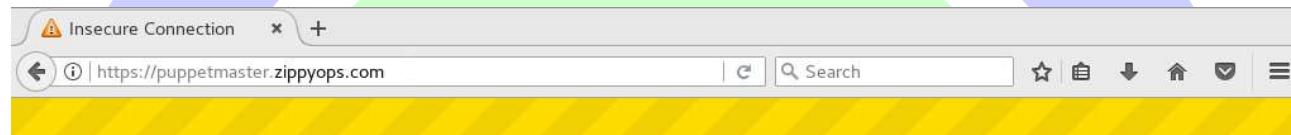
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Documentation: <https://docs.puppet.com/pe/2018.1/index.html>
Release notes: https://docs.puppet.com/pe/2018.1/release_notes.html

If this is a monolithic configuration, run 'puppet agent -t' to complete the setup of this system.

If this is a split configuration, install or upgrade the remaining PE components, and then run puppet agent -t on the Puppet master, PuppetDB, and PE console, in that order.
`/home/zippyops/Downloads/puppet-enterprise-2018.1.2-el-7-x86_64`

Go to browser then you can browse host DNS name ,



Your connection is not secure

The owner of `puppetmaster.zippyops.com` has configured their website improperly. To protect your information from being stolen, Firefox has not connected to this website.

[Learn more...](#)

[Go Back](#)

[Advanced](#)

Report errors like this to help Mozilla identify and block malicious sites

Click "Advanced button"

ZippyOPS

Making Automation Work



Your connection is not secure

The owner of puppetmaster.zippyops.com has configured their website improperly. To protect your information from being stolen, Firefox has not connected to this website.

[Learn more...](#)

[Go Back](#)

[Advanced](#)

Report errors like this to help Mozilla identify and block malicious sites

puppetmaster.zippyops.com uses an invalid security certificate.

The certificate is not trusted because the issuer certificate is unknown.
The server might not be sending the appropriate intermediate certificates.
An additional root certificate may need to be imported.

Error code: SEC_ERROR_UNKNOWN_ISSUER

[Add Exception...](#)

Click “Add Exception”



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Making Automation Work

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Add Security Exception

x



You are about to override how Firefox identifies this site.

Legitimate banks, stores, and other public sites will not ask you to do this.

Server

Location: <https://puppetmaster.zippyops.com/>

[Get Certificate](#)

Certificate Status

This site attempts to identify itself with invalid information.

[View...](#)

Unknown Identity

The certificate is not trusted because it hasn't been verified as issued by a trusted authority using a secure signature.

Permanently store this exception

[Confirm Security Exception](#)

[Cancel](#)

Click "Confirm security Exception" then we can reach login page give your admin user and password as given in pe.conf file .

ZippyOPS
Making Automation Work

ZippyOPS

The screenshot shows the ZippyOPS Puppet interface. On the left, a dark sidebar menu includes sections for INSPECT (Overview, Nodes, Packages, Reports, Jobs, Events), CONFIGURE (Classification), RUN (Puppet, Task), and SETUP (Unsigned certs, Access control, License). The 'Overview' link under 'INSPECT' is highlighted with a green background. The main content area is titled 'Overview' and contains a message: 'View the latest run status for each node and focus on areas in need of attention.' Below this, it says 'Nodes under Puppet management: 0'. A search bar and a 'Filter by fact value' button are present. Three summary cards are displayed: '0 Nodes run in enforcement' (with failures: 0, corrective changes: 0, intentional changes: 0, unchanged: 0), '0 Nodes run in no-op' (with failures: 0, would have corrective changes: 0, would have intentional changes: 0, would be unchanged: 0), and '0 Nodes not reporti' (unreported: 0, has errors: 0). A 'Run Puppet' button is located at the bottom right.

Then click on “unsigned certs”

The screenshot shows the 'Unsigned certificates' page. The sidebar menu is identical to the previous one, with 'Unsigned certs' selected under 'SETUP'. The main content area is titled 'Unsigned certificates' and includes a message: 'Accept certificate requests to bring nodes into your inventory.' Below this, there's a section titled 'Adding nodes to manage with Puppet Enterprise' with a note: 'Every node you wish to manage must have the Puppet Enterprise agent installed.' It provides instructions for installing the agent on a *nix node: 'To install the agent on a *nix node with the same operating system and architecture as the master, run this command:' followed by a code block:

```
curl -k https://puppetmaster.zippyops.com:8140/packages/current/install.bash | sudo bash
```

. It also notes: 'To install an agent on a *nix node with a different operating system and architecture than the Puppet master, follow [these steps](#).' and 'To install an agent on a Windows node, follow [these steps](#).'

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We have to use this url to connect to puppetmaster ,

```
[root@puppetagent1 zippyops]# curl -k https://puppetmaster.zippyops.com:8140/packages/current/install.bash | sudo bash
% Total    % Received % Xferd  Average Speed   Time   Time     Time  Current
          Dload  Upload Total Spent   Left Speed
100 25756  100 25756    0      0  41592      0 --::-- --::-- --::-- 41676
Loaded plugins: fastestmirror, langpacks
Cleaning repos: pe_repo
Cleaning up everything
Maybe you want: rm -rf /var/cache/yum, to also free up space taken by orphaned data from disabled
or removed repos
Cleaning up list of fastest mirrors
+ yum list installed puppet-agent
Loaded plugins: fastestmirror, langpacks
Determining fastest mirrors
 * base: ftp.iitm.ac.in
 * extras: ftp.iitm.ac.in
 * updates: ftp.iitm.ac.in
base                                         | 3.6 kB   00:00
extras                                        | 3.4 kB   00:00
pe_repo                                       | 2.5 kB   00:00
updates                                       | 3.4 kB   00:00
pe_repo/primary_db                           | 28 kB   00:00
Error: No matching Packages to list
+ yum install -y puppet-agent-5.5.3
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
 * base: ftp.iitm.ac.in
 * extras: ftp.iitm.ac.in
 * updates: ftp.iitm.ac.in
Resolving Dependencies
--> Running transaction check
--> Package puppet-agent.x86_64 0:5.5.3-1.el7 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

=====
Package           Arch      Version       Repository      Size
=====
Installing:
puppet-agent     x86_64   5.5.3-1.el7   pe_repo        20 M

Transaction Summary
=====
Install 1 Package

Total download size: 20 M
Installed size: 87 M
Downloading packages:
warning: /var/cache/yum/x86_64/7/pe_repo/packages/puppet-agent-5.5.3-1.el7.x86_64.rpm: Header V4
RSA/SHA256 Signature, key ID ef8d349f: NOKEY
Public key for puppet-agent-5.5.3-1.el7.x86_64.rpm is not installed
puppet-agent-5.5.3-1.el7.x86_64.rpm                                | 20 MB   00:01
Retrieving key from https://puppetmaster.zippyops.com:8140/packages/GPG-KEY-puppetlabs
Importing GPG key 0x4BD6EC30:
  Userid : "Puppet Labs Release Key (Puppet Labs Release Key) <info@puppetlabs.com>"
  Fingerprint: 47b3 20eb 4c7c 375a a9da e1a0 1054 b7a2 4bd6 ec30
  From    : https://puppetmaster.zippyops.com:8140/packages/GPG-KEY-puppetlabs
```

ZippyOPS

```
Retrieving key from https://puppetmaster.zippyops.com:8140/packages/GPG-KEY-puppet
Importing GPG key 0xEF8D349F:
  Userid      : "Puppet, Inc. Release Key (Puppet, Inc. Release Key) <release@puppet.com>"
  Fingerprint: 6f6b 1550 9cf8 e59e 6e46 9f32 7f43 8280 ef8d 349f
  From        : https://puppetmaster.zippyops.com:8140/packages/GPG-KEY-puppet
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : puppet-agent-5.5.3-1.el7.x86_64                               1/1
  Verifying   : puppet-agent-5.5.3-1.el7.x86_64                               1/1

Installed:
  puppet-agent.x86_64 0:5.5.3-1.el7

Complete!
+ set +x
service { 'puppet':
  ensure => 'stopped',
}
Notice: /Service[puppet]/ensure: ensure changed 'stopped' to 'running'
service { 'puppet':
  ensure => 'running',
  enable => 'true',
}
Notice: /File[/usr/local/bin/facter]/ensure: created
file { '/usr/local/bin/facter':
  ensure  => 'link',
  selrange => 's0',
  selrole  => 'object_r',
  seltype   => 'bin_t',
  seluser   => 'system_u',
  target    => '/opt/puppetlabs/puppet/bin/facter',
}
Notice: /File[/usr/local/bin/puppet]/ensure: created
file { '/usr/local/bin/puppet':
  ensure  => 'link',
  selrange => 's0',
  selrole  => 'object_r',
  seltype   => 'bin_t',
  seluser   => 'system_u',
  target    => '/opt/puppetlabs/puppet/bin/puppet',
}
Notice: /File[/usr/local/bin/pe-man]/ensure: created
file { '/usr/local/bin/pe-man':
  ensure  => 'link',
  selrange => 's0',
  selrole  => 'object_r',
  seltype   => 'bin_t',
  seluser   => 'system_u',
  target    => '/opt/puppetlabs/puppet/bin/pe-man',
}
Notice: /File[/usr/local/bin/hiera]/ensure: created
file { '/usr/local/bin/hiera':
  ensure  => 'link',
  selrange => 's0',
  selrole  => 'object_r',
  seltype   => 'bin_t',
  seluser   => 'system_u',
  target    => '/opt/puppetlabs/puppet/bin/hiera',
}
```

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Go back to console and check unsigned certificate ,

The screenshot shows the ZippyOPS Puppet interface. On the left, a sidebar menu includes sections for INSPECT (Overview, Nodes, Packages, Reports, Jobs, Events), CONFIGURE (Classification), RUN (Puppet, Task), and SETUP (Unsigned certs [1], Access control, License). The main content area is titled "Unsigned certificates" and contains a table with one row. The table has columns for "Node name" (puppetagent1.zippyops.com) and "Fingerprint" (9B:2F:6F:42:DF:32:17:BB:C8:F2:7F:AB:9...). To the right of the table are two buttons: "Accept All" and "Reject All". Below the table, there's a section titled "Adding nodes to manage with Puppet Enterprise" with instructions and a command-line example: "curl -k https://puppetmaster.zippyops.com:8140/packages/current/install.bash | sudo bash". There are also links for managing nodes on different operating systems.

Go to puppet master to check cert list ,

```
[root@puppetmaster zippyops]# puppet cert list
  "puppetagent1.zippyops.com" (SHA256)
9B:2F:6F:42:DF:32:17:BB:C8:F2:7F:AB:9A:A9:DF:74:8B:02:38:84:CC:2C:45:D6:1F:77:B0:93:6B:72:73:81
```

To sign this certificate ,

```
[root@puppetmaster zippyops]# puppet cert sign puppetagent1.zippyops.com
Signing Certificate Request for:
  "puppetagent1.zippyops.com" (SHA256)
9B:2F:6F:42:DF:32:17:BB:C8:F2:7F:AB:9A:A9:DF:74:8B:02:38:84:CC:2C:45:D6:1F:77:B0:93:6B:72:73:81
Notice: Signed certificate request for puppetagent1.zippyops.com
Notice: Removing file Puppet::SSL::CertificateRequest 'puppetagent1.zippyops.com' at
'/etc/puppetlabs/puppet/ssl/ca/requests/puppetagent1.zippyops.com.pem'
```

Go back to our agent terminal ,

```
[root@puppetagent1 zippyops]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1530957940'
Notice: Applied catalog in 0.09 seconds
```

ZippyOPS

Go to check dashboard ,

The screenshot shows the ZippyOPS webconsole dashboard. On the left, a sidebar menu includes 'Overview', 'Nodes', 'Packages', 'Reports', 'Jobs', 'Events', 'CONFIGURE' (with 'Classification'), 'RUN' (with 'Puppet' selected), 'Task', 'SETUP' (with 'Unsigned certs' and 'Access control' expanded), 'License', 'My account', 'Help', and 'Log out'. The main area is titled 'Overview' and displays the latest run status for each node. It shows 1 node under 'enforcement' mode, 0 nodes under 'no-op' mode, and 0 nodes not reporting. A legend indicates: 0 failures (red), 0 corrective changes (yellow), 0 intentional changes (blue), and 1 unchanged (green). Filter options include 'Filter by fact value' and 'Run Puppet'.

We have added one node to our webconsole .

PUPPET.CONF

The puppet.conf file is located in /etc/puppetlabs/puppet.

- Config sections
- main is the global section used by all commands and services. It can be overridden by the other sections.
- master is used by the Puppet master service and the Puppet cert command.
- agent is used by the Puppet agent service.
- user is used by the Puppet apply command

Note: Settings are loaded at service start time, to apply changes made to puppet.conf a restart to the pe-puppet service is required.

- Interpolating variables

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- The values of settings are available as variables within puppet.conf, and you can insert them into the values of other settings. To reference a setting as a variable, prefix its name with a dollar sign.
- Example:
 - \$codedir
 - \$confdir
 - \$vardir

Sample puppet.conf for a Puppet Maser.

```
[main]
certname = master.vagrant.vm
server = master.vagrant.vm
user = pe-puppet
group = pe-puppet
environment_timeout = 0
app_management = true
module_groups = base+pe_only
environmentpath = /etc/puppetlabs/code/environments codedir = /etc/puppetlabs/code [agent]
graph = true
[master]
node_terminus = classifier
storeconfigs = true
storeconfigs_backend = puppetdb
reports = puppetdb
certname = master.vagrant.vm
always_cache_features = true
Sample puppet.conf for an agent node.
[main]
server = master.vagrant.vm
certname = agent1.vagrant.vm
```

- Basic settings
 - always_retry_plugins: Affects how we cache attempts to load Puppet resource types and features.
 - basemodulepath: The search path for global modules. Should be specified as a list of directories separated by the system path separator character.
 - Default: \$codedir/modules:/opt/puppetlabs/puppet/modules
 - ca_server: The server to use for certificate authority requests.
 - certname: The name to use when handling certificates.
 - dns_alt_names: A list of hostnames the server is allowed to use when acting as the Puppet master. The hostname that an agent uses must be included this list or the agent will fail connecting to master. The hostname can also live in the certname setting.
 - environment: Defaults to production, is the environment to request but can be overridden by masters ENC (External Node Classifier).

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- environmentpath: A search path for directory environments, as a list of directories separated by the system path separator character.
 - manifest: The entry-point manifest for puppet master. This can be one file or a directory of manifests to be evaluated in alphabetical order. Puppet manages this path as a directory if one exists or if the path ends with a / or .
 - reports: The list of report handlers to use. When using multiple report handlers, their names should be comma-separated, with whitespace allowed. (For example, reports = http, log, store.)
 - http: Send reports via HTTP or HTTPS. This report processor submits reports as POST requests to the address in the reporturl setting. The body of each POST request is the YAML dump of a Puppet::Transaction::Report object, and the Content-Type is set as application/x-yaml.
 - log: Send all received logs to the local log destinations. Usually the log destination is syslog.
 - store: Store the YAML report on disk. Each host sends its report as a YAML dump and this just stores the file on disk, in the reportdir directory.
 - Default: store
 - rundir: The location where Puppet PID files are stored.
 - server: The Puppet master server to which the Puppet agent should connect.
 - ssldir: The location where SSL certs are stored.
 - vardir: The location where Puppet stores growing information.
-
- Run behavior settings
 - ignoreschedules: Schedules allow you to only execute a resource if it's during a specific time period; this setting can disable that feature that might be used when you are doing an initial setup on a node and everything needs to be executed or enforced the first time around
 - noop: Agent will not do any work only simulate changes and report to the master.
 - postrun_command: command to run after Puppet command execute
 - prerun_command: command to run before Puppet command executes
 - priority: The scheduling priority of the process. Valid values are 'high', 'normal', 'low', or 'idle', which are mapped to platform-specific values.
 - report: Whether to send reports after every transaction.
 - runinterval: how often the puppet agent daemon runs
 - tags: Limit the Puppet run to include only resources with certain tags (cool), specific data centers, etc
 - usecacheonfailure: Whether to use the cached configuration when the remote configuration will not compile.
 - waitforcert: Keep trying to run puppet agent if the certificate is not initially available (gives time for the master to sign)

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Lab:

Go to puppet master puppet.conf file ,

```
[root@puppetmaster zippyops]# cd /etc/puppetlabs/puppet/
[root@puppetmaster puppet]# ls
auth.conf      classifier.yaml  hiera.yaml      puppet.conf    routes.yaml
autosign.conf   fileserver.conf  hiera.yaml.rpmnew  puppetdb.conf  ssl
[root@puppetmaster puppet]# vi puppet.conf
[root@puppetmaster puppet]# cat puppet.conf
# This file can be used to override the default puppet settings.
# See the following links for more details on what settings are available:
# - https://puppet.com/docs/puppet/latest/config_important_settings.html
# - https://puppet.com/docs/puppet/latest/config_about_settings.html
# - https://puppet.com/docs/puppet/latest/config_file_main.html
# - https://puppet.com/docs/puppet/latest/configuration.html

[main]
certname = puppetmaster.zippyops.com
server = puppetmaster.zippyops.com
user = pe-puppet
group = pe-puppet
archive_files = true
archive_files_server = puppetmaster.zippyops.com
environment_timeout = 0
app_management = true
module_groups = base+pe_only
codedir = /etc/puppetlabs/code
environmentpath = $codedir/environments

[agent]
graph = true

[master]
node_terminus = classifier
storeconfigs = true
storeconfigs_backend = puppetdb
reports = puppetdb
certname = puppetmaster.zippyops.com
always_retry_plugins = false
disable_i18n = false
```

Go to agent puppet.conf file ,

```
[root@puppetagent1 puppet]# cat puppet.conf
# This file can be used to override the default puppet settings.
# See the following links for more details on what settings are available:
# - https://puppet.com/docs/puppet/latest/config_important_settings.html
# - https://puppet.com/docs/puppet/latest/config_about_settings.html
# - https://puppet.com/docs/puppet/latest/config_file_main.html
# - https://puppet.com/docs/puppet/latest/configuration.html

[main]
server = puppetmaster.zippyops.com
[agent]
certname = puppetagent1.zippyops.com
[root@puppetagent1 puppet]#
```

This is my puppet agent puppet.conf file .

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Here we can do some change to know how to remove ssl certificate and CA certificate from master and to add new certificate .

For example , we have uncheck the certname=puppetagent1.zippyops.com

```
[root@puppetagent1 puppet]# cat puppet.conf
# This file can be used to override the default puppet settings.
# See the following links for more details on what settings are available:
# - https://puppet.com/docs/puppet/latest/config_important_settings.html
# - https://puppet.com/docs/puppet/latest/config_about_settings.html
# - https://puppet.com/docs/puppet/latest/config_file_main.html
# - https://puppet.com/docs/puppet/latest/configuration.html

[main]
server = puppetmaster.zippyops.com
[agent]
# certname = puppetagent1.zippyops.com
certname = awsome_agent
[root@puppetagent1 puppet]#
```

Here , added new certname as " awesome_agent " . after that we can remove or back up our old ssl certificate,

```
[root@puppetagent1 puppet]# ls
auth.conf  hiera.yaml  puppet.conf  ssl
[root@puppetagent1 puppet]# mv ssl ssl_old
[root@puppetagent1 puppet]# ls
auth.conf  hiera.yaml  puppet.conf  ssl_old
```

Go back to our puppet master terminal ,

```
[root@puppetmaster puppet]# puppet cert list -a
+ "pe-internal-mcollective-servers"          (SHA256)
77:58:A2:D2:17:1C:75:A1:A1:19:E7:1C:8A:11:EA:52:92:EC:B7:8E:0D:DB:FD:A5:60:04:70:E1:A9:E2:B9:6C
+ "pe-internal-peadmin-mcollective-client"    (SHA256)
15:E2:98:DA:7E:AA:94:2B:E8:A3:8E:5A:36:99:1B:7A:E2:6D:3B:B7:89:E9:10:28:49:99:9C:4F:34:3E:A1:11
+ "puppetagent1.zippyops.com"                 (SHA256)
A4:DF:C7:C8:35:D7:C7:08:CE:9E:3C:73:41:C6:91:F7:BB:EA:5C:C9:A4:C5:75:B4:D1:7F:6F:78:9F:1A:39:E6
+ "puppetmaster.zippyops.com"                (SHA256)
D3:6B:AB:20:17:02:3E:10:42:F0:17:85:70:A2:89:06:24:7A:AB:A0:77:3A:69:55:47:8E:90:48:80:EC:FB:4C
(alt names: "DNS:master", "DNS:puppet", "DNS:puppetmaster", "DNS:puppetmaster.zippyops.com")
```

Remove puppetagent1.zippyops.com certificate from puppet master ,

```
[root@puppetmaster puppet]# puppet cert clean puppetagent1.zippyops.com
Notice: Revoked certificate with serial 5
Notice: Removing file Puppet::SSL::Certificate puppetagent1.zippyops.com at
'/etc/puppetlabs/puppet/ssl/ca/signed/puppetagent1.zippyops.com.pem'
Notice: Removing file Puppet::SSL::Certificate puppetagent1.zippyops.com at
'/etc/puppetlabs/puppet/ssl/certs/puppetagent1.zippyops.com.pem'
[root@puppetmaster puppet]#
```

We have cleared ca certificate , go back to puppet agent and to run puppet agent –t

```
[root@puppetagent1 puppet]# puppet agent -t
Info: Creating a new SSL key for awsome_agent
Info: Caching certificate for ca
Info: csr_attributes file loading from /etc/puppetlabs/puppet/csr_attributes.yaml
Info: Creating a new SSL certificate request for awsome_agent
Info: Certificate Request fingerprint (SHA256):
44:6E:EF:2F:54:C6:D9:60:DF:04:BD:7A:C5:3A:D8:42:FD:82:A4:C4:13:AC:31:A1:76:9A:1F:C9:F1:64:4C:C7
```

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```
Info: Caching certificate for ca  
Exiting; no certificate found and waitforcert is disabled  
[root@puppetagent1 puppet]#
```

This command to created new ssl cert , go back to puppet master to sign the cert.

```
[root@puppetmaster puppet]# puppet cert list  
"awsome_agent" (SHA256)  
44:6E:EF:2F:54:C6:D9:60:DF:04:BD:7A:C5:3A:D8:42:FD:82:A4:C4:13:AC:31:A1:76:9A:1F:C9:F1:64:4C:C7
```

Here shown up awsome_agent cert to sign it ,

```
[root@puppetmaster puppet]# puppet cert sign awsome_agent  
Signing Certificate Request for:  
"awsome_agent" (SHA256)  
44:6E:EF:2F:54:C6:D9:60:DF:04:BD:7A:C5:3A:D8:42:FD:82:A4:C4:13:AC:31:A1:76:9A:1F:C9:F1:64:4C:C7  
Notice: Signed certificate request for awsome_agent  
Notice: Removing file Puppet::SSL::CertificateRequest awsome_agent at  
'/etc/puppetlabs/puppet/ssl/ca/requests/awsome_agent.pem'  
[root@puppetmaster puppet]#
```

Puppet master signed the certificate , then go back to our puppet agent to accept that sign ,

```
[root@puppetagent1 puppet]# puppet agent -t  
Info: Caching certificate for awsome_agent  
Info: Caching certificate_revocation_list for ca  
Info: Caching certificate for awsome_agent  
Info: Using configured environment 'production'  
Info: Retrieving pluginfacts  
Info: Retrieving plugin  
Info: Retrieving locales  
Info: Loading facts  
Info: Caching catalog for awsome_agent  
Info: Applying configuration version '1530965064'  
Notice: /Stage[main]/Puppet_enterprise::Pxp_agent/File[/etc/puppetlabs/pxp-agent/pxp-  
agent.conf]/content:  
--- /etc/puppetlabs/pxp-agent/pxp-agent.conf 2018-07-07 06:01:09.683698392 -0400  
+++ /tmp/puppet-file20180707-4412-12lyk1a 2018-07-07 08:04:38.193545793 -0400  
@@ -1 +1 @@  
-{ "broker-ws-uris": [ "wss://puppetmaster.zippyops.com:8142/pcp2/" ], "pcp-version": "2", "master-  
uris": [ "https://puppetmaster.zippyops.com:8140" ], "ssl-  
key": "/etc/puppetlabs/puppet/ssl/private_keys/puppetagent1.zippyops.com.pem", "ssl-  
cert": "/etc/puppetlabs/puppet/ssl/certs/puppetagent1.zippyops.com.pem", "ssl-ca-  
cert": "/etc/puppetlabs/puppet/ssl/certs/ca.pem", "loglevel": "info" }  
\ No newline at end of file  
+{ "broker-ws-uris": [ "wss://puppetmaster.zippyops.com:8142/pcp2/" ], "pcp-version": "2", "master-  
uris": [ "https://puppetmaster.zippyops.com:8140" ], "ssl-  
key": "/etc/puppetlabs/puppet/ssl/private_keys/awsome_agent.pem", "ssl-  
cert": "/etc/puppetlabs/puppet/ssl/certs/awsome_agent.pem", "ssl-ca-  
cert": "/etc/puppetlabs/puppet/ssl/certs/ca.pem", "loglevel": "info" }  
\ No newline at end of file  
  
Notice: /Stage[main]/Puppet_enterprise::Pxp_agent/File[/etc/puppetlabs/pxp-agent/pxp-  
agent.conf]/content: content changed '{md5}c49e3798cd951c5272e7aac1f91285c' to  
'{md5}84a35f89304d73498088a0376d7297dd'  
Info: /Stage[main]/Puppet_enterprise::Pxp_agent/File[/etc/puppetlabs/pxp-agent/pxp-agent.conf]:  
Scheduling refresh of Service[pxp-agent]  
Notice: /Stage[main]/Puppet_enterprise::Pxp_agent::Service/Service[pxp-agent]: Triggered  
'refresh' from 1 event  
Notice: Applied catalog in 0.39 seconds
```

ZippyOPS

Go back to our console to refresh ,

The screenshot shows the ZippyOPS Puppet master interface. On the left, a sidebar menu includes 'Jobs', 'Events', 'CONFIGURE' (Classification), 'RUN' (Puppet, Task), 'SETUP' (Unsigned certs, Access control, License), 'My account', 'Help', 'Log out', and 'v2018.1.2'. The main area displays job statistics: 3 nodes run in enforcement (0 failures, 1 corrective changes, 1 intentional changes, 1 unchanged), 0 nodes run in no-op (0 failures, 0 corrective changes, 0 intentional changes, 0 unchanged), and 0 nodes not reporting (0 failures, 0 corrective changes, 0 intentional changes, 0 unchanged). Below this is a table of node reports:

Run status	No-op mode	Job ID	Last report	Node name
●	-	-	2018-07-07 12:04 Z	awsome_agent
○	-	-	2018-07-07 11:45 Z	puppetmaster.zippyops.com
✓	-	-	2018-07-07 11:39 Z	puppetagent1.zippyops.com

Our awesome_agent to add our puppet master server .

How to set configuration setting in puppet agent ?

Configuring setting via the command line :

```
Puppet config set <setting name><value>--section <config section>
```

Lets see one example ,

```
[root@puppetagent1 puppet]# puppet config set runinterval 2m --section main
```

Here ,

- 2m – run interval
- Main – section

Now we can see puppet.conf file ,

```
[root@puppetagent1 puppet]# cat puppet.conf
# This file can be used to override the default puppet settings.
# See the following links for more details on what settings are available:
# - https://puppet.com/docs/puppet/latest/config_important_settings.html
# - https://puppet.com/docs/puppet/latest/config_about_settings.html
# - https://puppet.com/docs/puppet/latest/config_file_main.html
# - https://puppet.com/docs/puppet/latest/configuration.html
```

```
[main]
```

ZippyOPS

```
server = puppetmaster.zippyops.com
runinterval = 2m
[agent]
# certname = puppetagent1.zippyops.com
certname = awsome_agent
[root@puppetagent1 puppet]#
```

Runinterval to be added in puppet.conf file , lets execute this to see working correct or not ,

Now we can restart our puppet ,

```
[root@puppetagent1 puppet]# systemctl restart puppet
[root@puppetagent1 puppet]# tail -f /var/lo
local/ lock/ log/
[root@puppetagent1 puppet]# tail -f /var/log/messages
Jul  7 08:21:38 puppetagent1 nm-dispatcher: req:1 'dhcp4-change' [enp0s8]: new request (4
scripts)
Jul  7 08:21:38 puppetagent1 nm-dispatcher: req:1 'dhcp4-change' [enp0s8]: start running ordered
scripts...
Jul  7 08:21:38 puppetagent1 systemd: Started Network Manager Script Dispatcher Service.
Jul  7 08:23:14 puppetagent1 puppet-agent[4973]: Applied catalog in 0.08 seconds
Jul  7 08:23:18 puppetagent1 puppet-agent[1135]: Caught TERM; exiting
Jul  7 08:23:18 puppetagent1 systemd: Stopping Puppet agent...
Jul  7 08:23:18 puppetagent1 systemd: Started Puppet agent.
Jul  7 08:23:18 puppetagent1 systemd: Starting Puppet agent...
Jul  7 08:23:20 puppetagent1 puppet-agent[5037]: Starting Puppet client version 5.5.2
Jul  7 08:23:26 puppetagent1 puppet-agent[5046]: Applied catalog in 0.08 seconds
Jul  7 08:25:25 puppetagent1 puppet-agent[5130]: Applied catalog in 0.08 seconds
```

We have set interval 2m this is exactly run after 2m only !!!.

One more thing to do , go back to puppet master puppet.conf file ,

```
[root@puppetmaster puppet]# cat puppet.conf
# This file can be used to override the default puppet settings.
# See the following links for more details on what settings are available:
# - https://puppet.com/docs/puppet/latest/config_important_settings.html
# - https://puppet.com/docs/puppet/latest/config_about_settings.html
# - https://puppet.com/docs/puppet/latest/config_file_main.html
# - https://puppet.com/docs/puppet/latest/configuration.html

[main]
certname = puppetmaster.zippyops.com
server = puppetmaster.zippyops.com
user = pe-puppet
group = pe-puppet
archive_files = true
archive_files_server = puppetmaster.zippyops.com
environment_timeout = 0
app_management = true
module_groups = base+pe_only
codedir = /etc/puppetlabs/code
environmentpath = $codedir/environments

[agent]
graph = true

[master]
node_terminus = classifier
storeconfigs = true
storeconfigs_backend = puppetdb
```

ZippyOPS

```
reports = puppetdb
certname = puppetmaster.zippyops.com
always_retry_plugins = false
disable_i18n = false
```

Here variables added in this file so its works correctly or not need to check with this ,

Now we can restart our pe-puppet service and download puppetlabs module ,

To see how we have to download modules ,

```
[root@puppetmaster puppet]# systemctl restart pe-puppetserver
[root@puppetmaster puppet]#
```

To search puppetlabs module in this site : <https://forge.puppet.com/>

The screenshot shows the Puppet Forge homepage. At the top, there's a navigation bar with links for Home, PuppetConf, Forge (which is highlighted in orange), Docs, Learn, Support & Services, and Contact Us. Below the navigation is the Puppet forge logo. To its right, it says "A repository of 5,741 modules for Puppet and Puppet Enterprise® IT automation software". On the far right of the header are links for Publish a Module, Sign Up, and Log In. The main content area has four filter dropdowns: "What do you want to automate?" (set to "puppetlabs"), "Supported/Approved" (set to "Any"), "Operating System" (set to "Any"), and "With Tasks?" (set to "Any"). To the right of these filters is a large orange "Search" button. Below the filters, a message says "Found 683 modules matching 'puppetlabs'". There are two sections of search results. The first section shows a module named "stdlib" by "puppetlabs". It has a yellow "PDK" badge and an orange "SUPPORTED" badge. To the right of the badge are metrics: "Updated 3 months ago", "Total downloads 80,279,432", and "Quality score 5.0". A "Guide to module badges" sidebar to the right explains what each badge means. The second section of results is partially visible.

In this example we have to download java module ,

ZippyOPS

Making Automation Work

ZippyOPS

https://forge.puppet.com/puppetlabs/java

Search

PDK SUPPORTED

Quality Score 5.0
No change with last release details

Community Rating 3.5
Based on 71 questions answered details

java by: Puppet

Installs the correct Java package on various platforms.

Project URL Report issues RSS Feed

Latest version is compatible with:

- Puppet Enterprise 2018.1.x, 2017.3.x, 2017.2.x, 2017.1.x, 2016.5.x, 2016.4.x
- Puppet >= 4.7.0 < 6.0.0
- RedHat, Ubuntu, Debian, Solaris, SLES, Scientific, CentOS, OracleLinux, Fedora

Tags: java, puppetlabs, stdlib, runtime, jdk, jre

To use this module, add this declaration to your Puppetfile:

```
mod 'puppetlabs-java', '2.4.0'
```

Learn more about managing modules with a Puppetfile download latest tar.gz

4,384,322 Latest version: 68.865

To manually install this module with puppet module tool:

```
puppet module install puppetlabs-java -
```

To run ,

```
[root@puppetmaster puppet]# puppet module install puppetlabs-java
Warning: Setting app_management is deprecated.
  (location: /opt/puppetlabs/puppet/lib/ruby/vendor_ruby/puppet/settings.rb:1163:in
`issue_deprecation_warning')
Notice: Preparing to install into /etc/puppetlabs/code/environments/production/modules ...
Notice: Downloading from https://forgeapi.puppet.com ...
Notice: Installing -- do not interrupt ...
/etc/puppetlabs/code/environments/production/modules
└── puppetlabs-java (v2.4.0)
    ├── puppet-archive (v2.3.0)
    └── puppetlabs-stdlib (v4.25.1)
[root@puppetmaster puppet]#
```

Java module has been downloaded , Need to check this ,

```
[root@puppetmaster puppetlabs]# pwd
/etc/puppetlabs
[root@puppetmaster puppetlabs]# cd code/environments/production/modules/
[root@puppetmaster modules]# ls
archive java stdlib
[root@puppetmaster modules]#
```

Our variable interpolation worked correctly .

Making Automation Work

HOW PUPPET WORKS

RESOURCE ABSTRACTION LAYER

- A system configuration is a collection of resources that make up the state of your system
 - Users
 - Cronjobs
 - Packages installed
 - Services
 - Etc.
- Primary issue: A command to start a service might be different, depending (SysVinit, Systemd, init, windows, etc.)
- Solution: Declare the state of a service rather than stating how to run the service
- Every resource is associated with a type, which determines the kind of configuration it manages.
- Declares what the resource looks like not how it is enforced.
- Every resource type has:
 - a title
 - a set of attributes

Resource Type Format:

