Implement Hiera to manage configuration data hierarchically.

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Introduction

This guide provides a step-by-step approach to implementing Hiera for managing configuration data hierarchically in Puppet.

Problem Statement

Managing configuration data directly within Puppet manifests can lead to duplication and reduced maintainability. Hiera helps to separate configuration data from code, making it easier to manage and reuse.

Pre-requisites

Completion of all previous lab guides (up to Lab Guide-03) is required before proceeding with Lab Guide-04.

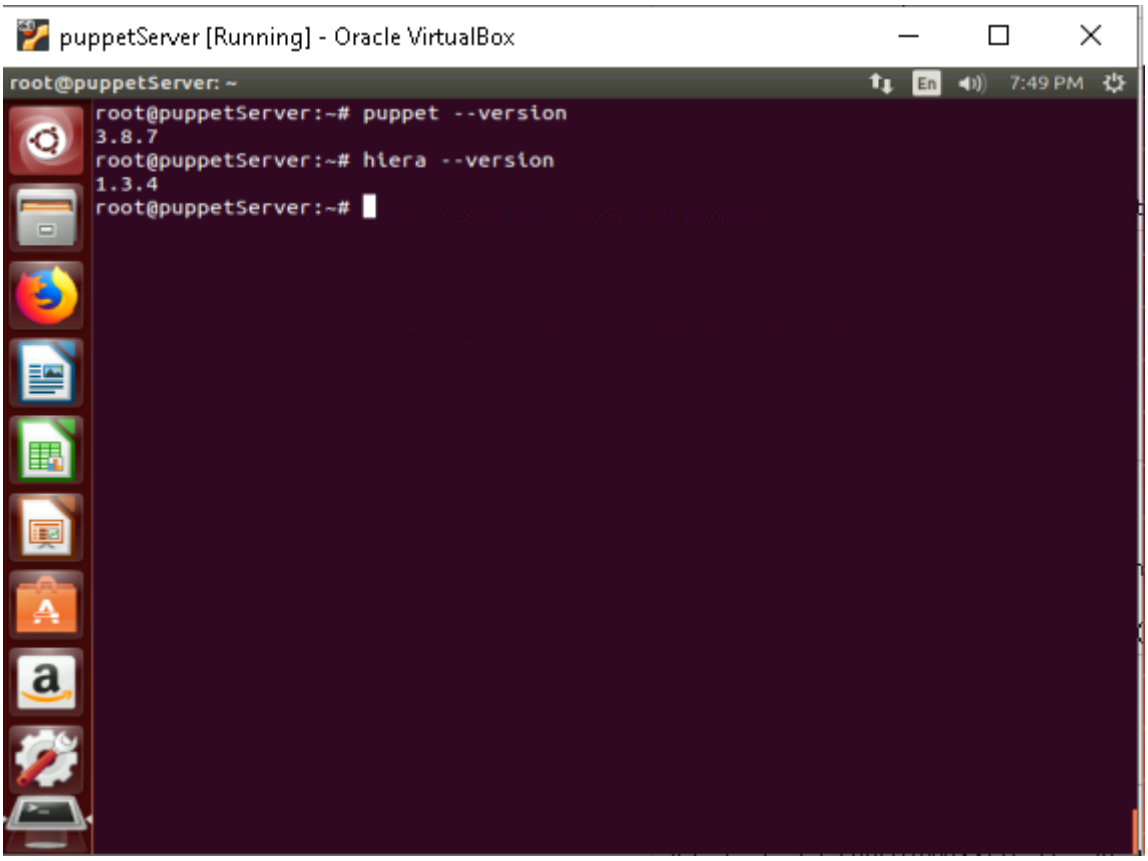
1. Puppet 3.8.7 is installed on your Puppet Master and Agent nodes.
2. Ensure YAML support is available, as it's the default backend for Hiera.
3. Administrative access to configure files on the Puppet server.

Steps to Implement Hiera

1. Install Hiera (if not already installed)

Hiera is bundled with Puppet 3.8.7. Verify installation using:

```
puppet --version
hiera --version
```



If not installed, run:

```
sudo apt-get install hiera
```

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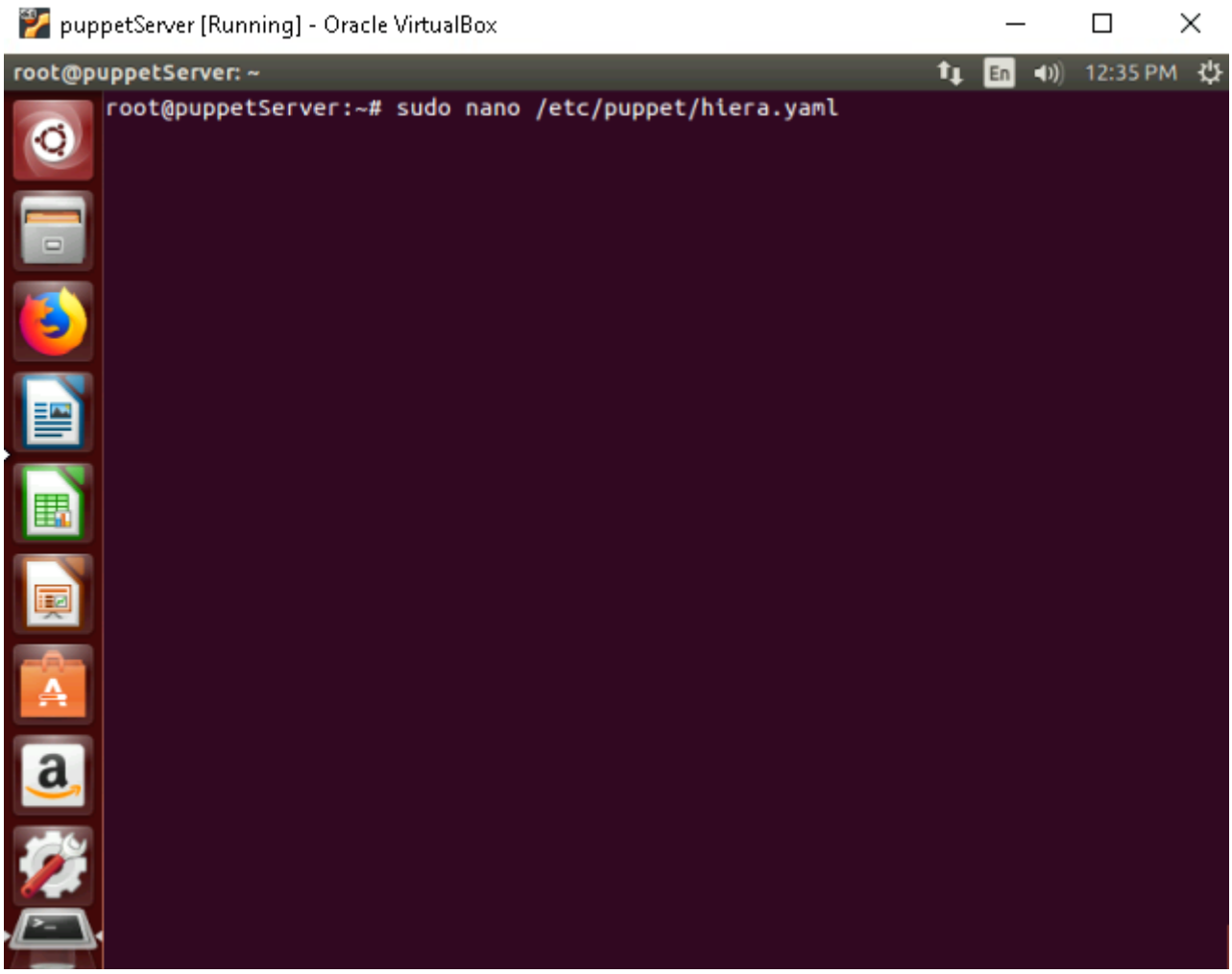
2. Configure Hiera

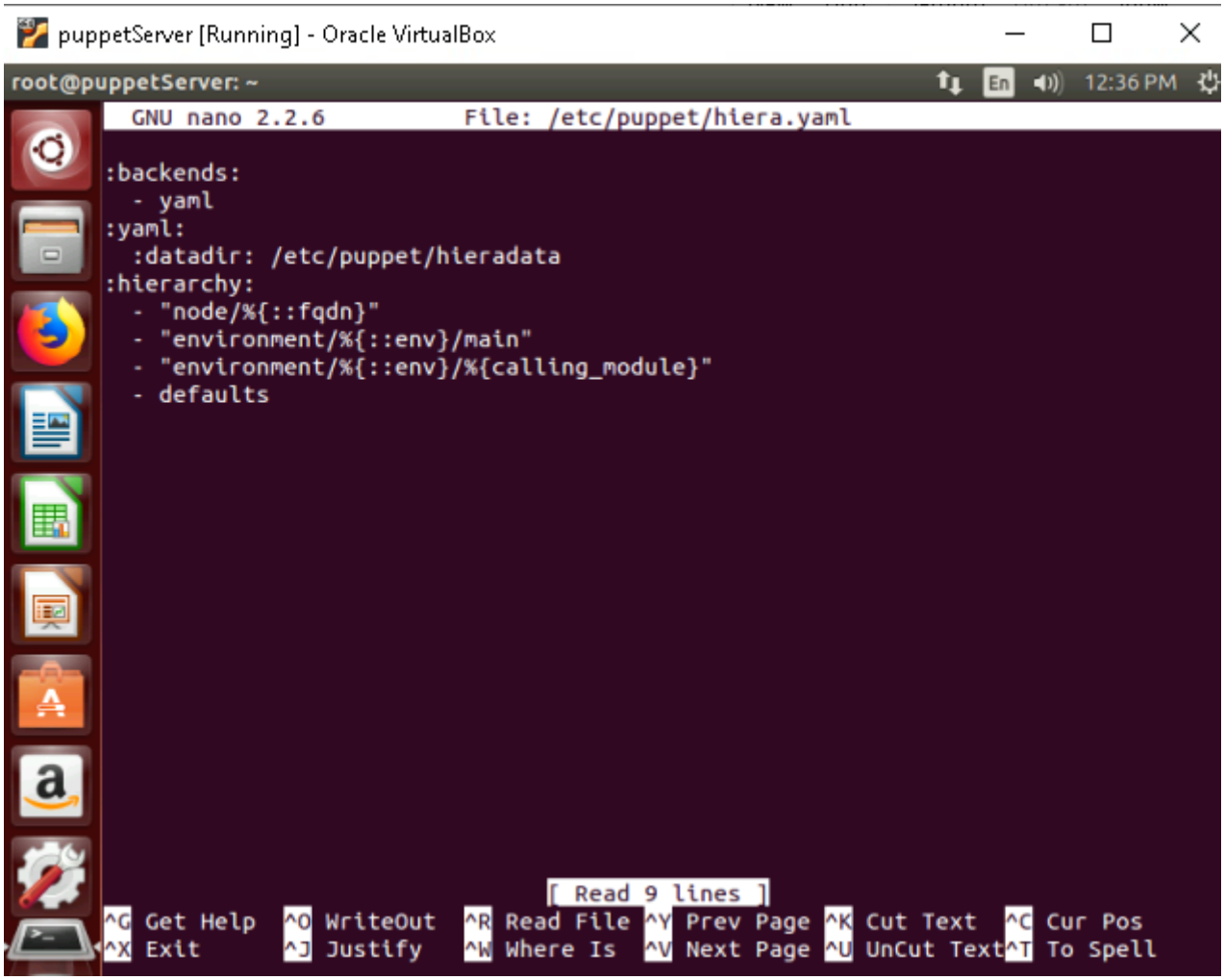
1. **Create the Hiera Configuration File**

