Devops internal-2

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AIM:

design and implement a puppet configuration using manifests, modules classes and functions to automate the installation of software package e.g. Apache or Nginx analyze how modularization and reusability are achieved in puppet configuration management

CODE:

1. Verify Puppet

```
puppet --version
```

2. Create module structure

```
mkdir -p ~/puppet-demo/modules/webserver/{manifests,lib/puppet/functions/webserver}
```

Create class manifest

```
tee ~/puppet-demo/modules/webserver/manifests/init.pp > /dev/null <<'EOF'
class webserver {
  package { 'apache2': ensure => installed }

  service { 'apache2':
        ensure => running,
        enable => true,
  }
```

```
  file { '/var/www/html/index.html':
        ensure  => file,
        content => "<h1>Hello from Puppet Webserver!</h1>"
  }

  notify { 'webserver_notice':
        message => webserver::greet(),
  }
}
EOF
```

Create function

```
tee ~/puppet-demo/modules/webserver/lib/puppet/functions/webserver/greet.rb > /dev/null <<'EOF'
Puppet::Functions.create_function(:'webserver::greet') do
  def greet()
        "Webserver setup done!"
  end
end
EOF
```

Create main manifest

```
tee ~/puppet-demo/site.pp > /dev/null <<'EOF'
include webserver
```

EOF

3. Apply Puppet manifest

sudo /opt/puppetlabs/bin/puppet apply ~/puppet-demo/site.pp
--modulepath=~/puppet-demo/modules

4. Verify Apache and HTML

systemctl status apache2

cat /var/www/html/index.html

OUTPUT:

```
root@CSE-LAB1-18:~# puppet --version
8.10.0
```

```
root@CSE-LAB1-18:~# mkdir -p ~/puppet-demo/modules/webserver/{manifests,lib/puppet/functions/webserver}
root@CSE-LAB1-18:~# tee ~/puppet-demo/modules/webserver/manifests/init.pp > /dev/null <<'EOF'
class webserver {
  package { 'apache2': ensure => installed }
  service { 'apache2': ensure => running, enable => true }
  file { '/var/www/html/index.html':
    ensure  => file,
    content => "<h1>Hello from Puppet Webserver!</h1>"
  }
  notify { call_function('webserver::greet'): }
}
EOF
root@CSE-LAB1-18:~# tee ~/puppet-demo/modules/webserver/lib/puppet/functions/webserver/greet.rb > /dev/null <<'EOF'
Puppet::Functions.create_function(:'webserver::greet') do
  def greet()
    "Webserver setup done!"
  end
end
EOF
root@CSE-LAB1-18:~# tee ~/puppet-demo/site.pp > /dev/null <<'EOF'
include webserver
EOF
```

```
root@CSE-LAB1-18:~# tee ~/puppet-demo/modules/webserver/manifests/init.pp > /dev/null <<'EOF'
class webserver {
  package { 'apache2': ensure => installed }
  service { 'apache2': ensure => running, enable => true }
  file { '/var/www/html/index.html':
    ensure  => file,
    content => "<h1>Hello from Puppet Webserver!</h1>"
  }
  notify { 'webserver_notice':
    message => webserver::greet(),
  }
}
EOF
root@CSE-LAB1-18:~# sudo /opt/puppetlabs/bin/puppet apply ~/puppet-demo/site.pp --modulepath=~/puppet-demo/modules
Warning: Facter: Container runtime, 'wsl', is unsupported, setting to 'container_other'
Notice: Compiled catalog for cse-lab1-18.localdomain in environment production in 0.17 seconds
Notice: /Stage[main]/Webserver/Package[apache2]/ensure: created
Notice: /Stage[main]/Webserver/File[/var/www/html/index.html]/content: content changed '{sha256}6faef4d5d777fdcaa653766b0ac8b9ed32d0fd87f7dcd79f02ff524dd1b0
eb69' to '{sha256}4e4a84c67239703ab938f9813c8f9edb75f6db6488edd8833bbab674e4824fd4'
Notice: Webserver setup done!
Notice: /Stage[main]/Webserver/Notify[webserver_notice]/message: defined 'message' as 'Webserver setup done!'
Notice: Applied catalog in 6.73 seconds
root@CSE-LAB1-18:~# systemctl status apache2
cat /var/www/html/index.html
● apache2.service - The Apache HTTP Server
     Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
     Active: active (running) since Fri 2025-10-31 09:19:27 UTC; 26s ago
       Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 3625 (apache2)
      Tasks: 55 (limit: 9329)
     Memory: 5.8M (peak: 9.3M)
        CPU: 27ms
     CGroup: /system.slice/apache2.service
             ├─3625 /usr/sbin/apache2 -k start
             ├─3627 /usr/sbin/apache2 -k start
             └─3628 /usr/sbin/apache2 -k start

Oct 31 09:19:27 CSE-LAB1-18 systemd[1]: Starting apache2.service - The Apache HTTP Server...
Oct 31 09:19:27 CSE-LAB1-18 systemd[1]: Started apache2.service - The Apache HTTP Server.
<h1>Hello from Puppet Webserver!</h1>root@CSE-LAB1-18:~#
```

CONCLUSION:

The Puppet configuration successfully automated the installation and configuration of the Apache webserver using manifests, modules, classes, and custom functions. By modularizing the configuration into a webserver module and using reusable classes and functions, the setup is maintainable, scalable, and easy to replicate across multiple nodes. This demonstrates the power of Puppet in implementing Infrastructure as Code (IaC), reducing manual effort, minimizing errors, and ensuring consistency across environments.