```
<TYPE> { '<TITLE>':  
<ATTRIBUTE> => <VALUE>,  
}
```

Example:

```
user { 'username':  
ensure  => present,  
uid     => '102',  
gid     => 'wheel',  
shell   => '/bin/bash',  
home    => '/home/username',  
managehome => true,  
}
```

Making Automation Work

ZippyOPS

A resource declaration is an expression that describes the desired state for a resource and Puppet to add it to the catalog. When Puppet applies that catalog to a target system, it manages every resource it contains, ensuring that the actual state matches the desired state.

Providers implement the same resource type on different kinds of systems. They usually do this by calling out to external commands.

Example:

- RedHat/CentOS uses yum and RPM
- Debian/Ubuntu uses apt-get and DPKG
- Ruby uses gems

RESOURCES

- When building modules, we are using Linux the Puppet Academy DSL to declare the desired state of resources on a node.
- Fundamentally, all we are doing with Puppet is managing resources on a large and automated scale while caring “as little as possible” about the platform/distribution.
- In Puppet we are using resource types to define instances of a resource on a node.
- <https://docs.puppet.com/puppet/latest/type.html>

COMMANDS

puppet resource: View resources Linux already installed Academy on a node (node level)

- puppet resource [type]
- puppet resource [type] [name]
- puppet resource user
- puppet resource user root

puppet describe: Provide information about resource types within puppet

- puppet describe -l (list all resource types available)
- puppet describe -s [type]
- puppet describe [type]

LAB

We have to create simple puppet manifest in puppet agent ,

```
[root@puppetagent1 puppet]# pwd  
/etc/puppetlabs/puppet  
[root@puppetagent1 puppet]# cd ..  
[root@puppetagent1 puppetlabs]# cd code/
```

ZippyOPS

```
[root@puppetagent1 code]# ls
environments modules
[root@puppetagent1 code]# cd environments/
[root@puppetagent1 environments]# ls
production
[root@puppetagent1 environments]# cd production/
[root@puppetagent1 production]# ls
data environment.conf hiera.yaml manifests modules
[root@puppetagent1 production]# cd manifests/
[root@puppetagent1 manifests]# ls
[root@puppetagent1 manifests]#
```

Here we have to create puppet manifest ,

First thing , How to create user resource type ,

```
[root@puppetagent1 manifests]# cat admin.pp
user { 'admin':
  ensure      => present,
  home       => '/home/admin',
  managehome => true,
  gid        => 'wheel',
  shell      => '/bin/bash',
}
```

File name as 'admin.pp' .

Here ,

- Admin – resource user
- Home – home/admin is user directory
- Wheel – group name

Now to run the manifest ,

```
[root@puppetagent1 manifests]# puppet apply admin.pp
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.04 seconds
Notice: /Stage[main]/Main/User[admin]/ensure: created
Notice: Applied catalog in 0.40 seconds
```

Its run exactly good !!!

Again change in manifest file to add group ,

```
[root@puppetagent1 manifests]# cat admin.pp
group { 'admin':
  ensure => present,
}
user { 'admin':
  ensure      => present,
  home       => '/home/admin',
  managehome => true,
  gid        => 'admin',
  groups     => 'wheel',
  shell      => '/bin/bash',
}
```

ZippyOPS

To run this manifest again ,

```
[root@puppetagent1 manifests]# puppet apply admin.pp
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.02 seconds
Notice: /Stage[main]/Main/Group[admin]/ensure: created
Notice: /Stage[main]/Main/User[admin]/gid: gid changed 10 to 'admin'
Notice: /Stage[main]/Main/User[admin]/groups: groups changed to ['wheel']
Notice: Applied catalog in 0.34 seconds
[root@puppetagent1 manifests]#
```

User and group has been created and one more thing we can run this manifest again and again we can get same result ,

```
[root@puppetagent1 manifests]# puppet apply admin.pp
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.02 seconds
Notice: /Stage[main]/Main/Group[admin]/ensure: created
Notice: /Stage[main]/Main/User[admin]/gid: gid changed 10 to 'admin'
Notice: /Stage[main]/Main/User[admin]/groups: groups changed to ['wheel']
Notice: Applied catalog in 0.34 seconds
[root@puppetagent1 manifests]# puppet apply admin.pp
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.02 seconds
Notice: Applied catalog in 0.09 seconds
[root@puppetagent1 manifests]# puppet apply admin.pp
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.02 seconds
Notice: Applied catalog in 0.08 seconds
[root@puppetagent1 manifests]#
```

We have to save and apply manifest to run , How many time run this manifest this is cannot be create any causes .

Now we go on create another one resource as notify manifest , which is gives output message when we run the puppet manifest ,

```
[root@puppetagent1 manifests]# cat notify.pp
notify { 'This is a test!!!': }
```

To run this manifest :

```
[root@puppetagent1 manifests]# puppet apply notify.pp
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.08 seconds
Notice: This is a test!!!
Notice: /Stage[main]/Main/Notify[This is a test!!!]/message: defined 'message' as 'This is a
test!!!'
Notice: Applied catalog in 0.05 seconds
```

We can create another resource as “file resource ”

```
[root@puppetagent1 manifests]# vi test_file.pp
[root@puppetagent1 manifests]# cat test_file.pp
file { '/home/admin/test_file.txt':
  ensure  => file,
  content => 'Look at me I am a file!',
  mode    => '0600',
  owner   => 'admin',
  group   => 'root',
}
```

ZippyOPS

Here , To create file in /home/admin/test_file.txt in this directory . In that file to add content "look at me I am a file ". mode of the file is "0600". Owner is "admin" and group as "root".

To run this file :

```
[root@puppetagent1 manifests]# puppet apply test_file.pp
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.02 seconds
Notice: /Stage[main]/Main/File[/home/admin/test_file.txt]/ensure: defined content as
'{md5}5a3add42b3f12712c5a79b33b10c35a0'
Notice: Applied catalog in 0.06 seconds
```

To check that file created or not ,

```
[root@puppetagent1 manifests]# cd /home/admin/
[root@puppetagent1 admin]# ls
test_file.txt
[root@puppetagent1 admin]# cat test_file.txt
Look at me I am a file!
```

It is created good !!

Now we can run some resource type in our command line ,

```
[root@puppetagent1 admin]# puppet resource user
user { 'abrt':
  ensure      => 'present',
  gid         => 173,
  home        => '/etc/abrt',
  password    => '!!!',
  password_max_age => -1,
  password_min_age => -1,
  password_warn_days => -1,
  shell       => '/sbin/nologin',
  uid         => 173,
}
user { 'adm':
  ensure      => 'present',
  comment    => 'adm',
  gid         => 4,
  home        => '/var/adm',
  password    => '*',
  password_max_age => 99999,
  password_min_age => 0,
  password_warn_days => 7,
  shell       => '/sbin/nologin',
  uid         => 3,
}
user { 'admin':
  ensure      => 'present',
  gid         => 1001,
  groups     => ['wheel'],
  home        => '/home/admin',
  password    => '!!!',
  password_max_age => 99999,
  password_min_age => 0,
  password_warn_days => 7,
  shell       => '/bin/bash',
  uid         => 1001,
}
```

ZippyOPS

Now we can add password in our admin.pp file ,

```
[root@puppetagent1 manifests]# ls
admin.pp  notify.pp  test_file.pp
[root@puppetagent1 manifests]# vi admin.pp
[root@puppetagent1 manifests]# cat admin.pp
group { 'admin':
  ensure => present,
}
user { 'admin':
  ensure      => present,
  password   => 'password123',
  home       => '/home/admin',
  managehome => true,
  gid        => 'admin',
  groups     => 'wheel',
  shell      => '/bin/bash',
}

[root@puppetagent1 manifests]#
```

To run this manifest ,

```
[root@puppetagent1 manifests]# puppet apply admin.pp
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.02 seconds
Notice: /Stage[main]/Main/User[admin]/password: changed password
Notice: Applied catalog in 0.35 seconds
[root@puppetagent1 manifests]#
```

Changed password in this run ,

TO check our resource ,

```
[root@puppetagent1 manifests]# puppet resource user admin
user { 'admin':
  ensure          => 'present',
  gid            => 1001,
  groups         => ['wheel'],
  home           => '/home/admin',
  password       => 'password123',
  password_max_age => 99999,
  password_min_age => 0,
  password_warn_days => 7,
  shell          => '/bin/bash',
  uid            => 1001,
}
```

We can do another one thing in this file , we have to add encrypt password ,

```
[root@puppetagent1 manifests]# openssl passwd -1
Password:
Verifying - Password:
$1$4yK0PsQz$Luijg.x6sVWF.xc750NV10
```

Generated encrypt password .

```
root@puppetagent1 manifests]# vi admin.pp
[root@puppetagent1 manifests]# cat admin.pp
group { 'admin':
  ensure => present,
}
user { 'admin':
```

ZippyOPS

```
ensure      => present,
password   => '$1$4yK0PsQz$Luijg.x6sVWF.xc750NV10',
home       => '/home/admin',
managehome => true,
gid        => 'admin',
groups     => 'wheel',
shell      => '/bin/bash',

}
```

To run again this manifest,

```
[root@puppetagent1 manifests]# puppet apply admin.pp
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.03 seconds
Notice: /Stage[main]/Main/User[admin]/password: changed password
Notice: Applied catalog in 0.10 seconds
```

Encrypt password as been added and password changed .

```
[root@puppetagent1 manifests]# puppet resource user admin
user { 'admin':
  ensure          => 'present',
  gid            => 1001,
  groups         => ['wheel'],
  home           => '/home/admin',
  password       => '$1$4yK0PsQz$Luijg.x6sVWF.xc750NV10',
  password_max_age => 99999,
  password_min_age => 0,
  password_warn_days => 7,
  shell          => '/bin/bash',
  uid            => 1001,
}
```

Now we can check this encrypt password ,

```
[root@puppetagent1 manifests]# ssh admin@192.168.140.8
The authenticity of host '192.168.140.8 (192.168.140.8)' can't be established.
ECDSA key fingerprint is SHA256:LRSezITXzmJCohgkaPmWxw3SEs4ap5ggoF6DQu189Ms.
ECDSA key fingerprint is MD5:3a:39:b2:b6:69:fa:3a:b6:70:ed:b7:82:ce:f7:81:e1.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.140.8' (ECDSA) to the list of known hosts.
admin@192.168.140.8's password:
[admin@puppetagent1 ~]$
```

Our encrypt password works good !!!

ZippyOPS
Making Automation Work

CATALOG COMPIILATION

A catalog describes the desired stateLinuxforeachAcademyresourceon the node

- The catalog is compiled on the master
- The compiled catalog is shipped to the node during the Puppet run
- The desired state is enforced on the node by the catalog
- The catalog is stored in PuppetDB
 - Default on PE install

Puppet compiles the catalog using sources of configuration info

- Agent-provided data (Facts)
- External data (Hiera)
- Puppet manifests (Puppet code)

Retrieve the node object

- Node object provides factual information about a node
- Set scope-level variables

Set variables from the node object, facts, and the certificate

- Variables provided by the node object will now be set as top-scope
- Node's facts are also set as top-scope variables
- Variables provided by the Puppet master will also be set

Evaluate the main manifest (site.pp)

- Match any matching node definitions

Load and evaluate classes from modules

- The environmentpath setting in puppet.conf tells Puppet where to find environments.
 - /etc/puppetlabs/code/environments/<ENVIRONMENT>/modules
 - Default environment is production

Evaluate classes from the node objectLinux Academy

- Variables provided by the node object will be set as top-scope
- Node's facts are set as top-scope variables
- Variables provided by the Puppet master will be set

ZippyOPS

Making Automation Work

NODE MANAGEMENT

CERTIFICATE SIGNING REQUEST

Puppet Server includes a certificate authorityLinux Academy(CA)service that accepts certificate signing requests (CSRs) from nodes, serves certificates and a certificate revocation list (CRL) to nodes, and optionally accepts commands to sign or revoke certificates.

- When you install a new PE agent, the agent will automatically submit a certificate signing request (CSR) to the Puppet master.
- Before Puppet agent nodes can retrieve their configuration catalogs, the certificate needs to be signed by the certificate authority (CA).

COMMAND:

```
puppet cert  
puppet cert list  
puppet cert sign <NAME>  
puppet cert revoke <NAME>
```

DNS ALTNAMES:

```
puppet cert sign (<HOSTNAME> or --all) --allow-dns-alt-names <NAME>
```

REGENERATING CERTIFICATES

- On the Puppet master:
 - puppet cert clean<NAME>
- Deleting SSL certs on agent:
 - cp -r /etc/puppetlabs/puppet/ssl/ /etc/puppetlabs/puppet/ssl_bak/

AUTOSIGNING

- Should only be used when the environmentLinux Academyfully trusts any computer able to connect to the Puppet master.
- The CA uses a config file containing a whitelist of certificate names and domain names.
 - confdir/autosign.conf
 - *.domain.com
- To disable autosigning
 - autosign = false in the [master] in puppet.conf

ZippyOPS

Lab :

Go to puppet agent and change the puppet.conf file to add dns_alt_names ,

```
[root@puppetagent1 puppet]# pwd  
/etc/puppetlabs/puppet  
[root@puppetagent1 puppet]# ls  
auth.conf hiera.yaml puppet.conf ssl ssl_old  
[root@puppetagent1 puppet]# vi puppet.conf  
[root@puppetagent1 puppet]# cat puppet.conf  
# This file can be used to override the default puppet settings.  
# See the following links for more details on what settings are available:  
# - https://puppet.com/docs/puppet/latest/config_important_settings.html  
# - https://puppet.com/docs/puppet/latest/config_about_settings.html  
# - https://puppet.com/docs/puppet/latest/config_file_main.html  
# - https://puppet.com/docs/puppet/latest/configuration.html  
  
[main]  
server = puppetmaster.zippyops.com  
runinterval = 2m  
[agent]  
certname = puppetagent1.zippyops.com  
#certname = awsome_agent  
dns_alt_names = awesome_agent
```

After that we can remove ssl ,

```
[root@puppetagent1 puppet]# rm -rf ssl  
[root@puppetagent1 puppet]# ls  
auth.conf hiera.yaml puppet.conf ssl_old  
[root@puppetagent1 puppet]#
```

Go back to puppetmaster terminal to remove Ca ,

```
[root@puppetmaster puppet]# puppet cert list -a  
"puppetagent1.zippyops.com" (SHA256)  
C1:25:B9:76:DD:0E:C8:38:9A:DD:C9:CD:AE:93:99:94:74:CC:C3:56:DE:09:3B:27:90:7F:E9:90:7A:FE:93:14  
(alt names: "DNS:awesome_agent", "DNS:puppetagent1.zippyops.com") **  
+ "awsome_agent" (SHA256)  
CF:FC:E1:40:70:9B:D6:1A:C9:D2:AA:39:F4:C1:3E:67:63:60:A3:AE:BE:F6:B2:68:EC:8E:EA:85:D0:F7:52:E6  
+ "pe-internal-mcollective-servers" (SHA256)  
77:58:A2:D2:17:1C:75:A1:A1:19:E7:1C:8A:11:EA:52:92:EC:B7:8E:0D:DB:FD:A5:60:04:70:E1:A9:E2:B9:6C  
+ "pe-internal-peadmin-mcollective-client" (SHA256)  
15:E2:98:DA:7E:AA:94:2B:E8:A3:8E:5A:36:99:1B:7A:E2:6D:3B:B7:89:E9:10:28:49:99:9C:4F:34:3E:A1:11  
+ "puppetmaster.zippyops.com" (SHA256)  
D3:6B:AB:20:17:02:3E:10:42:F0:17:85:70:A2:89:06:24:7A:AB:A0:77:3A:69:55:47:8E:90:48:80:EC:FB:4C  
(alt names: "DNS:master", "DNS:puppet", "DNS:puppetmaster", "DNS:puppetmaster.zippyops.com")  
[root@puppetmaster puppet]# puppet cert clean awsome_agent  
Notice: Revoked certificate with serial 6  
Notice: Removing file Puppet::SSL::Certificate awsome_agent at  
'/etc/puppetlabs/puppet/ssl/ca/signed/awsome_agent.pem'  
Notice: Removing file Puppet::SSL::Certificate awsome_agent at  
'/etc/puppetlabs/puppet/ssl/certs/awsome_agent.pem'  
[root@puppetmaster puppet]#
```

Removed certificate from master ,

Go back to agent terminal to run puppet agent -t ,

ZippyOPS

```
[root@puppetagent1 puppet]# puppet agent -t
Info: Creating a new SSL key for puppetagent1.zippyops.com
Info: Caching certificate for ca
Info: csr_attributes file loading from /etc/puppetlabs/puppet/csr_attributes.yaml
Info: Creating a new SSL certificate request for puppetagent1.zippyops.com
Info: Certificate Request fingerprint (SHA256):
36:01:36:E6:04:D3:58:79:61:1A:D7:A1:AA:EA:82:AF:55:89:07:72:6A:55:65:B4:2E:48:B7:60:9B:BD:04:E4
Info: Caching certificate for ca
Exiting; no certificate found and waitforcert is disabled
[root@puppetagent1 puppet]#
```

Go back to puppetmaster and sign the certificate ,

```
[root@puppetmaster puppet]# puppet cert sign puppetagent1.zippyops.com
Error: CSR 'puppetagent1.zippyops.com' contains subject alternative names (DNS:awesome_agent,
DNS:puppetagent1.zippyops.com), which are disallowed. Use `puppet cert --allow-dns-alt-names sign
puppetagent1.zippyops.com` to sign this request.
```

Got error because we have added dns name in puppet.conf file , so we can give a command as :

```
[root@puppetmaster puppet]# puppet cert sign puppetagent1.zippyops.com --allow-dns-alt-names
Signing Certificate Request for:
  "puppetagent1.zippyops.com" (SHA256)
36:01:36:E6:04:D3:58:79:61:1A:D7:A1:AA:EA:82:AF:55:89:07:72:6A:55:65:B4:2E:48:B7:60:9B:BD:04:E4
(alt names: "DNS:awesome_agent", "DNS:puppetagent1.zippyops.com") **
Notice: Signed certificate request for puppetagent1.zippyops.com
Notice: Removing file Puppet::SSL::CertificateRequest puppetagent1.zippyops.com at
'/etc/puppetlabs/puppet/ssl/ca/requests/puppetagent1.zippyops.com.pem'
```

Again go back to puppet agent to run :

```
[root@puppetagent1 puppet]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1530989161'
Notice: Applied catalog in 0.10 seconds
```

We have added agent .

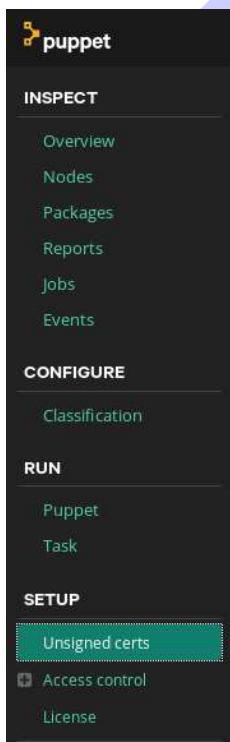
To see puppet cert list:

```
[root@puppetmaster puppet]# puppet cert list -a
+ "pe-internal-mcollective-servers"          (SHA256)
77:58:A2:D2:17:1C:75:A1:A1:19:E7:1C:8A:11:EA:52:92:EC:B7:8E:0D:DB:FD:A5:60:04:70:E1:A9:E2:B9:6C
+ "pe-internal-peadmin-mcollective-client" (SHA256)
15:E2:98:DA:7E:AA:94:2B:E8:A3:8E:5A:36:99:1B:7A:E2:6D:3B:B7:89:E9:10:28:49:99:9C:4F:34:3E:A1:11
+ "puppetagent1.zippyops.com"                (SHA256)
FA:B3:D5:C9:EC:DD:43:B3:08:DA:00:DF:E5:74:81:9D:7C:F2:B9:4D:61:5E:82:83:C2:9B:94:CA:53:06:03:93
(alt names: "DNS:awesome_agent", "DNS:puppetagent1.zippyops.com")
+ "puppetmaster.zippyops.com"               (SHA256)
D3:6B:AB:20:17:02:3E:10:42:F0:17:85:70:A2:89:06:24:7A:AB:A0:77:3A:69:55:47:8E:90:48:80:EC:FB:4C
(alt names: "DNS:master", "DNS:puppet", "DNS:puppetmaster", "DNS:puppetmaster.zippyops.com")
[root@puppetmaster puppet]#
```

Making Automation work

RUNNING THE PUPPET AGENT

In this topic , we have to add Ubuntu node to our puppet master ,



Unsigned certificates

Accept certificate requests to bring nodes into your inventory.



Adding nodes to manage with Puppet Enterprise

Every node you wish to manage must have the Puppet Enterprise agent installed.

To install the agent on a *nix node with the same operating system and architecture as the master, run this command:

```
curl -k https://puppetmaster.zippyops.com:8140/packages/current/install.bash | sudo bash
```

To install an agent on a *nix node with a different operating system and architecture than the Puppet master, follow [these steps](#).

To install an agent on a Windows node, follow [these steps](#).

We can run this unsigned certificate in our Ubuntu node ,

```
root@puppetagent2:~# curl -k https://puppetmaster.zippyops.com:8140/packages/current/install.bash | sudo bash
% Total    % Received % Xferd  Average Speed   Time   Time     Time Current
          Dload  Upload Total   Spent   Left Speed
100 25756  100 25756    0     0 26528      0 --:--:-- --:--:-- 26525
The agent packages needed to support ubuntu-16.04-amd64 are not present on your master. To
add them, apply the pe_repo::platform::ubuntu_1604_amd64 class to your master node and then run
Puppet. The required agent packages should be retrieved when puppet runs on the master, af
ter which you can run the install.bash script again.
```

We have problem here. Our puppet master not configure for Ubuntu .So we need to configure for Ubuntu.

Go back to our puppet master console -> got to classification ,

ZippyOPS

Making Automation Work

ZippyOPS

The screenshot shows the ZippyOPS Puppet interface. On the left, there's a dark sidebar with navigation links: INSPECT (Overview, Nodes, Packages, Reports, Jobs, Events), CONFIGURE (Classification, highlighted in green), RUN (Puppet, Task), and SETUP (Unsigned certs, Access control, License). The main area is titled "Classification" with the sub-instruction "Create, edit, and remove node groups here." Below this is a button "Add group...". A hierarchical tree view shows node groups: "All Nodes" (production), "PE Infrastructure" (production), and "Production environment" (production, with an "Env group" button next to it). A cursor arrow is pointing towards the "PE Infrastructure" node.

Click “PE infrastructure” :

This screenshot is similar to the one above, but the "PE Infrastructure" node under "All Nodes" is now expanded, showing its sub-components: "PE Agent" (production), "PE Certificate Authority" (production), "PE Console" (production), "PE Database" (production), "PE Master" (production), "PE Orchestrator" (production), and "PE PuppetDB" (production).

Click “PE master” ,

Making Automation Work

ZippyOPS

Click "configuration"

Classes

Declare the classes that you want to apply to nodes in this group. The classes will be applied on the next run.

Class definitions updated: 6 minutes ago
[Refresh](#)

Add new class

Add class

Class: pe_repo

Parameter	Value
Parameter name	=

[Remove this class](#)

Class: pe_repo::platform::el_7_x86_64

Parameter	Value
Parameter name	=

To search class ,

ZippyOPS

Classes

Declare the classes that you want to apply to nodes in this group. The classes will be applied on the next run.

Class definitions updated: 8 minutes ago

[Refresh](#)

Add new class

pe_repo::platform::ubuntu_1404_amd64

Add class

To add pe_repo::platform::Ubuntu_1404_amd64 class to our master classes .

Classes

Declare the classes that you want to apply to nodes in this group. The classes will be applied on the next run.

Class definitions updated: 9 minutes ago

[Refresh](#)

Add new class

Add class

Class: pe_repo::platform::ubuntu_1404_amd64

Parameter	Value
Parameter name	=

[Discard this class](#)

Class: pe_repo

[Discard changes](#)

[Commit 1 change](#)

To accept commit changes .

ZippyOPS

Making Automation Work

ZippyOPS

The screenshot shows the ZippyOPS web interface. On the left, there's a sidebar with links for Events, CONFIGURE (Classification is selected), RUN (Puppet, Task), SETUP (Unsigned certs, Access control, License, My account, Help, Log out), and v2018.1.2. The main content area has tabs for Rules, Matching nodes, Configuration (selected), Variables, and Activity. Below these tabs, the 'Classes' section is active. It displays a message: 'Declare the classes that you want to apply to nodes in this group. The classes will be applied on the next run.' followed by 'Class definitions updated: 10 minutes ago' and a 'Refresh' button. There's a 'Add new class' input field and a 'Add class' button. A table for the 'pe_repo::platform::ubuntu_1404_amd64' class shows a single parameter: 'Parameter name' with a dropdown menu and a value input field. A 'Add parameter' button is also present. At the bottom right of the class card is a 'Remove this class' button.

We have added Ubuntu class to our master.

After that we have to run puppet agent -t in our master ,

```
[root@puppetmaster zippyops]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetmaster.zippyops.com
Info: Applying configuration version '1531030734'
Notice: /Stage[main]/Pe_repo::Platform::Ubuntu_1404_amd64/Pe_repo::Debian[ubuntu-14.04-amd64]/File[/opt/puppetlabs/server/data/packages/public/2018.1.2/ubuntu-14.04-amd64.bash]/ensure: defined content as '{md5}086764a4c506a36e982ba2fe24923d2c'
Notice: /Stage[main]/Pe_repo::Platform::Ubuntu_1604_amd64/Pe_repo::Debian[ubuntu-16.04-amd64]/File[/opt/puppetlabs/server/data/packages/public/2018.1.2/ubuntu-16.04-amd64.bash]/ensure: defined content as '{md5}4cebd5361bc554522aecbd9ed71a0da7'
Notice: /Stage[main]/Pe_repo::Platform::Ubuntu_1404_amd64/Pe_repo::Debian[ubuntu-14.04-amd64]/Pe_repo::Repo[ubuntu-14.04-amd64]
2018.1.2]/File[/opt/puppetlabs/server/data/packages/public/2018.1.2/ubuntu-14.04-amd64-5.5.3]/ensure: created
Notice: /Stage[main]/Pe_repo::Platform::Ubuntu_1404_amd64/Pe_repo::Debian[ubuntu-14.04-amd64]/Pe_repo::Repo[ubuntu-14.04-amd64]
2018.1.2]/File[/opt/puppetlabs/server/data/packages/public/2018.1.2/ubuntu-14.04-amd64]/ensure: created
Notice: /Stage[main]/Pe_repo::Platform::Ubuntu_1604_amd64/Pe_repo::Debian[ubuntu-16.04-amd64]/Pe_repo::Repo[ubuntu-16.04-amd64]
2018.1.2]/File[/opt/puppetlabs/server/data/packages/public/2018.1.2/ubuntu-16.04-amd64-5.5.3]/ensure: created
Notice: /Stage[main]/Pe_repo::Platform::Ubuntu_1604_amd64/Pe_repo::Debian[ubuntu-16.04-amd64]/Pe_repo::Repo[ubuntu-16.04-amd64]
2018.1.2]/File[/opt/puppetlabs/server/data/packages/public/2018.1.2/ubuntu-16.04-amd64]/ensure: created
Notice: /Stage[main]/Pe_repo::Platform::Ubuntu_1404_amd64/Pe_repo::Debian[ubuntu-14.04-amd64]/Pe_repo::Repo[ubuntu-14.04-amd64 2018.1.2]/Pe_staging::Deploy[puppet-agent-ubuntu-14.04-amd64.tar.gz]/Pe_staging::File[puppet-agent-ubuntu-14.04-
```

ZippyOPS

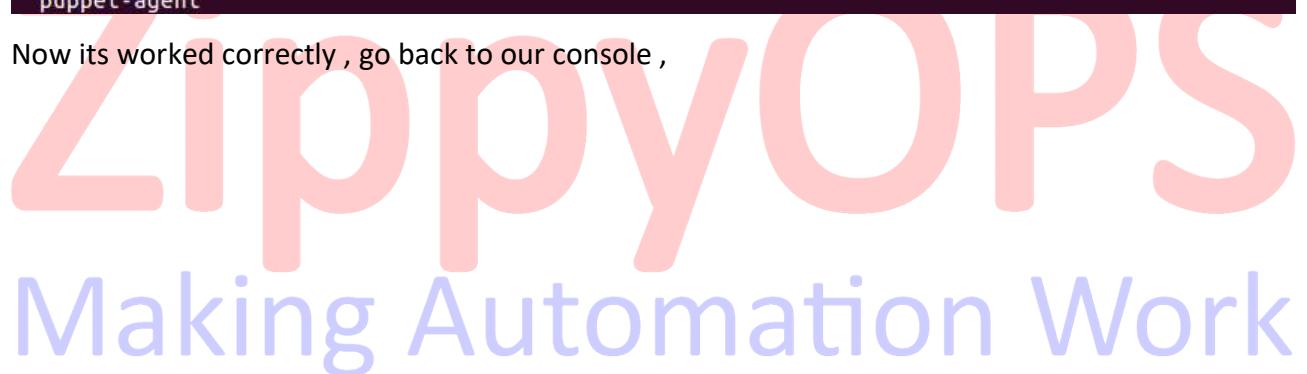
```
amd64.tar.gz]/Exec[/opt/puppetlabs/server/data/staging/pe_repo-puppet-agent-5.5.3/puppet-agent-ubuntu-14.04-amd64.tar.gz]/returns: executed successfully
Notice: /Stage[main]/Pe_repo::Platform::Ubuntu_1404_amd64/Pe_repo::Debian[ubuntu-14.04-amd64]/Pe_repo::Repo[ubuntu-14.04-amd64 2018.1.2]/Pe_staging::Deploy[puppet-agent-ubuntu-14.04-amd64.tar.gz]/Pe_staging::Extract[puppet-agent-ubuntu-14.04-amd64.tar.gz]/Exec[extract puppet-agent-ubuntu-14.04-amd64.tar.gz]/returns: executed successfully
Notice: /Stage[main]/Pe_repo::Platform::Ubuntu_1604_amd64/Pe_repo::Debian[ubuntu-16.04-amd64]/Pe_repo::Repo[ubuntu-16.04-amd64 2018.1.2]/Pe_staging::Deploy[puppet-agent-ubuntu-16.04-amd64.tar.gz]/Pe_staging::File[puppet-agent-ubuntu-16.04-amd64.tar.gz]/Exec[/opt/puppetlabs/server/data/staging/pe_repo-puppet-agent-5.5.3/puppet-agent-ubuntu-16.04-amd64.tar.gz]/returns: executed successfully
Notice: /Stage[main]/Pe_repo::Platform::Ubuntu_1604_amd64/Pe_repo::Debian[ubuntu-16.04-amd64]/Pe_repo::Repo[ubuntu-16.04-amd64 2018.1.2]/Pe_staging::Deploy[puppet-agent-ubuntu-16.04-amd64.tar.gz]/Pe_staging::Extract[puppet-agent-ubuntu-16.04-amd64.tar.gz]/Exec[extract puppet-agent-ubuntu-16.04-amd64.tar.gz]/returns: executed successfully
Notice: Applied catalog in 157.68 seconds
```

Execute successfully !!!

Go back to our Ubuntu node ,

```
root@puppetagent2:~# curl -k https://puppetmaster.zippyops.com:8140/packages/current/install.bash | sudo bash
      % Total    % Received % Xferd  Average Speed   Time     Time     Time  Current
                                     Dload  Upload Total   Spent   Left  Speed
100 25756  100 25756    0      0  103k      0  ---:---:---:---:---:--- 103k
AppStream cache update completed, but some metadata was ignored due to errors.
Reading package lists... Done
Building dependency tree
Reading state information... Done
apt-transport-https is already the newest version (1.2.27).
The following packages were automatically installed and are no longer required:
  iucode-tool libllvm5.0
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 3 not upgraded.
OK
OK
+ DEBIAN_FRONTEND=noninteractive
+ apt-get install -y -o Apt::Get::Purge=false -o Dpkg::Options::=--force-confold -o Dpkg::Options::=--force-confdef --no-install-recommends 'puppet-agent=5.5.3*'
Reading package lists... Done
Building dependency tree
Reading state information... Done
Selected version '5.5.3-1xenial' (Puppet Labs:puppetmaster.zippyops.com [amd64]) for 'puppet-agent'
The following packages were automatically installed and are no longer required:
  iucode-tool libllvm5.0
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  puppet-agent
```

Now its worked correctly , go back to our console ,



ZippyOPS

The screenshot shows the ZippyOPS web interface. On the left, there's a sidebar with navigation links: Overview, Nodes, Packages, Reports, Jobs, Events, Classification, Puppet, Task, Unsigned certs (highlighted), Access control, and License. The main content area has a title "Unsigned certificates" and a sub-section "Accept certificate requests to bring nodes into your inventory." It lists a single node entry: "Node name: puppetagent2.zippyops.com" and "Fingerprint: 0F:59:83:2E:77:62:C5:72:78:68:BF:14:5A....". Below this are two buttons: "Accept All" and "Reject All". Further down, there's a section titled "Adding nodes to manage with Puppet Enterprise" with instructions for installing the agent on various operating systems. A command-line example for Linux is shown: "curl -k https://puppetmaster.zippyops.com:8140/packages/current/install.bash | sudo bash". There are also links for Windows and other architectures.

We need to accept this certification ,

```
[root@puppetmaster zippyops]# puppet cert list
  "puppetagent2.zippyops.com" (SHA256)
0F:59:83:2E:77:62:C5:72:78:68:BF:14:5A:47:61:B6:55:78:57:E3:62:EF:EC:92:0E:30:17:2C:56:94:D7:EC
[root@puppetmaster zippyops]# puppet cert sign puppetagent2.zippyops.com
Signing Certificate Request for:
  "puppetagent2.zippyops.com" (SHA256)
0F:59:83:2E:77:62:C5:72:78:68:BF:14:5A:47:61:B6:55:78:57:E3:62:EF:EC:92:0E:30:17:2C:56:94:D7:EC
Notice: Signed certificate request for puppetagent2.zippyops.com
Notice: Removing file Puppet::SSL::CertificateRequest puppetagent2.zippyops.com at
'/etc/puppetlabs/puppet/ssl/ca/requests/puppetagent2.zippyops.com.pem'
```

We have signed certificate ,