   The `hiera.yaml` file should be located at `/etc/puppet/hiera.yaml`. Example configuration:

   ```
   sudo nano /etc/puppet/hiera.yaml
   ```




```
:backends:
  - yaml
:yaml:
  :datadir: /etc/puppet/hieradata
:hierarchy:
  - "node/%{::fqdn}"
  - "environment/%{::env}/main"
  - "environment/%{::env}/%{calling_module}"
  - defaults
```

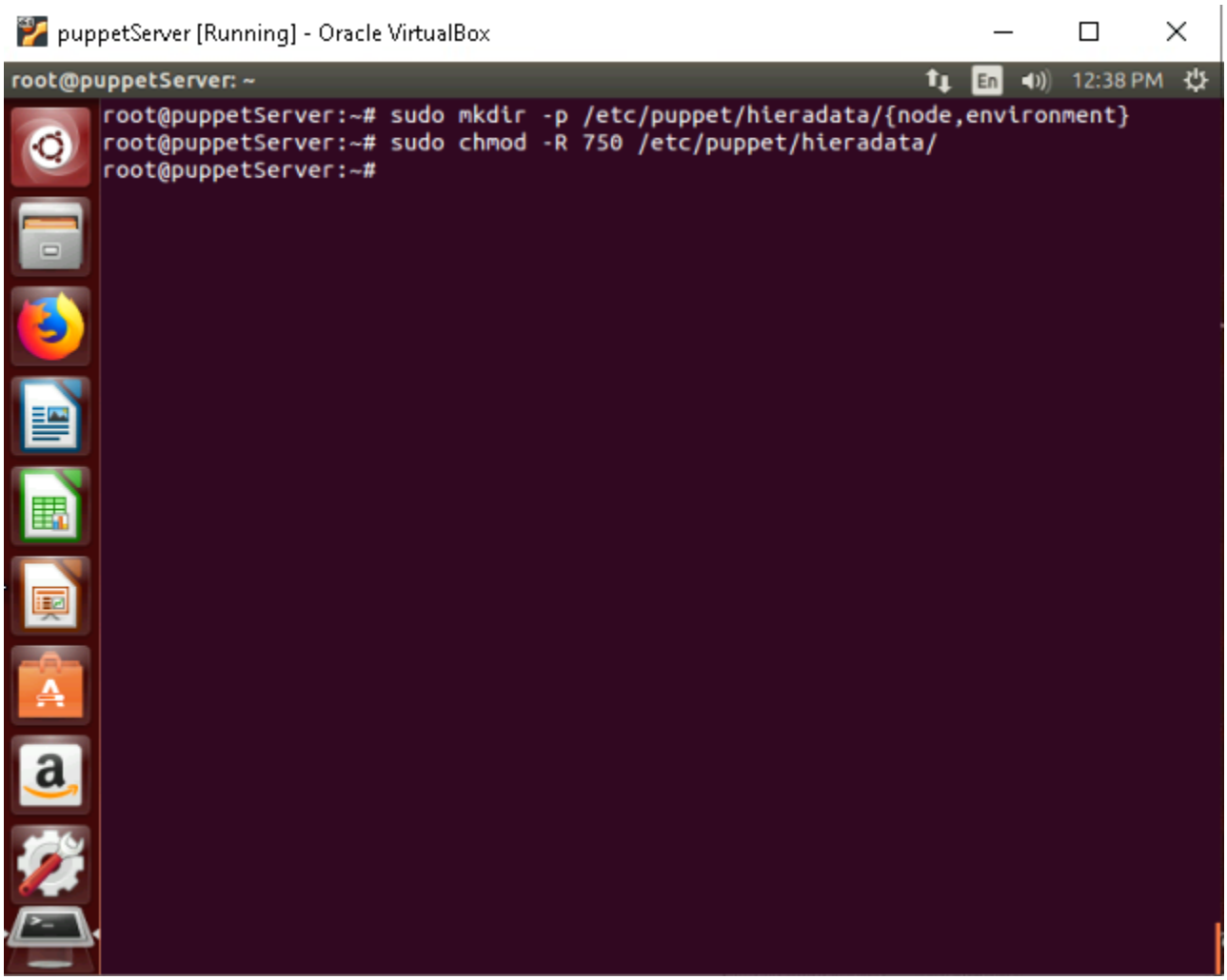


- **Backends**: Defines data storage formats (YAML is default).
- **Data Directory**: `/etc/puppet/hieradata` is where your YAML files will reside.
- **Hierarchy**: Defines the order of data lookups. It uses variables like `::fqdn` (node hostname) or `::env` (environment).

2. **Create Data Directory**

   Ensure the directory `/etc/puppet/hieradata` exists:

```
sudo mkdir -p /etc/puppet/hieradata/{node,environment}
sudo chmod -R 750 /etc/puppet/hieradata
```



- **Node Data**: Contains node-specific data files.
- **Environment Data**: Contains environment-specific data files.

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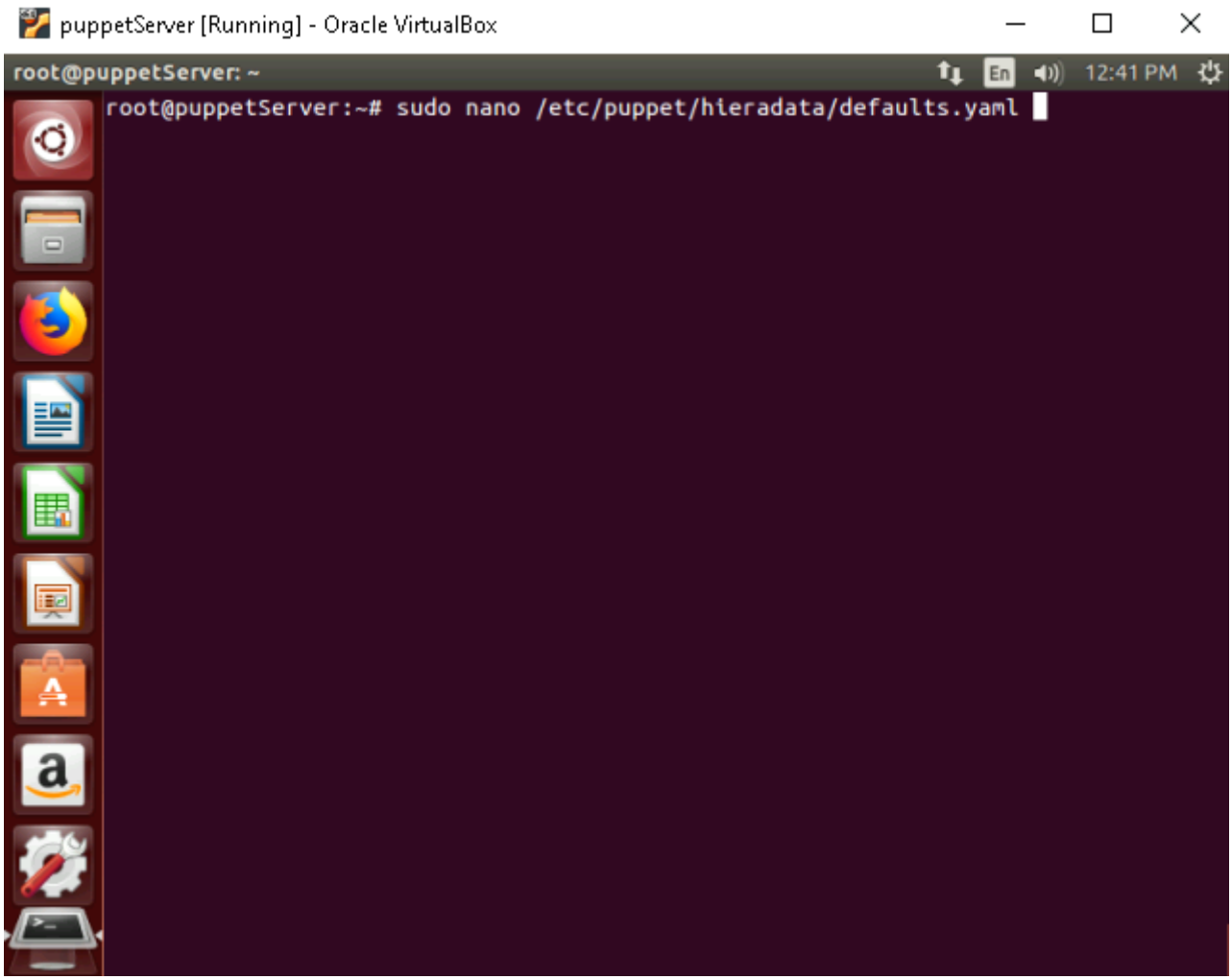
3. Create Hierarchical Data Files

1. **Common Data**: Default values shared across nodes.

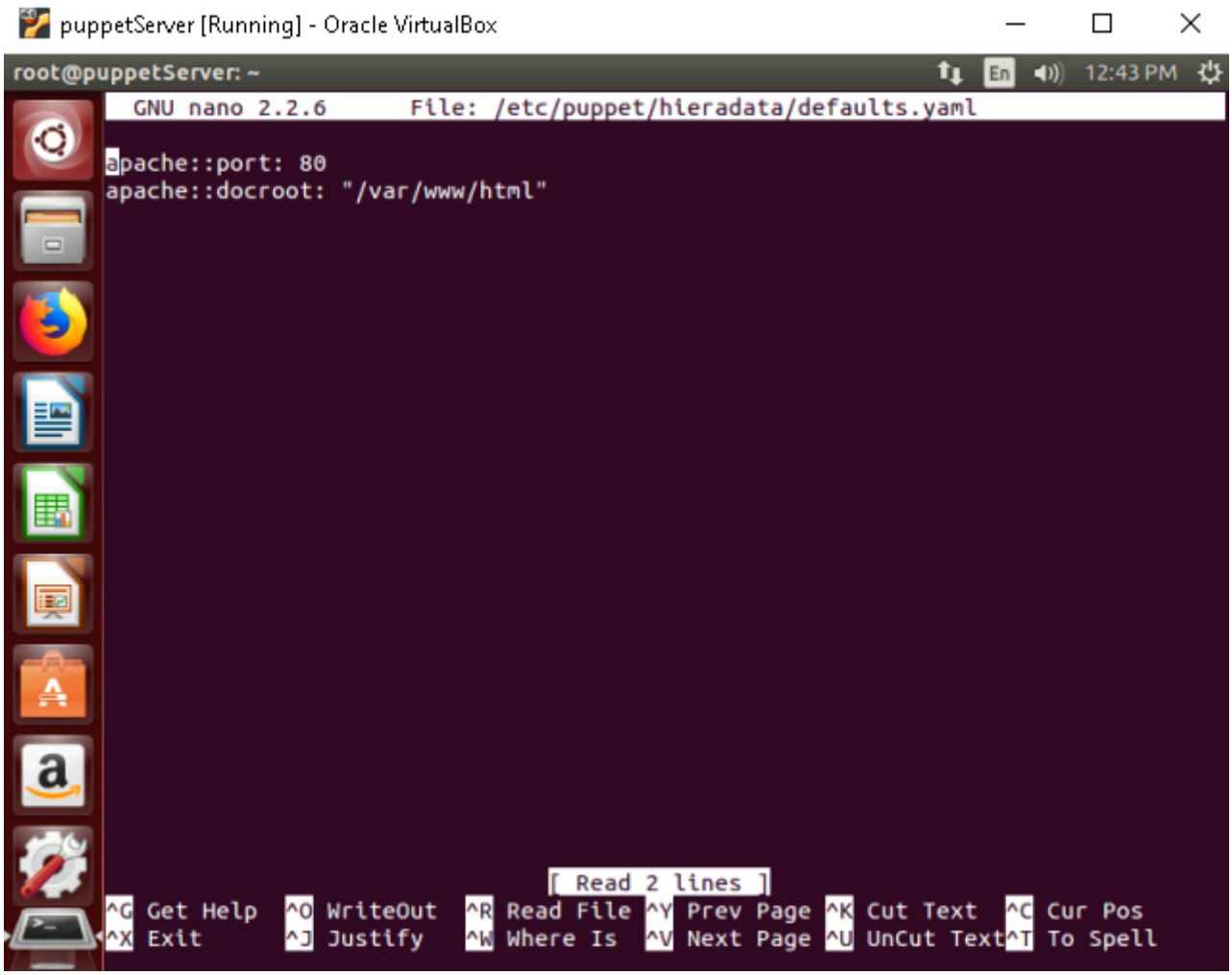
   File: `/etc/puppet/hieradata/defaults.yaml`

   ```
   sudo nano /etc/puppet/hieradata/defaults.yaml
   ```



Example:

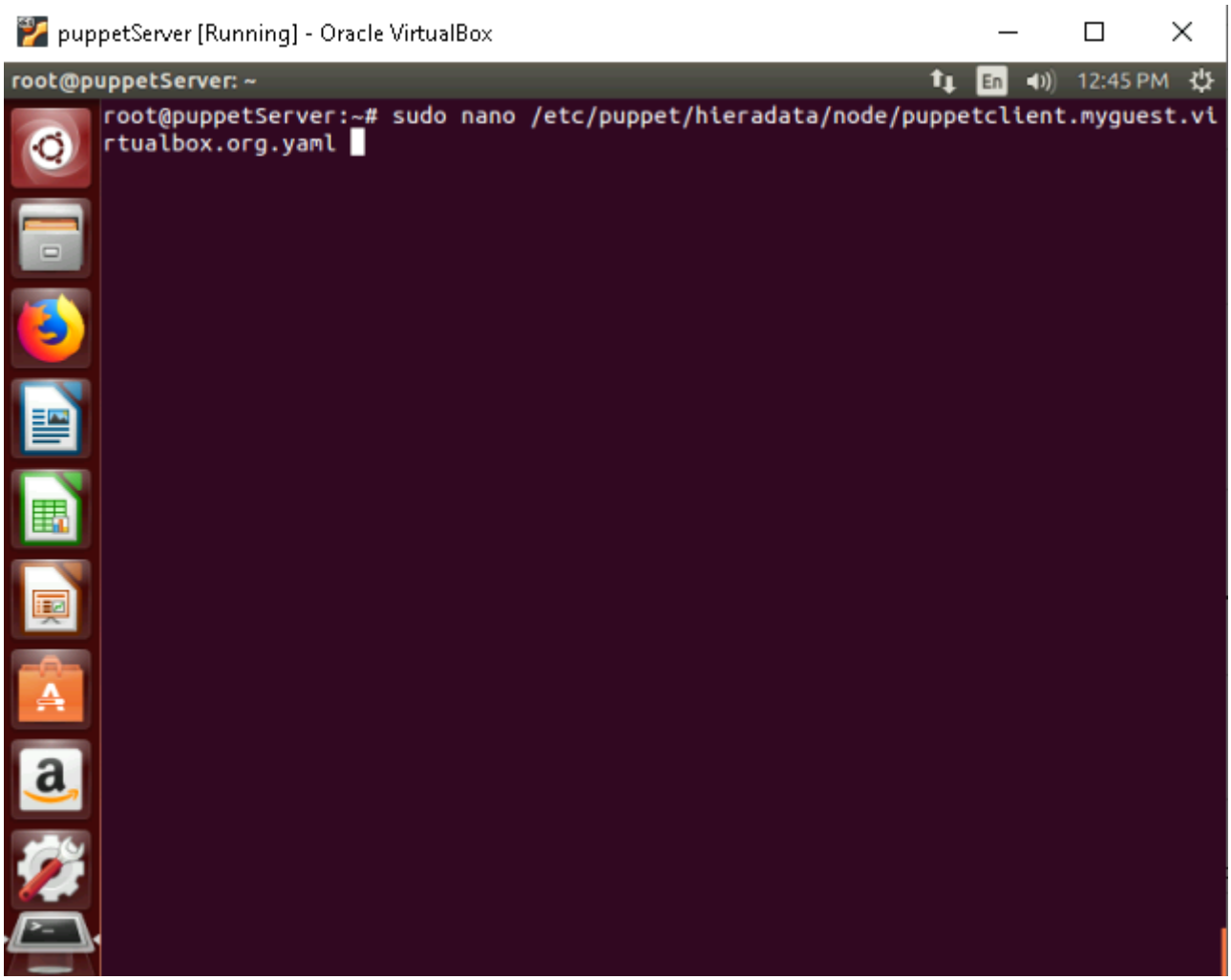
```
apache::port: 80
apache::docroot: "/var/www/html"
```



2. **Node-Specific Data**: Values for individual nodes.

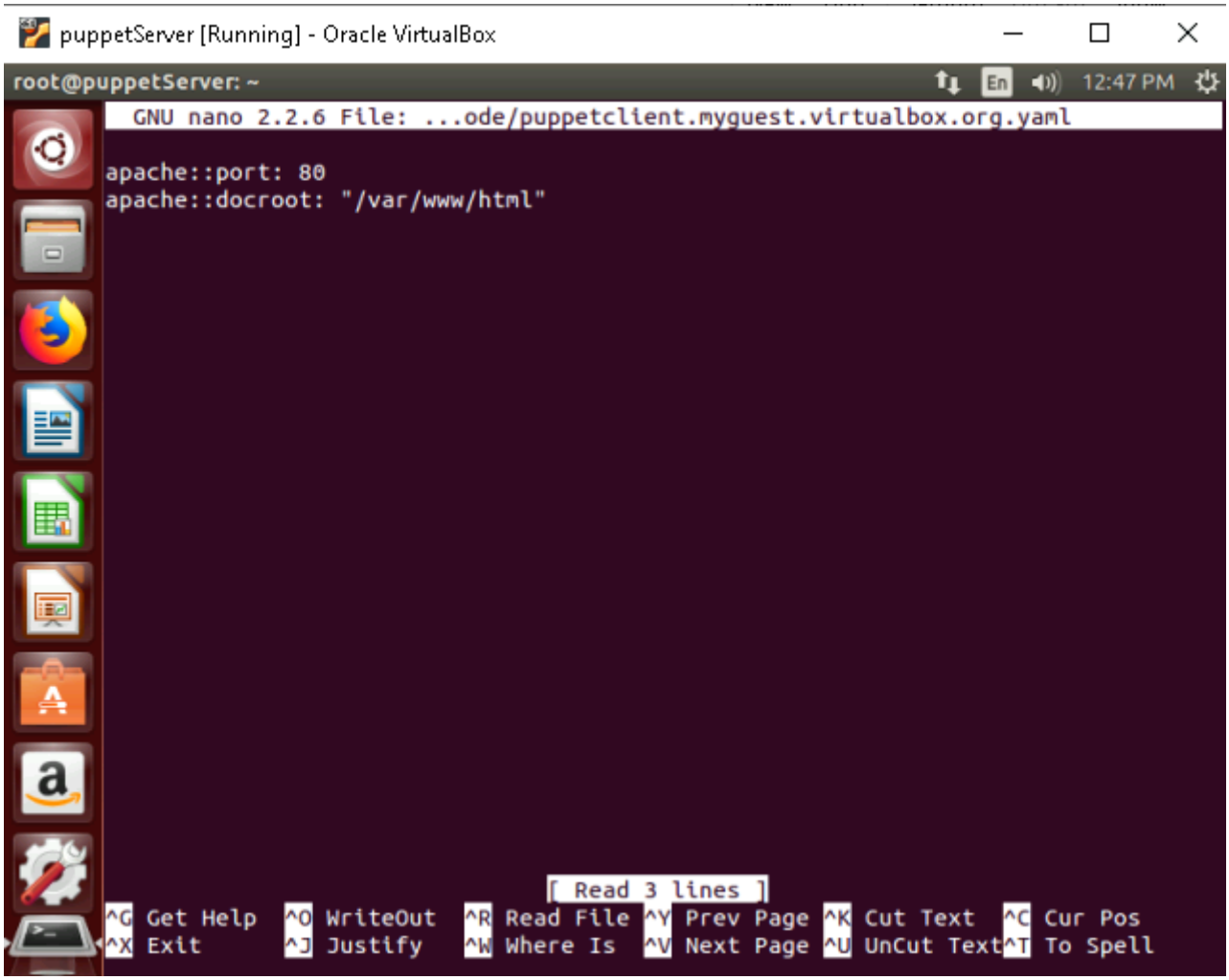
   File: `/etc/puppet/hieradata/node/puppetclient.myguest.virtualbox.org.yaml`

```
sudo nano
/etc/puppet/hieradata/node/puppetclient.myguest.virtualbox.org.yaml
```



Example:

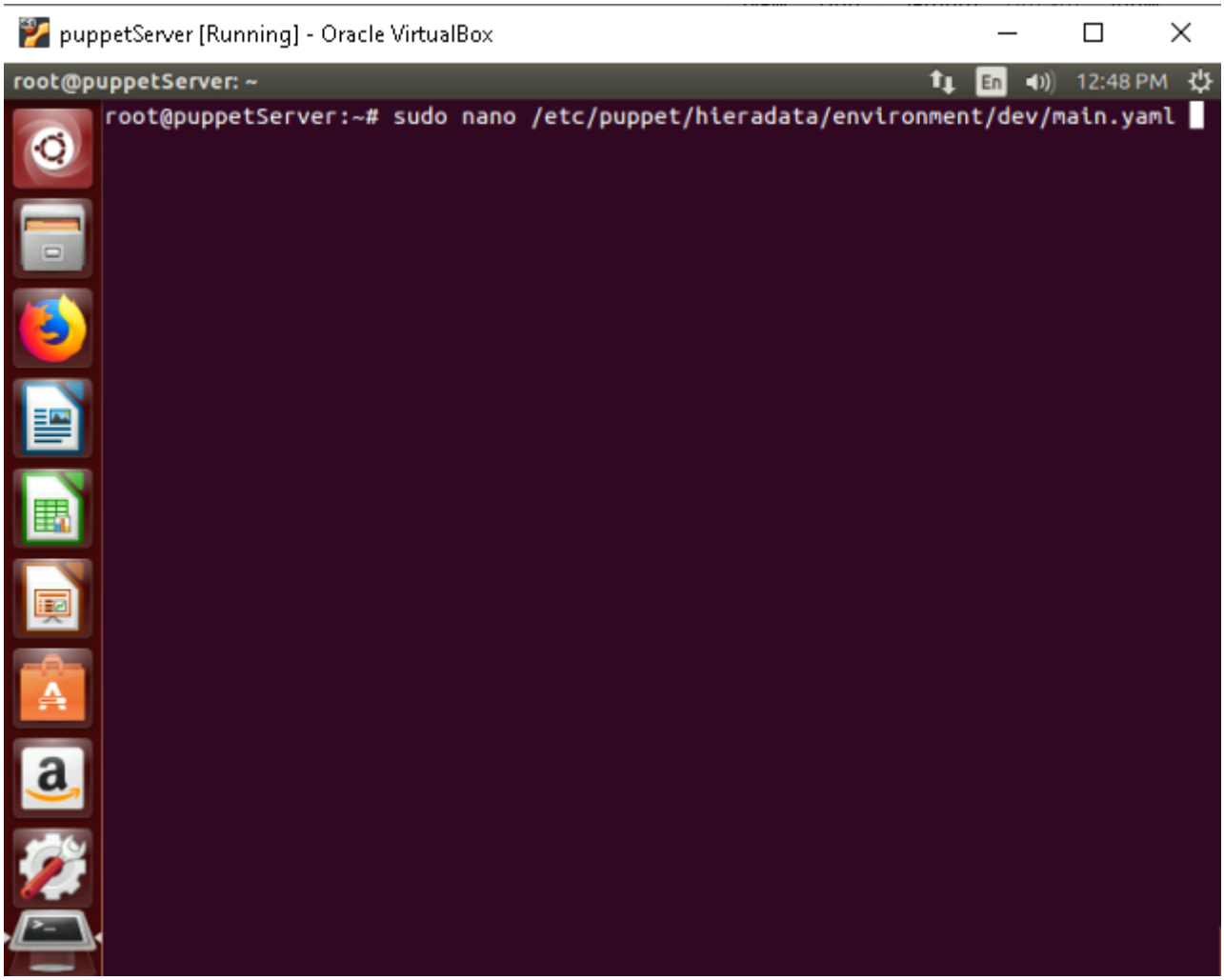
```
apache::port: 80
apache::docroot: "/home/www/html"
```



3. **Environment-Specific Data**: Values for environments like `dev` or `prod`, environments has to be created in `/etc/puppet/hieradata/environment/` directory manually.

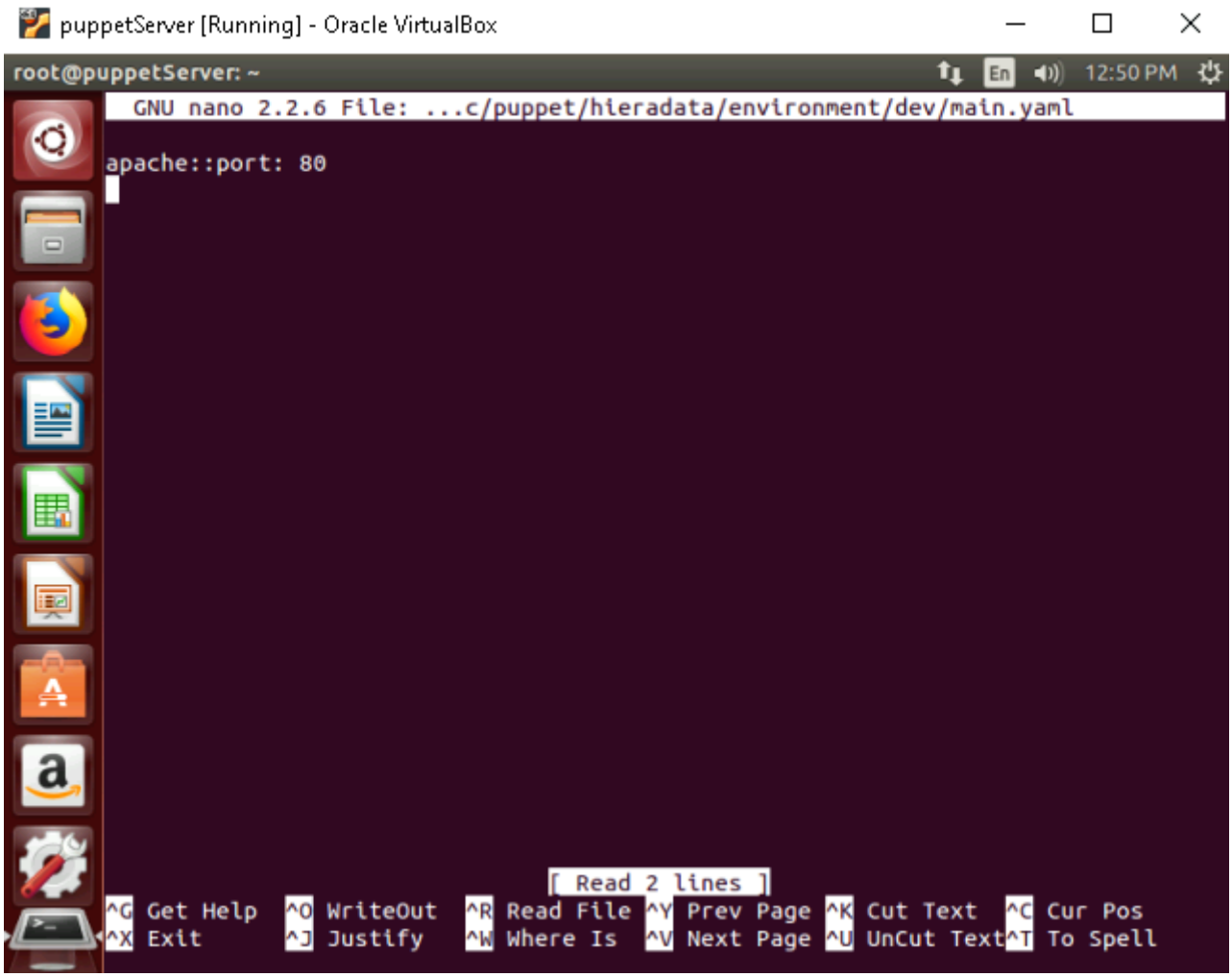
   File: `/etc/puppet/hieradata/environment/prod/main.yaml`

```
sudo nano /etc/puppet/hieradata/environment/prod/main.yaml
```



Example:

```
apache::port: 80
```



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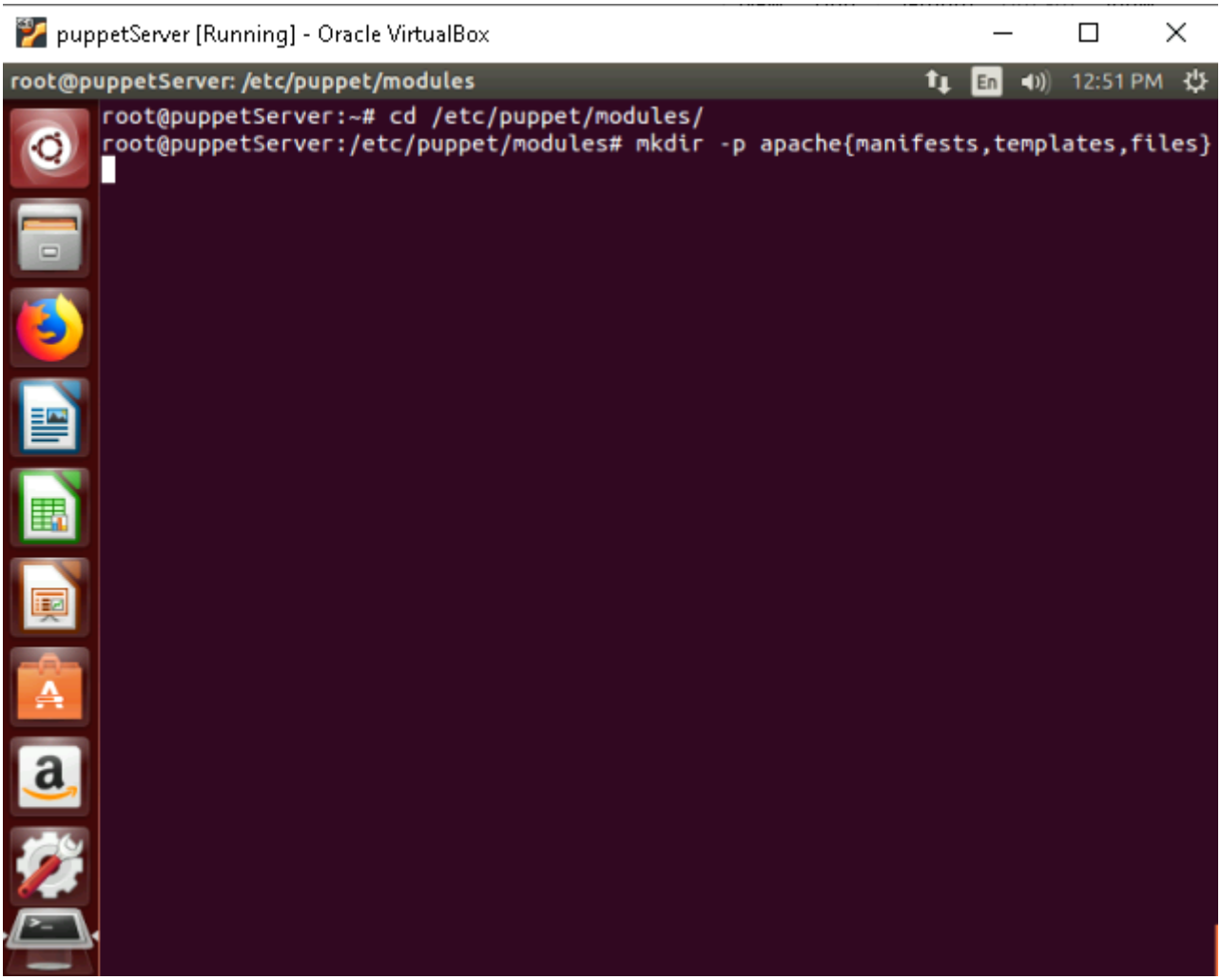
4. Create a Puppet Module

Modules are essential for organizing Puppet manifests and enabling Hiera integration.