```
root@puppetagent2:~# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent2.zippyops.com
Info: Applying configuration version '1531031579'
Notice: Applied catalog in 0.10 seconds
root@puppetagent2:~#
```

Go back to our console ,

ZippyOPS

Making Automation Work

ZippyOPS

The screenshot shows the ZippyOPS Puppet interface. On the left, a dark sidebar menu includes sections for INSPECT (Overview, Nodes, Packages, Reports, Jobs, Events), CONFIGURE (Classification), RUN (Puppet, Task), and SETUP (Unsigned certs, Access control, License). The 'Nodes' option under 'INSPECT' is highlighted. The main content area is titled 'Nodes' and displays a message: 'View information about your 4 Puppet-managed nodes.' Below this is a search bar with 'Filter by' and 'Node name' dropdown, and a 'Submit' button. To the right is an 'Export data' link. A table lists four nodes with their names and last report times:

Node name	Last report
awsome_agent	2018-07-07 18:18 Z
puppetagent1.zippyops.com	2018-07-07 18:56 Z
puppetagent2.zippyops.com	2018-07-08 06:32 Z
puppetmaster.zippyops.com	2018-07-08 06:22 Z

Ubuntu node has been added to our master .

Here I have added one group as "ubuntu"

The screenshot shows the ZippyOPS Puppet interface. The sidebar menu is identical to the previous screenshot. The main content area is titled 'Classification' and includes a sub-header: 'Create, edit, and remove node groups here.' Below this is a form for adding a new group:

Add group...

Parent name	Group name	Environment
All Nodes	<input type="text"/>	production
<input type="checkbox"/> Environment group ?		

Description (optional):

Ubuntu added! [Add membership rules, classes, and variables.](#)

Below the form is a tree view of node classifications:

- All Nodes production
- + PE Infrastructure production
- + Production environment production Env group
- Ubuntu production

Click on this Ubuntu group ,

ZippyOPS

Overview
Nodes
Packages
Reports
Jobs
Events

CONFIGURE
Classification

RUN
Puppet
Task

SETUP
Unsigned certs 1
Access control
License
My account
Help
Log out

Parent All Nodes
Environment production
[Edit node group metadata](#) [Remove node group](#) Run ▾

Rules Matching nodes Configuration Variables Activity

Write rules to dynamically assign nodes to this group based on fact values. Begin with "trusted" to designate a trusted fact.

Nodes must match all rules.
 Nodes may match any rule.

Show all node matches

Fact	Operator	Value	Node matches
	=		-

Add rule

Number of nodes pinned to this group: 1

Certname
Node name

Pin node

puppetagent2.zippyops.com

✗ Unpin

Certname add ubuntu node “puppetagent2.zippyops.com” after that added java classes,

Rules Matching nodes Configuration (1 change) Variables Activity

Classes

Declare the classes that you want to apply to nodes in this group. The classes will be applied on the next run.

Class definitions updated: a minute ago
[Refresh](#)

Add new class

Add class

Class: java

Parameter

Value

Parameter name

=

Add parameter

Discard this class

Go back to our Ubuntu node to run puppet agent -t

Making Automation Work

ZippyOPS

```
root@puppetagent2:~# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent2.zippyops.com
Info: Applying configuration version '1531032312'
Notice: /Stage[main]/Java/Package[java-common]/ensure: created
Notice: /Stage[main]/Java/Package[java]/ensure: created
Notice: /Stage[main]/Java::Config/File_line[java-home-environment]/ensure: created
Notice: Applied catalog in 209.60 seconds
root@puppetagent2:~#
```

Java class installed successfully!!!

Now go back to our console , before that we can stop puppet in Ubuntu node ,

```
root@puppetagent2:~# systemctl stop puppet
```

Go back to our puppet master to install ntp module ,

```
[root@puppetmaster zippyops]# puppet module install puppetlabs-ntp
Notice: Preparing to install into /etc/puppetlabs/code/environments/production/modules ...
Notice: Downloading from https://forgeapi.puppet.com ...
Notice: Installing -- do not interrupt ...
/etc/puppetlabs/code/environments/production/modules
└── puppetlabs-ntp (v7.2.0)
    └── puppetlabs-stdlib (v4.25.1)
[root@puppetmaster zippyops]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Notice: /File[/opt/puppetlabs/puppet/cache/locales/ja/puppetlabs-ntp.po]/ensure: defined content
as '{md5}7265ff57e178feb7a65835f7cf271e2c'
Info: Loading facts
Info: Caching catalog for puppetmaster.zippyops.com
Info: Applying configuration version '1531033387'
Notice: Applied catalog in 61.71 seconds
[root@puppetmaster zippyops]#
```

Then we have added ntp class to our Ubuntu node and give service enable parameter ,

ZippyOPS
Making Automation Work

ZippyOPS

Rules

Matching nodes

Configuration

Variables

Activity

Classes

Declare the classes that you want to apply to nodes in this group. The classes will be applied on the next run.

Class definitions updated: 3 minutes ago

[Refresh](#)

Add new class

Add class

Class: ntp

Parameter	Value	
service_enable	false	Add parameter

[Remove this class](#)

Commit the changes and save it.

Go back to our Ubuntu node terminal ,

```
root@puppetagent2:~# puppet agent -t --noop
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Notice: /File[/opt/puppetlabs/puppet/cache/locales/ja/puppetlabs-ntp.po]/ensure: defined content as '{md5}7265ff57e178feb7a65835f7cf271e2c'
Info: Loading facts
Info: Applying configuration version '1531033783'
Notice: /Stage[main]/Ntp::Install/Package[ntp]/ensure: current_value 'purged', should be 'present' (noop)
Notice: Class[Ntp::Install]: Would have triggered 'refresh' from 1 event
Notice: /Stage[main]/Ntp::Config/File[/etc/ntp.conf]/ensure: current_value 'absent', should be 'file' (noop)
Notice: Class[Ntp::Config]: Would have triggered 'refresh' from 1 event
Info: Class[Ntp::Config]: Scheduling refresh of Class[Ntp::Service]
Notice: Class[Ntp::Service]: Would have triggered 'refresh' from 1 event
Info: Class[Ntp::Service]: Scheduling refresh of Service[ntp]
Notice: /Stage[main]/Ntp::Service/Service[ntp]/ensure: current_value 'stopped', should be 'running' (noop)
Info: /Stage[main]/Ntp::Service/Service[ntp]: Unscheduling refresh on Service[ntp]
Notice: Class[Ntp::Service]: Would have triggered 'refresh' from 1 event
Notice: Class[Ntp]: Would have triggered 'refresh' from 3 events
Notice: Stage[main]: Would have triggered 'refresh' from 4 events
Notice: Applied catalog in 0.47 seconds
root@puppetagent2:~#
```

- noop used form no changes to do in puppet run ,.

Making Automation Work

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Now we can run normal way that ,

```
root@puppetagent2:~# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent2.zippyops.com
Info: Applying configuration version '1531033977'
Notice: /Stage[main]/Ntp::Install/Package[ntp]/ensure: created
Notice: /Stage[main]/Ntp::Config/File[/etc/ntp.conf]/content:
--- /etc/ntp.conf      2018-02-14 20:26:48.000000000 +0530
+++ /tmp/puppet-file20180708-11478-erh4gn      2018-07-08 12:43:45.616000000 +0530
@@ -1,66 +1,32 @@
-# /etc/ntp.conf, configuration for ntpd; see ntp.conf(5) for help
-
-driftfile /var/lib/ntp/ntp.drift
-
-# Enable this if you want statistics to be logged.
-#statsdir /var/log/ntpstats/
-
-statistics loopstats peerstats clockstats
-filegen loopstats file loopstats type day enable
-filegen peerstats file peerstats type day enable
-filegen clockstats file clockstats type day enable
-
-# Specify one or more NTP servers.
-
-# Use servers from the NTP Pool Project. Approved by Ubuntu Technical Board
-# on 2011-02-08 (LP: #104525). See http://www.pool.ntp.org/join.html for
-# more information.
-pool 0.ubuntu.pool.ntp.org iburst
+pool 1.ubuntu.pool.ntp.org iburst
-#Changes required to use pps synchronisation as explained in documentation:
-#http://www.ntp.org/ntpfaq/NTP-s-config-adv.htm#AEN3918
-
-#server 127.127.8.1 mode 135 prefer      # Meinberg GPS167 with PPS
-#fudge 127.127.8.1 time1 0.0042          # relative to PPS for my hardware
+# Set up servers for ntpd with next options:
+# server - IP address or DNS name of upstream NTP server
+# iburst - allow send sync packages faster if upstream unavailable
+# prefer - select preferable server
+# minpoll - set minimal update frequency
+# maxpoll - set maximal update frequency
+# noselect - do not sync with this server
+server 0.debian.pool.ntp.org iburst
+server 1.debian.pool.ntp.org iburst
+server 2.debian.pool.ntp.org iburst
+server 3.debian.pool.ntp.org iburst
-
-#server 127.127.22.1                  # ATOM(PPS)
-#fudge 127.127.22.1 flag3 1           # enable PPS API
+#
+driftfile /var/lib/ntp/drift
-
Notice: /Stage[main]/Ntp::Config/File[/etc/ntp.conf]/content:
-
Notice: /Stage[main]/Ntp::Config/File[/etc/ntp.conf]/content: content changed '{md5}cf6cfc355b6c31fed23af938b4396c46' to '{md5}aa9ba8f7efa91810b2836c8c2afdac38'
Info: Class[Ntp::Config]: Scheduling refresh of Class[Ntp::Service]
Info: Class[Ntp::Service]: Scheduling refresh of Service[ntp]
Notice: /Stage[main]/Ntp::Service/Service[ntp]/enable: enable changed 'true' to 'false'
Notice: /Stage[main]/Ntp::Service/Service[ntp]: Triggered 'refresh' from 1 event
Notice: Applied catalog in 49.52 seconds
root@puppetagent2:~#
```

Its worked good ,!!!

ZippyOPS

We have add stage environment in our puppet master ,

```
[root@puppetmaster zippyops]# cd /etc/puppetlabs/code/environments/  
[root@puppetmaster environments]# ls  
production  
[root@puppetmaster environments]# cp -r production/ stage  
[root@puppetmaster environments]# ls  
production  stage  
[root@puppetmaster environments]#
```

After that we can create one staging group ,

The screenshot shows the Puppet Classification interface. On the left, there's a sidebar with tabs for INSPECT (Overview, Nodes, Packages, Reports), CONFIGURE (Classification, selected), RUN (Puppet, Task), and SETUP (Unsigned certs, Access control, License). The main area is titled "Classification" and contains a form for creating a new node group:

Parent name	Group name	Environment
Production e...	ubuntu-staging	production

There's also a checked checkbox for "Environment group". Below the form, there's a "Description (optional)" field and a green "Add" button. At the bottom of the interface, there's a list of existing node groups:

- All Nodes production
- + PE Infrastructure production
- + Production environment production Env group
- Ubuntu production

New node group is “Ubuntu-staging” and parent name “production environment”

Environment = production and check environment group ..

Click to add group.

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Making Automation Work

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The screenshot shows the ZippyOPS interface. At the top, there's a navigation bar with 'All Nodes' and 'production'. Below it, a tree view shows 'PE Infrastructure production', 'Production environment production' (selected), 'Agent-specified environment agent-specified', and 'ubuntu-staging production'. A 'Ubuntu production' node is also listed. On the left, a sidebar has sections for 'Reports', 'Jobs', 'Events', 'CONFIGURE', 'Classification' (selected), 'RUN', 'Puppet', 'Task', 'SETUP', 'Unsigned certs', 'Access control' (selected), 'License', 'My account', 'Help', 'Log out', and 'y2018.1.2'. The main content area shows a 'node group' for 'Environment production' (Env group). It includes buttons for 'Edit node group metadata', 'Remove node group', and 'Run'. Below this are tabs for 'Rules', 'Matching nodes', 'Configuration', 'Variables', and 'Activity'. A note says 'Write rules to dynamically assign nodes to this group based on fact values. Begin with "trusted" to designate a trusted fact.' There are two radio button options: 'Nodes must match all rules.' (selected) and 'Nodes may match any rule.'. A table for 'Fact', 'Operator', 'Value', and 'Node matches' is shown with one row. At the bottom, it says 'Number of nodes pinned to this group: 1' and shows a 'Certname' section with 'Node name' set to 'puppetagent2.zippyops.com' and a 'Pin node' button.

Click “Ubuntu-staging” ,

Environment production Env group

Edit node group metadata Remove node group Run ▾

Rules Matching nodes Configuration Variables Activity

Write rules to dynamically assign nodes to this group based on fact values. Begin with “trusted” to designate a trusted fact.

Nodes must match all rules.
 Nodes may match any rule.

Show all node matches

Fact	Operator	Value	Node matches
	=		- Add rule

Number of nodes pinned to this group: 1

Certname

Node name

puppetagent2.zippyops.com

Pin node Unpin

Certname added as Ubuntu node .

To add ntp class in this group and edit metadata and refresh new update to executed in our environment .

Making Automation Work

ZippyOPS

Node group name

Description

Parent

Environment

This is an environment group ?

This change may affect the classes that are available in this group.

[Discard metadata changes](#) [Remove node group](#) [Run](#) ▾

Rules Matching nodes Configuration Variables Activity

Classes

Declare the classes that you want to apply to nodes in this group. The classes will be applied on the next run. Class definitions updated: 3 minutes ago

[Refresh](#)

Add new class Add class

Class: ntp

Parameter	Value	
Parameter name	=	<input type="button" value="Add parameter"/> Remove this class

[Remove all classes](#)

ZippyOPS

To run puppet agent -t in ubuntu node,

```
root@puppetagent2:~# puppet agent -t
Notice: Local environment: 'production' doesn't match server specified node environment 'stage'
, switching agent to 'stage'.
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Error: Could not retrieve catalog from remote server: Error 500 on SERVER: Server Error: Could
not parse for environment stage: Permission denied - /etc/puppetlabs/code/environments/stage/ma
nifests/site.pp on node puppetagent2.zippyops.com
Warning: Not using cache on failed catalog
Error: Could not retrieve catalog; skipping run
```

We have permission access problem here , because stage file donot have access for puppet . So we got error ,

```
[root@puppetmaster environments]# ls -la
total 0
drwxr-xr-x 4 pe-puppet pe-puppet 37 Jul  8 03:22 .
drwxr-xr-x 4 pe-puppet pe-puppet 41 Jul  7 05:17 ..
drwxr-xr-x 5 pe-puppet pe-puppet 92 Jul  7 05:17 production
drwxr-xr-x 5 root      root     92 Jul  8 03:22 stage
```

There is only permission from root, So we have give permission to our puppet ,

```
[root@puppetmaster environments]# chown pe-puppet:pe-puppet -R stage
[root@puppetmaster environments]# ls -la
total 0
drwxr-xr-x 4 pe-puppet pe-puppet 37 Jul  8 03:22 .
drwxr-xr-x 4 pe-puppet pe-puppet 41 Jul  7 05:17 ..
drwxr-xr-x 5 pe-puppet pe-puppet 92 Jul  7 05:17 production
drwxr-xr-x 5 pe-puppet pe-puppet 92 Jul  8 03:22 stage
```

We have added permission to stage file .

```
root@puppetagent2:~# puppet agent -t
Notice: Local environment: 'production' doesn't match server specified node environment 'stage'
, switching agent to 'stage'.
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent2.zippyops.com
Info: Applying configuration version '1531035838'
Notice: /Stage[main]/Ntp::Service/Service[ntp]/enable: enable changed 'false' to 'true'
Notice: Applied catalog in 1.10 seconds
```

Now its run good !!!! stage environment has been created .

USING SITE.PP

We are use classification in our site.pp file ,

First we have to go Ubuntu terminal and uninstall ntp ,

Making Automation Work

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```
root@puppetagent2:~# apt-get purge ntp
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  iucode-tool liblvm5.0 libopts25
Use 'sudo apt autoremove' to remove them.
The following packages will be REMOVED:
  ntp*
0 upgraded, 0 newly installed, 1 to remove and 3 not upgraded.
After this operation, 1,621 kB disk space will be freed.
Do you want to continue? [Y/n] y
(Reading database ... 229652 files and directories currently installed.)
Removing ntp (1:4.2.8p4+dfsg-3ubuntu5.8) ...
Purging configuration files for ntp (1:4.2.8p4+dfsg-3ubuntu5.8) ...
Processing triggers for man-db (2.7.5-1) ...
```

Uninstalled ntp in Ubuntu node ,

Go back to our puppet master site.pp file ,

```
[root@puppetmaster manifests]# pwd
/etc/puppetlabs/code/environments/production/manifests
[root@puppetmaster manifests]# ls
site.pp
```

We can edit this file to add classes in it,

```
[root@puppetmaster manifests]# cat site.pp
## site.pp ##

# This file (/etc/puppetlabs/puppet/manifests/site.pp) is the main entry point
# used when an agent connects to a master and asks for an updated configuration.
#
# Global objects like filebuckets and resource defaults should go in this file,
# as should the default node definition. (The default node can be omitted
# if you use the console and don't define any other nodes in site.pp. See
# http://docs.puppetlabs.com/guides/language_guide.html#nodes for more on
# node definitions.)

## Active Configurations ##

# Disable filebucket by default for all File resources:
File { backup => false }

# DEFAULT NODE
# Node definitions in this file are merged with node data from the console. See
# http://docs.puppetlabs.com/guides/language_guide.html#nodes for more on
# node definitions.

# The default node definition matches any node lacking a more specific node
# definition. If there are no other nodes in this file, classes declared here
# will be included in every node's catalog, *in addition* to any classes
# specified in the console for that node.

node 'puppetagent2.zippyops.com'{
    include ntp
}

node default {
    # This is where you can declare classes for all nodes.
    # Example:
    #   class { 'my_class': }
```

ZippyOPS

```
}
```

[root@puppetmaster manifests]#

Here , specified node as 'puppetagent2.zippyops.com' . and include ntp to install in Ubuntu node .

```
root@puppetagent2:~# puppet agent -t
Notice: Local environment: 'production' doesn't match server specified node environment 'stage'
, switching agent to 'stage'.
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent2.zippyops.com
Info: Applying configuration version '1531036931'
Notice: /Stage[main]/Ntp::Install/Package[ntp]/ensure: created
Notice: /Stage[main]/Ntp::Config/File[/etc/ntp.conf]/content:
--- /etc/ntp.conf      2018-02-14 20:26:48.000000000 +0530
+++ /tmp/puppet-file20180708-14879-oe590h      2018-07-08 13:32:19.150352386 +0530
@@ -1,66 +1,32 @@
-# /etc/ntp.conf, configuration for ntpd; see ntp.conf(5) for help
-
-driftfile /var/lib/ntp/ntp.drift
-
-# Enable this if you want statistics to be logged.
-#statsdir /var/log/ntpstats/
-
-statistics loopstats peerstats clockstats
-filegen loopstats file loopstats type day enable
-filegen peerstats file peerstats type day enable
-filegen clockstats file clockstats type day enable
-
-# Specify one or more NTP servers.
-
-# Use servers from the NTP Pool Project. Approved by Ubuntu Technical Board
-# on 2011-02-08 (LP: #104525). See http://www.pool.ntp.org/join.html for
-# more information.
-pool 0.ubuntu.pool.ntp.org iburst
-pool 1.ubuntu.pool.ntp.org iburst
```

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```
-#broadcastclient
-
-#Changes required to use pps synchronisation as explained in documentation:
-#http://www.ntp.org/ntpfaq/NTP-s-config-adv.htm#AEN3918
-
-#server 127.127.8.1 mode 135 prefer      # Meinberg GPS167 with PPS
-#fudge 127.127.8.1 time1 0.0042        # relative to PPS for my hardware
+## Set up servers for ntpd with next options:
+## server - IP address or DNS name of upstream NTP server
+## iburst - allow send sync packages faster if upstream unavailable
+## prefer - select preferable server
+## minpoll - set minimal update frequency
+## maxpoll - set maximal update frequency
+## noselect - do not sync with this server
+server 0.debian.pool.ntp.org iburst
+server 1.debian.pool.ntp.org iburst
+server 2.debian.pool.ntp.org iburst
+server 3.debian.pool.ntp.org iburst

-#server 127.127.22.1                      # ATOM(PPS)
-#fudge 127.127.22.1 flag3 1                # enable PPS API
+## Driftfile.
+driftfile /var/lib/ntp/drift

Notice: /Stage[main]/Ntp::Config/File[/etc/ntp.conf]/content:

Notice: /Stage[main]/Ntp::Config/File[/etc/ntp.conf]/content: content changed '{md5}cf6cfc355b6c31fed23af938b4396c46' to '{md5}aa9ba8f7efa91810b2836c8c2afdac38'
Info: Class[Ntp::Config]: Scheduling refresh of Class[Ntp::Service]
Info: Class[Ntp::Service]: Scheduling refresh of Service[ntp]
Notice: /Stage[main]/Ntp::Service/Service[ntp]: Triggered 'refresh' from 1 event
Notice: Applied catalog in 5.66 seconds
```

Above shown that ntp has been installed again.

Go back to our master terminal ,

```
[root@puppetmaster manifests]# cat site.pp
## site.pp ##

# This file (/etc/puppetlabs/puppet/manifests/site.pp) is the main entry point
# used when an agent connects to a master and asks for an updated configuration.
#
# Global objects like filebuckets and resource defaults should go in this file,
# as should the default node definition. (The default node can be omitted
# if you use the console and don't define any other nodes in site.pp. See
# http://docs.puppetlabs.com/guides/language_guide.html#nodes for more on
# node definitions.)

## Active Configurations ##

# Disable filebucket by default for all File resources:
File { backup => false }

# DEFAULT NODE
# Node definitions in this file are merged with node data from the console. See
# http://docs.puppetlabs.com/guides/language_guide.html#nodes for more on
# node definitions.

# The default node definition matches any node lacking a more specific node
# definition. If there are no other nodes in this file, classes declared here
# will be included in every node's catalog, *in addition* to any classes
# specified in the console for that node.

#node 'puppetagent2.zippyops.com'{
```

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```
#      include ntp
#}

node default {
  notify { "This is my default node!": }
  # This is where you can declare classes for all nodes.
  # Example:
  #   class { 'my_class': }
}
[root@puppetmaster manifests]#
```

Previously used specific node to run , but now we have use default node . Uncheck previous class .

In this example I have used notify ,

```
node default {
  notify { "This is my default node!": }
}
```

Now go back to Ubuntu node , to run puppet agent -t ,

```
root@puppetagent2:~# puppet agent --test
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent2.zippyops.com
Info: Applying configuration version '1531037482'
Notice: This is my default node!
Notice: /Stage[main]/Main/Node[default]/Notify[This is my default node!]/message: defined 'message' as 'This is my default node!'
Notice: Applied catalog in 0.10 seconds
root@puppetagent2:~#
```

Notify executed successfully !!!

Go back to our puppet master , use another classification regex in ,

```
[root@puppetmaster manifests]# cat site.pp
## site.pp ##

# This file (/etc/puppetlabs/puppet/manifests/site.pp) is the main entry point
# used when an agent connects to a master and asks for an updated configuration.
#
# Global objects like filebuckets and resource defaults should go in this file,
# as should the default node definition. (The default node can be omitted
# if you use the console and don't define any other nodes in site.pp. See
# http://docs.puppetlabs.com/guides/language_guide.html#nodes for more on
# node definitions.)

## Active Configurations ##

# Disable filebucket by default for all File resources:
File { backup => false }

# DEFAULT NODE
# Node definitions in this file are merged with node data from the console. See
# http://docs.puppetlabs.com/guides/language_guide.html#nodes for more on
# node definitions.

# The default node definition matches any node lacking a more specific node
# definition. If there are no other nodes in this file, classes declared here
```

ZippyOPS

```
# will be included in every node's catalog, *in addition* to any classes
# specified in the console for that node.

#node 'puppetagent2.zippyops.com'{
#    include ntp
#}

node /^puppetagent2/ {
    notify { "This is a node definition using regex!!!": }
}
#node default {
#    notify { "This is my default node!": }
    # This is where you can declare classes for all nodes.
    # Example:
    #   class { 'my_class': }
#}
[root@puppetmaster manifests]#
```

Go back to run puppet agent -t in ubunut node ,

```
root@puppetagent2:~# puppet agent --test
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent2.zippyops.com
Info: Applying configuration version '1531037930'
Notice: This is a node definition using regex!!!
Notice: /Stage[main]/Main/Node['__node__regexp__puppetagent2']/Notify[This is a node definition us
ing regex!!!]/message: defined 'message' as 'This is a node definition using regex!!!'
Notice: Applied catalog in 0.11 seconds
```

Regex is worked correctly !!!

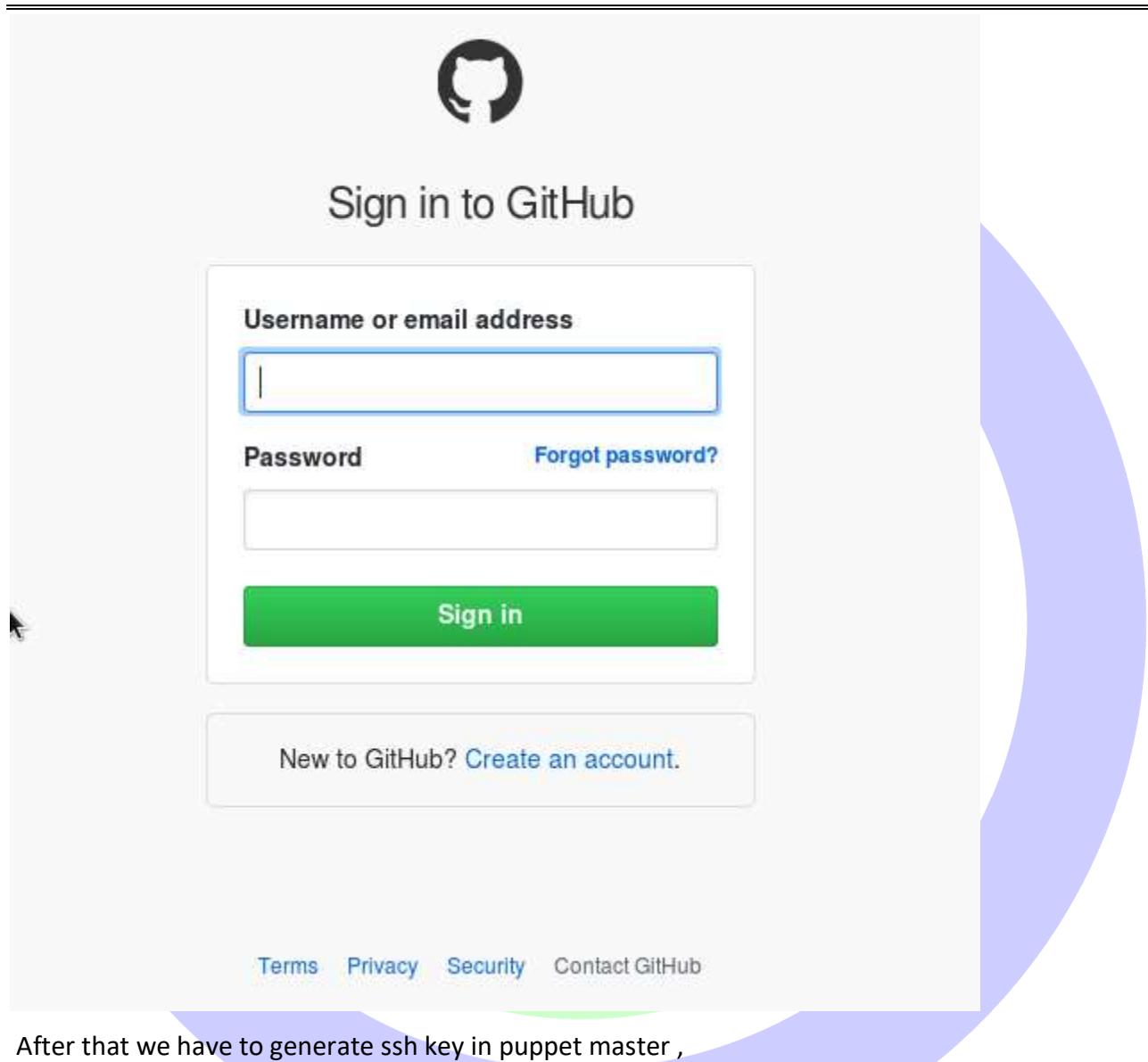
MODULES AND CLASSES

Before go in to modules and class we need github ,

SETTING UP A GITHUB ACCOUNT

First login to github account :





After that we have to generate ssh key in puppet master ,

```
[root@puppetmaster manifests]# ssh-keygen -t rsa -b 4096 -C "zippyops@gmail.com"
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa):
Created directory '/root/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id_rsa.
Your public key has been saved in /root/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:pbgS7jr8bW3ZkQgQRVHahU2Q18xCuCCNZ0gWsqdsm0 zippyops@gmail.com
The key's randomart image is:
+---[RSA 4096]----+
| o0*=o0++ |
| .+ =+++.+ |
| o o...o.. |
| .+.. . .o |
| oo o. ..S.. |
| +. . . .o |
| o Eo .. o . |
```

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```
| +. o. + . |  
| .+o... |  
+---[SHA256]---+  
[root@puppetmaster manifests]# cat /root/.ssh/id_rsa.pub  
ssh-rsa  
AAAAB3NzaC1yc2EAAAQABAAQCVUYGVI0NGgps2CBWK89fyS5wvWtfbQlXh10osi1BElt8gwP6HQ8IxacjcTs0CbFCM  
9CVKJW4fZKJSysUzsPOCW3Lv2ht5i4H4lcK/pSXsxFb27KK1W0V8xT8dh1v32UsDCMsMQyY2VjYM/m4qnE2pT5a0di9JUItjv  
qJF1NXtU306PQXHUtixiFSg9rF8cg+xr6suht9G0C+VZpZ1DOSfxFRX3ZdmZMd+spsX6AKYngaMB/iaTQKPU4gcz6j0DjaLp  
4UH5bIjVF35SAv7V+coBFNDsbWVkhW78pAL2fhBw6iGiMREwI4fKyn7KWC0jt1lvvgnUSoOkSxmNT8WpI74GKhEbGr8rsKNBq  
dyTVMtq1W+2wo0m2or9t/r8kJG1MEn28uSdXp+YDWj0iP1v0aPJbGR2mRZB87y7xb1Q59M2wmoNDx4FYfmC0uSzn+IIhmy4jN  
TjfCrL4dqEgd8Kn8H5X4deNEKRn09WLNI/Ac0B7pCeVvaRop8T710ti4GswfLCRH9gVs1YnJWtQmGO/rYwQCOKJYdIUdqW  
N0Xu07/6Uu91ycT3vBDHHXzwYgFxUspXYhMK91S6+5m7PVH9Gk3nEaJhB4eH+QrSuWdN0CEkeyoZT6X7FPnXREHOQuCfkq7R/  
5HEFGZvA65094EYvqHsOEar1L2zJh1xvFOQ== zippyops@gmail.com
```

We have add this ssh key to our github account,

The screenshot shows the GitHub user interface for managing SSH keys. On the left, there's a sidebar with links like Personal settings, Profile, Account, Emails, Notifications, Billing, SSH and GPG keys (which is selected), Security, Blocked users, Repositories, Organizations, Saved replies, and Applications. The main area is titled "SSH keys" and contains a message: "This is a list of SSH keys associated with your account. Remove any keys that you do not need." Below this, there are three entries:

- user-b**: Fingerprint: ac:01:f1:f0:4b:66:b0:c2:cf:a9:67:56:f6:71:49:1c, Added on Dec 5, 2017, Last used within the last 8 months — Read/write.
- jenkins**: Fingerprint: c0:71:19:62:23:52:2f:c9:19:4f:4a:1f:94:9d:51:d2, Added on May 22, 2018, Never used — Read/write. There is a red "Delete" button next to it.
- puppetmaster**: Fingerprint: cd:6d:07:36:4e:59:df:a2:4b:d4:52:fd:bc:0f:0d:13, Added on Jul 8, 2018, Never used — Read/write. There is a red "Delete" button next to it.

On the right side, there's a sidebar with "Signed in as Zippyops" and links for Your profile, Your stars, Your gists, Help, Settings (which is selected), and Sign out.

Click ssh and GPG keys ,

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Personal settings

Profile

Account

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Notifications

Billing

SSH and GPG keys

Security

Blocked users

Repositories

Organizations

Saved replies

Applications

SSH keys / Add new

Title

Key

Begins with 'ssh-rsa', 'ssh-dss', 'ssh-ed25519', 'ecdsa-sha2-nistp256', 'ecdsa-sha2-nistp384', or 'ecdsa-sha2-nistp521'

Add SSH key

Add title and aah key in that ,

This is a list of SSH keys associated with your account. Remove any keys that you do not recognize.

 user-b SSH	Fingerprint: ac:01:f1:f0:4b:66:b0:c2:cf:a9:67:56:f6:71:49:1c Added on Dec 5, 2017 Last used within the last 8 months — Read/write	Delete
 jenkins SSH	Fingerprint: c0:71:19:62:23:52:2f:c9:19:4f:4a:1f:94:9d:51:d2 Added on May 22, 2018 Never used — Read/write	Delete
 puppetmaster SSH	Fingerprint: cd:6d:07:36:4e:59:df:a2:4b:d4:52:fd:bc:0f:0d:13 Added on Jul 8, 2018 Never used — Read/write	Delete

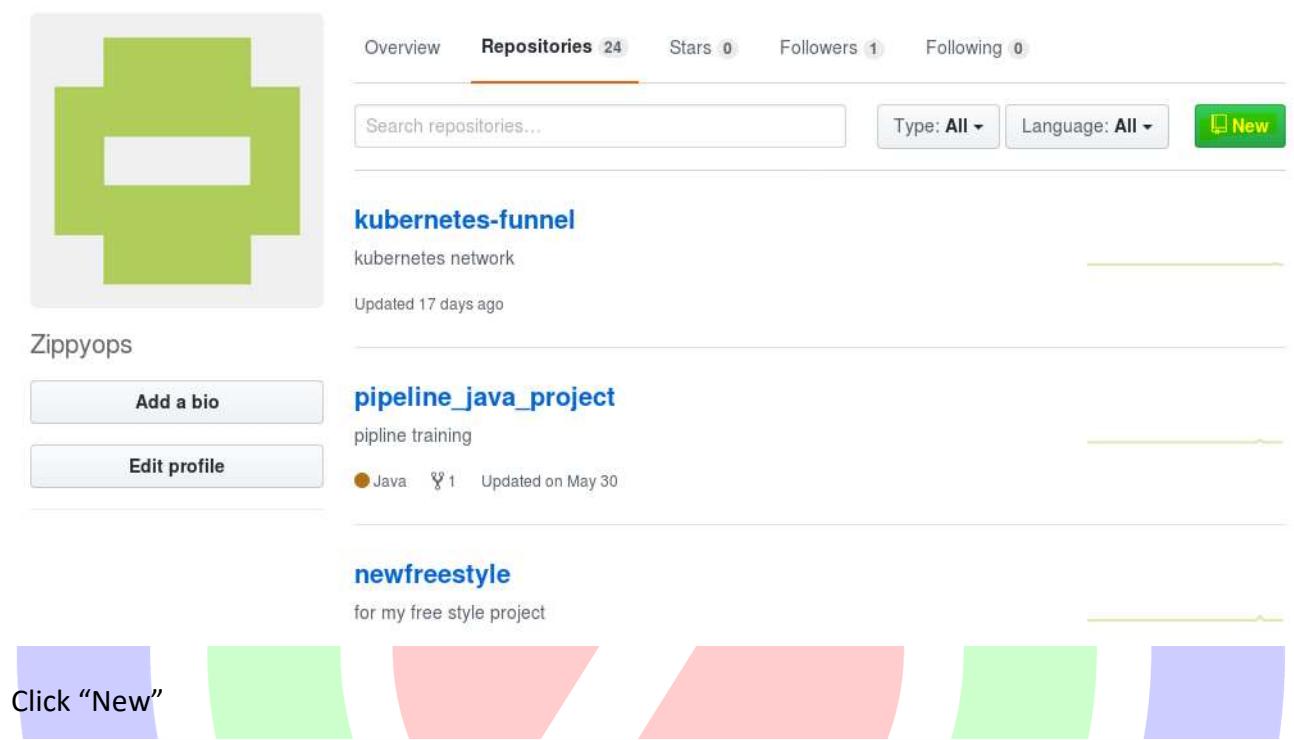
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Now we have to create one repository



The screenshot shows a user profile page with a large green plus sign icon. Below it, there are three repository cards:

- kubernetes-funnel**: kubernetes network, Updated 17 days ago.
- pipeline_java_project**: pipeline training, Java, Updated on May 30.
- newfreestyle**: for my free style project.

A green button labeled "New" is located at the top right of the repository list. A callout bubble points to this button with the text "Click 'New'".

Owner



Repository name



/ puppet-ssh ✓

Great repository names are short and memorable. Need inspiration? How about **scaling-invention**.

Description (optional)

 **Public**

Anyone can see this repository. You choose who can commit.

 **Private**

You choose who can see and commit to this repository.

Initialize this repository with a README

This will let you immediately clone the repository to your computer. Skip this step if you're importing an existing repository.

Add .gitignore: **None**

Add a license: **None**



Create repository

ZippyOPS

Give a name to this repo , and click create repository .

Now we have to enable ssh key to this repo ,