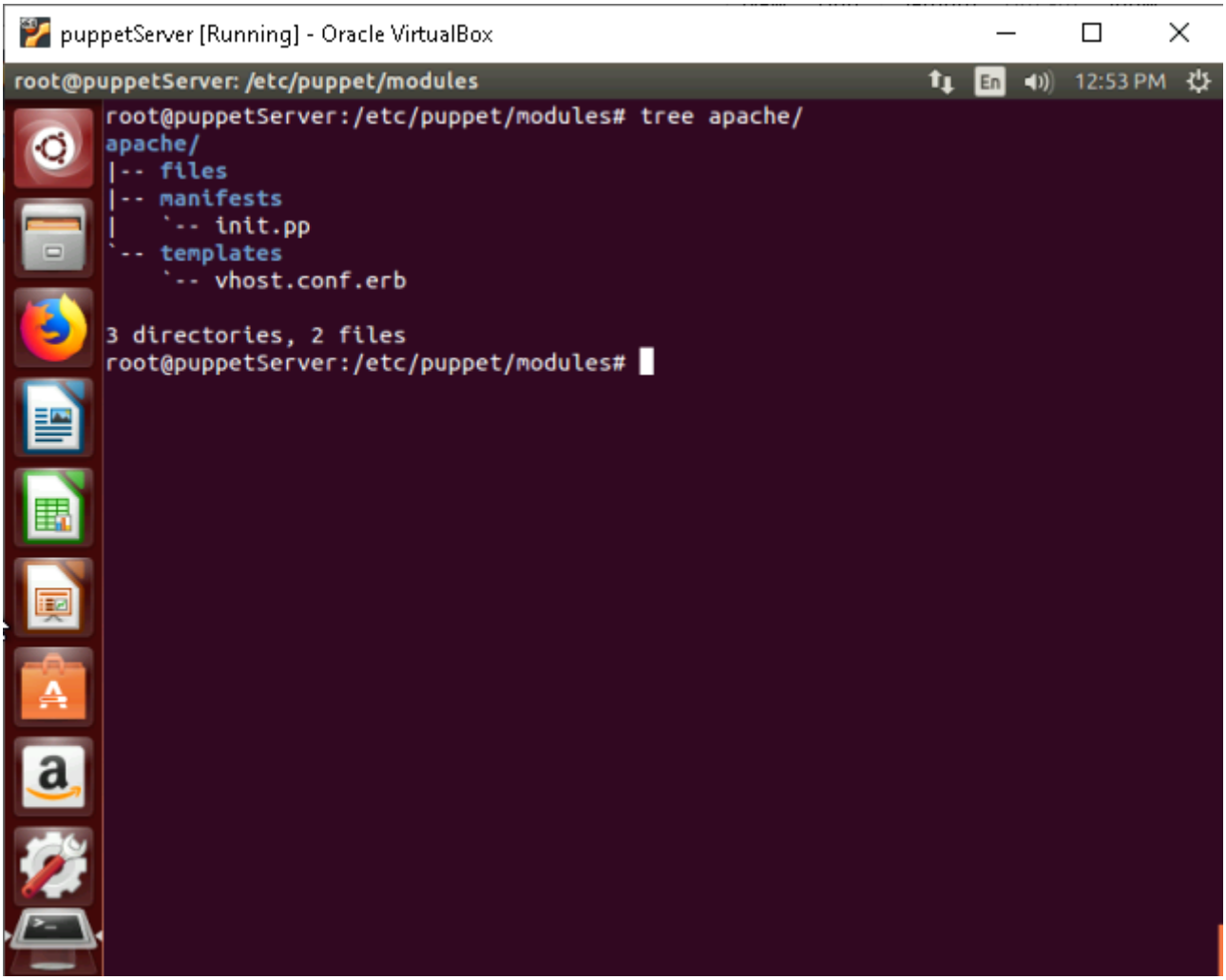
Step 1: Create the Module Directory

```
cd /etc/puppet/modules
mkdir -p apache{manifests,templates,files}
```



This creates a skeleton module structure:

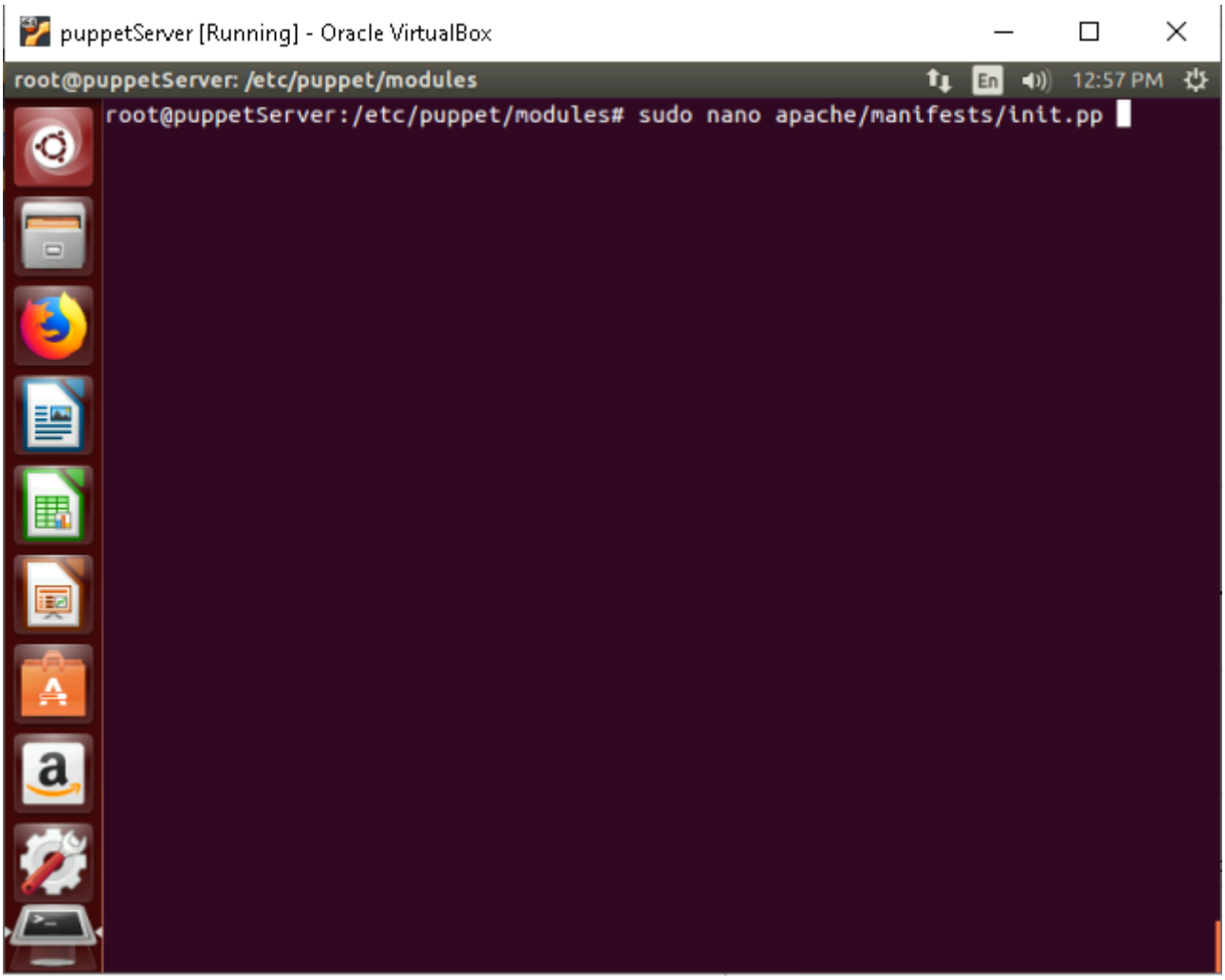
```
modules/apache/
├── manifests/
├── templates/
├── files/
```



Step 2: Define a Manifest

Create a manifest to define your class in `manifests/init.pp`:

```
sudo nano apache/manifests/init.pp
```



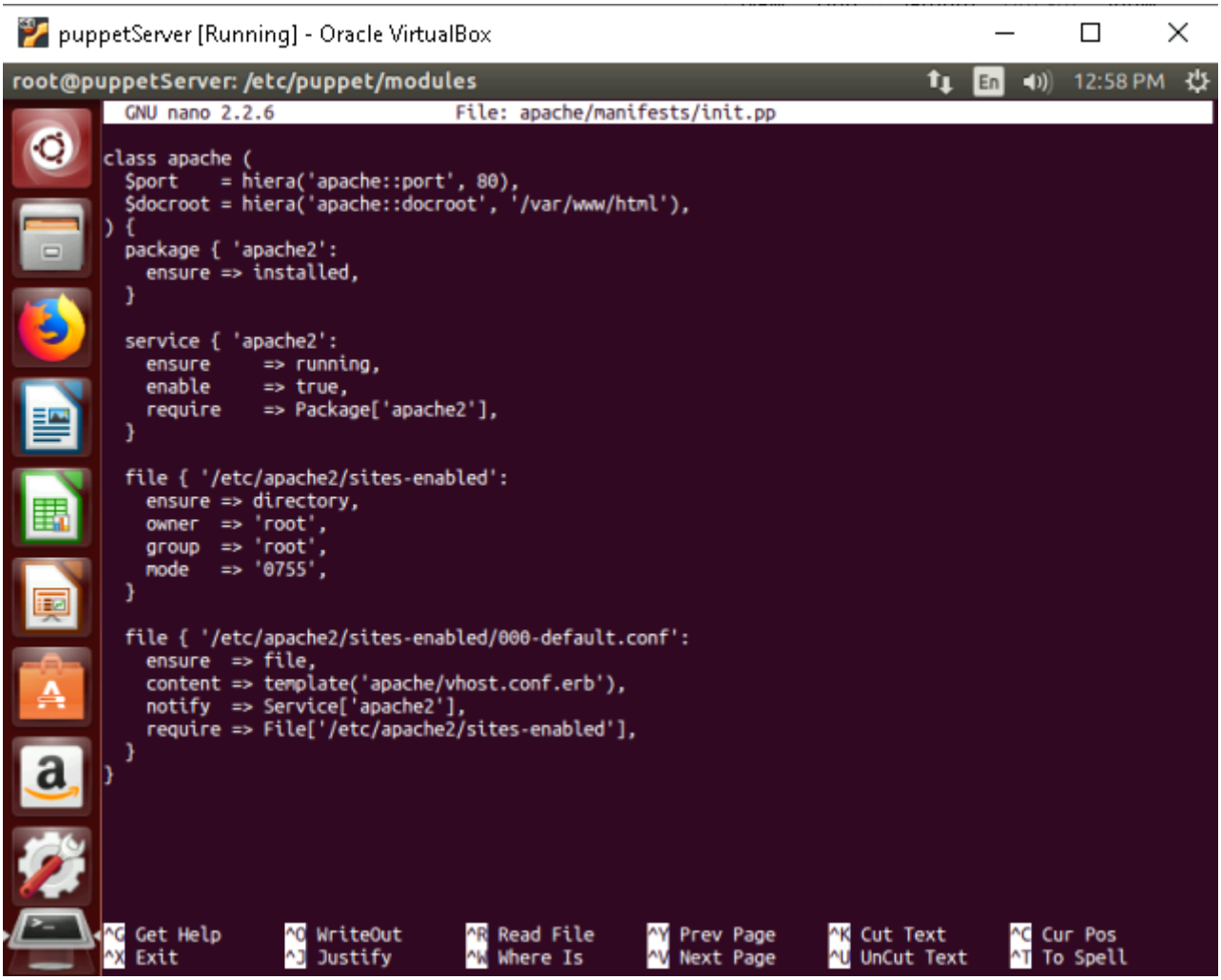

```
class apache (
  $port    = hiera('apache::port', 80),
  $docroot = hiera('apache::docroot', '/var/www/html'),
) {
  package { 'apache2':
    ensure => installed,
  }

  service { 'apache2':
    ensure     => running,
    enable     => true,
    require    => Package['apache2'],
  }

  file { '/etc/apache2/sites-enabled':
    ensure => directory,
    owner  => 'root',
    group  => 'root',
    mode   => '0755',
  }

  file { '/etc/apache2/sites-enabled/000-default.conf':
    ensure  => file,
    content => template('apache/vhost.conf.erb'),
```