```
[root@puppetmaster home]# git clone git@github.com:Zippyops/puppet-ssh.git
Cloning into 'puppet-ssh'...
The authenticity of host 'github.com (192.30.253.112)' can't be established.
RSA key fingerprint is SHA256:nThbg6kXUpJWG17E1IGOCspRomTxdCARLviKw6E5SY8.
RSA key fingerprint is MD5:16:27:ac:a5:76:28:2d:36:63:1b:56:4d:eb:df:a6:48.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'github.com,192.30.253.112' (RSA) to the list of known hosts.
warning: You appear to have cloned an empty repository.
```

To verify repo ,

```
[root@puppetmaster home]# ls
puppet-ssh  zippyops
[root@puppetmaster home]#
```

MODULE :

CREATING A MODULE

- Modules are self-contained bundles of code used to manage a single piece of technology.
- How to generate a module
 - `puppet module generate <MAINTAINER>-<MODULE_NAME>`
 - The tests directory deprecated
 - The examples directory has been added
- Module names contain
 - Lowercase letters
 - Numbers
 - Underscores
 - Should begin with a lowercase letter
 - Module names cannot contain the namespace separator (::)
 - Modules cannot be nested

MODULE LAYOUT

```
<MODULE NAME>
o      manifests
o      files
o      templates
o      lib
o      facts.d
o      examples
o      spec
o      functions
o      types
```

IMPORTANT DIRECTORIES

- manifests/ - Contains all of the manifests the module.
- files/ - Contains static files, which managed nodes can download.
- lib/ - Contains plugins, like custom facts and custom resource types.
- facts.d/ - Contains external facts, which are an alternative to Ruby-based custom facts.
- templates/ - Contains templates, which the module's manifests can use.
- examples/ - Contains examples showing how to declare the module's classes and defined types.

Lab:

We are go on create our first module ,

```
[root@puppetmaster home]# cd /etc/puppetlabs/code/environments/production/modules/  
[root@puppetmaster modules]# ls  
archive java ntp stdlib  
[root@puppetmaster modules]#
```

Here we have to create our first module it ssh module ,

```
[root@puppetmaster modules]# puppet module generate zippyops-ssh  
Warning: `puppet module generate` is deprecated and will be removed in a future release. This  
action has been replaced by Puppet Development Kit. For more information visit  
https://puppet.com/docs/pdk/latest/pdk.html.  
(location: /opt/puppetlabs/puppet/lib/ruby/vendor_ruby/puppet/face/module/generate.rb:142:in  
'generate')  
We need to create a metadata.json file for this module. Please answer the  
following questions; if the question is not applicable to this module, feel free  
to leave it blank.
```

Puppet uses Semantic Versioning (semver.org) to version modules.

What version is this module? [0.1.0]

-->

Who wrote this module? [zippyops]

--> praveen D

What license does this module code fall under? [Apache-2.0]

-->

How would you describe this module in a single sentence?

--> This module will manage ssh.

Where is this module's source code repository?

--> <https://github.com/Zippyops/puppet-ssh>

Where can others go to learn more about this module? [<https://github.com/Zippyops/puppet-ssh>]

-->

Where can others go to file issues about this module? [<https://github.com/Zippyops/puppet-ssh/issues>]

-->

```
{  
  "name": "zippyops-ssh",  
  "version": "0.1.0",
```

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```
"author": "praveen D",
"summary": "This module will manage ssh.",
"license": "Apache-2.0",
"source": "https://github.com/Zippyops/puppet-ssh",
"project_page": "https://github.com/Zippyops/puppet-ssh",
"issues_url": "https://github.com/Zippyops/puppet-ssh/issues",
"dependencies": [
  {
    "name": "puppetlabs-stdlib",
    "version_requirement": ">= 1.0.0"
  }
],
"data_provider": null
}

-----
About to generate this metadata; continue? [n/Y]
--> y

Notice: Generating module at /etc/puppetlabs/code/environments/production/modules/ssh...
Notice: Populating templates...
Finished; module generated in ssh.
ssh/Gemfile
ssh/Rakefile
ssh/examples
ssh/examples/init.pp
ssh/manifests
ssh/manifests/init.pp
ssh/spec
ssh/spec/classes
ssh/spec/classes/init_spec.rb
ssh/spec/spec_helper.rb
ssh/README.md
ssh/metadata.json
```

Here , we can provide some answer for those questions and also give ah source code repo address too.

```
[root@puppetmaster modules]# ls
archive java ntp ssh stdlib
[root@puppetmaster modules]# cd ssh
[root@puppetmaster ssh]# ls
examples Gemfile manifests metadata.json Rakefile README.md spec
```

Our ssh module has been generated.

```
[root@puppetmaster ssh]# cat metadata.json
{
  "name": "zippyops-ssh",
  "version": "0.1.0",
  "author": "praveen D",
  "summary": "This module will manage ssh.",
  "license": "Apache-2.0",
  "source": "https://github.com/Zippyops/puppet-ssh",
  "project_page": "https://github.com/Zippyops/puppet-ssh",
  "issues_url": "https://github.com/Zippyops/puppet-ssh/issues",
  "dependencies": [
    {
      "name": "puppetlabs-stdlib",
      "version_requirement": ">= 1.0.0"
    }
}
```

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```
],
  "data_provider": null
}

[root@puppetmaster ssh]#
```

These are the details about this module .

We have to move this file to gitrepo ,

```
[root@puppetmaster ssh]# git init
Initialized empty Git repository in
/etc/puppetlabs/code/environments/production/modules/ssh/.git/
[root@puppetmaster ssh]# git add .
[root@puppetmaster ssh]# git commit -m "First commit to staging area"
[master (root-commit) 451ec2a] First commit to staging area
Committer: root <root@puppetmaster.zippyops.com>
Your name and email address were configured automatically based
on your username and hostname. Please check that they are accurate.
You can suppress this message by setting them explicitly:
```

```
git config --global user.name "Your Name"
git config --global user.email you@example.com
```

After doing this, you may fix the identity used for this commit with:

```
git commit --amend --reset-author

8 files changed, 224 insertions(+)
create mode 100644 Gemfile
create mode 100644 README.md
create mode 100644 Rakefile
create mode 100644 examples/init.pp
create mode 100644 manifests/init.pp
create mode 100644 metadata.json
create mode 100644 spec/classes/init_spec.rb
create mode 100644 spec/spec_helper.rb
[root@puppetmaster ssh]# git remote add origin git@github.com:Zippyops/puppet-ssh.git
[root@puppetmaster ssh]# git push origin master
Warning: Permanently added the RSA host key for IP address '192.30.253.113' to the list of known
hosts.
Counting objects: 14, done.
Compressing objects: 100% (11/11), done.
Writing objects: 100% (14/14), 4.19 KiB | 0 bytes/s, done.
Total 14 (delta 0), reused 0 (delta 0)
To git@github.com:Zippyops/puppet-ssh.git
 * [new branch]      master -> master
[root@puppetmaster ssh]#
```

All the files moved to git repo ,

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1 commit · 1 branch · 0 releases · 0 contributors

Branch: master · New pull request · Create new file · Upload files · Find file · Clone or download

File	Description	Time Ago
root	First commit to staging area	Latest commit 451ec2a 3 minutes ago
examples	First commit to staging area	3 minutes ago
manifests	First commit to staging area	3 minutes ago
spec	First commit to staging area	3 minutes ago
Gemfile	First commit to staging area	3 minutes ago
README.md	First commit to staging area	3 minutes ago
Rakefile	First commit to staging area	3 minutes ago
metadata.json	First commit to staging area	3 minutes ago

CLASSES

PUPPET CLASSES

- Classes are named blocks of Puppet that used in a modules.
- They are not applied until they are invoked by name.
- They can be added to a node's catalog by declaring it in a manifest or in the ENC.
- They use Resource Types to configure packages, files, services, etc.
- Classes can use parameters to request external data.
 - A default parameter should be supplied.
 - Each parameter can be preceded by an optional data type.
- Classes are singletons.
- Class names can consist of one or more namespace segments.
- Each namespace segment must begin with a lowercase letter and can include:
 - Lowercase letters
 - Digits
 - Underscores
- Namespace segments should match the following regular expression:
 - `\A[a-z][a-z0-9_]*\Z`
 - `class_name123`
- Multiple namespace segments can be joined together in a class name with the `::` (double colon) namespace separator.
 - `\A([a-z][a-z0-9_]*?)?::([a-z][a-z0-9_]*?)?\Z`

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- module_name::class_name

Class syntax:

```
class <CLASS_NAME> (<DATA_TYPE> <PARAM_NAME>
) {
...
    puppet code ...
}
```

Example:

```
class ssh {
file { "/etc/ssh/ssh_config":
ensure => file,
source => "puppet:///modules/ssh/ssh_config"
}
}
```

CLASS VARIABLES

- Variable names begin with a \$ (dollar sign) and are case-sensitive.
- Variable names can include:
 - Uppercase and lowercase letters
 - Numbers
 - Underscores (_)
- There are reserved variable names:
 - Data Types
 - Function names

Lab:

Go back to our puppet master and ssh module ,

```
[root@puppetmaster ssh]# pwd
/etc/puppetlabs/code/environments/production/modules/ssh
[root@puppetmaster ssh]# ls
examples  Gemfile  manifests  metadata.json  Rakefile  README.md  spec
[root@puppetmaster ssh]# cd manifests/
[root@puppetmaster manifests]# ls
init.pp
```

we can edit this init.pp file ,

```
class ssh {
  class { 'ssh::install': } ->
  class { 'ssh::service': }

}
```

Here , added ssh module to install ssh .

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Install and service – files

```
[root@puppetmaster manifests]# cat install.pp
class ssh::install {
  package { 'openssh-server':
    ensure => present,
  }
}
[root@puppetmaster manifests]#
```

Here , package as been given “openssh-server” to install.

Now we can create service.pp file ,

```
[root@puppetmaster manifests]# cat service.pp
class ssh::service {
  service { 'sshd':
    ensure      => running,
    enable      => true,
    hasstatus   => true,
    hasrestart => true,
  }
}
```

Now we can validate our codes ,

```
[root@puppetmaster manifests]# puppet parser validate init.pp
[root@puppetmaster manifests]# puppet parser validate install.pp
[root@puppetmaster manifests]# puppet parser validate service.pp
```

There is no error found .

Go back to our console , To create new node group ,

Classification

Create, edit, and remove node groups here.

[Add group...](#)

Parent name	Group name	Environment
All Nodes	Base	production
Description (optional)		
<input type="checkbox"/> Base added! Add membership rules, classes, and variables .		

[Add](#)

Click add button ,

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Environment production

[Edit node group metadata](#)

[Remove node group](#)

Run ▾

Rules

Matching nodes

Configuration

Variables

Activity

Write rules to dynamically assign nodes to this group based on fact values. Begin with "trusted" to designate a trusted fact.

- Nodes must match all rules.
- Nodes may match any rule.

[Show all node matches](#)

Fact	Operator	Value	Node matches
<input type="text"/>	=	<input type="text"/>	Add rule

Pin specific nodes to the group.

Certname
puppetagent1.zippyops.

[Pin node](#)

In this group we have added our centos agent only ,

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[Rules](#)[Matching nodes](#)[Configuration](#)[Variables](#)[Activity](#)

Classes

Declare the classes that you want to apply to nodes in this group. The classes will be applied on the next run.

Class definitions updated: a minute ago

[Refresh](#)[Add new class](#)[Add class](#)**Class: ssh**

Parameter	Value
Parameter name	=

[Add parameter](#)[✖ Remove this class](#)

Added ssh class to this node ,

Now we have to go puppetagent1.zippyops.com node,

```
[root@puppetagent1 zippyops]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531047345'
Notice: This is my default node!
Notice: /Stage[main]/Main/Node[default]/Notify[This is my default node!]/message: defined
'message' as 'This is my default node!'
Notice: Applied catalog in 0.34 seconds
```

Nothing to be installed because already ssh installed and running .

So we have to stop the ssh service ,

```
[root@puppetagent1 zippyops]# service sshd stop
Redirecting to /bin/systemctl stop sshd.service
[root@puppetagent1 zippyops]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531047372'
```

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```
Notice: This is my default node!
Notice: /Stage[main]/Main/Node[default]/Notify[This is my default node!]/message: defined
'message' as 'This is my default node!'
Notice: /Stage[main]/Ssh::Service/Service[sshd]/ensure: ensure changed 'stopped' to 'running'
Info: /Stage[main]/Ssh::Service/Service[sshd]: Unscheduling refresh on Service:sshd
Notice: Applied catalog in 0.59 seconds
```

You can see that sshd service start running it !!

FACTER

- Facter is Puppet's cross-platform systemprofiling library. It discovers and reports per-node facts, which are available in your Puppet manifests as variables.
 - Core Facts: Built-in fact that ships with Facter
 - External Facts: Provide a way to use arbitrary executables or scripts as facts
 - Custom Facts: Extend Facter by writing Ruby code
- Facter Command
 - `facter`: Returns a list all facts.
 - `facter <fact>`: Returns a particular fact.
 - `facter -p`: Allows Facter to load Puppet-specific facts.

Lab:

Go to puppetmaster terminal ,

```
[root@puppetmaster ssh]# pwd
/etc/puppetlabs/code/environments/production/modules/ssh
[root@puppetmaster ssh]# cd manifests/
[root@puppetmaster manifests]# ls
init.pp  install.pp  service.pp
```

here we have to create params.pp file ,

```
[root@puppetmaster manifests]# cat params.pp
class ssh::params {
  case $facts['os']['family'] {
    'Debian': {
      $package_name = 'openssh-server'
      $service_name = 'ssh'
    }
    'RedHat': {
      $package_name = 'openssh-server'
      $service_name = 'sshd'
    }
    default: {
      fail("${facts['operatingsystem']} is not supported!")
    }
  }
}
```

Here , I have used case statement to get two different environment os family .

Next , to edit init.pp file ,

```
class ssh(
```

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```
String $package_name = $::ssh::params::package_name,
String $service_name = $::ssh::params::service_name,
) inherits ::ssh::params {
  class { '::ssh::install': } ->
  class { '::ssh::service': }

}
```

Here , we have mentioned that package name is available in params.pp file using “inherits”.

```
[root@puppetmaster manifests]# cat install.pp
class ssh::install(
  String $package_name = $::ssh::params::package_name,
) {
  package { 'ssh-package':
    ensure => present,
    name   => $package_name,
  }
}
```

Have added package details in install.pp file .

```
[root@puppetmaster manifests]# cat service.pp
class ssh::service(
  String $service_name = $::ssh::params::service_name,
) {
  service { 'ssh-service':
    ensure      => running,
    name        => $service_name,
    enable      => true,
    hasstatus   => true,
    hasrestart => true,
  }
}
```

Service details has been added to service.pp file .

Go back to my puppetagent1 to uininstall the openssh-server ,

```
[root@puppetagent1 zippyops]# yum remove sshd
Loaded plugins: fastestmirror, langpacks
No Match for argument: sshd
No Packages marked for removal
[root@puppetagent1 zippyops]# yum remove openssh-server
Loaded plugins: fastestmirror, langpacks
Resolving Dependencies
--> Running transaction check
--> Package openssh-server.x86_64 0:7.4p1-16.el7 will be erased
--> Finished Dependency Resolution
```

Dependencies Resolved

```
=====
Package           Arch      Version       Repository  Size
=====
Removing:
  openssh-server x86_64  7.4p1-16.el7     @base      971 k
```

Transaction Summary

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```
Remove 1 Package
```

```
Installed size: 971 k
Is this ok [y/N]: y
Downloading packages:
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Erasing   : openssh-server-7.4p1-16.el7.x86_64          1/1
  Verifying  : openssh-server-7.4p1-16.el7.x86_64          1/1

Removed:
  openssh-server.x86_64 0:7.4p1-16.el7

Complete!
```

Sshd server has been uninstalled in puppet agent

Next , we have to run puppet agent -t ,

```
[root@puppetagent1 zippyops]# service puppet stop
Redirecting to /bin/systemctl stop puppet.service
[root@puppetagent1 zippyops]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531050853'
Notice: This is my default node!
Notice: /Stage[main]/Main/Node[default]/Notify[This is my default node!]/message: defined 'message' as 'This is my default node!'
Notice: /Stage[main]/Ssh::Install/Package[ssh-package]/ensure: created
Notice: /Stage[main]/Ssh::Service/Service[ssh-service]/ensure: ensure changed 'stopped' to 'running'
Info: /Stage[main]/Ssh::Service/Service[ssh-service]: Unscheduling refresh on Service[ssh-service]
Notice: Applied catalog in 4.50 seconds
[root@puppetagent1 zippyops]#
```

Execute successfully !!! sshd server installed again !!!

AUTOLOADING

- Puppet will use a class's full name of in it in your module.
- Every class should be in its own file and use the .pp file extension.
- Names map to the file
 - First segment in a name identifies the module.
 - init.pp class will always be the module name.
 - The last segment identifies the file name.
 - Any segments between the first and last are subdirectories in the manifests directory.

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- Example:

```
apache - <MODULE DIRECTORY>/apache/manifests/init.pp apache::mod - <MODULE  
DIRECTORY>/apache/manifests/mod.pp apache::mod::passenger - <MODULE  
DIRECTORY>/apache/manifests/mod/passenger.pp
```

Lab:

Go to my puppet master terminal , to edit install.pp file ,

```
[root@puppetmaster manifests]# cat install.pp  
class ssh::install1(  
  String $package_name = $::ssh::package_name,  
) {  
  package { 'ssh-package':  
    ensure => present,  
    name   => $package_name,  
  }  
}
```

In this file I have renamed the install as install1

Lets run puppet agent , to see what will be happen ,

```
[root@puppetagent1 zippyops]# puppet agent -t  
Info: Using configured environment 'production'  
Info: Retrieving pluginfacts  
Info: Retrieving plugin  
Info: Retrieving locales  
Info: Loading facts  
Error: Could not retrieve catalog from remote server: Error 500 on SERVER: Server Error:  
Evaluation Error: Error while evaluating a Resource Statement, Evaluation Error: Error while  
evaluating a Resource Statement, Could not find declared class ::ssh::install (file:  
/etc/puppetlabs/code/environments/production/modules/ssh/manifests/init.pp, line: 49, column: 3)  
on node puppetagent1.zippyops.com  
Warning: Not using cache on failed catalog  
Error: Could not retrieve catalog; skipping run
```

Puppet run failed , because declaration class install not found in install.pp file.

Go back to install.pp file change the name ,

```
[root@puppetmaster manifests]# cat install.pp  
class ssh::install(  
  String $package_name = $::ssh::package_name,  
) {  
  package { 'ssh-package':  
    ensure => present,  
    name   => $package_name,  
  }  
}
```

Again we have to run the puppet agent ,

```
[root@puppetagent1 zippyops]# puppet agent -t  
Info: Using configured environment 'production'  
Info: Retrieving pluginfacts  
Info: Retrieving plugin  
Info: Retrieving locales  
Info: Loading facts
```

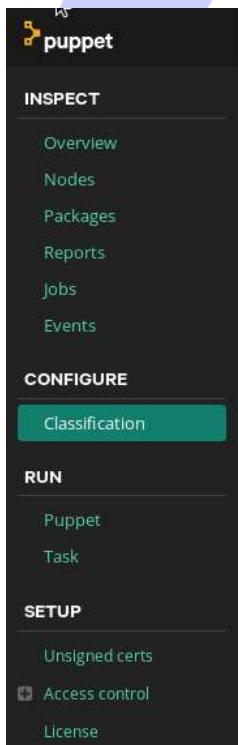
ZippyOPS

```
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531051758'
Notice: This is my default node!
Notice: /Stage[main]/Main/Node[default]/Notify[This is my default node!]/message: defined
'message' as 'This is my default node!'
Notice: Applied catalog in 0.37 seconds
```

Now it is run correctly !!!

DECLARING CLASSES IN THE PE CONSOLE AND SITE.PP

We will go to puppet console base group ,



Classification

Create, edit, and remove node groups here.

▶ [Add group...](#)

■	All Nodes	production
	Base	production
+	PE Infrastructure	production
+	Production environment	production
	Ubuntu	production

Click on base ,

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Parent [All Nodes](#)

Environment production

[Edit node group metadata](#)

[Remove node group](#)

Run



Rules

Matching nodes

Configuration

Variables

Activity

Write rules to dynamically assign nodes to this group based on fact values. Begin with "trusted" to designate a trusted fact.

- Nodes must match all rules.
- Nodes may match any rule.

[Show all node matches](#)

Fact	Operator	Value	Node matches
<input type="text"/>	=	<input type="text"/>	Add rule

Number of nodes pinned to this group: 1

Certname
<input type="text"/> Node name

puppetagent1.zippyops.com

[Pin node](#)

[Unpin](#)

Already added one node , go to classes ,

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[Rules](#)[Matching nodes](#)[Configuration](#)[Variables](#)[Activity](#)

Classes

Declare the classes that you want to apply to nodes in this group. The classes will be applied on the next run.

Class definitions updated: 9 minutes ago

[Refresh](#)[Add new class](#)[Add class](#)

Class: ssh

Parameter	Value	
Parameter name	=	Add parameter

[✖ Remove this class](#)

In this node only one class added that is ssh . Here one more class to be added as ntp,

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Classes

Declare the classes that you want to apply to nodes in this group. The classes will be applied on the next run.

Class definitions updated: a few seconds ago
[Refresh](#)

[Add new class](#)[Add class](#)**Class: ntp**

Parameter	Value
Parameter name	=

[Add parameter](#) [Remove this class](#)

Go back to puppet agent terminal to run ,

```
[root@puppetagent1 zippyops]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531052333'
Notice: This is my default node!
Notice: /Stage[main]/Main/Node[default]/Notify[This is my default node!]/message: defined 'message' as 'This is my default node!'
Notice: /Stage[main]/Ntp::Install/Package[ntp]/ensure: created
Notice: /Stage[main]/Ntp::Config/File[/etc/ntp.conf]/content:
--- /etc/ntp.conf 2018-04-10 16:29:08.000000000 -0400
+++ /tmp/puppet-file20180708-9319-ryhbhs 2018-07-08 08:18:59.780916482 -0400
@@ -1,58 +1,31 @@
-# For more information about this file, see the man pages
-# ntp.conf(5), ntp_acc(5), ntp_auth(5), ntp_clock(5), ntp_misc(5), ntp_mon(5).
+## ntp.conf: Managed by puppet.
+#
+## Enable next tinker options:
+## panic - keep ntpd from panicking in the event of a large clock skew
+## when a VM guest is suspended and resumed;
+## stepout - allow ntpd change offset faster
+## tinker panic 0
+## disable monitor

-driftfile /var/lib/ntp/drift
+statsdir /var/log/ntpstats
```

```
# Permit time synchronization with our time source, but do not
# permit the source to query or modify the service on this system.
-restrict default nomodify notrap nopeer noquery
-
-# Permit all access over the loopback interface. This could
-# be tightened as well, but to do so would effect some of
-# the administrative functions.
-restrict 127.0.0.1
-restrict ::1
-
-# Hosts on local network are less restricted.
-#restrict 192.168.1.0 mask 255.255.255.0 nomodify notrap
-
-# Use public servers from the pool.ntp.org project.
-# Please consider joining the pool (http://www.pool.ntp.org/join.html).
-server 0.centos.pool.ntp.org iburst
-server 1.centos.pool.ntp.org iburst
-server 2.centos.pool.ntp.org iburst
-server 3.centos.pool.ntp.org iburst
-
-#broadcast 192.168.1.255 autokey      # broadcast server
-#broadcastclient                      # broadcast client
-#broadcast 224.0.1.1 autokey          # multicast server
-#multicastclient 224.0.1.1           # multicast client
-#multicastserver 239.255.254.254     # manycast server
-#mancastclient 239.255.254.254 autokey # manycast client
-
-# Enable public key cryptography.
-#crypto
-
-includefile /etc/ntp/crypto/pw
+restrict default kod nomodify notrap nopeer noquery
+restrict -6 default kod nomodify notrap nopeer noquery
+restrict 127.0.0.1
+restrict -6 ::1
+
++ Set up servers for ntpd with next options:
++ server - IP address or DNS name of upstream NTP server
++ iburst - allow send sync packages faster if upstream unavailable
++ prefer - select preferable server
++ minpoll - set minimal update frequency
++ maxpoll - set maximal update frequency
++ noselect - do not sync with this server
+server 0.centos.pool.ntp.org
+server 1.centos.pool.ntp.org
+server 2.centos.pool.ntp.org

-# Key file containing the keys and key identifiers used when operating
-# with symmetric key cryptography.
-keys /etc/ntp/keys
-
-# Specify the key identifiers which are trusted.
-#trustedkey 4 8 42
-
-# Specify the key identifier to use with the ntpdc utility.
-#requestkey 8
-
-# Specify the key identifier to use with the ntpq utility.
-#controlkey 8
-
```

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```
-# Enable writing of statistics records.
-#statistics clockstats cryptostats loopstats peerstats
-
-# Disable the monitoring facility to prevent amplification attacks using ntpdc
-# monlist command when default restrict does not include the noquery flag. See
-# CVE-2013-5211 for more details.
-# Note: Monitoring will not be disabled with the limited restriction flag.
-disable monitor
+## Driftfile.
+driftfile /var/lib/ntp/drift

Notice: /Stage[main]/Ntp::Config/File[/etc/ntp.conf]/content: content changed
'{md5}dc9e5754ad2bb6f6c32b954c04431d0a' to '{md5}d51b2e5ec0a9f463047efb49555f65fe'
Notice: /Stage[main]/Ntp::Config/File[/etc/ntp/step-tickers]/content:
--- /etc/ntp/step-tickers 2018-04-10 16:29:08.000000000 -0400
+++ /tmp/puppet-file20180708-9319-nee0eh 2018-07-08 08:18:59.851916420 -0400
@@ -1,3 +1,5 @@
 # List of NTP servers used by the ntpdate service.

 0.centos.pool.ntp.org
+1.centos.pool.ntp.org
+2.centos.pool.ntp.org

Notice: /Stage[main]/Ntp::Config/File[/etc/ntp/step-tickers]/content: content changed
'{md5}9b77b3b3eb41daf0b9abb8ed01c5499b' to '{md5}413c531d0533c4dba18b9acf7a29ad5d'
Info: Class[Ntp::Config]: Scheduling refresh of Class[Ntp::Service]
Info: Class[Ntp::Service]: Scheduling refresh of Service[ntp]
Notice: /Stage[main]/Ntp::Service/Service[ntp]/ensure: ensure changed 'stopped' to 'running'
Info: /Stage[main]/Ntp::Service/Service[ntp]: Unscheduling refresh on Service[ntp]
Notice: Applied catalog in 5.44 seconds
[root@puppetagent1 zippyops]#
```

Ntp service installed in our puppet agent ,

Next , go back to our puppet master and site.pp manifest directory

```
[root@puppetmaster manifests]# pwd
/etc/puppetlabs/code/environments/production/manifests
[root@puppetmaster manifests]# ls
site.pp
[root@puppetmaster manifests]#
```

To edit site.pp file ,

```
node 'puppetagent2.zippyops.com','puppetagent1.zippyops.com' {
    notify { 'This matches the node name!!!': }
    include ntp
    include ntp
    include ntp
}
```

Here I have added too many include ntp content , lets puppet run in agent ,

```
[root@puppetagent1 zippyops]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531052869'
```

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```
Notice: This matches the node name!!!
Notice: /Stage[main]/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node
name!!!]/message: defined 'message' as 'This matches the node name!!!'
Notice: Applied catalog in 0.39 seconds
[root@puppetagent1 zippyops]#
```

Its run with out any error , suppose we have add class in site.pp file , lets see what will be happen

```
node 'puppetagent2.zippyops.com','puppetagent1.zippyops.com' {
    notify { 'This matches the node name!!!': }
    include ntp
    include ntp
    include ntp
    class { 'ntp': }
}
```

Here I have added class, lets run puppet agent ,

```
[root@puppetagent1 zippyops]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Error: Could not retrieve catalog from remote server: Error 500 on SERVER: Server Error:
Evaluation Error: Error while evaluating a Resource Statement, Duplicate declaration: Class[Ntp]
is already declared; cannot redeclare (file:
/etc/puppetlabs/code/environments/production/manifests/site.pp, line: 32) (file:
/etc/puppetlabs/code/environments/production/manifests/site.pp, line: 32, column: 7) on node
puppetagent1.zippyops.com
Warning: Not using cache on failed catalog
Error: Could not retrieve catalog; skipping run
```

We got a error . because we have declared class .

Go back to puppet master to edit site.pp file ,

```
node 'puppetagent2.zippyops.com','puppetagent1.zippyops.com' {
    notify { 'This matches the node name!!!': }
    class { 'java': }
}
```

In this , I have remove ntp class and added java class in it. Go back to our puppet agent to run ,

```
[root@puppetagent1 zippyops]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531053156'
Notice: This matches the node name!!!
Notice: /Stage[main]/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node
name!!!]/message: defined 'message' as 'This matches the node name!!!'
Notice: /Stage[main]/Java/Package[java]/ensure: created
Notice: /Stage[main]/Java::Config/File_line[java-home-environment]/ensure: created
Notice: Applied catalog in 12.28 seconds
```

Java installed successfully !!!

PUPPET DSL

RESOURCE TYPES: REVIEW

- Resource types are the basic building blocks of the Puppet DSL.
- Every resource type has:
 - a title
 - a set of attributes

RESOURCE TYPE SYNTAX:

```
<TYPE> { '<TITLE>':  
<ATTRIBUTE> => <VALUE>,  
}
```

- The attributes (sometimes called parameters) of a resource determine its desired state.

COMMON RESOURCE TYPES: FILE

```
file { '/etc/ssh/sshd_config': Linux Academy  
ensure => file,  
owner => root,  
group => root,  
mode => '0644',  
}
```

ensure:

- file – make sure it's a normal file
- directory – makes sure it is a directory (enables recursive)
- link – ensures file is a symlink (requires target attribute)
- absent – deletes file if it exists

COMMON RESOURCE TYPES: FILE ATTRIBUTES

Attributes:

- source
- content
- target

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Lab:

Go to centos agent node ,

```
[root@puppetagent1 zippyops]# cd /etc/puppetlabs/code/environments/production/manifests/  
[root@puppetagent1 manifests]# ls  
admin.pp  notify.pp  test_file.pp
```

Previously we had created some manifest , those manifest we can use this example ,

To edit test_file.pp :

```
[root@puppetagent1 manifests]# cat test_file.pp  
file { 'create_test_file':  
    ensure  => file,  
    name   => '/home/admin/test_file.txt',  
    content => 'Look at me I am a file!',  
    mode    => '0600',  
    owner   => 'admin',  
    group   => 'root',  
}  
}
```

In this file I have added name , file as create_test_file .

```
[root@puppetagent1 manifests]# puppet apply test_file.pp  
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.02 seconds  
Notice: Applied catalog in 0.04 seconds
```

Its run good , but that file already there so , we can remove that file and rerun it again ,

```
[root@puppetagent1 manifests]# cat test_file.pp  
file { 'create_test_file':  
    ensure  => absent,  
    name   => '/home/admin/test_file.txt',  
    content => 'Look at me I am a file!',  
    mode    => '0600',  
    owner   => 'admin',  
    group   => 'root',  
}  
[root@puppetagent1 manifests]#
```

Here I have given file as been “absent”. Lets run it again ,

```
[root@puppetagent1 manifests]# puppet apply test_file.pp  
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.02 seconds  
Notice: /Stage[main]/Main/File[create_test_file]/ensure: removed  
Notice: Applied catalog in 0.11 seconds
```

You could saw that file has been remove ,

```
[root@puppetagent1 manifests]# ls /home/admin/  
[root@puppetagent1 manifests]#
```

There is no files available again we can change that file ,

```
[root@puppetagent1 manifests]# cat test_file.pp  
file { 'create_test_file':  
    ensure  => file,  
    name   => '/home/admin/test_file.txt',  
    content => 'Look at me I am a file!',
```

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```
mode      => '0600',
owner     => 'admin',
group     => 'root',
}
```

To apply it again ,

```
[root@puppetagent1 manifests]# puppet apply test_file.pp
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.02 seconds
Notice: /Stage[main]/Main/File[create_test_file]/ensure: defined content as
'{md5}5a3add42b3f12712c5a79b33b10c35a0'
Notice: Applied catalog in 0.14 seconds
[root@puppetagent1 manifests]# ls /home/admin/
test_file.txt
[root@puppetagent1 manifests]#
```

Its created successfully and also available in that directory !!!

COMMON RESOURCE TYPES: PACKAGE

```
package { 'tree':
  ensure => present
}
```

Installing packages with an array (multiple packages at one time)

```
package { ['tree','bind-utils']:
  ensure => present,
}
```

COMMON RESOURCE TYPES: SERVICE

```
service { 'sshd': ensure => running, enable => true,
}
```

Ensure: stopped/running

Enable: determines if a service should be enabled to start at boot time. Values: true/false

CASE STATEMENTS

```
case $osfamily {
'RedHat': { $ssh_name = 'sshd'
'Debian': { $ssh_name = 'ssh'
} 'default': { Warning('OS family')
}
service { 'resource-name':
name => $ssh_name
ensure => running,
enable => true,
```

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```
}
```

Lab:

Go back to our puppet master ,

```
[root@puppetmaster ssh]# pwd  
/etc/puppetlabs/code/environments/production/modules/ssh  
[root@puppetmaster ssh]# ls  
examples  manifests  metadata.json  Rakefile  README.md  spec  
[root@puppetmaster ssh]# cd manifests/  
[root@puppetmaster manifests]# ls  
init.pp  install.pp  params.pp  service.pp
```

To edit params.pp file ,

```
[root@puppetmaster manifests]# cat params.pp  
class ssh::params {  
  case $::osfamily {  
    'Debian': {  
      $package_name = 'openssh-server'  
      $service_name = 'ssh'  
    }  
    'RedHat': {  
      $package_name = 'openssh-server'  
      $service_name = 'sshd'  
    }  
    default: {  
      fail("${::operatingsystem} is not supported!")  
    }  
  }  
}
```

We have added operating system. Now we have to run puppet agent run ,

```
root@puppetagent1 manifests]# puppet agent -t  
Info: Using configured environment 'production'  
Info: Retrieving pluginfacts  
Info: Retrieving plugin  
Info: Retrieving locales  
Info: Loading facts  
Info: Caching catalog for puppetagent1.zippyops.com  
Info: Applying configuration version '1531055415'  
Notice: This matches the node name!!!  
Notice: /Stage[main]/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node  
name!!!!]/message: defined 'message' as 'This matches the node name!!!!'  
Notice: Applied catalog in 0.40 seconds
```

Its run successfully . it not causes any error .

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ADDITIONAL CONDITIONAL STATEMENTS

```
$apache = true
if $apache {
  file { '/etc/motd': ensure => present, content => 'Apache web server',
} } else {
  file { '/etc/motd': ensure => present, content => 'Unassigned server', }
}
Negative if: unless
unless $memorytotal > 1024 {
$maxclient = 300
}
```

Execute only if the given statement is false; cannot include elsif or else statements

DEPENDENCIES AND RELATIONSHIPS

- Key concepts:
 - Puppet does not enforce resources from top down, instead based on dependency relationships
 - Code is executed from top down
 - Always define the dependency relationships needed and never to define ones that you don't
- Resource metaparameters
 - require: require a referenced resource to be applied first (note: resource naming)
 - before: request to be applied before a referenced resource
 - subscribe: listen for Puppet changes to the referenced resource
 - notify: send a notification when Puppet changes the containing resource

Note: Metaparameters are attributes that work with any resource type.

REQUIRE

```
package { 'ssh':
  name => 'openssh',
  ensure => present,
}
service { 'sshd':
  ensure => running,
  enable => true,
  require => Package['ssh'],
}
```

Note: the uppercase P and what it is doing.

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BEFORE

```
package { 'ssh':  
  name  => 'openssh',  
  ensure => present,  
  before => Service['sshd']  
}  
  
service { 'sshd':  
  ensure => running,  
  enable  => true,  
}
```

Note: the uppercase S and what it is doing.

SUBSCRIBE

```
file { '/etc/ssh/sshd_config':  
  ensure => present,  
  source => 'puppet:///modules/ssh/sshd_config',  
}  
  
service { 'sshd':  
  ensure => running,  
  enable  => true,  
  subscribe => File['/etc/ssh/sshd_config'],  
}
```

Note: uppercase F, resource name; subscribe watches for changes, so will only restart the sshd service if Puppet makes a change to the sshd_config file. Subscribe also implies require.

METAPARAMETERS

Meta parameters are part of the Puppet framework and works with any resource type.

- schedule: creates a window of time for the resource to be managed
- alias: creates an alias for the resource name
- audit: will check if an attribute for the resource has been modified
- noop: tells the resource not to execute
- loglevel: debug, info, notice, warning, err, alert, emerg, crit, verbose
- tag: sets a specific tag for a given resource type (more advanced usage)

Note: Puppet has the ability to apply resource types with specific tags during a catalog run. i.e. tagging a data center.

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THE PUPPET STYLE

PUPPET LANGUAGE AND STYLE

The style guide is to promote consistent formatting in the Puppet Language, especially across modules, giving users and developers of Puppet modules a common pattern, design, and style to follow.

- Readability matters.
- Scoping and simplicity are key.
- Your module is a piece of software.
- Version your modules.

SPACING, INDENTATION, AND WHITESPACE

Module manifests:

- Must use two-space soft tabs,
- Must not use literal tab characters,
- Must not contain trailing whitespace,
- Must include trailing commas after all resource attributes and parameter definitions,
- Must end the last line with a new line,
- Must use one space between the resource type and opening brace, one space between the opening brace and the title, and no spaces between the title and colon.

Example:

```
file { '/tmp/foo': ... }
```

Module manifests:

- Should not exceed a 140-character line width, except where such a limit would be impractical
- Should leave one empty line between resources, except when using dependency chains
- May align hash rockets (=>) within blocks of attributes, one space after the longest resource key, arranging hashes for maximum readability first.

ARRAYS AND HASHES

- Each element on its own line
- Each new element line indented one level
- First and last lines used only for the syntax of that data type

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Example:

```
#      array with multiple elements on multiple
lines service { 'some_service':
require => [
  File['some_config_file'],
  File['some_sysconfig_file'], ],
}
```

QUOTING

- All strings must be enclosed in single quotes, unless the string:
 - Contains variables
 - Contains single quotes
 - Contains escaped characters not supported by single-quoted strings
 - Is an enumerable set of options, such as present/absent, in which case the single quotes are optional
 - All variables must be enclosed in braces when interpolated in a string.

Example:

```
file { "/tmp${file_name}": ... }
```

"\${facts['operatingsystem']} is not supported by \${module_name}"

- Double quotes should be used rather than escaping when a string contains single quotes, unless that would require an inconvenient amount of additional escaping.

Example:

```
warning("Class['class_name'] doesn't work they way you expected it too.")
```

ESCAPE CHARACTERS AND COMMENTS

Puppet uses backslash as an escape character.

Comments must be hash comments (# This is a comment), not /* */

Documentation comments for Puppet Strings should be included for each of your classes, defined types, functions, and resource types and providers.

Example:

Escaping as \ would be "\\\"

```
# Configures sshd
```

```
file { '/etc/ssh/ssh_config': ... }
```

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MODULE METADATA

- Every module must have metadata defined in the metadata.json file.
- Hard dependencies must be declared in your module's metadata.json file.
- Soft dependencies should be in the README.md.
- A full sample is your study guide.

Example:

```
{  
  "name": "zippyops-my_module_name",  
  "version": "0.1.0",  
  "author": "praveen D",  
  "license": "Apache-2.0",  
  "summary": "It's a module that does things",  
  "source": "https://github.com/mygithubaccount/zippyops-my_module_name",  
  "project_page": "https://github.com/mygithubaccount/zippyops-my_module_name",  
  "issues_url": "https://github.com/mygithubaccount/zippyops-my_module_name/issues",  
  "tags": ["things", "and", "stuff"],  
}
```

RESOURCES

- All resource names or titles must be quoted.
- Hash rockets (`=>`) in a resource's attribute/value list may be aligned.
- Ensure should be the first attribute specified.
- Resources should be grouped by logical relationship to each other, rather than by resource type.
- Semicolon-separated multiple resource bodies should be used only in conjunction with a local default body.

Example:

```
file { '/etc/ssh/ssh_config':  
  ensure => file,  
  mode  => "0600",  
}
```

CLASSES AND DEFINED TYPES

All classes and resource type definitions (defined types) must be separate files in the manifests directory of the module. Each separate file in the manifest directory of the module should contain nothing other than the class or resource type definition.

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Example:

```
#      /etc/puppetlabs/code/environments/production/modules/apache/manifests
#
#      init.pp
#
class apache { }
#
# ssl.pp
#
class apache::ssl { }
#
# virtual_host.pp
#
define apache::virtual_host () { }
```

- When a resource or include statement is placed outside of a class, node definition, or defined type, it is included in all catalogs. This can have undesired effects and is not always easy to detect.

Example:

```
#manifests/init.pp:
class { 'some_class':
  include some_other_class
}
```

CHAINING ARROW SYNTAX

When you have many interdependent or order-specific items, chaining syntax may be used.

Example:

```
# Points left to right
Package['package_name'] -> Service['service_name']
#
# On the line of the right-hand operand Package['package_name']
-> Service['service_name']
```

NESTED CLASSES OR DEFINED TYPES

- Don't define Classes and defined resource types in other classes or defined types.
- Classes and defined types should be declared as close to node scope as possible.
- Don't use nesting mkay!

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Example of bad behavior:

```
class some_class {  
    class a_nested_class { ... }  
}  
  
class some_class {  
    define a_nested_define_type() { ... }  
}
```

PARAMETER

- Declare required parameters before optional parameters.
- Optional parameters are parameters with defaults.
- Declare the data type of parameters, as this provides automatic type assertions.
- For Puppet 4.9.0 and greater, use Hiera data in the module and rely on automatic parameter lookup for class parameters.
- Puppet versions less than 4.9.0, use the “params.pp” pattern. In simple cases, you can also specify the default values directly in the class or defined type.

Example:

```
#     parameter defaults provided via API > puppet 4.9.0  
class some_module (  
    String $source, String $config,) {  
    ... puppet code ...  
}
```

CLASS INHERITANCE

- Class inheritance should not be used.
- Use data binding instead of params.pp pattern.
- Inheritance should only be used for params.pp, which is not recommended in Puppet 4.
- For maintaining older modules inheritance can be used but must not be used across module namespaces.

Example:

```
class ssh { ... }  
class ssh::client inherits ssh { ... }  
class ssh::server inherits ssh { ... }
```

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VARIABLES

- Referencing facts
 - When referencing facts, prefer the \$facts hash to plain top-scope variables.
 - It's clearer.
 - It's easier to read.
 - Distinguishes facts from other top-scope variables.
- Example: \$facts[::operatingsystem]
- Namespacing variables
 - When referencing top-scope variables other than facts, explicitly specify absolute namespaces for clarity and improved readability. This includes top-scope variables set by the node classifier and in the main manifest.
 - This is not necessary for:
 - the \$facts hash.
 - the \$trusted hash.
 - the \$server_facts hash.

VARIABLE FORMAT

- Use numbers
- Use lowercase letters
- Use underscores
- Don't use camel case
- Don't use dashes

Good Examples:

- \$this_is_vairable
- \$so_is_this
- \$also_good123

Bad Examples:

- \$ThisIsNotGood
- \$neither-is-this

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DATA TYPES

CORE DATA TYPES

- § The most common data types:
- § String
- § Integer, Float, and Numeric
- § Boolean
- § Array
- § Hash
- § Regexp
- § Undef
- § Default

RESOURCE AND CLASS REFERENCES

- § Resources and classes are implemented data types.
- § However, they behave differently from other values.

ABSTRACT DATA TYPES

➤ Abstract data types let you do more sophisticated or permissive type checking.

- § Scalar
- § Collection
- § Variant
- § Data
- § Pattern
- § Enum
- § Tuple
- § Struct
- § Optional
- § Catalogentry
- § Type
- § Any

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§ Callable

THE TYPE DATA TYPE

All data types are of type Type.

Syntax:

Type[<ANY DATA TYPE>]

Example:

Type: matches any data type, such as Integer, String, Any, or Type.

Type[String]: matches the data type String, as well as any of its more specific subtypes like String[3] or Enum["running", "stopped"].

Type[Resource]: matches any Resource data type - that is, any resource reference.

Lab:

Go to puppet master ,

```
[root@puppetmaster manifests]# pwd  
/etc/puppetlabs/code/environments/production/modules/ssh/manifests  
[root@puppetmaster manifests]# ls  
init.pp  install.pp  params.pp  service.pp
```

Lets see where we are using data types in it ,

```
class ssh(  
  String $package_name = $::ssh::params::package_name,  
  Integer $service_name = $::ssh::params::service_name,  
) inherits ::ssh::params {  
  class { '::ssh::install': } ->  
  class { '::ssh::service': }  
}
```

Here I have used intiger ,

Lets run the puppet agent ,

```
[root@puppetagent1 manifests]# puppet agent -t  
Info: Using configured environment 'production'  
Info: Retrieving pluginfacts  
Info: Retrieving plugin  
Info: Retrieving locales  
Info: Loading facts  
Error: Could not retrieve catalog from remote server: Error 500 on SERVER: Server Error:  
Evaluation Error: Resource type not found: Intiger (file:  
/etc/puppetlabs/code/environments/production/modules/ssh/manifests/init.pp, line: 47, column: 2)  
on node puppetagent1.zippyops.com  
Warning: Not using cache on failed catalog  
Error: Could not retrieve catalog; skipping run
```

Resource type is incorrect so we got an error ,

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Lets go back to our puppet master and changed to string ,

```
class ssh(
  String $package_name = $::ssh::params::package_name,
  String $service_name = $::ssh::params::service_name,
) inherits ::ssh::params {
  class { '::ssh::install': } ->
  class { '::ssh::service': }
}
```

Again we can run puppet agent ,

```
[root@puppetagent1 manifests]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531059410'
Notice: This matches the node name!!!
Notice: /Stage[main]/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node
name!!!]/message: defined 'message' as 'This matches the node name!!!'
Notice: Applied catalog in 0.48 seconds
[root@puppetagent1 manifests]#
```

Puppet agent run fine now .

Lets see where we can use data types , I have one scenario ,

Go to puppet agent centos node ,

```
[root@puppetagent1 manifests]# pwd
/etc/puppetlabs/code/environments/production/manifests
[root@puppetagent1 manifests]# ls
admin.pp  notify.pp  test_file.pp
```

here I can create data type ,

```
[root@puppetagent1 manifests]# cat test_data_type.pp
case $facts {
  Hash: {
    notify { "This var is a hash!": }
  }
  default: {
    notify { "var not in list": }
  }
}
```

Here I have used case statement that is \$facts ,

Lets apply it ,

```
[root@puppetagent1 manifests]# puppet apply test_data_type.pp
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.02 seconds
Notice: This var is a hash!
Notice: /Stage[main]/Main/Notify[This var is a hash!]/message: defined 'message' as 'This var is
a hash!'
Notice: Applied catalog in 0.09 seconds
```

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This is matches data type so its notify that this var is hash,

Go back to edit that file again and add one more string ,

```
[root@puppetagent1 manifests]# cat test_data_type.pp
$test_var = "some data"

case $test_var {
  Hash: {
    notify { "This var is a hash!": }
  }
  String: {
    notify { "This var is a string!": }
  }
  default: {
    notify { "var not in list": }
  }
}
```

Here I have added string to notify that “this var is a string ” and specified the data “\$test_var”

```
[root@puppetagent1 manifests]# puppet apply test_data_type.pp
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.04 seconds
Notice: This var is a string!
Notice: /Stage[main]/Main/Notify[This var is a string!]/message: defined 'message' as 'This var
is a string!'
Notice: Applied catalog in 0.08 seconds
```

Yea , this is works good !!!

RELATIONSHIPS AND DEPENDENCIES

RELATIONSHIP METAPARAMETERS

By default, Puppet applies resources in the order they’re declared in their manifest. However, if a group of resources must always be managed in a specific order, you should explicitly declare such relationships with relationship metaparameters, chaining arrows, and the require function.

- before: Applies a resource before the target resource.
- require: Applies a resource after the target resource.
- notify: Applies a resource before the target resource. The target resource refreshes if the notifying resource changes.
- subscribe: Applies a resource after the target resource. The subscribing resource refreshes if the target resource changes.

Lab:

Go to puppet master and module directory ,

```
[root@puppetmaster manifests]# pwd
/etc/puppetlabs/code/environments/production/modules/ssh/manifests
```

Here I have to edit init.pp file ,

```
class ssh(
```

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```
String $package_name = $::ssh::params::package_name,
String $service_name = $::ssh::params::service_name,
) inherits ::ssh::params {
  class { '::ssh::install': }
  class { '::ssh::service':
    require => Class['::ssh::install']
  }
}
```

Here I have given chain to install ssh . lets see what will be happen

```
[root@puppetagent1 manifests]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531061288'
Notice: This matches the node name!!!
Notice: /Stage/main/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node name!!!]/message: defined 'message' as 'This matches the node name!!!'
Notice: /Stage/main/Ssh::Install/Package[ssh-package]/ensure: created
Notice: /Stage/main/Ssh::Service/Service[ssh-service]/ensure: ensure changed 'stopped' to 'running'
Info: /Stage/main/Ssh::Service/Service[ssh-service]: Unscheduling refresh on Service[ssh-service]
Notice: Applied catalog in 12.06 seconds
[root@puppetagent1 manifests]#
```

Ssh installed successfully again !!

Go back to my puppet master again modify that file ,

```
class ssh(
  String $package_name = $::ssh::params::package_name,
  String $service_name = $::ssh::params::service_name,
) inherits ::ssh::params {
  class { '::ssh::install':
    before => Class['::ssh::service']
  }
  class { '::ssh::service':
    require => Class['::ssh::install']
  }
}
```

Save it and run it again puppet agent , before that uninstall openssh-server and stop puppet ,

```
[root@puppetagent1 manifests]# yum remove openssh-server
Loaded plugins: fastestmirror, langpacks
Resolving Dependencies
--> Running transaction check
--> Package openssh-server.x86_64 0:7.4p1-16.el7 will be erased
--> Finished Dependency Resolution
```

Dependencies Resolved

Package	Arch	Version	Repository	Size
Removing:				

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```
openssh-server           x86_64      7.4p1-16.el7      @base      971 k
Transaction Summary
=====
Remove 1 Package

Installed size: 971 k
Is this ok [y/N]: y
Downloading packages:
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Erasing   : openssh-server-7.4p1-16.el7.x86_64          1/1
  Verifying  : openssh-server-7.4p1-16.el7.x86_64          1/1

Removed:
  openssh-server.x86_64 0:7.4p1-16.el7

Complete!
[root@puppetagent1 manifests]# systemctl stop puppet
[root@puppetagent1 manifests]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531061679'
Notice: This matches the node name!!!
Notice: /Stage/main/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node name!!!]/message: defined 'message' as 'This matches the node name!!!'
Notice: /Stage/main/Ssh::Install/Package[ssh-package]/ensure: created
Notice: /Stage/main/Ssh::Service/Service[ssh-service]/ensure: ensure changed 'stopped' to 'running'
Info: /Stage/main/Ssh::Service/Service[ssh-service]: Unscheduling refresh on Service[ssh-service]
Notice: Applied catalog in 10.82 seconds
[root@puppetagent1 manifests]#
```

First our package to be installed after that service to be run .

We can change reverse way this , what go on be happen

```
class ssh(
  String $package_name = $::ssh::params::package_name,
  String $service_name = $::ssh::params::service_name,
) inherits ::ssh::params {
  class { '::ssh::install':
    require => Class['::ssh::service']
  }
  class { '::ssh::service':
    before => Class['::ssh::install']
  }
}
```

Lets run puppet agent ,

```
[root@puppetagent1 manifests]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
```

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```
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531062091'
Notice: This matches the node name!!!
Notice: /Stage[main]/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node name!!!]/message: defined 'message' as 'This matches the node name!!!'
Error: Systemd start for sshd failed!
journalctl log for sshd:
-- Logs begin at Sun 2018-07-08 06:35:18 EDT, end at Sun 2018-07-08 11:01:34 EDT. --
Jul 08 10:59:24 puppetagent1.zippyops.com systemd[1]: Stopping OpenSSH server daemon...
Jul 08 10:59:24 puppetagent1.zippyops.com systemd[1]: Stopped OpenSSH server daemon.
Jul 08 10:59:42 puppetagent1.zippyops.com systemd[1]: Starting OpenSSH server daemon...
Jul 08 10:59:42 puppetagent1.zippyops.com sshd[13961]: Server listening on 0.0.0.0 port 22.
Jul 08 10:59:42 puppetagent1.zippyops.com sshd[13961]: Server listening on :: port 22.
Jul 08 10:59:42 puppetagent1.zippyops.com systemd[1]: Started OpenSSH server daemon.
Jul 08 11:01:18 puppetagent1.zippyops.com systemd[1]: Stopping OpenSSH server daemon...
Jul 08 11:01:18 puppetagent1.zippyops.com systemd[1]: Stopped OpenSSH server daemon.

Error: /Stage[main]/Ssh::Service[ssh-service]/ensure: change from 'stopped' to 'running' failed: Systemd start for sshd failed!
journalctl log for sshd:
-- Logs begin at Sun 2018-07-08 06:35:18 EDT, end at Sun 2018-07-08 11:01:34 EDT. --
Jul 08 10:59:24 puppetagent1.zippyops.com systemd[1]: Stopping OpenSSH server daemon...
Jul 08 10:59:24 puppetagent1.zippyops.com systemd[1]: Stopped OpenSSH server daemon.
Jul 08 10:59:42 puppetagent1.zippyops.com systemd[1]: Starting OpenSSH server daemon...
Jul 08 10:59:42 puppetagent1.zippyops.com sshd[13961]: Server listening on 0.0.0.0 port 22.
Jul 08 10:59:42 puppetagent1.zippyops.com sshd[13961]: Server listening on :: port 22.
Jul 08 10:59:42 puppetagent1.zippyops.com systemd[1]: Started OpenSSH server daemon.
Jul 08 11:01:18 puppetagent1.zippyops.com systemd[1]: Stopping OpenSSH server daemon...
Jul 08 11:01:18 puppetagent1.zippyops.com systemd[1]: Stopped OpenSSH server daemon.

Notice: /Stage[main]/Ssh::Install/Package[ssh-package]: Dependency Service[ssh-service] has failures: true
Warning: /Stage[main]/Ssh::Install/Package[ssh-package]: Skipping because of failed dependencies
Info: Stage[main]: Unscheduling all events on Stage[main]
Notice: Applied catalog in 0.83 seconds
[root@puppetagent1 manifests]#
```

We got a error executing puppet agent ,

```
class ssh(
  String $package_name = $::ssh::params::package_name,
  String $service_name = $::ssh::params::service_name,
) inherits ::ssh::params {
  class { '::ssh::service':
    # require => Class['::ssh::install']
  }
  class { '::ssh::install':
    before => Class['::ssh::service']
  }
}
```

To run puppet agent ,

```
[root@puppetagent1 manifests]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
```

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```
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531062385'
Notice: This matches the node name!!!
Notice: /Stage[main]/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node
name!!!]/message: defined 'message' as 'This matches the node name!!!'
Notice: /Stage[main]/Ssh::Install/Package[ssh-package]/ensure: created
Notice: /Stage[main]/Ssh::Service/Service[ssh-service]/ensure: ensure changed 'stopped' to
'running'
Info: /Stage[main]/Ssh::Service/Service[ssh-service]: Unscheduling refresh on Service[ssh-
service]
Notice: Applied catalog in 7.89 seconds
```

Its works good!!

CHAINING ARROWS

You can create relationships between two resources or groups of resources using the `->` and `~>` operators.

`->` ordering arrow: Applies the resource on the left before the resource on the right.

`~>` notifying arrow: Applies the resource on the left first. If the left-hand resource changes, the right-hand resource will refresh.

Both chaining arrows have a reversed form (`<-` and `<~`).

CHAINING ARROWS: OPERANDS

The chaining arrows accept the following kinds of operands on either side of the arrow:

- Resource references, including multi-resource references
- Arrays of resource references
- Resource declarations
- Resource collectors

ORDERING

All relationships cause Puppet to manage one or more resources before one or more other resources.

By default, unrelated resources are managed in the order in which they're written in their manifest file. If you declare an explicit relationship between resources, it will override this default ordering.

REFRESHING AND NOTIFICATION

Some resource types can be refreshed when a dependency is changed.

- Built-in resource types that can be refreshed:
 - service
 - mount

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- exec
- Sometimes package
- Rules for notification and refreshing are:
 - Receiving refresh events
 - Sending refresh events
 - No-op

REFRESHING AND NOTIFICATION

- Certain resource types can have automatic relationships with other resources, using auto require, auto_notify, auto_before, or auto_subscribe.
- A complete list can be found in the resource type reference.
- Auto relationships between types and resources are established when applying a catalog.

MISSING DEPENDENCIES

- If one of the resources in a relationship is not declared the catalog will fail to compile.
- Could not find dependency <OTHER RESOURCE> for <RESOURCE>
- Could not find resource '<OTHER RESOURCE>' for relationship on '<RESOURCE>'.

FAILED DEPENDENCIES

- If a resource with dependencies fails to be applied, all dependent resource will be skipped.
- notice: <RESOURCE>: Dependency <OTHER RESOURCE> has failures: true
- warning: <RESOURCE>: Skipping because of failed dependencies

Lab:

We can add chain arrow in init.pp file ,

```
[root@puppetmaster manifests]# vi init.pp
class ssh(
  String $package_name = $::ssh::params::package_name,
  String $service_name = $::ssh::params::service_name,
) inherits ::ssh::params {
  class { '::ssh::service': }
  class { '::ssh::install': }

  Class['::ssh::install'] -> Class['::ssh::service'] -> Class['::ssh::install']
}
```

Lets run puppet agent ,

```
[root@puppetagent1 manifests]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
```

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```
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531067647'
Error: Found 1 dependency cycle:
(Package[ssh-package] => Class[Ssh::Install] => Class[Ssh::Service] => Service[ssh-service] =>
Class[Ssh::Service] => Class[Ssh::Install] => Package[ssh-package])\nTry the '--graph' option and
opening the resulting '.dot' file in OmniGraffle or GraphViz
Error: Failed to apply catalog: One or more resource dependency cycles detected in graph
[root@puppetagent1 manifests]#
```

Dependency cycle created Executed successfully!!!

CONDITIONAL STATEMENTS

Conditional statements let your Puppet code behave differently in different situations. They are most helpful when combined with facts or with data retrieved from an external source.

Conditionals that alter logic:

- if statement
- unless statement
- case statement

Conditionals that return a value:

- selector

"If" Statements

"If" statements take a Boolean condition and an arbitrary block of Puppet code and will only execute the block if the condition is true. They can optionally include elsif and else clauses.

Syntax:

```
if condition {
  block of code
}
elsif condition {
  block of code
}
else {
  default option
}
```

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"If" Statements

Example:

```
if $facts['os']['name'] == 'Windows' {  
    include role::windows  
}  
  
elsif ($facts['os']['name'] == 'RedHat') and ($facts['os']['name'] == 'CentOS') { include role::redhat  
}  
  
elsif $facts['os']['name'] =~ /^(Debian|Ubuntu)$/ {  
    include role::debian  
}  
  
else {  
    include role::generic::os  
}
```

"If" Statements

Behavior

- The Puppet if statement behaves like if statements in any other language.
- If none of the conditions match and there is no else block, Puppet will do nothing.

Conditions

- Variables
- Expressions, including arbitrarily nested and/or expressions
- Functions that return values

"If" Statements

- Regex capture variables

If you use a regular expression match operator as your condition, any captures from parentheses in the pattern will be available inside the associated code block as numbered variables (\$1, \$2, etc.), and the entire match will be available as \$0:

Example:

```
if $trusted['certname'] =~ /^www(\d+)\./ {  
    notice("This is web server number $1.")  
}
```

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Lab:

Now we are going to use if statement in our params.pp file ,

```
[root@puppetmaster manifests]# cat params.pp
class ssh::params {
    if $facts['os']['family'] == 'Debian' {
        $package_name = 'openssh-server'
        $service_name = 'ssh'
    }
    elsif $facts['os']['family'] == 'RedHat' {
        $package_name = 'openssh-server'
        $service_name = 'sshd'
    }
    else {
        fail("${facts['operatingsystem']} is not supported!")
    }

    # case $::osfamily {
    # 'Debian': {
    #     $service_name = 'ssh'
    #     $package_name = 'openssh-server'
    # }
    # 'RedHat': {
    #     $package_name = 'openssh-server'
    #     $service_name = 'sshd'
    # }
    # default: {
    #     fail("${::operatingsystem} is not supported!")
    # }
    # }
}
[root@puppetmaster manifests]#
```

Go back to our puppet agent centos node , to uninstall ssh ,

```
[root@puppetagent1 manifests]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531067935'
Notice: This matches the node name!!!
Notice: /Stage[main]/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node name!!!]/message: defined 'message' as 'This matches the node name!!!'
Notice: /Stage[main]/Ssh::Install/Package[ssh-package]/ensure: created
Notice: /Stage[main]/Ssh::Service/Service[ssh-service]/ensure: ensure changed 'stopped' to 'running'
Info: /Stage[main]/Ssh::Service/Service[ssh-service]: Unscheduling refresh on Service[ssh-service]
Notice: Applied catalog in 6.23 seconds
```

If statement works good !!!

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"Unless" Statements

"Unless" is the reversed "if" statements. It takes a Boolean condition and an arbitrary block of Puppet code. It will only execute the block of code if the condition is false. There cannot be an `elsif` clause.

Syntax:

```
unless condition {  
  block of code  
}
```

Example:

```
unless $facts['memory']['system']['totalbytes'] > 1073741824 { $maxclient = 500  
}
```

- Behavior
 - the condition is evaluated first and, if it is false, the code block is executed.
 - If the condition is true, Puppet will do nothing.
 - The unless statement is also an expression that produces a value and can be used wherever a value is allowed.
- Conditions
 - Variables
 - Expressions, including arbitrarily nested and/or expressions
 - Functions that return values
- Regex capture variables
 - Although "unless" statements receive regex capture variables like "if" statements, they usually aren't used.

Lab:

We have use unless statement in our params.pp file ,

```
[root@puppetmaster manifests]# cat params.pp  
class ssh::params {  
  unless $facts['os']['family'] == 'Debian' {  
    $package_name = 'openssh-server'  
    $service_name = 'sshd'  
  }  
  # if $facts['os']['family'] == 'Debian' {  
  #   $package_name = 'openssh-server'  
  #   $service_name = 'ssh'  
  # }  
  # elsif $facts['os']['family'] == 'RedHat' {  
  #   $package_name = 'openssh-server'  
  #   $service_name = 'sshd'  
  # }  
  # else {
```

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```
#  fail("${facts['operatingsystem']} is not supported!")
# }

# case $::osfamily {
# 'Debian': {
#   $service_name = 'ssh'
# $package_name = 'openssh-server'
# }
# 'RedHat': {
#   $package_name = 'openssh-server'
#   $service_name = 'sshd'
# }
# default: {
#   fail("${::operatingsystem} is not supported!")
# }
# }
```

Go back to puppet agent to remove ssh and run puppet agent -t ,

```
[root@puppetagent1 manifests]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531069429'
Notice: This matches the node name!!!
Notice: /Stage[main]/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node
name!!!]/message: defined 'message' as 'This matches the node name!!!'
Notice: /Stage[main]/Ssh::Install/Package[ssh-package]/ensure: created
Notice: /Stage[main]/Ssh::Service/Service[ssh-service]/ensure: ensure changed 'stopped' to
'running'
Info: /Stage[main]/Ssh::Service/Service[ssh-service]: Unscheduling refresh on Service[ssh-
service]
Notice: Applied catalog in 3.76 seconds
[root@puppetagent1 manifests]#
```

Its run with out error and install ssh !!!

“CASE” STATEMENTS

Similar to the “if” statements, case statements choose one of several blocks of arbitrary Puppet code.