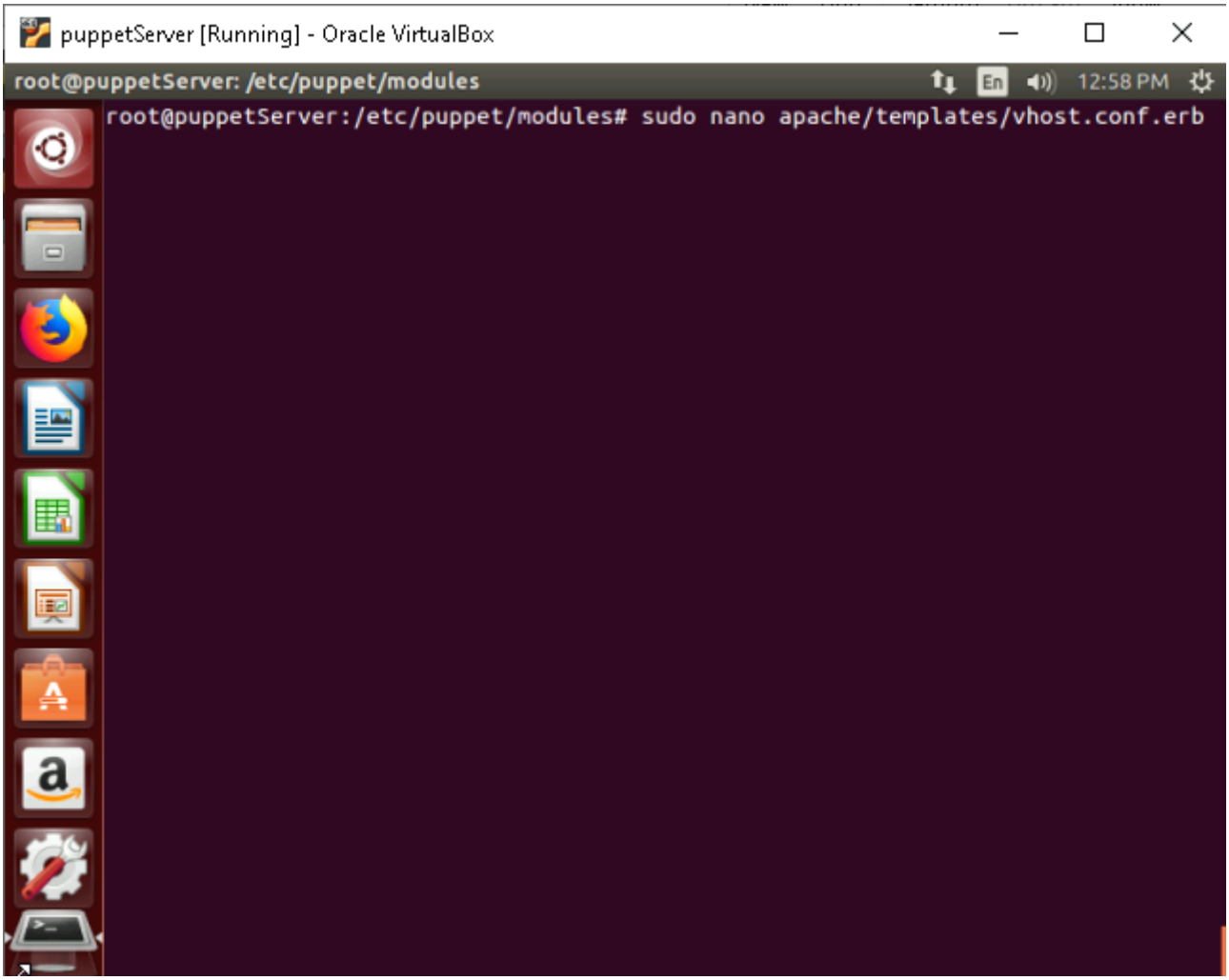
```
    notify  => Service['apache2'],
    require => File['/etc/apache2/sites-enabled'],  # Ensure the directory exists
first
  }
}
```



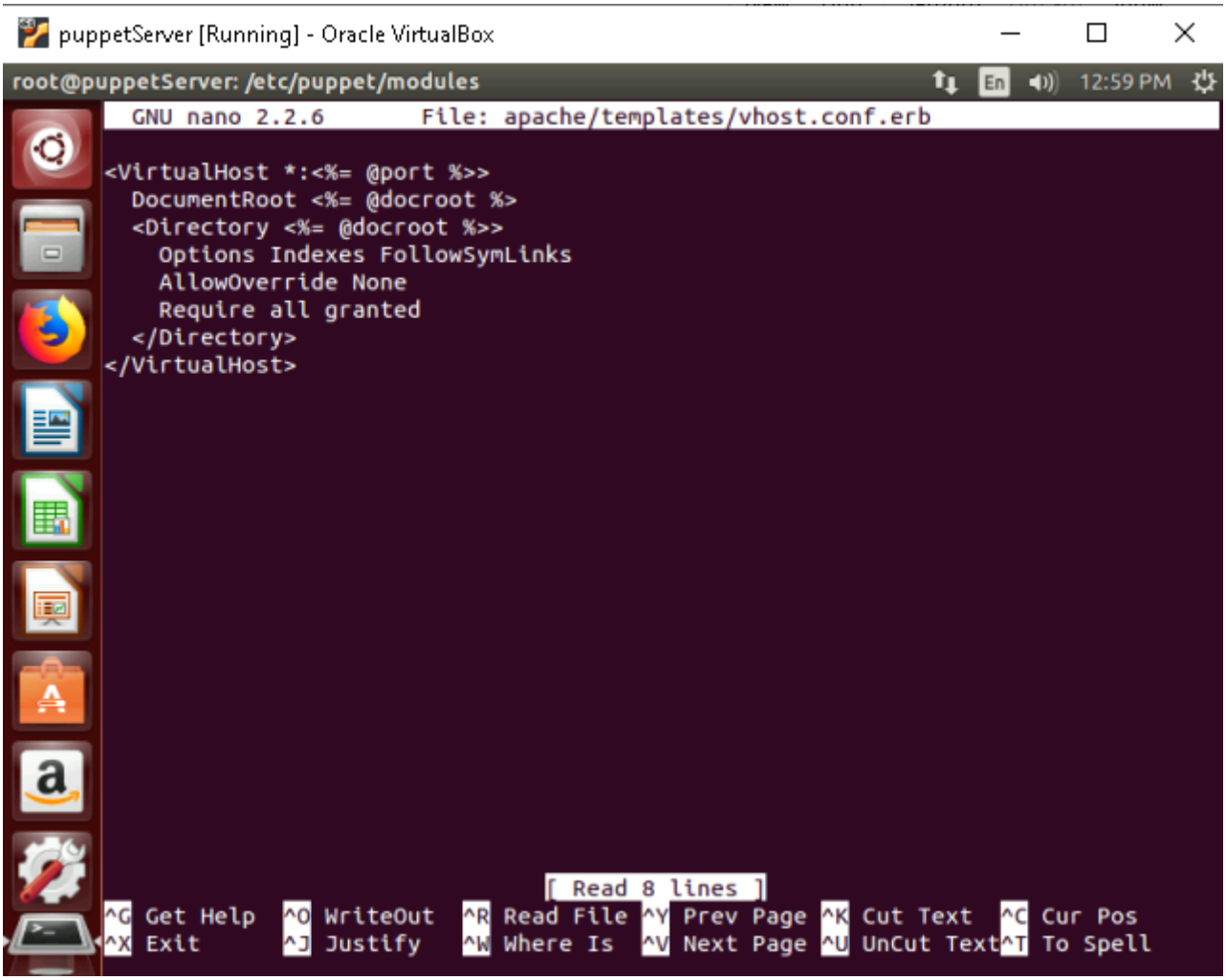
Step 3: Add a Template

Create a file `templates/vhost.conf.erb` for the virtual host configuration:

```
sudo nano apache/templates/vhost.conf.erb
```




```
<VirtualHost *:<%= @port %>>
  DocumentRoot <%= @docroot %>
  <Directory <%= @docroot %>>
    Options Indexes FollowSymLinks
    AllowOverride None
    Require all granted
  </Directory>
</VirtualHost>
```