Syntax:

```
case condition {
  'control expression': { block of code }
  default: { block of code }
}
```

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Example:

```
case $facts['os']['name'] {  
  'Windows': { include role::windows }  
  'RedHat', 'CentOS': { include role::redhat }  
  /^Debian|Ubuntu$/: { include role::debian }  
  default: { include role::generic::os }  
}
```

- Behavior
 - Compares the control expression to each of the cases in the order they are defined.
 - The default case is always evaluated last.
 - The code block for the first matching case is executed.
 - A maximum of one code block will be executed.
 - If none of the cases match, Puppet will do nothing.
- Conditions
 - Variables
 - Expressions, including arbitrarily nested and/or expressions
 - Functions that return values

Lab:

Go back to my puppet master and params.pp file use case statement ,

```
[root@puppetmaster manifests]# cat params.pp  
class ssh::params {  
  # unless $facts['os']['family'] == 'Debian' {  
  #   $package_name = 'openssh-server'  
  #   $service_name = 'sshd'  
  # }  
  # if $facts['os']['family'] == 'Debian' {  
  #   $package_name = 'openssh-server'  
  #   $service_name = 'ssh'  
  # }  
  # elsif $facts['os']['family'] == 'RedHat' {  
  #   $package_name = 'openssh-server'  
  #   $service_name = 'sshd'  
  # }  
  # else {  
  #   fail("${facts['operatingsystem']} is not supported!")  
  # }  
  
  # case $::osfamily {  
  case $facts['operatingsystem'] {  
  
    'Debian', 'Ubuntu' : {  
      $service_name = 'ssh'  
      $package_name = 'openssh-server'  
    }  
    /^RedHat|CentOS/: {  
      $package_name = 'openssh-server'
```

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```
$service_name = 'sshd'  
notify{ "${0} is our operating system!": }  
}  
default: {  
    fail("${::operatingsystem} is not supported!")  
}  
}  
}  
[root@puppetmaster manifests]#
```

Uncheck previous unless statement and added case statement ,

To run puppet agent now,

```
[root@puppetagent1 manifests]# puppet agent -t  
Info: Using configured environment 'production'  
Info: Retrieving pluginfacts  
Info: Retrieving plugin  
Info: Retrieving locales  
Info: Loading facts  
^[[BInfo: Caching catalog for puppetagent1.zippyops.com  
Info: Applying configuration version '1531070087'  
Notice: This matches the node name!!!  
Notice: /Stage[main]/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node  
name!!!]/message: defined 'message' as 'This matches the node name!!!'  
Notice: CentOS is our operating system!  
Notice: /Stage[main]/Ssh::Params/Notify[CentOS is our operating system!]/message: defined  
'message' as 'CentOS is our operating system!'  
Notice: /Stage[main]/Ssh::Install/Package[ssh-package]/ensure: created  
Notice: /Stage[main]/Ssh::Service/Service[ssh-service]/ensure: ensure changed 'stopped' to  
'running'  
Info: /Stage[main]/Ssh::Service/Service[ssh-service]: Unscheduling refresh on Service[ssh-  
service]  
Notice: Applied catalog in 9.79 seconds  
[root@puppetagent1 manifests]#
```

Its works good !!!

FILES AND RESOURCE DEFAULTS

Go to puppet master server and go to ssh module ,

```
[root@puppetmaster ssh]# pwd  
/etc/puppetlabs/code/environments/production/modules/ssh  
[root@puppetmaster ssh]# ls  
examples  Gemfile  manifests  metadata.json  Rakefile  README.md  spec  
[root@puppetmaster ssh]#
```

In this directory , we will create file directory ,

```
[root@puppetmaster ssh]# mkdir files  
[root@puppetmaster ssh]# ls  
examples  files  Gemfile  manifests  metadata.json  Rakefile  README.md  spec  
[root@puppetmaster ssh]#
```

Now we can copy the ssh_config file to files directory ,

ZippyOPS

```
[root@puppetmaster ssh]# cp /etc/ssh/sshd_config  
/etc/puppetlabs/code/environments/production/modules/ssh/files/  
[root@puppetmaster ssh]# cd files/  
[root@puppetmaster files]# ls  
sshd_config
```

we can go into ssh_config file ,

```
[root@puppetmaster files]# vi sshd_config  
#      This file is managed by puppet  
#      $OpenBSD: sshd_config,v 1.100 2016/08/15 12:32:04 naddy Exp $  
  
# This is the sshd server system-wide configuration file. See  
# sshd_config(5) for more information.  
  
# This sshd was compiled with PATH=/usr/local/bin:/usr/bin  
  
# The strategy used for options in the default sshd_config shipped with  
# OpenSSH is to specify options with their default value where  
# possible, but leave them commented. Uncommented options override the  
# default value.  
  
# If you want to change the port on a SELinux system, you have to tell  
# SELinux about this change.  
# semanage port -a -t ssh_port_t -p tcp #PORTNUMBER  
#  
Port 22  
#AddressFamily any  
#ListenAddress 0.0.0.0  
#ListenAddress ::
```

In this file I have added “This file is managed by puppet” and checked port 22

Go back to our manifest directory ,

```
[root@puppetmaster files]# cd ../../manifests/  
[root@puppetmaster manifests]#
```

Here we have create config.pp file for sshd_config ,

```
[root@puppetmaster manifests]# cat config.pp  
class ssh::config {  
  file { '/etc/ssh/sshd_config':  
    ensure  => file,  
    mode   => '0600',  
    owner   => 'root',  
    group   => 'root',  
    source  => 'puppet:///modules/ssh/sshd_config'  
  }  
}
```

To validate code :

```
[root@puppetmaster manifests]# puppet parser validate config.pp  
[root@puppetmaster manifests]#
```

Making Automation Work

No issues everything is file ,

Now we have to edit init.pp file to add another new class,

ZippyOPS

```
[root@puppetmaster manifests]# vi init.pp
class ssh(
  String $package_name = $::ssh::params::package_name,
  String $service_name = $::ssh::params::service_name,
) inherits ::ssh::params {
  class { '::ssh::service': }
  class { '::ssh::config': }
  class { '::ssh::install': }

  Class['::ssh::install']
  -> Class['::ssh::config']
  ~> Class['::ssh::service']
  -> Class['ssh']
}

}
```

To validate this code :

```
[root@puppetmaster manifests]# puppet parser validate init.pp
[root@puppetmaster manifests]#
```

There is no error in this code ,

Go back to puppet agent to stop and remove ssh ,

```
[root@puppetagent1 manifests]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531073132'
Notice: This matches the node name!!!
Notice: /Stage[main]/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node name!!!!]/message: defined 'message' as 'This matches the node name!!!'
Notice: CentOS is our operating system!
Notice: /Stage[main]/Ssh::Params/Notify[CentOS is our operating system!]/message: defined 'message' as 'CentOS is our operating system!'
Notice: /Stage[main]/Ssh::Config/File[/etc/ssh/sshd_config]/content:
--- /etc/ssh/sshd_config      2018-04-11 00:21:29.000000000 -0400
+++ /tmp/puppet-file20180708-18288-1w4cmkr      2018-07-08 14:05:34.654678802 -0400
@@ -1,3 +1,5 @@
+##      This file is managed by puppet
+##
 #      $OpenBSD: sshd_config,v 1.100 2016/08/15 12:32:04 naddy Exp $
#
 # This is the sshd server system-wide configuration file. See
@@ -14,7 +16,7 @@
 # SELinux about this change.
 # semanage port -a -t ssh_port_t -p tcp #PORTNUMBER
 #
-#Port 22
+Port 22
 #AddressFamily any
 #ListenAddress 0.0.0.0
 #ListenAddress ::

Notice: /Stage[main]/Ssh::Config/File[/etc/ssh/sshd_config]/content: content changed
'{md5}40d961cd3154f0439fcac1a50bd77b96' to '{md5}7a6f5854fbbee8fefaf15c02365439a1e'
Info: Class[Ssh::Config]: Scheduling refresh of Class[Ssh::Service]
Info: Class[Ssh::Service]: Scheduling refresh of Service[ssh-service]
```

ZippyOPS

```
Notice: /Stage[main]/Ssh::Service[Service[ssh-service]]/ensure: ensure changed 'stopped' to  
'running'  
Info: /Stage[main]/Ssh::Service[Service[ssh-service]]: Unscheduling refresh on Service[ssh-  
service]  
Notice: Applied catalog in 1.22 seconds  
[root@puppetagent1 manifests]#
```

Its works good !!!

TEMPLATES

- template: Loads an ERB template from a module , evaluates it, and returns the resulting value as a string.
- A template is referenced by template(<MODULE NAME>/<TEMPLATE FILE>)
 - template('modulename/motd.erb')
- The file is located in <MODULES DIRECTORY>/<MODULE NAME>/templates/motd.erb.

Example:

```
file { '/etc/motd':  
  ensure => file,  
  content => template('modulename/motd.erb')  
}
```

EMBEDDED RUBY (ERB) TEMPLATE SYNTAX

- § ERB is a templating language based on Ruby.
- § Puppet uses the template and inline_template functions to evaluate a template file.

Expression-printing:

```
<%= @value %>
```

If statement:

```
<% if condition %> ...text... <% end %>
```

Comments:

```
<%# This is a comment. %>
```

Looping:

```
<% @values.each do |value| -%>
```

```
some value <%= value %>
```

```
<% end -%>
```

Lab:

ZippyOPS

Go to puppet master to create template ,

```
[root@puppetmaster ssh]# pwd  
/etc/puppetlabs/code/environments/production/modules/ssh  
[root@puppetmaster ssh]# mkdir templates
```

Here I have created template directory and copy sshd_config file to this directory ,

```
[root@puppetmaster templates]# mv sshd_config sshd_config.erb  
[root@puppetmaster templates]# vi sshd_config.erb  
#LoginGraceTime 2m  
<% if @permit_root_login %>  
PermitRootLogin yes  
<% end %>
```

Checked permitroot login and added if statement in it,

Go back to manifest directory and to edit params.pp file ,

```
[root@puppetmaster manifests]# cat params.pp  
class ssh::params {  
  # unless $facts['os']['family'] == 'Debian' {  
  #   $package_name = 'openssh-server'  
  #   $service_name = 'sshd'  
  # }  
  # if $facts['os']['family'] == 'Debian' {  
  #   $package_name = 'openssh-server'  
  #   $service_name = 'ssh'  
  # }  
  # elsif $facts['os']['family'] == 'RedHat' {  
  #   $package_name = 'openssh-server'  
  #   $service_name = 'sshd'  
  # }  
  # else {  
  #   fail("${facts['operatingsystem']} is not supported!")  
  # }  
  $permit_root_login = false  
  
  # case $::osfamily {  
  case $facts['operatingsystem'] {  
  
    'Debian', 'Ubuntu' : {  
      $service_name = 'ssh'  
      $package_name = 'openssh-server'  
    }  
    /^RedHat|CentOS/ : {  
      $package_name = 'openssh-server'  
      $service_name = 'sshd'  
      notify{ "${0} is our operating system!": }  
    }  
    default: {  
      fail("${::operatingsystem} is not supported!")  
    }  
  }  
}  
[root@puppetmaster manifests]#
```

To added template "\$permit_root_login = false "

Now go to init.pp file

```
[root@puppetmaster manifests]# vi init.pp
```

ZippyOPS

```
class ssh(
  Boolean $permit_root_login = $::ssh::params::permit_root_login,
  String $package_name      = $::ssh::params::package_name,
  String $service_name       = $::ssh::params::service_name,
) inherits ::ssh::params {
  class { '::ssh::service': }
  class { '::ssh::config': }
  class { '::ssh::install': }

  Class['::ssh::install']
  -> Class['::ssh::config']
  ~> Class['::ssh::service']
  -> Class['ssh']
}
```

Here I have added new parameter Boolean for permit_root_login.

To edit config.pp file ,

```
[root@puppetmaster manifests]# cat config.pp
class ssh::config(
  $permit_root_login = $::ssh::permit_root_login,
) {
  file { '/etc/ssh/sshd_config':
    ensure  => file,
    mode    => '0600',
    owner   => 'root',
    group   => 'root',
    content => template('ssh/sshd_config.erb')
  }
}
```

Here I have added variable as permit_root_login and template also used.

Go to puppet agent to run ,

```
[root@puppetagent1 manifests]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531074510'
Notice: This matches the node name!!!
Notice: /Stage[main]/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node name!!!!]/message: defined 'message' as 'This matches the node name!!!'
Notice: CentOS is our operating system!
Notice: /Stage[main]/Ssh::Params/Notify[CentOS is our operating system!]/message: defined 'message' as 'CentOS is our operating system!'
Notice: /Stage[main]/Ssh::Config/File[/etc/ssh/sshd_config]/content:
--- /etc/ssh/sshd_config 2018-07-08 14:05:34.707678853 -0400
+++ /tmp/puppet-file20180708-18842-3ft2fe 2018-07-08 14:28:32.106820866 -0400
@@ -37,7 +37,8 @@
 # Authentication:

 #LoginGraceTime 2m
-#PermitRootLogin yes
+
+
 #StrictModes yes
```

ZippyOPS

```
#MaxAuthTries 6
#MaxSessions 10

Notice: /Stage[main]/Ssh::Config/File[/etc/ssh/sshd_config]/content: content changed
'{md5}7a6f5854fbbee8fefafa15c02365439a1e' to '{md5}188a336ba64e67f803fb78835c04e118'
Info: Class[Ssh::Config]: Scheduling refresh of Class[Ssh::Service]
Info: Class[Ssh::Service]: Scheduling refresh of Service[ssh-service]
Notice: /Stage[main]/Ssh::Service/Service[ssh-service]: Triggered 'refresh' from 1 event
Notice: Applied catalog in 0.53 seconds
[root@puppetagent1 manifests]#
```

It is run good !!!

Now we have added port to all the files ,

```
[root@puppetmaster templates]# vi sshd_config.erb
port <%= @Port %>
#AddressFamily any
#ListenAddress 0.0.0.0
#ListenAddress ::
```

Here I have added port template but I have not mentioned port range ,

To edit params.pp file ,

```
[root@puppetmaster templates]# cd ../../manifests/
[root@puppetmaster manifests]# vi params.pp
$permit_root_login = false
$port = 22
# case $::osfamily {
case $facts['operatingsystem'] {

    'Debian', 'Ubuntu' : {
        $service_name = 'ssh'
        $package_name = 'openssh-server'
    }
    /^RedHat|CentOS/ {
        $package_name = 'openssh-server'
        $service_name = 'sshd'
        notify{ "${0} is our operating system!": }
    }
    default: {
        fail("${::operatingsystem} is not supported!")
    }
}
```

In this I have added port value ,

To edit init.pp file ,m

```
[root@puppetmaster manifests]# vi init.pp
class ssh(
    Boolean $permit_root_login = $::ssh::params::permit_root_login,
    Integer $port = $::ssh::params::port,
    String $package_name      = $::ssh::params::package_name,
    String $service_name      = $::ssh::params::service_name,
) inherits ::ssh::params {
    class { '::ssh::service': }
    class { '::ssh::config': }
    class { '::ssh::install': }
```

ZippyOPS

```
Class['::ssh::install']
  -> Class['::ssh::config']
  ~> Class['::ssh::service']
  -> Class['ssh']
}
```

Here I have defined port in this file ,

To edit config.pp file ,

```
[root@puppetmaster manifests]# cat config.pp
class ssh::config(
  $permit_root_login = $::ssh::permit_root_login,
  $port              = $::ssh::port,
) {
  file { '/etc/ssh/sshd_config':
    ensure  => file,
    mode    => '0600',
    owner   => 'root',
    group   => 'root',
    content => template('ssh/sshd_config.erb')
  }
}
```

Go back to puppet agent to run this ,

```
[root@puppetagent1 manifests]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531075317'
Notice: This matches the node name!!!
Notice: /Stage[main]/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node name!!!!]/message: defined 'message' as 'This matches the node name!!!!'
Notice: CentOS is our operating system!
Notice: /Stage[main]/Ssh::Params/Notify[CentOS is our operating system!]/message: defined 'message' as 'CentOS is our operating system!'
Notice: /Stage[main]/Ssh::Install/Package[ssh-package]/ensure: created
Notice: /Stage[main]/Ssh::Config/File[/etc/ssh/sshd_config]/content:
--- /etc/ssh/sshd_config      2018-04-11 00:21:29.000000000 -0400
+++ /tmp/puppet-file20180708-19380-1qvemlo      2018-07-08 14:42:02.650639632 -0400
@@ -1,3 +1,5 @@
++#      This file is managed by puppet
+#
#      $OpenBSD: sshd_config,v 1.100 2016/08/15 12:32:04 naddy Exp $
#
# This is the sshd server system-wide configuration file. See
@@ -14,7 +16,7 @@
# SELinux about this change.
# semanage port -a -t ssh_port_t -p tcp #PORTNUMBER
#
-#Port 22
+port
#AddressFamily any
#ListenAddress 0.0.0.0
#ListenAddress ::

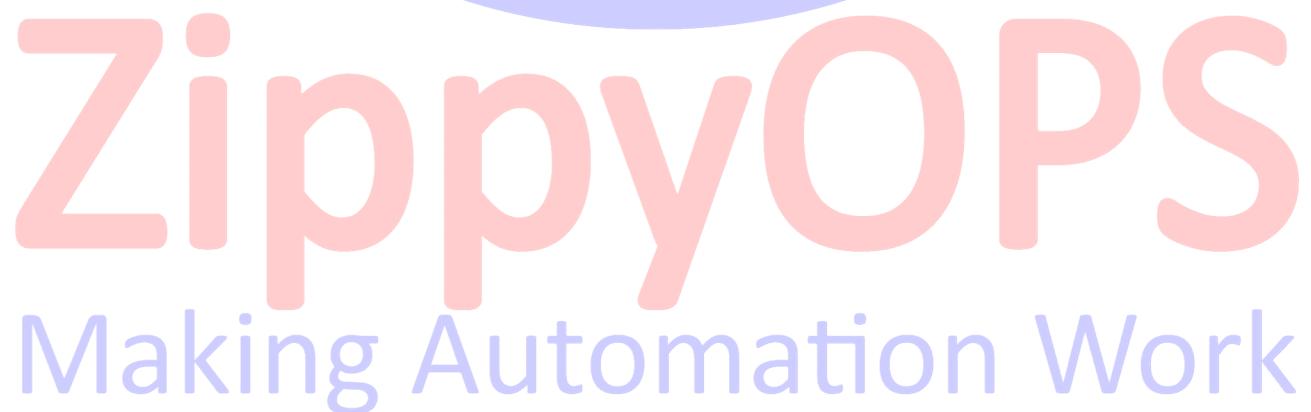
@@ -35,7 +37,8 @@

```

ZippyOPS

```
# Authentication:  
  
#LoginGraceTime 2m  
-#PermitRootLogin yes  
+  
+  
#StrictModes yes  
#MaxAuthTries 6  
#MaxSessions 10  
  
Notice: /Stage[main]/Ssh::Config/File[/etc/ssh/sshd_config]/content:  
  
Notice: /Stage[main]/Ssh::Config/File[/etc/ssh/sshd_config]/content: content changed  
'{md5}40d961cd3154f0439fcac1a50bd77b96' to '{md5}7fd34bd6fd7d819cd32323efabd03222'  
Info: Class[Ssh::Config]: Scheduling refresh of Class[Ssh::Service]  
Info: Class[Ssh::Service]: Scheduling refresh of Service[ssh-service]  
Notice: /Stage[main]/Ssh::Service/Service[ssh-service]: Triggered 'refresh' from 1 event  
Info: Class[Ssh::Service]: Unscheduling all events on Class[Ssh::Service]  
Info: Stage[main]: Unscheduling all events on Stage[main]  
Notice: Applied catalog in 4.31 seconds  
[root@puppetagent1 manifests]#
```

Its works good , go to puppet console ,
IN my base node group , have a two class one is ssh and ntp ,
In ssh class I have to add some parameters ,



ZippyOPS

Making Automation Work

ZippyOPS

Parent [All Nodes](#)
Environment production

[Edit node group metadata](#) [Remove node group](#) [Run](#)

Rules Matching nodes Configuration Variables Activity

Classes

Declare the classes that you want to apply to nodes in this group. The classes will be applied on the next run.

Class definitions updated: 3 minutes ago [Refresh](#)

Add new class [Add class](#)

Class: ssh

Parameter	Value
Parameter name	=

INSPECT

- Overview
- Nodes
- Packages
- Reports
- Jobs
- Events

CONFIGURE

- Classification

RUN

- Puppet
- Task

SETUP

- Unsigned certs
- Access control
- License

Classes

Declare the classes that you want to apply to nodes in this group. The classes will be applied on the next run.

Class definitions updated: 5 minutes ago [Refresh](#)

Add new class [Add class](#)

Class: ssh

Parameter	Value
Parameter name	=
permit_root_login	= true
port	= 2222

[Edit](#) [Remove](#) [Edit](#) [Remove](#) [Remove this class](#)

Here I have added port as 2222 and permit_root_login as true,

ZippyOPS

To run puppet agent ,

```
[root@puppetagent1 manifests]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531076171'
Notice: This matches the node name!!!
Notice: /Stage[main]/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node
name!!!]/message: defined 'message' as 'This matches the node name!!!'
Notice: CentOS is our operating system!
Notice: /Stage[main]/Ssh::Params/Notify[CentOS is our operating system!]/message: defined
'message' as 'CentOS is our operating system!'
Notice: /Stage[main]/Ssh::Install/Package[ssh-package]/ensure: created
Notice: /Stage[main]/Ssh::Config/File[/etc/ssh/sshd_config]/content:
--- /etc/ssh/sshd_config    2018-04-11 00:21:29.000000000 -0400
+++ /tmp/puppet-file20180708-20162-1ojcaal    2018-07-08 14:56:16.492863920 -0400
@@ -1,3 +1,5 @@
++#      This file is managed by puppet
+#
#      $OpenBSD: sshd_config,v 1.100 2016/08/15 12:32:04 naddy Exp $

# This is the sshd server system-wide configuration file. See
@@ -14,7 +16,7 @@
# SELinux about this change.
# semanage port -a -t ssh_port_t -p tcp #PORTNUMBER
#
-#Port 22
+port 2222
#AddressFamily any
#ListenAddress 0.0.0.0
#ListenAddress ::

@@ -35,7 +37,11 @@
# Authentication:

#LoginGraceTime 2m
-#PermitRootLogin yes
+
+
+PermitRootLogin yes
+
+
#StrictModes yes
#MaxAuthTries 6
#MaxSessions 10

Notice: /Stage[main]/Ssh::Config/File[/etc/ssh/sshd_config]/content:

Notice: /Stage[main]/Ssh::Config/File[/etc/ssh/sshd_config]/content: content changed
'{md5}40d961cd3154f0439fcac1a50bd77b96' to '{md5}477ac390c389ced67406f5091f2ce337'
Info: Class[Ssh::Config]: Scheduling refresh of Class[Ssh::Service]
Info: Class[Ssh::Service]: Scheduling refresh of Service[ssh-service]
Notice: /Stage[main]/Ssh::Service/Service[ssh-service]: Triggered 'refresh' from 1 event
Info: Class[Ssh::Service]: Unscheduling all events on Class[Ssh::Service]
Info: Stage[main]: Unscheduling all events on Stage[main]
Notice: Applied catalog in 4.29 seconds
```

There is created another one port !!!

CLASS PARAMETERS AND DEFAULTS

PARAMETERS

Classes, defined types, and lambdas can all take parameters.

A way for you to pass external data.

Syntax:

```
class <CLASS NAME> (<DATA TYPE> <PARAMETER NAME>, <DATA TYPE> <PARAMETER NAME> = <VALUE>, # ... ) { # ... }
```

Example:

```
class ntp { Boolean $service_manage Boolean $autoupdate String $package_ensure # ... } { # ... }
```

params.pp

- The main classes inherit from a <MODULE>::params class, which only sets variables.
- Using the “params.pp” pattern is now deprecated.
- Using a function or Hiera for your defaults data is now the recommended method.

FUNCTION DATA PROVIDER

- The function provider calls a function named <MODULENAME>::data.
- This function is similar to the params.pp file.
- It takes no arguments and returns a hash.
- Puppet will try to find the requested data as a key in that hash.
- The <MODULE NAME>::data function can be one of:
 - A Puppet language function, located at <MODULE ROOT>/functions/data.pp.
 - A Ruby function (using the modern Puppet::Functions API), located at <MODULE ROOT>/lib/puppet/functions/<MODULE NAME>/data.rb.

Making Automation Work

ZippyOPS

Example:

```
# ntp/metadata.json
{
  ...
  "data_provider": "function"
}

# ntp/manifests/init.pp

class ntp (
  #      default values are in ntp/functions/data.pp $autoupdate,
  $service_name,
)
{
  ...
}
```

Lab:

Go to puppet master and create function directory in ssh module ,

```
[root@puppetmaster ssh]# pwd
/etc/puppetlabs/code/environments/production/modules/ssh
[root@puppetmaster ssh]# mkdir functions
[root@puppetmaster ssh]# cd functions/
```

Here we have to create data.pp file ,

```
[root@puppetmaster functions]# cat data.pp
function ssh::data {
  $base_params = {
    'ssh::ensure' => 'present',
    'ssh::service_enable' => true,
    'ssh::service_ensure' => 'running',
  }
  case $facts['os']['family'] {
    'Debian': {
      $os_params = {
        'ssh:: package_name' => 'openssh-server',
        'ssh::service_name' => 'ssh',
      }
    }
    'RedHat': {
      $os_params = {
        'ssh:: package_name' => 'openssh-server',
        'ssh::service_name' => 'sshd',
      }
    }
    default: {
      fail("${facts['operatingsystem']} is not supported!")
    }
  }
  $base_params + $os_params
}
```

ZippyOPS

```
[root@puppetmaster functions]#
```

To Validate code :

```
[root@puppetmaster functions]# puppet parser validate data.pp  
[root@puppetmaster functions]#
```

No error found , go to ssh manifest directory ,

```
[root@puppetmaster manifests]# vi init.pp  
class ssh(  
  String $package_name,  
  String $service_name,  
  String $ensure,  
  String $service_ensure,  
  Boolean $service_enable,  
  Boolean $permit_root_login = false,  
  Integer $port = 22,  
) {  
  class { '::ssh::service': }  
  class { '::ssh::config': }  
  class { '::ssh::install': }  
  
  Class['::ssh::install']  
    -> Class['::ssh::config']  
    ~> Class['::ssh::service']  
    -> Class['ssh']  
}  
}
```

To validate this code ,

```
[root@puppetmaster manifests]# puppet parser validate init.pp  
[root@puppetmaster manifests]#
```

Everythig as good!!

To edit service.pp file ,

```
[root@puppetmaster manifests]# cat service.pp  
class ssh::service(  
  String $service_name = $::ssh::service_name,  
  String $service_ensure = $::ssh::service_ensure,  
  Boolean $service_enable = $::ssh::service_enable,  
) {  
  service { 'ssh-service':  
    ensure => $service_ensure,  
    name => $service_name,  
    enable => $service_enable,  
    hasstatus => true,  
    hasrestart => true,  
  }  
}
```

To edit install.pp file ,

```
[root@puppetmaster manifests]# cat install.pp  
class ssh::install(  
  String $package_name = $::ssh::package_name,  
  String $ensure = $::ssh::ensure  
) {  
  package { 'ssh-package':
```

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```
ensure => $ensure,
name   => $package_name,
}
}
```

To validate this file ,

```
[root@puppetmaster manifests]# puppet parser validate install.pp
[root@puppetmaster manifests]#
```

Now we are going to modify metadata.json file ,

```
[root@puppetmaster ssh]# cat metadata.json
{
  "name": "zippyops-ssh",
  "version": "0.1.0",
  "author": "praveen D",
  "summary": "This module will manage ssh.",
  "license": "Apache-2.0",
  "source": "https://github.com/Zippyops/puppet-ssh",
  "project_page": "https://github.com/Zippyops/puppet-ssh",
  "issues_url": "https://github.com/Zippyops/puppet-ssh/issues",
  "dependencies": [
    {
      "name": "puppetlabs-stdlib",
      "version_requirement": ">= 1.0.0"
    }
  ],
  "data_provider": "function"
}
```

In this file added data_provider as "function"

Now we can execute puppet agent to run ,

```
[root@puppetagent1 manifests]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531078798'
Notice: This matches the node name!!!
Notice: /Stage[main]/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node name!!!!]/message: defined 'message' as 'This matches the node name!!!!'
Notice: /Stage[main]/Ssh::Config/File[/etc/ssh/sshd_config]/content:
--- /etc/ssh/sshd_config    2018-07-08 14:56:16.501863936 -0400
+++ /tmp/puppet-file20180708-22203-1d0gqag    2018-07-08 15:40:00.331040971 -0400
@@ -16,7 +16,7 @@
  # SELinux about this change.
  # semanage port -a -t ssh_port_t -p tcp #PORTNUMBER
  #
-port 2222
+port 22
  #AddressFamily any
  #ListenAddress 0.0.0.0
  #ListenAddress ::

@@ -39,8 +39,6 @@
  #LoginGraceTime 2m
```

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```
-PermitRootLogin yes  
-  
  
#StrictModes yes  
#MaxAuthTries 6  
  
Notice: /Stage[main]/Ssh::Config/File[/etc/ssh/sshd_config]/content: content changed  
'{md5}477ac390c389ced67406f5091f2ce337' to '{md5}fa4d356cf3331b433ce109e437f4b90b'  
Info: Class[Ssh::Config]: Scheduling refresh of Class[Ssh::Service]  
Info: Class[Ssh::Service]: Scheduling refresh of Service[ssh-service]  
Notice: /Stage[main]/Ssh::Service/Service[ssh-service]/ensure: ensure changed 'stopped' to  
'running'  
Info: /Stage[main]/Ssh::Service/Service[ssh-service]: Unscheduling refresh on Service[ssh-  
service]  
Notice: Applied catalog in 43.09 seconds  
[root@puppetagent1 manifests]#
```

Puppet agent runs good!!!

METAPARAMETERS

- § Metaparameters are attributes that all resource type, custom types and defined types have.
- § Available metaparameters:
- § alias
- § audit
- § consume
- § export
- § loglevel
- § noop
- § schedule
- § stage
- § tag

Lab:

Go to puppet agent centos node to create test file ,

```
[root@puppetagent1 manifests]# pwd  
/etc/puppetlabs/code/environments/production/manifests
```

To create test_schedule.pp file in this directory,

```
[root@puppetagent1 manifests]# vi test_schedule.pp  
[root@puppetagent1 manifests]# cat test_schedule.pp  
schedule { 'run-daily':
```

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```
period => 'daily',
range  => '7-22',
}
notify { 'test-run-daily':
  message => 'This should run during the schedule!',
  schedule => 'run-daily',
}
```

To puppet apply to execute this file ,

```
[root@puppetagent1 manifests]# puppet apply test_schedule.pp
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.03 seconds
Notice: This should run during the schedule!
Notice: /Stage[main]/Main/Notify[test-run-daily]/message: defined 'message' as 'This should run
during the schedule!'
Notice: Applied catalog in 0.06 seconds
```

This is to be run correctly and executed fine .

PUPPET FUNCTIONS

FUNCTIONS

- There are two types of functions instatements andrvalues functions.
 - Statements
 - They do not return arguments.
 - Rvalues
 - They return values.
 - They can only be used in a statement requiring a value.
 - variable assignment
 - case statement

STATEMENT FUNCTIONS

- alert: Log a message on the server at level alert.
- create_resources: Converts a hash into a set of resources and adds them to the catalog.
- err: Log a message on the server at level err.
- fail: Fail with a parse error.
- hiera_include: Uses an array merge lookup to retrieve the classes array, so every node gets every class from the hierarchy.
- include: Declares one or more classes, causing the resources in them to be evaluated and added to the catalog.
- warning: Log a message on the server at level warning.

Making Automation Work

- Rvalue Functions
- defined: Determines whether a given class or resource type is defined and returns a

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Boolean value.

- file: Loads a file from a module and returns its contents as a string.
- generate: Calls an external command on the Puppet master and returns the results of the command.
- hiera: Performs a standard priority lookup of the hierarchy and returns the most specific value for a given key.

Lab:

Go to centos node ,

```
[root@puppetagent1 manifests]# pwd  
/etc/puppetlabs/code/environments/production/manifests  
[root@puppetagent1 manifests]#
```

Here to create new manifest for resource :

```
[root@puppetagent1 manifests]# cat test_create_resources.pp  
$messages = {  
  'message1' => {  
    'name' => 'message test 1',  
    'message' => 'this is a test!',  
  },  
  'message2' => {  
    'name' => 'message test 2',  
    'message' => 'this is also a test!',  
  }  
}
```

Here I have used notify resource type to get message ,

```
[root@puppetagent1 manifests]# puppet apply test_create_resources.pp  
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.09 seconds  
Notice: this is a test!  
Notice: /Stage/main/Main/Notify[message1]/message: defined 'message' as 'this is a test!'  
Notice: this is also a test!  
Notice: /Stage/main/Main/Notify[message2]/message: defined 'message' as 'this is also a test!'  
Notice: Applied catalog in 0.06 seconds  
[root@puppetagent1 manifests]#
```

Executed correctly !!!

ITERATION AND LOOPS

ITERATION AND LOOPS

- Iteration features are implemented as functions that accept blocks of code called lambdas.
- List of iteration functions
- each: Repeat a block of code any number of times, using a collection of values to provide different parameters each time.
- slice: Repeat a block of code any number of times, using groups of values from a collection as parameters.

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- filter: Use a block of code to transform some data structure by removing non-matching elements.
- map: Use a block of code to transform every value in some data structure.
- reduce: Use a block of code to create a new value or data structure by combining values from a provided data structure.
- with: Evaluate a block of code once, isolating it in its own local scope. Doesn't iterate but has a family resemblance to the iteration functions.

Example:

```
$values = ['a', 'b', 'c', 'd', 'e']

#      function call with lambda:

$values.each |String $value|
{ notify { $value:
  message => "Value from a lambda code block: ${value}"
}
}
```

Lab:

Go to centos node and manifest directory ,

```
[root@puppetagent1 manifests]# pwd
/etc/puppetlabs/code/environments/production/manifests
[root@puppetagent1 manifests]#
```

Here we have to create new file test_each.pp

```
[root@puppetagent1 manifests]# cat test_each.pp
$facts['os'].each |$values| {
  notify { $values[0]:
    message => $values[1],
  }
}
```

Here I have added two values using each function ,

Now we have to apply this file to run ,

```
[root@puppetagent1 manifests]# puppet apply test_each.pp
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.03 seconds
Notice: x86_64
Notice: /Stage/main/Main/Notify[architecture]/message: defined 'message' as 'x86_64'
Notice: RedHat
Notice: /Stage/main/Main/Notify[family]/message: defined 'message' as 'RedHat'
Notice: x86_64
Notice: /Stage/main/Main/Notify[hardware]/message: defined 'message' as 'x86_64'
Notice: CentOS
Notice: /Stage/main/Main/Notify[name]/message: defined 'message' as 'CentOS'
```

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```
Notice: {"full"=>"7.5.1804", "major"=>"7", "minor"=>"5"}  
Notice: /Stage[main]/Main/Notify[release]/message: defined 'message' as {  
  'full' => '7.5.1804',  
  'major' => '7',  
  'minor' => '5'  
}  
Notice: {"config_mode"=>"enforcing", "current_mode"=>"enforcing", "enabled"=>true,  
"enforced"=>true, "policy_version"=>"31"}  
Notice: /Stage[main]/Main/Notify[selinux]/message: defined 'message' as {  
  'config_mode' => 'enforcing',  
  'current_mode' => 'enforcing',  
  'enabled' => true,  
  'enforced' => true,  
  'policy_version' => '31'  
}  
Notice: Applied catalog in 0.05 seconds  
[root@puppetagent1 manifests]#
```

Executed successfully !!

Same thing we have try it in slice ,

```
[root@puppetagent1 manifests]# cat test_slice.pp  
notice $facts['os']  
  
$facts['os'].slice(2) |$value| {  
  notice "value: ${value}"  
}
```

Lets apply this manifest ,

```
[root@puppetagent1 manifests]# puppet apply test_slice.pp  
Notice: Scope(Class[main]): {architecture => x86_64, family => RedHat, hardware => x86_64, name => CentOS, release => {full => 7.5.1804, major => 7, minor => 5}, selinux => {config_mode => enforcing, current_mode => enforcing, enabled => true, enforced => true, policy_version => 31}}  
Notice: Scope(Class[main]): value: [[architecture, x86_64], [family, RedHat]]  
Notice: Scope(Class[main]): value: [[hardware, x86_64], [name, CentOS]]  
Notice: Scope(Class[main]): value: [[[release, {full => 7.5.1804, major => 7, minor => 5}],  
[selinux, {config_mode => enforcing, current_mode => enforcing, enabled => true, enforced => true, policy_version => 31}]]]  
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.02 seconds  
Notice: Applied catalog in 0.03 seconds  
[root@puppetagent1 manifests]#
```

Its run successfully !!!

VARIABLES AND SCOPE

VARIABLES

- § Variables store values so they can be accessed later.
- § Variables are actually constants and can't be reassigned.
- § Facts and built-in variables.
- § Variable names are prefixed with a \$ (dollar sign).

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§ They are assigned using the = (equal sign) assignment operator.

§ Variable names can include:

§ Uppercase and lowercase letters

§ Numbers

§ Underscores

Example:

```
$variable_name1 = "value"
```

Variables

§ Append a variable by using the + symbol

```
$variable = ['a', 'b']
```

```
$variable += ['c']
```

```
$variable now equals ['a', 'b', 'c']
```

§ Assigning multiple variables

```
You can assign multiple variables at once from an array or hash.
```

§ Arrays

```
When using an array you need an equal number of variables and values.
```

```
Arrays can be nested.
```

§ Hashes

```
Variables are listed in an array on the left side of the assignment operator.
```

```
The hash is on the right of the assignment operator.
```

```
Hash keys must match their corresponding variable name.
```

Array Assignment Example:

```
[$a, $b, $c] = [1,2,3] # $a = 1, $b = 2, $c = 3
```

```
[$a, [$b, $c]] = [1,[2,3]] # $a = 1, $b = 2, $c = 3
```

```
[$a, $b] = [1, [2]] # $a = 1, $b = [2]
```

```
[$a, [$b]] = [1, [2]] # $a = 1, $b = 2
```

ZippyOPS

Making Automation Work

Hash Assignment Example:

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```
[$a, $b] = {a => 10, b => 20} # $a = 10, $b = 20
```

```
[$a, $c] = {a => 5, b => 10, c => 15, d => 22} # $a = 5, $c = 15
```

VARIABLE INTERPOLATION

- Variable interpolation is when a variable is resolved in a double-quoted strings.
- Inside the double-quoted strings the variable is referenced using a dollar sign with curly braces.
- \${var_name}
- Single quotes will treat the variable as a literal.

Example:

```
$variable = "${some_other_variable} is being interpolation in here."
```

ARRAYS AND HASHES

Arrays

- Arrays are ordered lists of values.
- There are functions that take arrays as parameters, including the iteration functions like each.

Hashes

- Hashes map keys to values.
- The entries are maintained in the order they were added.
- Hashes are merged using the + operator.

Array Example:

```
$array_variable = [ 'a', 'b', 'c' ]
```

Hash Example:

```
$hash_variable = { key1 => "value1", key2 => "value2" }
```

SCOPE

- Scope is a specific area of code that is partially isolated from other areas of code.
- Top scope
 - Code that is outside any class definition, type definition, or node definition exists at top scope. Variables and defaults declared at top scope are available everywhere.
- Node scope
 - Code inside a node definition exists at node scope. Note that since only one node definition can match a given node, only one node scope can exist at a time.
- Local scopes

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- Code inside a class definition, defined type, or lambda exists in a local scope.
- Variables and defaults declared in a local scope are only available in that scope and its children.

Lab:

Go to centos node and manifest directory ,

```
[root@puppetagent1 manifests]# vi arrays.pp
[root@puppetagent1 manifests]# cat arrays.pp
$array_var = ['a', 'b', 'c', 'd']

$array_var.each {$value| {
    notify {$value:
        message => $value,
    }
}
[root@puppetagent1 manifests]#
```

New manifest arrays.pp created ,

```
[root@puppetagent1 manifests]# puppet apply arrays.pp
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.02 seconds
Notice: a
Notice: /Stage[main]/Main/Notify[a]/message: defined 'message' as 'a'
Notice: b
Notice: /Stage[main]/Main/Notify[b]/message: defined 'message' as 'b'
Notice: c
Notice: /Stage[main]/Main/Notify[c]/message: defined 'message' as 'c'
Notice: d
Notice: /Stage[main]/Main/Notify[d]/message: defined 'message' as 'd'
Notice: Applied catalog in 0.10 seconds
```

Its run good!!!

Next we have to create hashes.pp manifest ,

```
[root@puppetagent1 manifests]# cat hashes.pp
$hash_var = {
    'el1' => '1',
    'el2' => '2',
    'el3' => '3',
    'el4' => '4',
}

$hash_var.each {$key, $value| {
    notify { $key:
        message => $value,
    }
}
}
```

Now to run this file ,

```
[root@puppetagent1 manifests]# puppet apply hashes.pp
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.02 seconds
Notice: 1
Notice: /Stage[main]/Main/Notify[el1]/message: defined 'message' as '1'
Notice: 2
Notice: /Stage[main]/Main/Notify[el2]/message: defined 'message' as '2'
Notice: 3
```

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```
Notice: /Stage[main]/Main/Notify[e13]/message: defined 'message' as '3'  
Notice: 4  
Notice: /Stage[main]/Main/Notify[e14]/message: defined 'message' as '4'  
Notice: Applied catalog in 0.04 seconds  
[root@puppetagent1 manifests]#
```

Its edxecuted successfully !!!

DEFINED RESOURCE TYPES

Defined Resource Types

- § Defined resource types also called **defined types** or **defines**.
- § Are blocks of code that can be evaluated multiple times with different parameters.
- § They act like a new resource type.
- § They are declared like a resource type.
- § Definitions should be stored in the manifests/ directory.
- § Defined type instance can include any metaparameter.
- § Defined type names can consist of one or more namespace segments.
- § Each namespace segment must begin with a lowercase letter and can include:
 - § Lowercase letters
 - § Digits
 - § Underscores
- § Namespace segments should match the following regular expression:
 - § `\A[a-z][a-z0-9_]*\Z`
 - § `define_name123`
- § Multiple namespace segments can be joined together in a define type name with the `::` (double colon) namespace separator.
 - § `\A([a-z][a-z0-9_]*)?::([a-z][a-z0-9_]*)*\Z`
 - § `module_name::defined_type_name`

Defined Resource Types

Syntax:

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```
define name (  
<DATA TYPE> <PARAMETER> ) {  
... puppet code ...  
}
```

Declaring an instance:

```
<DEFINED TYPE> { '<TITLE>': <ATTRIBUTE> => <VALUE>,  
}  
Lab:
```

Go to puppet agent centos node and manifest directory

```
[root@puppetagent1 manifests]# pwd  
/etc/puppetlabs/code/environments/production/manifests  
[root@puppetagent1 manifests]#
```

Here we have to create new manifest ,

```
[root@puppetagent1 manifests]# cat show_message.pp  
define show_message(  
  String $message,  
) {  
  notify { $title:  
    message => $message,  
  }  
  
  $messages = {  
    'message1' => { 'message' => 'This is message 1' },  
    'message2' => { 'message' => 'This is message 2' },  
  }  
  
  create_resources(show_message, $messages)
```

To apply this manifest ,

```
[root@puppetagent1 manifests]# puppet apply show_message.pp  
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.02 seconds  
Notice: This is message 1  
Notice: /Stage[main]/Main>Show_message[message1]/Notify[message1]/message: defined 'message' as  
'This is message 1'  
Notice: This is message 2  
Notice: /Stage[main]/Main>Show_message[message2]/Notify[message2]/message: defined 'message' as  
'This is message 2'  
Notice: Applied catalog in 0.08 seconds
```

This is defined resource type to execute values and messages in it.

RESOURCE COLLECTORS

- Resource collectors, also called the spaceship operator.

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- It selects a group of resources by searching the attributes of every resource in the catalog.
- This search is independent of evaluation order.
- Collectors realize virtual resources.
- Can be used in chaining statements.
- Can override resource attributes.
- Can function as both a statement and a value.
- The resource type, capitalized.

Operators :

§ ==
§ !=
§ and
§ or

Syntax:

```
<RESOURCE TYPE> <| <SEARCH EXPRESSION> |> {  
...  
}
```

Example:

```
User <| groups == 'admin' |> {  
...  
}
```

Lab :

Go to centos node and manifest directory and create test_resource_collector.pp file ,

```
[root@puppetagent1 manifests]# vi test_resource_collector.pp  
[root@puppetagent1 manifests]# cat test_resource_collector.pp  
group { 'admin1':  
    ensure => present,  
}  
  
user { 'admin1':  
    ensure      => present,  
    home       => '/home/admin1',  
    managehome => true,  
    gid        => 'admin1',  
    shell      => '/bin/bash',  
}  
file { '/home/admin1/test1.txt':  
    ensure => file,  
    mode   => '0600',  
    owner  => 'root',
```

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```
group  => 'admin1',
  content => 'this is a test',
}
file { '/home/admin1/test2.txt':
  ensure => file,
  mode   => '0600',
  owner   => 'root',
  group   => 'admin1',
  content => 'this is a test',
}
file { '/home/admin1/test3.txt':
  ensure => file,
  mode   => '0600',
  owner   => 'root',
  group   => 'admin1',
  content => 'this is a test',
}
```

Now to apply this manifest,

```
[root@puppetagent1 manifests]# puppet apply test_resource_collector.pp
Notice: Compiled catalog for puppetagent1.zippyops.com in environment production in 0.02 seconds
Notice: /Stage[main]/Main/Group[admin1]/ensure: created
Notice: /Stage[main]/Main/User[admin1]/ensure: created
Notice: /Stage[main]/Main/File[/home/admin1/test1.txt]/ensure: defined content as
'{md5}54b0c58c7ce9f2a8b551351102ee0938'
Notice: /Stage[main]/Main/File[/home/admin1/test2.txt]/ensure: defined content as
'{md5}54b0c58c7ce9f2a8b551351102ee0938'
Notice: /Stage[main]/Main/File[/home/admin1/test3.txt]/ensure: defined content as
'{md5}54b0c58c7ce9f2a8b551351102ee0938'
Notice: Applied catalog in 0.28 seconds
[root@puppetagent1 manifests]#
```

Here user as admin1 and executed successfully and files are created !!!

ROLES AND PROFILES

ROLES AND PROFILES OVERVIEW

Overview

- § The roles and profiles are used to build reliable, reusable, configurable, and refactorable system configurations.
- § They are two extra layers of indirection between your node classifier and your component modules.
- § Component modules: Normal modules that manage one particular technology. (For example, puppetlabs/apache.)
- § Profiles: Wrapper classes that use multiple component modules to configure a layered technology stack.
- § Roles: Wrapper classes that use multiple profiles to build a complete system configuration.

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PROFILES

- § A profile is just a normal class stored in the profile module.
- § Make sure you can safely include any profile multiple times - don't use resource-like declarations on them.
- § Profiles can include other profiles.
- § Profiles own all the class parameters for their component classes.
- § Components class shouldn't use a value from Hiera data.
- § Ways a profile can get the data it needs to configure component classes:
 - § Hardcode it in the profile.
 - § Look it up from Hiera.

Example:

```
class profiles::apache(  
String $apache_vhost_name,  
String $apache_vhost_docroot,  
Boolean $apache_default_vhost = false,  
String $apache_vhost_port = 80,  
) {  
class { 'apache':  
default_vhost => $apache_default_vhost,  
}  
  
apache::vhost { $apache_vhost_name:  
  
port      => $apache_vhost_port,  
docroot => $apache_vhost_docroot,  
}  
}
```

ROLES

- § The only thing roles should do is declare profile classes.
- § Use include <PROFILE NAME>.
- § Don't declare any component classes or normal resources in a role.
- § Roles can use conditional logic to decide which profiles to use. Roles should not have any class parameters of their own.
- § Roles should not set class parameters for any profiles.

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§ The name of a role should be based on your business's conversational name for the type of node it manages.

Roles Names Example:

```
role::web  
role::jenkins::master  
role::jenkins::slave
```

Example:

```
class role::web {  
  include profile::base  
  include profile::apache  
  include profile::php  
}
```

Assigning a role to a node

- The PE console node classifier.
- The main manifest.
- Hiera or Puppet lookup.

CREATE A PROFILE MODULE:

Lab:

Go to puppet master and to go modules directory ,

```
[root@puppetmaster modules]# pwd  
/etc/puppetlabs/code/environments/production/modules
```

Here we have to generate new modules for profile ,

```
[root@puppetmaster modules]# puppet module generate zippyops-profile  
Warning: `puppet module generate` is deprecated and will be removed in a future release. This  
action has been replaced by Puppet Development Kit. For more information visit  
https://puppet.com/docs/pdk/latest/pdk.html.  
(location: /opt/puppetlabs/puppet/lib/ruby/vendor_ruby/puppet/face/module/generate.rb:142:in  
'generate')  
We need to create a metadata.json file for this module. Please answer the  
following questions; if the question is not applicable to this module, feel free  
to leave it blank.
```

Puppet uses Semantic Versioning (semver.org) to version modules.

What version is this module? [0.1.0]

-->

ZippyOPS

```
Who wrote this module? [zippyops]
--> zippyops

What license does this module code fall under? [Apache-2.0]
-->

How would you describe this module in a single sentence?
--> this is a profile module

Where is this module's source code repository?
--> git@github.com:Zippyops/puppet-profile.git

Where can others go to learn more about this module?
--> git@github.com:Zippyops/puppet-profile.git

Where can others go to file issues about this module?
-->

-----
{
  "name": "zippyops-profile",
  "version": "0.1.0",
  "author": "zippyops",
  "summary": "this is a profile module",
  "license": "Apache-2.0",
  "source": "git@github.com:Zippyops/puppet-profile.git",
  "project_page": "git@github.com:Zippyops/puppet-profile.git",
  "issues_url": null,
  "dependencies": [
    {
      "name": "puppetlabs-stdlib",
      "version_requirement": ">= 1.0.0"
    }
  ],
  "data_provider": null
}
-----

About to generate this metadata; continue? [n/Y]
--> y

Notice: Generating module at /etc/puppetlabs/code/environments/production/modules/profile...
Notice: Populating templates...
Finished; module generated in profile.
profile/Gemfile
profile/Rakefile
profile/examples
profile/examples/init.pp
profile/manifests
profile/manifests/init.pp
profile/spec
profile/spec/classes
profile/spec/classes/init_spec.rb
profile/spec/spec_helper.rb
profile/README.md
profile/metadata.json
[root@puppetmaster modules]# ls
archive java ntp profile ssh stdlib
[root@puppetmaster modules]# cd profile/
[root@puppetmaster profile]# ls
```

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```
examples Gemfile manifests metadata.json Rakefile README.md spec
[root@puppetmaster profile]# cd manifests/
[root@puppetmaster manifests]# ls
init.pp
[root@puppetmaster manifests]# rm -rf init.pp
[root@puppetmaster manifests]#
```

Here we have to create base.pp file first ,

```
[root@puppetmaster manifests]# cat base.pp
class profile::base(
  $ntp_servers = [
    '0.ubuntu.pool.ntp.org',
    '1.ubuntu.pool.ntp.org',
  ],
) {
  include ::ssh
  class '::ntp' {
    servers => $ntp_servers,
  }
  if $facts['os']['family'] == 'RedHat' {
    include ::profile::selinux
  }
}
[root@puppetmaster manifests]#
```

We have to install selinux module to use this example ,

```
[root@puppetmaster manifests]# puppet module install puppet-selinux --version 0.8.0
Notice: Preparing to install into /etc/puppetlabs/code/environments/production/modules ...
Notice: Downloading from https://forgeapi.puppet.com ...
Notice: Installing -- do not interrupt ...
/etc/puppetlabs/code/environments/production/modules
└── puppet-selinux (v0.8.0)
    └── puppetlabs-stdlib (v4.25.1)
```

Now we have to create selinux.pp file ,

```
[root@puppetmaster manifests]# vi selinux.pp
[root@puppetmaster manifests]# cat selinux.pp
class profile::selinux {
  include ::selinux
}
```

Go back to puppet console and go to classifications ,

ZippyOPS
Making Automation Work

ZippyOPS

The screenshot shows the ZippyOPS Puppet interface. On the left, a sidebar menu includes sections for INSPECT (Overview, Nodes, Packages, Reports, Jobs, Events), CONFIGURE (Classification, which is highlighted with a green border), RUN (Puppet, Task), and SETUP (Unsigned certs, Access control, License). The main content area is titled "Classification" and contains the instruction "Create, edit, and remove node groups here." Below this is a button labeled "Add group...". A list of node groups is displayed, each with a minus sign icon and a tooltip indicating they are part of the "production" environment:

- All Nodes production
- Base production
- + PE Infrastructure production
- + Production environment production Env group
- Ubuntu production

Click on base ,

The screenshot shows the "Base" node group details. The sidebar menu is identical to the previous screen. The main content area is titled "Base" and shows the following information:

- Parent: All Nodes
- Environment: production
- Actions: Edit node group metadata, Remove node group, Run

Below this are tabs for Rules, Matching nodes, Configuration (which is selected), Variables, and Activity.

The "Classes" section allows adding new classes to the node group. It displays the message: "Declare the classes that you want to apply to nodes in this group. The classes will be applied on the next run." It also shows the last update time: "Class definitions updated: 2 minutes ago" and a Refresh button.

The "Data" section is partially visible at the bottom.

ZippyOPS

Remove previous classes in this base node ,

Rules

Matching nodes

Configuration

Variables

Activity

Classes

Declare the classes that you want to apply to nodes in this group. The classes will be applied on the next run.

Class definitions updated: a few seconds ago

[Refresh](#)

Add new class

Add class

Class: profile::selinux

Parameter

Value

Parameter name :

=

Add parameter

I have added profile::selinux classes .

Go back to puppet master terminal ,

```
[root@puppetmaster manifests]# puppet parser validate base.pp
```

Go to puppet agent and run puppet agent -t,

```
[root@puppetagent1 manifests]# service puppet stop
Redirecting to /bin/systemctl stop puppet.service
[root@puppetagent1 manifests]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531088780'
Notice: This matches the node name!!!
Notice: /Stage[main]/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node name!!!]/message: defined 'message' as 'This matches the node name!!!'
Notice: /Stage[main]/Ntp::Config/File[/etc/ntp.conf]/content:
--- /etc/ntp.conf 2018-07-08 08:18:59.803916462 -0400
+++ /tmp/puppet-file20180708-25934-12m6jq0    2018-07-08 18:26:25.439606991 -0400
@@ -23,9 +23,8 @@
 # minpoll - set minimal update frequency
 # maxpoll - set maximal update frequency
 # noselect - do not sync with this server
-server 0.centos.pool.ntp.org
-server 1.centos.pool.ntp.org
```

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```
-server 2.centos.pool.ntp.org
+server 0.ubuntu.pool.ntp.org
+server 1.ubuntu.pool.ntp.org

# Driftfile.
driftfile /var/lib/ntp/drift

Notice: /Stage[main]/Ntp::Config/File[/etc/ntp.conf]/content: content changed
'{md5}d51b2e5ec0a9f463047efb49555f65fe' to '{md5}e7b4a8f7870474f9189bcf7216b60116'
Notice: /Stage[main]/Ntp::Config/File[/etc/ntp/step-tickers]/content:
--- /etc/ntp/step-tickers 2018-07-08 08:18:59.873916401 -0400
+++ /tmp/puppet-file20180708-25934-ug1a9k 2018-07-08 18:26:25.539606709 -0400
@@ -1,5 +1,4 @@
 # List of NTP servers used by the ntpdate service.

-0.centos.pool.ntp.org
-1.centos.pool.ntp.org
-2.centos.pool.ntp.org
+0.ubuntu.pool.ntp.org
+1.ubuntu.pool.ntp.org

Notice: /Stage[main]/Ntp::Config/File[/etc/ntp/step-tickers]/content: content changed
'{md5}413c531d0533c4dba18b9acf7a29ad5d' to '{md5}3fe231f8f69fe77102ae8bceaff3648'
Info: Class[Ntp::Config]: Scheduling refresh of Class[Ntp::Service]
Info: Class[Ntp::Service]: Scheduling refresh of Service[ntp]
Notice: /Stage[main]/Ntp::Service/Service[ntp]: Triggered 'refresh' from 1 event
Notice: /Stage[main]/Selinux::Package/Package[selinux-policy-devel]/ensure: created
Notice: Applied catalog in 28.64 seconds
[root@puppetagent1 manifests]#
```

Executed successfully !!!!

CREATING ROLE MODULE

First we have to generate role module ,

```
[root@puppetmaster modules]# puppet module generate zippyops-role
Warning: `puppet module generate` is deprecated and will be removed in a future release. This
action has been replaced by Puppet Development Kit. For more information visit
https://puppet.com/docs/pdk/latest/pdk.html.
(location: /opt/puppetlabs/puppet/lib/ruby/vendor_ruby/puppet/face/module/generate.rb:142:in
`generate')
We need to create a metadata.json file for this module. Please answer the
following questions; if the question is not applicable to this module, feel free
to leave it blank.

Puppet uses Semantic Versioning (semver.org) to version modules.
What version is this module? [0.1.0]
-->

Who wrote this module? [zippyops]
-->

What license does this module code fall under? [Apache-2.0]
-->

How would you describe this module in a single sentence?
```

ZippyOPS

```
--> This is a role module
```

```
Where is this module's source code repository?  
--> git@github.com:Zippyops/puppet-role.git
```

```
Where can others go to learn more about this module?  
--> https://github.com/Zippyops/puppet-role
```

```
Where can others go to file issues about this module?  
--> git@github.com:Zippyops/puppet-role.git
```

```
-----  
{  
  "name": "zippyops-role",  
  "version": "0.1.0",  
  "author": "zippyops",  
  "summary": "This is a role module",  
  "license": "Apache-2.0",  
  "source": "git@github.com:Zippyops/puppet-role.git",  
  "project_page": "https://github.com/Zippyops/puppet-role",  
  "issues_url": "git@github.com:Zippyops/puppet-role.git",  
  "dependencies": [  
    {  
      "name": "puppetlabs-stdlib",  
      "version_requirement": ">= 1.0.0"  
    }  
  ],  
  "data_provider": null  
}  
-----
```

```
About to generate this metadata; continue? [n/Y]  
--> y
```

```
Notice: Generating module at /etc/puppetlabs/code/environments/production/modules/role...  
Notice: Populating templates...  
Finished; module generated in role.  
role/Gemfile  
role/Rakefile  
role/examples  
role/examples/init.pp  
role/manifests  
role/manifests/init.pp  
role/spec  
role/spec/classes  
role/spec/classes/init_spec.rb  
role/spec/spec_helper.rb  
role/README.md  
role/metadata.json  
[root@puppetmaster modules]#
```

We have to move role directory , To create linux.pp file ,

```
[root@puppetmaster manifests]# cat linux.pp  
class role::linux {  
  include ::profile::base  
}
```

Go back to puppet console ,

To add classes role::linux in that ,

ZippyOPS

Classes

Declare the classes that you want to apply to nodes in this group. The classes will be applied on the next run.

Class definitions updated: 2 minutes ago

[Refresh](#)

[Add new class](#)

[Add class](#)

Class: role::linux

Parameter	Value
Parameter name	=

[Add parameter](#)

[Remove this class](#)

[Remove all classes](#)

Go to puppet agent and run puppet agent -t

first we have to stop ntpd and remove ntp.conf ,

```
[root@puppetagent1 manifests]# service ntpd stop
Redirecting to /bin/systemctl stop ntpd.service
[root@puppetagent1 manifests]# rm /etc/ntp.conf
rm: remove regular file '/etc/ntp.conf'? y
```

now to run puppet agent -t:

```
[root@puppetagent1 manifests]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531089968'
Notice: This matches the node name!!!
Notice: /Stage[main]/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node name!!!]/message: defined 'message' as 'This matches the node name!!!'
Notice: /Stage[main]/Ntp::Config/File[/etc/ntp.conf]/ensure: defined content as
'{md5}e7b4a8f7870474f9189bcf7216b60116'
Info: Class[Ntp::Config]: Scheduling refresh of Class[Ntp::Service]
Info: Class[Ntp::Service]: Scheduling refresh of Service[ntp]
Notice: /Stage[main]/Ntp::Service/Service[ntp]/ensure: ensure changed 'stopped' to 'running'
Info: /Stage[main]/Ntp::Service/Service[ntp]: Unscheduling refresh on Service[ntp]
Notice: Applied catalog in 0.84 seconds
```

Making Automation Work

```
[root@puppetmaster manifests]# puppet module install puppetlabs-apache --version 1.11.0
Notice: Preparing to install into /etc/puppetlabs/code/environments/production/modules ...
```

ZippyOPS

```
Notice: Downloading from https://forgeapi.puppet.com ...
Notice: Installing -- do not interrupt ...
/etc/puppetlabs/code/environments/production/modules
└── puppetlabs-apache (v1.11.0)
    ├── puppetlabs-concat (v2.2.1)
    └── puppetlabs-stdlib (v4.25.1)
```

Now we have created web.pp file ,

```
[root@puppetmaster manifests]# cat web.pp
class role::web {
  include profile::base
  include profile::apache
}
[root@puppetmaster manifests]#
[root@puppetmaster manifests]# ls
linux.pp  web.pp
```

go back to console ,

create new node group as web ,

Rules

Matching nodes

Configuration

Variables

Activity

Write rules to dynamically assign nodes to this group based on fact values. Begin with "trusted" to designate a trusted fact.

- Nodes must match all rules.
 Nodes may match any rule.

Show all node matches

Fact	Operator	Value	Node matches
<input type="text"/>	=	<input type="text"/>	Add rule

Number of nodes pinned to this group: 1

Certname	Node name	Pin node
	puppetagent1.zippyops.com	Unpin

[Unpin all pinned](#)

Making Automation Work

Now I have added my centos node to this group ,

ZippyOPS

After that add class ,

The screenshot shows the ZippyOPS web interface. On the left, a sidebar menu includes 'Jobs', 'Events', 'CONFIGURE' (with 'Classification' selected), 'RUN' (with 'Puppet' selected), 'SETUP' (with 'Access control' selected), 'My account', 'Help', 'Log out', and 'v2018.1.2'. The main content area has tabs 'Rules', 'Matching nodes', 'Configuration' (selected), 'Variables', and 'Activity'. Under 'Configuration', the 'Classes' section is shown. It says 'Declare the classes that you want to apply to nodes in this group. The classes will be applied on the next run.' A message indicates 'Class definitions updated: 8 minutes ago' with a 'Refresh' button. An 'Add new class' input field and an 'Add class' button are present. Below this, a specific class definition for 'Class: role::web' is shown with a table for parameters. The table has columns 'Parameter' and 'Value', with one row containing 'Parameter name' and an empty 'Value' field. Buttons for 'Add parameter' and 'Remove this' are available.

Go back to centos node ,

```
[root@puppetagent1 manifests]# service puppet stop
Redirecting to /bin/systemctl stop puppet.service
[root@puppetagent1 manifests]# puppet agent -t
Info: Using configured environment 'production'
Info: Retrieving pluginfacts
Info: Retrieving plugin
Notice: /File[/opt/puppetlabs/puppet/cache/lib/facter/apache_version.rb]/ensure: defined content
as '{md5}bab22b1d567021995b4b5fa9328047b'
Notice: /File[/opt/puppetlabs/puppet/cache/lib/puppet/parser/functions/bool2httpd.rb]/ensure:
defined content as '{md5}05d5deeb6e0c31acee7c55b249ec8e06'
Notice:
/File[/opt/puppetlabs/puppet/cache/lib/puppet/parser/functions/validate_apache_log_level.rb]/ensu
re: defined content as '{md5}d75bc4ef17ff5c9a1f94dd3948e733d1'
Notice: /File[/opt/puppetlabs/puppet/cache/lib/puppet/provider/a2mod]/ensure: created
Notice: /File[/opt/puppetlabs/puppet/cache/lib/puppet/provider/a2mod.rb]/ensure: defined content
as '{md5}03ed73d680787dd126ea37a03be0b236'
Notice: /File[/opt/puppetlabs/puppet/cache/lib/puppet/provider/a2mod/a2mod.rb]/ensure: defined
content as '{md5}d986d8e8373f3f3c97359381c180628'
Notice: /File[/opt/puppetlabs/puppet/cache/lib/puppet/provider/a2mod/gentoo.rb]/ensure: defined
content as '{md5}2492d446adb68f678e86a75eb7ff3bd'
Notice: /File[/opt/puppetlabs/puppet/cache/lib/puppet/provider/a2mod/modfix.rb]/ensure: defined
content as '{md5}b689a1c83c9cccd8590399c67f3e588e5'
Notice: /File[/opt/puppetlabs/puppet/cache/lib/puppet/provider/a2mod/redhat.rb]/ensure: defined
content as '{md5}c39b80e75e7d0666def31c2a6cdedb0b'
Notice: /File[/opt/puppetlabs/puppet/cache/lib/puppet/type/a2mod.rb]/ensure: defined content as
'{md5}9042ccc045bfeecca28bebb834114f05'
Notice: /File[/opt/puppetlabs/puppet/cache/lib/puppet/type(concat_file.rb)]/ensure: defined
content as '{md5}e7b02f157ef1d05bff5c9eb7e05a7772'
```

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```
Notice: /File[/opt/puppetlabs/puppet/cache/lib/puppet/type(concat_fragment.rb)]/ensure: defined content as '{md5}3203ea0608a63551676dea9ed53de110'
Info: Retrieving locales
Info: Loading facts
Info: Caching catalog for puppetagent1.zippyops.com
Info: Applying configuration version '1531091253'
Notice: This matches the node name!!!
Notice: /Stage[main]/Main/Node[puppetagent1.zippyops.com]/Notify[This matches the node name!!!]/message: defined 'message' as 'This matches the node name!!!'
Notice: /Stage[main]/Apache/Package[httpd]/ensure: created
Info: /Stage[main]/Apache/Package[httpd]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache/File[/etc/httpd/conf.d/README]/ensure: removed
Notice: /Stage[main]/Apache/File[/etc/httpd/conf.d/autoindex.conf]/ensure: removed
Notice: /Stage[main]/Apache/File[/etc/httpd/conf.d/userdir.conf]/ensure: removed
Notice: /Stage[main]/Apache/File[/etc/httpd/conf.d/welcome.conf]/ensure: removed
Info: /etc/httpd/conf.d: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Mime/File[mime.conf]/ensure: defined content as '{md5}9da85e58f3bd6c780ce76db603b7f028'
Info: /Stage[main]/Apache::Mod::Mime/File[mime.conf]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Mime_magic/File[mime_magic.conf]/ensure: defined content as '{md5}b258529b332429e2ff8344f726a95457'
Info: /Stage[main]/Apache::Mod::Mime_magic/File[mime_magic.conf]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Alias/File[alias.conf]/ensure: defined content as '{md5}983e865be85f5e0daaed7433db82995e'
Info: /Stage[main]/Apache::Mod::Alias/File[alias.conf]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Autoindex/File[autoindex.conf]/ensure: defined content as '{md5}2421a3c6df32c7e38c2a7a22afdf5728'
Info: /Stage[main]/Apache::Mod::Autoindex/File[autoindex.conf]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Deflate/File[deflate.conf]/ensure: defined content as '{md5}a045d750d819b1e9dae3fbfb3f20edd5'
Info: /Stage[main]/Apache::Mod::Deflate/File[deflate.conf]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Dir/File[dir.conf]/ensure: defined content as '{md5}c741d8ea840e6eb999d739eed47c69d7'
Info: /Stage[main]/Apache::Mod::Dir/File[dir.conf]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Negotiation/File[negotiation.conf]/ensure: defined content as '{md5}47284b5580b986a6ba32580b6ffb9fd7'
Info: /Stage[main]/Apache::Mod::Negotiation/File[negotiation.conf]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Setenvif/File[setenvif.conf]/ensure: defined content as '{md5}c7ede4173da1915b7ec088201f030c28'
Info: /Stage[main]/Apache::Mod::Setenvif/File[setenvif.conf]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Prefork/File[/etc/httpd/conf.modules.d/prefork.conf]/ensure: defined content as '{md5}109c4f51dac10fc1b39373855e566d01'
Info: /Stage[main]/Apache::Mod::Prefork/File[/etc/httpd/conf.modules.d/prefork.conf]: Scheduling refresh of Class[Apache::Service]
Notice:
/Stage[main]/Apache/Concat[/etc/httpd/conf/ports.conf]/File[/etc/httpd/conf/ports.conf]/ensure: defined content as '{md5}334fa5cddb9a408ea1ca7a1666b1fc4'
Info: Concat[/etc/httpd/conf/ports.conf]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache/File[/etc/httpd/conf/httpd.conf]/content:
--- /etc/httpd/conf/httpd.conf      2018-06-26 14:07:11.000000000 -0400
+++ /tmp/puppet-file20180708-27042-luru91      2018-07-08 19:07:56.648296029 -0400
@@ -1,353 +1,49 @@
-#
-# This is the main Apache HTTP server configuration file. It contains the
```