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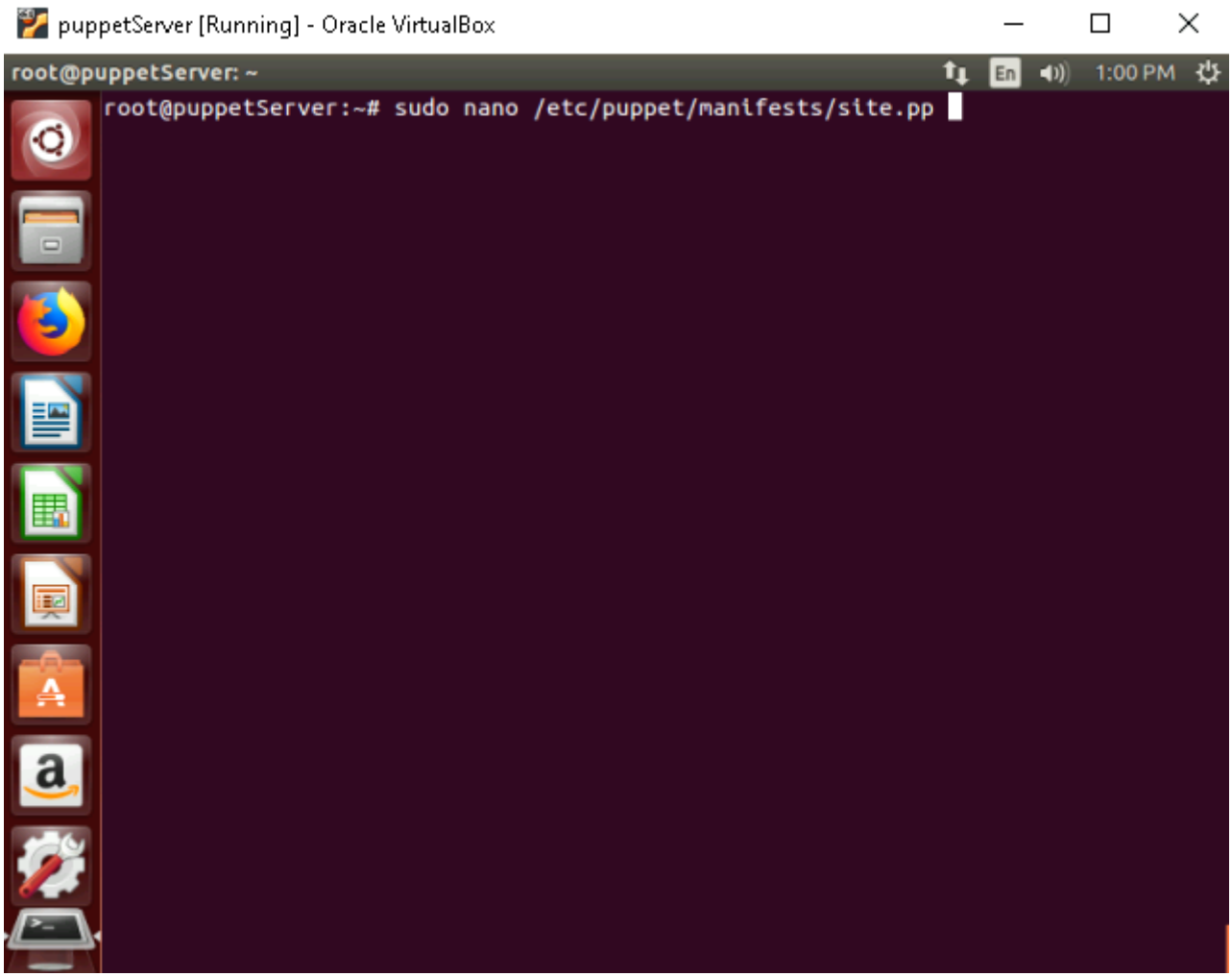
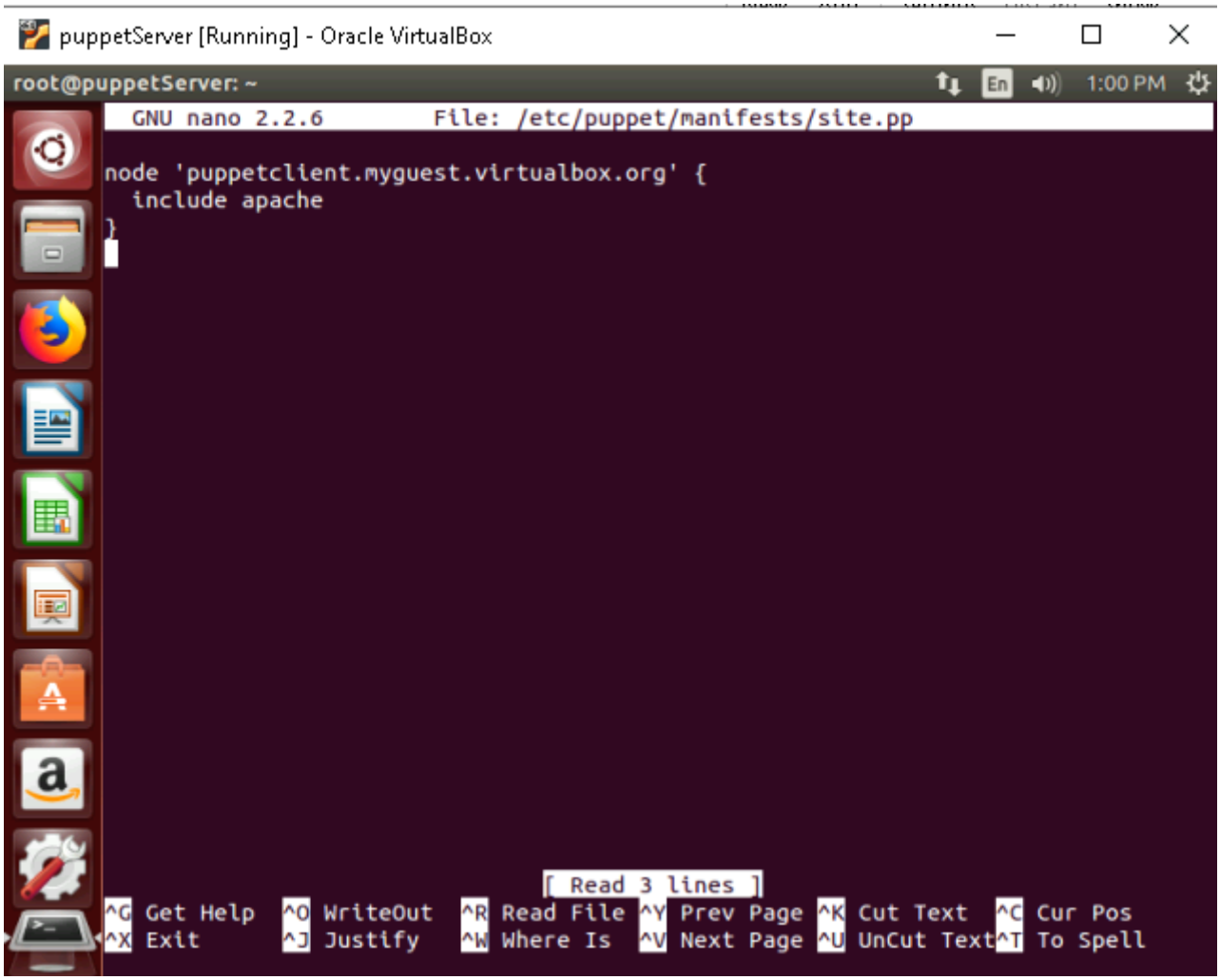
5. Apply the Module

1. Include the module in a node manifest:

```
sudo nano /etc/puppet/manifests/site.pp
```

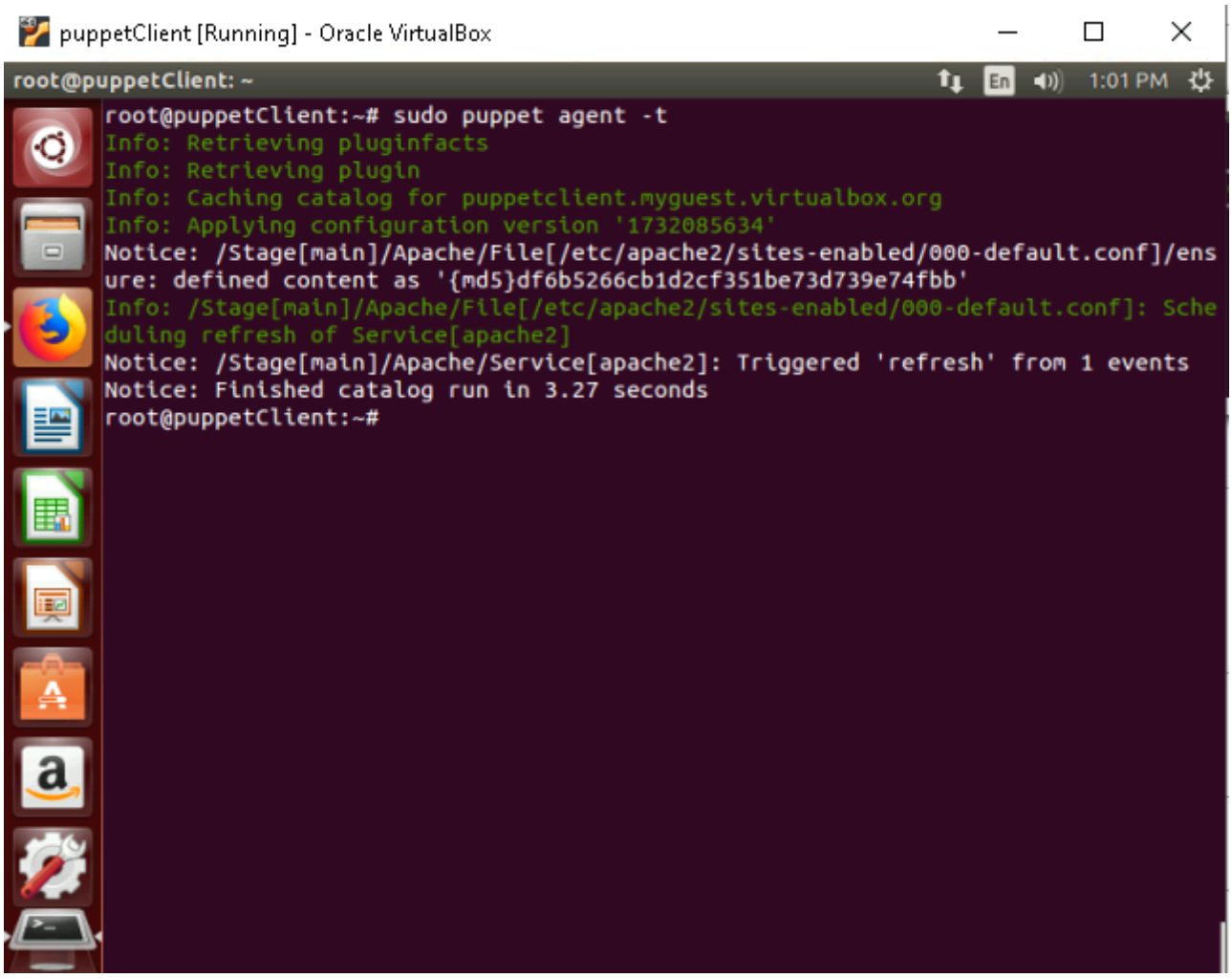



```
node 'puppetclient.myguest.virtualbox.org' {
  include apache
}
```