ZippyOPS

```
-# configuration directives that give the server its instructions.  
-# See <URL:http://httpd.apache.org/docs/2.4/> for detailed information.  
-# In particular, see  
-# <URL:http://httpd.apache.org/docs/2.4/mod/directives.html>  
-# for a discussion of each configuration directive.  
-#  
-# Do NOT simply read the instructions in here without understanding  
-# what they do. They're here only as hints or reminders. If you are unsure  
-# consult the online docs. You have been warned.  
-#  
-# Configuration and logfile names: If the filenames you specify for many  
-# of the server's control files begin with "/" (or "drive:/\" for Win32), the  
-# server will use that explicit path. If the filenames do *not* begin  
-# with "/", the value of ServerRoot is prepended -- so 'log/access_log'  
-# with ServerRoot set to '/www' will be interpreted by the  
-# server as '/www/log/access_log', whereas '/log/access_log' will be  
-# interpreted as '/log/access_log'.  
-#  
-#  
-# ServerRoot: The top of the directory tree under which the server's  
-# configuration, error, and log files are kept.  
-#  
-# Do not add a slash at the end of the directory path. If you point  
-# ServerRoot at a non-local disk, be sure to specify a local disk on the  
-# Mutex directive, if file-based mutexes are used. If you wish to share the  
-# same ServerRoot for multiple httpd daemons, you will need to change at  
-# least PidFile.  
-#  
+## Security  
+ServerTokens OS  
+ServerSignature On  
+TraceEnable On  
+  
+ServerName "puppetagent1.zippyops.com"  
ServerRoot "/etc/httpd"  
+PidFile run/httpd.pid  
+Timeout 120  
+KeepAlive Off  
+MaxKeepAliveRequests 100  
+KeepAliveTimeout 15  
+LimitRequestFieldSize 8190  
+  
  
-#  
-# Listen: Allows you to bind Apache to specific IP addresses and/or  
-# ports, instead of the default. See also the <VirtualHost>  
-# directive.  
-#  
-# Change this to Listen on specific IP addresses as shown below to  
-# prevent Apache from glomming onto all bound IP addresses.  
-#  
-#Listen 12.34.56.78:80  
-Listen 80  
-  
-#  
-# Dynamic Shared Object (DSO) Support  
-#  
-# To be able to use the functionality of a module which was built as a DSO you  
-# have to place corresponding 'LoadModule' lines at this location so the  
-# directives contained in it are actually available _before_ they are used.  
-# Statically compiled modules (those listed by 'httpd -l') do not need
```

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```
-# to be loaded here.  
-#  
-# Example:  
-# LoadModule foo_module modules/mod_foo.so  
-#  
-Include conf.modules.d/*.conf  
  
-#  
-# If you wish httpd to run as a different user or group, you must run  
-# httpd as root initially and it will switch.  
-#  
-# User/Group: The name (or #number) of the user/group to run httpd as.  
-# It is usually good practice to create a dedicated user and group for  
-# running httpd, as with most system services.  
-#  
User apache  
Group apache  
  
-# 'Main' server configuration  
-#  
-# The directives in this section set up the values used by the 'main'  
-# server, which responds to any requests that aren't handled by a  
-# <VirtualHost> definition. These values also provide defaults for  
-# any <VirtualHost> containers you may define later in the file.  
-#  
-# All of these directives may appear inside <VirtualHost> containers,  
-# in which case these default settings will be overridden for the  
-# virtual host being defined.  
-#  
-#  
-# ServerAdmin: Your address, where problems with the server should be  
-# e-mailed. This address appears on some server-generated pages, such  
-# as error documents. e.g. admin@your-domain.com  
-#  
-ServerAdmin root@localhost  
  
-#  
-# ServerName gives the name and port that the server uses to identify itself.  
-# This can often be determined automatically, but we recommend you specify  
-# it explicitly to prevent problems during startup.  
-#  
-# If your host doesn't have a registered DNS name, enter its IP address here.  
-#  
-#ServerName www.example.com:80  
  
-#  
-# Deny access to the entirety of your server's filesystem. You must  
-# explicitly permit access to web content directories in other  
-# <Directory> blocks below.  
-#  
-<Directory />  
-    AllowOverride none  
+AccessFileName .htaccess  
+<FilesMatch "^\.ht">  
    Require all denied  
-</Directory>  
+</FilesMatch>  
  
-#  
-# Note that from this point forward you must specifically allow
```

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```
-# particular features to be enabled - so if something's not working as
-# you might expect, make sure that you have specifically enabled it
-# below.
-#
-
-#
-# DocumentRoot: The directory out of which you will serve your
-# documents. By default, all requests are taken from this directory, but
-# symbolic links and aliases may be used to point to other locations.
-#
-DocumentRoot "/var/www/html"
-
-#
-# Relax access to content within /var/www.
-#
-<Directory "/var/www">
-    AllowOverride None
-    # Allow open access:
-    Require all granted
+<Directory />
+    Options FollowSymLinks
+    AllowOverride None
</Directory>

-# Further relax access to the default document root:
-<Directory "/var/www/html">
-    #
-    # Possible values for the Options directive are "None", "All",
-    # or any combination of:
-    #   Indexes Includes FollowSymLinks SymLinksifOwnerMatch ExecCGI MultiViews
-    #
-    # Note that "MultiViews" must be named *explicitly* --- "Options All"
-    # doesn't give it to you.
-    #
-    # The Options directive is both complicated and important. Please see
-    # http://httpd.apache.org/docs/2.4/mod/core.html#options
-    # for more information.
-    #
-    Options Indexes FollowSymLinks
-
-    #
-    # AllowOverride controls what directives may be placed in .htaccess files.
-    # It can be "All", "None", or any combination of the keywords:
-    #   Options FileInfo AuthConfig Limit
-    #
-    AllowOverride None
-
-    #
-    # Controls who can get stuff from this server.
-    #
-    Require all granted
-</Directory>

-#
-# DirectoryIndex: sets the file that Apache will serve if a directory
-# is requested.
-#
-<IfModule dir_module>
-    DirectoryIndex index.html
-</IfModule>
-
```

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```
-#
-# The following lines prevent .htaccess and .htpasswd files from being
-# viewed by Web clients.
-#
-<Files ".ht*">
-    Require all denied
-</Files>
-
-#
-# ErrorLog: The location of the error log file.
-# If you do not specify an ErrorLog directive within a <VirtualHost>
-# container, error messages relating to that virtual host will be
-# logged here. If you *do* define an error logfile for a <VirtualHost>
-# container, that host's errors will be logged there and not here.
-#
-ErrorLog "logs/error_log"
-
-#
-# LogLevel: Control the number of messages logged to the error_log.
-# Possible values include: debug, info, notice, warn, error, crit,
-# alert, emerg.
-#
+HostnameLookups Off
+ErrorLog "/var/log/httpd/error_log"
LogLevel warn
+EnableSendfile On

-<IfModule log_config_module>
-    #
-    # The following directives define some format nicknames for use with
-    # a CustomLog directive (see below).
-    #
-    LogFormat "%h %l %u %t \"%r\" %>s %b \"%{Referer}i\" \"%{User-Agent}i\"" combined
-    LogFormat "%h %l %u %t \"%r\" %>s %b" common
-
-    <IfModule logio_module>
-        # You need to enable mod_logio.c to use %I and %O
-        LogFormat "%h %l %u %t \"%r\" %>s %b \"%{Referer}i\" \"%{User-Agent}i\" %I %O" combinedio
-    </IfModule>
-
-    #
-    # The location and format of the access logfile (Common Logfile Format).
-    # If you do not define any access logfiles within a <VirtualHost>
-    # container, they will be logged here. Contrariwise, if you *do*
-    # define per-<VirtualHost> access logfiles, transactions will be
-    # logged therein and *not* in this file.
-    #
-    #CustomLog "logs/access_log" common
-
-    #
-    # If you prefer a logfile with access, agent, and referer information
-    # (Combined Logfile Format) you can use the following directive.
-    #
-    CustomLog "logs/access_log" combined
-</IfModule>
-
-<IfModule alias_module>
-    #
-    # Redirect: Allows you to tell clients about documents that used to
-    # exist in your server's namespace, but do not anymore. The client
-    # will make a new request for the document at its new location.
```

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```
- # Example:
- # Redirect permanent /foo http://www.example.com/bar
-
- #
- # Alias: Maps web paths into filesystem paths and is used to
- # access content that does not live under the DocumentRoot.
- # Example:
- # Alias /webpath /full/filesystem/path
- #
- # If you include a trailing / on /webpath then the server will
- # require it to be present in the URL. You will also likely
- # need to provide a <Directory> section to allow access to
- # the filesystem path.
-
- #
- # ScriptAlias: This controls which directories contain server scripts.
- # ScriptAliases are essentially the same as Aliases, except that
- # documents in the target directory are treated as applications and
- # run by the server when requested rather than as documents sent to the
- # client. The same rules about trailing "/" apply to ScriptAlias
- # directives as to Alias.
- #
- ScriptAlias /cgi-bin/ "/var/www/cgi-bin/"
-
-</IfModule>
-
-#
-# "/var/www/cgi-bin" should be changed to whatever your ScriptAliased
-# CGI directory exists, if you have that configured.
-#
-<Directory "/var/www/cgi-bin">
-    AllowOverride None
-    Options None
-    Require all granted
-</Directory>
+<#Listen 80
+
+
+Include "/etc/httpd/conf.modules.d/*.load"
+Include "/etc/httpd/conf.modules.d/*.conf"
+Include "/etc/httpd/conf/ports.conf"
+
+LogFormat "%h %l %u %t \"%r\" %>s %b \"%{Referer}i\" \"%{User-Agent}i\"" combined
+LogFormat "%h %l %u %t \"%r\" %>s %b" common
+LogFormat "%{Referer}i -> %U" referer
+LogFormat "%{User-agent}i" agent
+LogFormat "%{X-Forwarded-For}i %l %u %t \"%r\" %s %b \"%{Referer}i\" \"%{User-agent}i\""
forwarded
+
+IncludeOptional "/etc/httpd/conf.d/*.conf"
-
-<IfModule mime_module>
-    #
-    # TypesConfig points to the file containing the list of mappings from
-    # filename extension to MIME-type.
-    #
-    TypesConfig /etc/mime.types
-
-
-    #
-    # AddType allows you to add to or override the MIME configuration
-    # file specified in TypesConfig for specific file types.
```

```
- #
- #AddType application/x-gzip .tgz
- #
- # AddEncoding allows you to have certain browsers uncompress
- # information on the fly. Note: Not all browsers support this.
- #
- #AddEncoding x-compress .Z
- #AddEncoding x-gzip .gz .tgz
- #
- # If the AddEncoding directives above are commented-out, then you
- # probably should define those extensions to indicate media types:
- #
- AddType application/x-compress .Z
- AddType application/x-gzip .gz .tgz
-
- #
- # AddHandler allows you to map certain file extensions to "handlers":
- # actions unrelated to filetype. These can be either built into the server
- # or added with the Action directive (see below)
- #
- # To use CGI scripts outside of ScriptAliased directories:
- # (You will also need to add "ExecCGI" to the "Options" directive.)
- #
- #AddHandler cgi-script .cgi
-
- # For type maps (negotiated resources):
- #AddHandler type-map var
-
- #
- # Filters allow you to process content before it is sent to the client.
- #
- # To parse .shtml files for server-side includes (SSI):
- # (You will also need to add "Includes" to the "Options" directive.)
- #
- AddType text/html .shtml
- AddOutputFilter INCLUDES .shtml
- </IfModule>
-
-#
-# Specify a default charset for all content served; this enables
-# interpretation of all content as UTF-8 by default. To use the
-# default browser choice (ISO-8859-1), or to allow the META tags
-# in HTML content to override this choice, comment out this
-# directive:
-#
-AddDefaultCharset UTF-8
-
-<IfModule mime_magic_module>
-    #
-    # The mod_mime_magic module allows the server to use various hints from the
-    # contents of the file itself to determine its type. The MIMEMagicFile
-    # directive tells the module where the hint definitions are located.
-    #
-    MIMEMagicFile conf/magic
-</IfModule>
-
-#
-# Customizable error responses come in three flavors:
-# 1) plain text 2) local redirects 3) external redirects
-#
-# Some examples:
```

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```
-#ErrorDocument 500 "The server made a boo boo."
-#ErrorDocument 404 /missing.html
-#ErrorDocument 404 "/cgi-bin/missing_handler.pl"
-#ErrorDocument 402 http://www.example.com/subscription_info.html
-#
-
-#
-# EnableMMAP and EnableSendfile: On systems that support it,
-# memory-mapping or the sendfile syscall may be used to deliver
-# files. This usually improves server performance, but must
-# be turned off when serving from networked-mounted
-# filesystems or if support for these functions is otherwise
-# broken on your system.
-# Defaults if commented: EnableMMAP On, EnableSendfile Off
-#
-#EnableMMAP off
-EnableSendfile on
-
-# Supplemental configuration
-#
-# Load config files in the "/etc/httpd/conf.d" directory, if any.
-IncludeOptional conf.d/*.conf

Notice: /Stage[main]/Apache/File[/etc/httpd/conf/httpd.conf]/content: content changed
'{md5}f5e7449c0f17bc856e86011cb5d152ba' to '{md5}b9bf6ab1aa1c69a94a135fa829b180b8'
Info: /Stage[main]/Apache/File[/etc/httpd/conf/httpd.conf]: Scheduling refresh of
Class[Apache::Service]
Notice: /Stage[main]/Apache::Default_mods/Apache::Mod[log_config]/File[log_config.load]/ensure:
defined content as '{md5}785d35cb285e190d589163b45263ca89'
Info: /Stage[main]/Apache::Default_mods/Apache::Mod[log_config]/File[log_config.load]: Scheduling
refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Default_mods/Apache::Mod[systemd]/File[systemd.load]/ensure: defined
content as '{md5}26e5d44aae258b3e9d821cbbbd3e2826'
Info: /Stage[main]/Apache::Default_mods/Apache::Mod[systemd]/File[systemd.load]: Scheduling
refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Default_mods/Apache::Mod[unixd]/File[unixd.load]/ensure: defined
content as '{md5}0e8468ecc1265f8947b8725f4d1be9c0'
Info: /Stage[main]/Apache::Default_mods/Apache::Mod[unixd]/File[unixd.load]: Scheduling refresh
of Class[Apache::Service]
Notice: /Stage[main]/Apache::Default_mods/Apache::Mod[authz_host]/File[authz_host.load]/ensure:
defined content as '{md5}d1045f54d2798499ca0f030ca0eef920'
Info: /Stage[main]/Apache::Default_mods/Apache::Mod[authz_host]/File[authz_host.load]: Scheduling
refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Actions/Apache::Mod[actions]/File[actions.load]/ensure: defined
content as '{md5}599866dfaf734f60f7e2d41ee8235515'
Info: /Stage[main]/Apache::Mod::Actions/Apache::Mod[actions]/File[actions.load]: Scheduling
refresh of Class[Apache::Service]
Notice:
/Stage[main]/Apache::Mod::Authn_core/Apache::Mod[authn_core]/File[authn_core.load]/ensure:
defined content as '{md5}704d6e8b02b0eca0eba4083960d16c52'
Info: /Stage[main]/Apache::Mod::Authn_core/Apache::Mod[authn_core]/File[authn_core.load]:
Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Cache/Apache::Mod[cache]/File[cache.load]/ensure: defined
content as '{md5}01e4d392225b518a65b0f7d6c4e21d29'
Info: /Stage[main]/Apache::Mod::Cache/Apache::Mod[cache]/File[cache.load]: Scheduling refresh of
Class[Apache::Service]
Notice:
/Stage[main]/Apache::Mod::Ext_filter/Apache::Mod[ext_filter]/File[ext_filter.load]/ensure:
defined content as '{md5}76d5e0ac3411a4be57ac33ebe2e52ac8'
Info: /Stage[main]/Apache::Mod::Ext_filter/Apache::Mod[ext_filter]/File[ext_filter.load]:
Scheduling refresh of Class[Apache::Service]
```

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Notice: /Stage[main]/Apache::Mod::Mime/Apache::Mod[mime]/File[mime.load]/ensure: defined content as '{md5}e36257b9efab01459141d423cae57c7c'
Info: /Stage[main]/Apache::Mod::Mime/Apache::Mod[mime]/File[mime.load]: Scheduling refresh of Class[Apache::Service]
Notice:
/Stages[main]/Apache::Mod::Mime_magic/Apache::Mod[mime_magic]/File[mime_magic.load]/ensure: defined content as '{md5}cb8670bb2fb352aac7ebf3a85d52094c'
Info: /Stage[main]/Apache::Mod::Mime_magic/Apache::Mod[mime_magic]/File[mime_magic.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Rewrite/Apache::Mod[rewrite]/File[rewrite.load]/ensure: defined content as '{md5}26e2683352fc1599f29573ff0d934e79'
Info: /Stage[main]/Apache::Mod::Rewrite/Apache::Mod[rewrite]/File[rewrite.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Speling/Apache::Mod[speling]/File[speling.load]/ensure: defined content as '{md5}f82e9e6b871a276c324c9effcec8a61'
Info: /Stage[main]/Apache::Mod::Speling/Apache::Mod[speling]/File[speling.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Suexec/Apache::Mod[suexec]/File[suexec.load]/ensure: defined content as '{md5}c7d5c61c534ba423a79b0ae78ff9be35'
Info: /Stage[main]/Apache::Mod::Suexec/Apache::Mod[suexec]/File[suexec.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Version/Apache::Mod[version]/File[version.load]/ensure: defined content as '{md5}1c9243de22ace4dc8266442c48ae0c92'
Info: /Stage[main]/Apache::Mod::Version/Apache::Mod[version]/File[version.load]: Scheduling refresh of Class[Apache::Service]
Notice:
/Stages[main]/Apache::Mod::Vhost_alias/Apache::Mod[vhost_alias]/File[vhost_alias.load]/ensure: defined content as '{md5}eca907865997d50d5130497665c3f82e'
Info: /Stage[main]/Apache::Mod::Vhost_alias/Apache::Mod[vhost_alias]/File[vhost_alias.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Default_mods/Apache::Mod[auth_digest]/File[auth_digest.load]/ensure: defined content as '{md5}df9e85f8da0b239fe8e698ae7ead4f60'
Info: /Stage[main]/Apache::Default_mods/Apache::Mod[auth_digest]/File[auth_digest.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Default_mods/Apache::Mod[authn_anon]/File[authn_anon.load]/ensure: defined content as '{md5}bf57b94b5aec35476fc2a2dc3861f132'
Info: /Stage[main]/Apache::Default_mods/Apache::Mod[authn_anon]/File[authn_anon.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Default_mods/Apache::Mod[authn_dbm]/File[authn_dbm.load]/ensure: defined content as '{md5}90ee8f8ef1a017cacadfd4225e10651'
Info: /Stage[main]/Apache::Default_mods/Apache::Mod[authn_dbm]/File[authn_dbm.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Default_mods/Apache::Mod[authz_dbm]/File[authz_dbm.load]/ensure: defined content as '{md5}c1363277984d22f99b70f7dce8753b60'
Info: /Stage[main]/Apache::Default_mods/Apache::Mod[authz_dbm]/File[authz_dbm.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Default_mods/Apache::Mod[authz_owner]/File[authz_owner.load]/ensure: defined content as '{md5}f30a9be1016df87f195449d9e02d1857'
Info: /Stage[main]/Apache::Default_mods/Apache::Mod[authz_owner]/File[authz_owner.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Default_mods/Apache::Mod[expires]/File[expires.load]/ensure: defined content as '{md5}f0825bad1e470de86ffabeb86dcc5d95'
Info: /Stage[main]/Apache::Default_mods/Apache::Mod[expires]/File[expires.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Default_mods/Apache::Mod[include]/File[include.load]/ensure: defined content as '{md5}88095a914eedc3c2c184dd5d74c3954c'
Info: /Stage[main]/Apache::Default_mods/Apache::Mod[include]/File[include.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Default_mods/Apache::Mod[logio]/File[logio.load]/ensure: defined content as '{md5}084533c7a44e9129d0e6df952e2472b6'
```

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Info: /Stage[main]/Apache::Default_mods/Apache::Mod[logio]/File[logio.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Default_mods/Apache::Mod[substitute]/File[substitute.load]/ensure: defined content as '{md5}8077c34a71afcfc41c8fc644830935915'
Info: /Stage[main]/Apache::Default_mods/Apache::Mod[substitute]/File[substitute.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Default_mods/Apache::Mod[usertrack]/File[usertrack.load]/ensure: defined content as '{md5}e95fbff030fabec98b948f8dc217775c'
Info: /Stage[main]/Apache::Default_mods/Apache::Mod[usertrack]/File[usertrack.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Alias/Apache::Mod[alias]/File[alias.load]/ensure: defined content as '{md5}3cf2fa309ccae4c29a4b875d0894cd79'
Info: /Stage[main]/Apache::Mod::Alias/Apache::Mod[alias]/File[alias.load]: Scheduling refresh of Class[Apache::Service]
Notice:
/Stage[main]/Apache::Mod::Authn_file/Apache::Mod[authn_file]/File[authn_file.load]/ensure: defined content as '{md5}d41656680003d7b890267bb73621c60b'
Info: /Stage[main]/Apache::Mod::Authn_file/Apache::Mod[authn_file]/File[authn_file.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Autoindex/Apache::Mod[autoindex]/File[autoindex.load]/ensure: defined content as '{md5}515cdf5b573e961a60d2931d39248648'
Info: /Stage[main]/Apache::Mod::Autoindex/Apache::Mod[autoindex]/File[autoindex.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Dav/Apache::Mod[dav]/File[dav.load]/ensure: defined content as '{md5}588e496251838c4840c14b28b5aa7881'
Info: /Stage[main]/Apache::Mod::Dav/Apache::Mod[dav]/File[dav.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Dav_fs/File[dav_fs.conf]/ensure: defined content as '{md5}899a57534f3d84efa81887ec93c90c9b'
Info: /Stage[main]/Apache::Mod::Dav_fs/File[dav_fs.conf]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Dav_fs/Apache::Mod[dav_fs]/File[dav_fs.load]/ensure: defined content as '{md5}2996277c73b1cd684a9a3111c355e0d3'
Info: /Stage[main]/Apache::Mod::Dav_fs/Apache::Mod[dav_fs]/File[dav_fs.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Deflate/Apache::Mod[deflate]/File[deflate.load]/ensure: defined content as '{md5}2d1a1afcae0c70557251829a8586eeaf'
Info: /Stage[main]/Apache::Mod::Deflate/Apache::Mod[deflate]/File[deflate.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Dir/Apache::Mod[dir]/File[dir.load]/ensure: defined content as '{md5}1bfb1c2a46d7351fc9eb47c659dee068'
Info: /Stage[main]/Apache::Mod::Dir/Apache::Mod[dir]/File[dir.load]: Scheduling refresh of Class[Apache::Service]
Notice:
/Stage[main]/Apache::Mod::Negotiation/Apache::Mod[negotiation]/File[negotiation.load]/ensure: defined content as '{md5}d262ee6a5f20d9dd7f87770638dc2ccd'
Info: /Stage[main]/Apache::Mod::Negotiation/Apache::Mod[negotiation]/File[negotiation.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Setenvif/Apache::Mod[setenvif]/File[setenvif.load]/ensure: defined content as '{md5}ec6c99f7cc8e35bdbcf8028f652c9f6d'
Info: /Stage[main]/Apache::Mod::Setenvif/Apache::Mod[setenvif]/File[setenvif.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Default_mods/Apache::Mod[auth_basic]/File[auth_basic.load]/ensure: defined content as '{md5}494bcf4b843f7908675d663d8dc1bdc8'
Info: /Stage[main]/Apache::Default_mods/Apache::Mod[auth_basic]/File[auth_basic.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Filter/Apache::Mod[filter]/File[filter.load]/ensure: defined content as '{md5}66a1e2064a140c3e7dca7ac33877700e'
Info: /Stage[main]/Apache::Mod::Filter/Apache::Mod[filter]/File[filter.load]: Scheduling refresh of Class[Apache::Service]
```

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Notice: /Stage[main]/Apache::Default_mods/Apache::Mod[authz_core]/File[authz_core.load]/ensure: defined content as '{md5}39942569bff2abdb259f9a347c7246bc'
Info: /Stage[main]/Apache::Default_mods/Apache::Mod[authz_core]/File[authz_core.load]: Scheduling refresh of Class[Apache::Service]
Notice:
/Stages/main]/Apache::Default_mods/Apache::Mod[access_compat]/File[access_compat.load]/ensure: defined content as '{md5}d5feb88bec4570e2dbc41cce7e0de003'
Info: /Stage[main]/Apache::Default_mods/Apache::Mod[access_compat]/File[access_compat.load]: Scheduling refresh of Class[Apache::Service]
Notice:
/Stages/main]/Apache::Mod::Authz_user/Apache::Mod[authz_user]/File[authz_user.load]/ensure: defined content as '{md5}63594303ee808423679b1ea13dd5a784'
Info: /Stage[main]/Apache::Mod::Authz_user/Apache::Mod[authz_user]/File[authz_user.load]: Scheduling refresh of Class[Apache::Service]
Notice:
/Stages/main]/Apache::Default_mods/Apache::Mod[authz_groupfile]/File[authz_groupfile.load]/ensure: defined content as '{md5}ae005a36b3ac8c20af36c434561c8a75'
Info: /Stage[main]/Apache::Default_mods/Apache::Mod[authz_groupfile]/File[authz_groupfile.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Env/Apache::Mod[env]/File[env.load]/ensure: defined content as '{md5}d74184d40d0ee24ba02626a188ee7e1a'
Info: /Stage[main]/Apache::Mod::Env/Apache::Mod[env]/File[env.load]: Scheduling refresh of Class[Apache::Service]
Notice:
/Stages/main]/Apache::Mod::Prefork/Apache::Mpm[prefork]/File[/etc/httpd/conf.modules.d/prefork.load]/ensure: defined content as '{md5}157529aafcfc03fa491bc924103e4608e'
Info:
/Stages/main]/Apache::Mod::Prefork/Apache::Mpm[prefork]/File[/etc/httpd/conf.modules.d/prefork.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache::Mod::Cgi/Apache::Mod[cgi]/File[cgi.load]/ensure: defined content as '{md5}ac20c5c5779b37ab06b480d6485a0881'
Info: /Stage[main]/Apache::Mod::Cgi/Apache::Mod[cgi]/File[cgi.load]: Scheduling refresh of Class[Apache::Service]
Notice: /Stage[main]/Apache/File[/etc/httpd/conf.modules.d/00-base.conf]/ensure: removed
Notice: /Stage[main]/Apache/File[/etc/httpd/conf.modules.d/00-dav.conf]/ensure: removed
Notice: /Stage[main]/Apache/File[/etc/httpd/conf.modules.d/00-lua.conf]/ensure: removed
Notice: /Stage[main]/Apache/File[/etc/httpd/conf.modules.d/00-mpm.conf]/ensure: removed
Notice: /Stage[main]/Apache/File[/etc/httpd/conf.modules.d/00-proxy.conf]/ensure: removed
Notice: /Stage[main]/Apache/File[/etc/httpd/conf.modules.d/00-systemd.conf]/ensure: removed
Notice: /Stage[main]/Apache/File[/etc/httpd/conf.modules.d/01-cgi.conf]/ensure: removed
Info: /etc/httpd/conf.modules.d: Scheduling refresh of Class[Apache::Service]
Notice:
/Stages/main]/Profile::Apache/Apache::Vhost[puppetagent1.zippyops.com]/File[/var/www/test]/ensure: created
Notice: /Stage[main]/Profile::Apache/Apache::Vhost[puppetagent1.zippyops.com]/Concat[25-puppetagent1.zippyops.com.conf]/File[/etc/httpd/conf.d/25-puppetagent1.zippyops.com.conf]/ensure: defined content as '{md5}7d957ad94fdb270f20555b9bd96278c'
Info: Concat[25-puppetagent1.zippyops.com.conf]: Scheduling refresh of Class[Apache::Service]
Info: Class[Apache::Service]: Scheduling refresh of Service[httpd]
Notice: /Stage[main]/Apache::Service/Service[httpd]/ensure: ensure changed 'stopped' to 'running'
Info: /Stage[main]/Apache::Service/Service[httpd]: Unscheduling refresh on Service[httpd]
Notice: Applied catalog in 16.27 seconds
[root@puppetagent1 manifests]#
```

Its executed successfully !!!

Making Automation Work

HIERA:

OVERVIEW

- § Hiera is a key/value data store for looking up data.
- § Let you set node-specific data without repeating yourself.
- § Why use Hiera?
 - Single source of truth for your data.
 - Configure default data with hierachal overrides.
 - Use Puppet modules from the Forge.
 - No need to edit the module, just put the data in Hiera.
 - Publish your own modules for collaboration.
 - Keeps your data out of your module before sharing it.
 - No more clashing variable names.

SETTING UP HIERA

§ `hiera.yaml` is located in `/etc/puppetlabs/puppet/`
§ `:backends`: tells Hiera what kind of data sources it should process. In this case, we'll be using YAML files.

§ `:yaml`: configures the YAML data backend.
§ `:datadir`: tells Hiera the location of the data sources.
§ `:hierarchy`: configures the data sources Hiera be using.

- Separate their hierarchies into directories.
- More specific data at the top.
- Least specific at the bottom.

Setting Up Hiera

§ You can use facts in your Hiera lookups.

`hiera.yaml`

```
---:backends:
```

```
- yaml
```

```
:yaml:
```

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```
:datadir: "/etc/puppetlabs/code/environments/%{environment}/hieradata"
```

```
:hierarchy:
```

- "nodes/%{::trusted.certname}"
- common

AUTOMATIC PARAMETER LOOKUP

§ Process of automatic parameter lookup:

§ Look for parameters passed using the class {} declaration.

- If no parameter is passed, it will look in the Hiera data source for the parameter<CLASS NAMESPACE>::parameter
- If it's not found in the Hiera data source it will use the default set "common"

HIERA FUNCTION

§ hiera: Performs a standard priority lookup of the hierarchy and returns the most specific value for a given key. The returned value can be any type of data.

§ Arguments:

§ A string key that Hiera searches for in the hierarchy. Required.

§ An optional default value to return if Hiera doesn't find anything matching the key.

§ The optional name of an arbitrary hierarchy level to insert at the top of the hierarchy.

Example:

```
define apache::vhost(  
  $port,  
)
```

```
#/etc/puppetlabs/code/environments<ENVIRONMENT>/hieradata/common.yml
```

```
---
```

```
apache::vhost::port: 80
```

§ hiera_array: Finds all matches of a key throughout the hierarchy and returns them as a single flattened array of unique values. If any of the matched values are arrays, they're flattened and included in the results. This is called an array merge lookup.

§ Arguments:

- A string key that Hiera searches for in the hierarchy. Required.

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- An optional default value to return if Hiera doesn't find anything matching the key.
- The optional name of an arbitrary hierarchy level to insert at the top of the hierarchy.

§ `hiera_hash`: Finds all matches of a key throughout the hierarchy and returns them in a merged hash. If any of the matched hashes share keys, the final hash uses the value from the highest priority match. This is called a hash merge lookup.

§ Arguments:

- A string key that Hiera searches for in the hierarchy. Required.
- An optional default value to return if Hiera doesn't find anything matching the key.
- The optional name of an arbitrary hierarchy level to insert at the top of the hierarchy.

SETTING UP OUR CONFIGURATION FILE AND DATA SOURCES

First we have to go puppet directory and edit `hiera.yaml` file ,

```
[root@puppetmaster puppet]# cd /etc/puppetlabs/code/environments/production/  
[root@puppetmaster production]# vi hiera.yaml
```

In that file we have to add data directory route ,

```
:datadir: /etc/puppetlabs/code/environments/%{environment}/hieradata
```

Now we can go production directory and to create hieradata directory ,

```
[root@puppetmaster puppet]# cd ../code/environments/production/hieradata/
```

In that directory we have to create `common.yaml` file ,

```
[root@puppetmaster hieradata]# vi common.yaml  
---  
foo: bar
```

in this file I have added sample code init for this example ,

```
[root@puppetmaster puppet]# hiera -d foo environment=production  
DEBUG: 2018-07-08 20:29:40 -0400: Hiera YAML backend starting  
DEBUG: 2018-07-08 20:29:40 -0400: Looking up foo in YAML backend  
DEBUG: 2018-07-08 20:29:40 -0400: Ignoring bad definition in :hierarchy: 'nodes/'  
DEBUG: 2018-07-08 20:29:40 -0400: Looking for data source common  
DEBUG: 2018-07-08 20:29:40 -0400: Found foo in common  
Bar
```

Its run exactly !!!

Now we can use this good one ,

```
[root@puppetmaster hieradata]# cat common.yaml  
---  
ntp_server:
```

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- 0.ubuntu.pool.ntp.org
- 1.ubuntu.pool.ntp.org
- 2.ubuntu.pool.ntp.org
- 3.ubuntu.pool.ntp.org

Now I have added in common.yaml ntp_server ,

Lets run hiera ,

```
[root@puppetmaster hieradata]# hiera -d ntp_server environment=production
DEBUG: 2018-07-08 20:37:52 -0400: Hiera YAML backend starting
DEBUG: 2018-07-08 20:37:52 -0400: Looking up ntp_server in YAML backend
DEBUG: 2018-07-08 20:37:52 -0400: Ignoring bad definition in :hierarchy: 'nodes/'
DEBUG: 2018-07-08 20:37:52 -0400: Looking for data source common
DEBUG: 2018-07-08 20:37:52 -0400: Found ntp_server in common
["0.ubuntu.pool.ntp.org",
 "1.ubuntu.pool.ntp.org",
 "2.ubuntu.pool.ntp.org",
 "3.ubuntu.pool.ntp.org"]
[root@puppetmaster hieradata]#
```

There is my data added in common.yaml file .

```
[root@puppetmaster hieradata]# cat common.yaml
---
profile::base::ntp_servers:
  - 0.ubuntu.pool.ntp.org
  - 1.ubuntu.pool.ntp.org
  - 2.ubuntu.pool.ntp.org
  - 3.ubuntu.pool.ntp.org
profile::apache::default_vhost: false
```

Here I have added profile classes in this file ,

Lets test this setting ,

```
[root@puppetmaster hieradata]# hiera -d profile::base::ntp_servers environment=production
DEBUG: 2018-07-08 20:42:02 -0400: Hiera YAML backend starting
DEBUG: 2018-07-08 20:42:02 -0400: Looking up profile::base::ntp_servers in YAML backend
DEBUG: 2018-07-08 20:42:02 -0400: Ignoring bad definition in :hierarchy: 'nodes/'
DEBUG: 2018-07-08 20:42:02 -0400: Looking for data source common
DEBUG: 2018-07-08 20:42:02 -0400: Found profile::base::ntp_servers in common
["0.ubuntu.pool.ntp.org",
 "1.ubuntu.pool.ntp.org",
 "2.ubuntu.pool.ntp.org",
 "3.ubuntu.pool.ntp.org"]
```

Its worked good!!!

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Making Automation Work



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