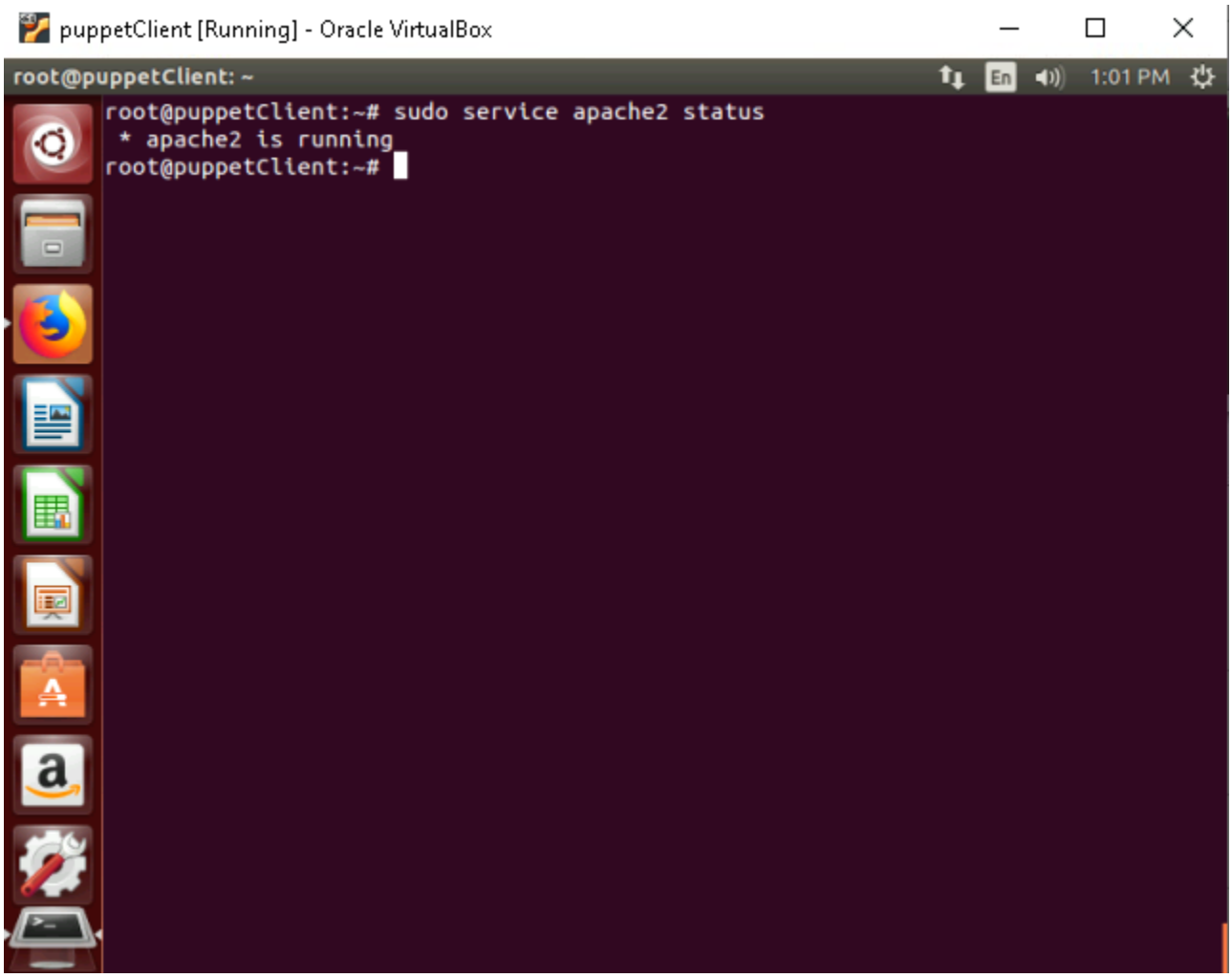
2. Run Puppet to apply the changes:

```
puppet agent --test
```



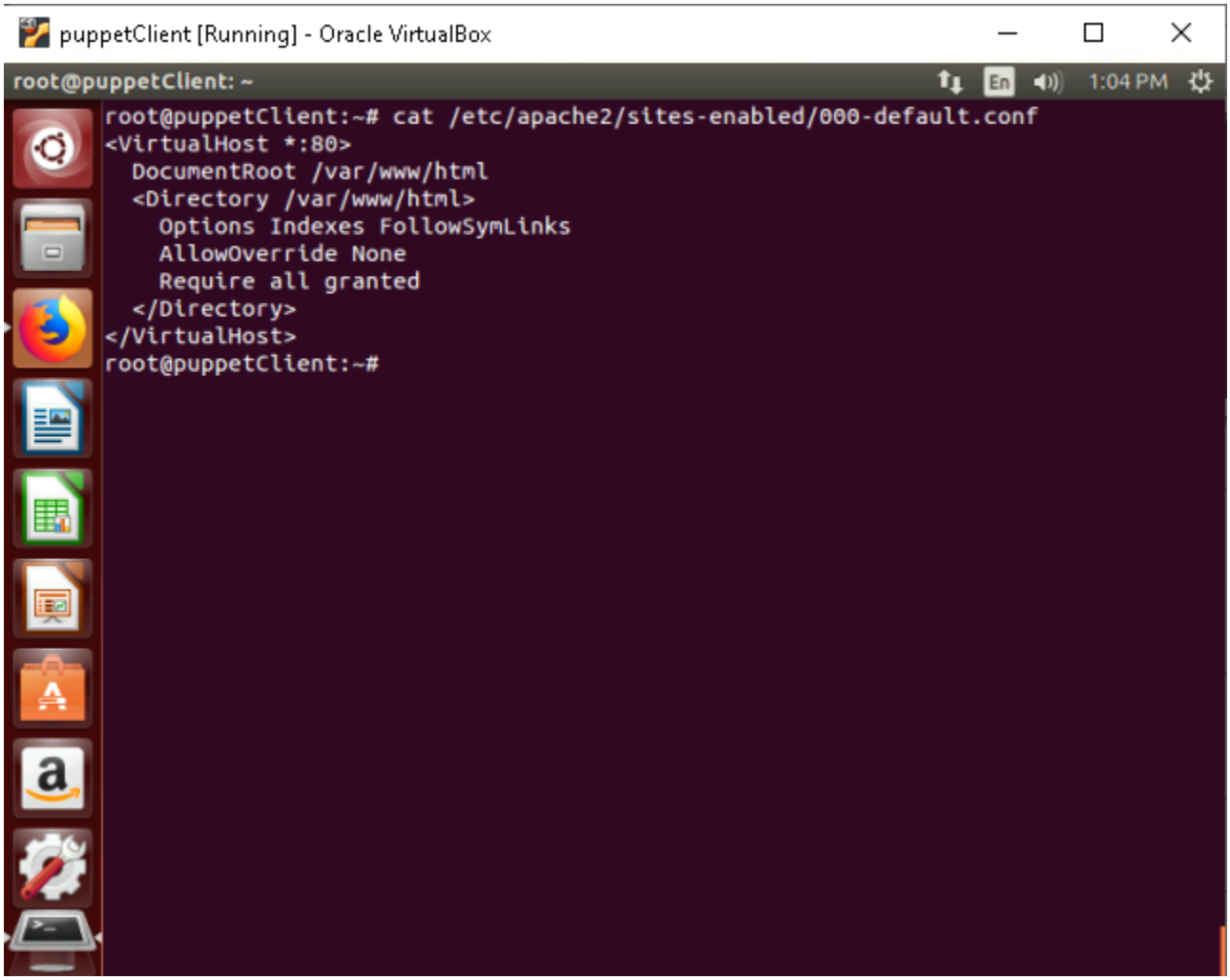
3. Verify the Apache service is running:

```
sudo service apache2 status
```

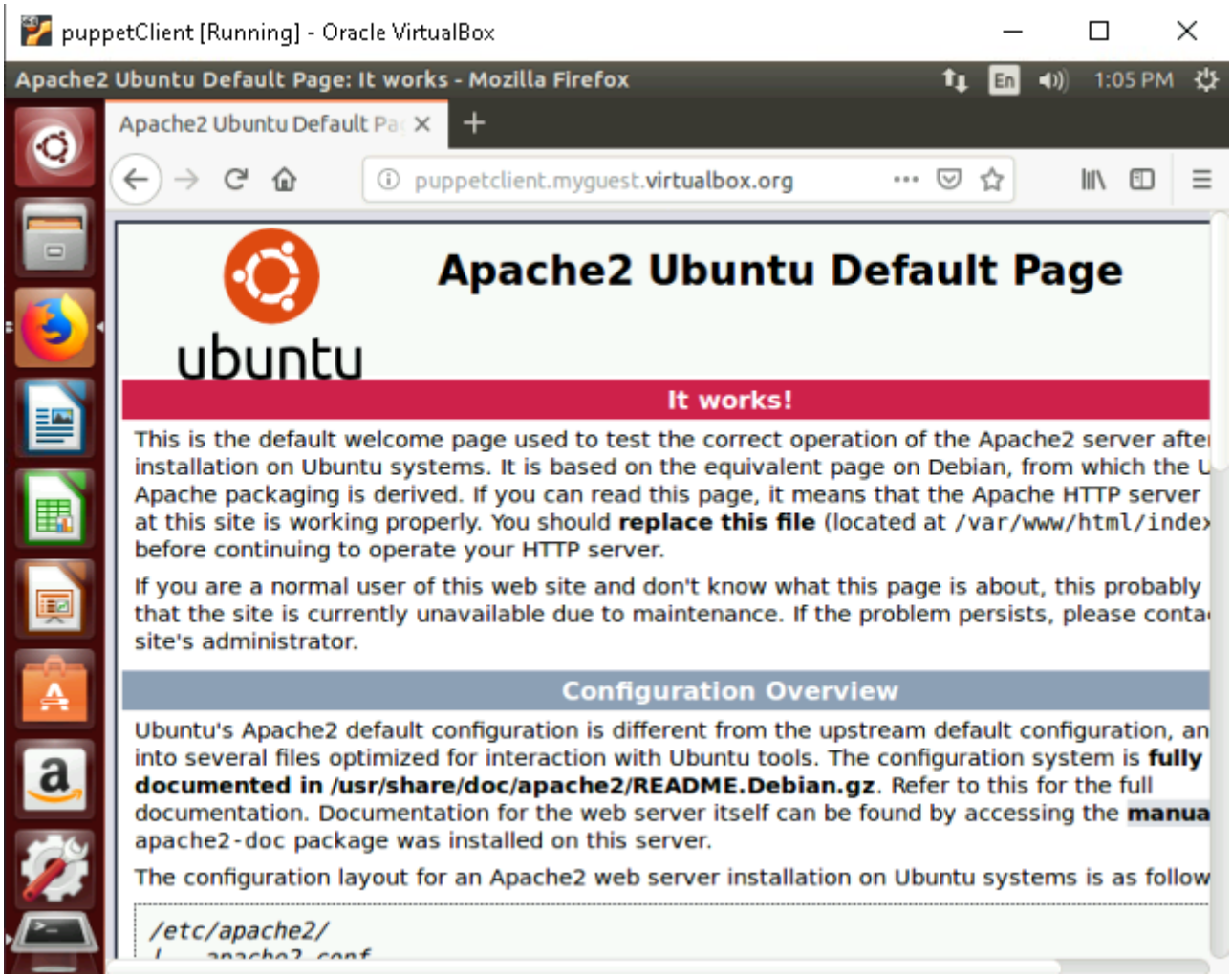


4. Check the virtual host configuration file:

```
cat /etc/apache2/sites-enabled/000-default.conf
```



5. Test the Apache server by browsing to `http://puppetclient.myguest.virtualbox.org` in a web browser.



References

- Puppet Hiera Documentation
- Linux Journal: Using Hiera with Puppet
