WileyNXT

mthree

Understanding repositories, Powershell Installation & IP Assignment

Package Management

Package management is a method of installing and maintaining (which includes updating and removing) software on the system.

In the early days of Linux, programs were only distributed as source code, along with the required man pages, the necessary configuration files, and more. Nowadays, most Linux distributors use by default pre-built programs or sets of programs called packages, which are presented to users ready for installation on that distribution. However, one of the wonders of Linux is still the possibility to obtain source code of a program to be studied, improved, and compiled.

How package management systems work?

If a certain package requires a certain resource such as a shared library, or another package, it is said to have a dependency. All modern package management systems provide some method of dependency resolution to ensure that when a package is installed, all of its dependencies are installed as well.

Packaging Systems

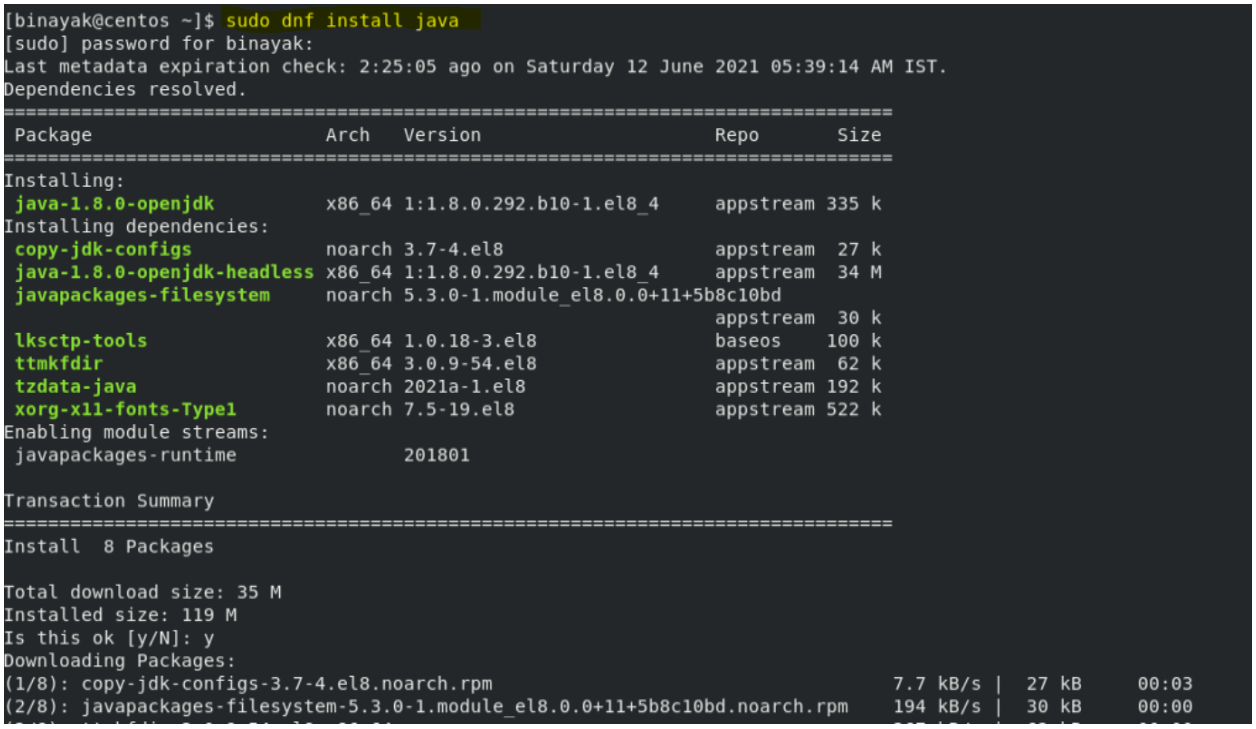
Almost all the software that is installed on a modern Linux system will be found on the Internet. It can either be provided by the distribution vendor through central repositories (which can contain several thousands of packages, each of which has been specifically built, tested, and maintained for the distribution) or be available in source code that can be downloaded and installed manually.Because different distribution families use different packaging systems (Debian: *.deb / CentOS: *.rpm / openSUSE: *.rpm built specially for openSUSE), a package intended for one distribution will not be compatible with another distribution.

High and low-level package tools

In order to perform the task of package management effectively, you need to be aware that you will have two types of available utilities: low-level tools (which handle in the backend the actual installation, upgrade, and removal of package files), and high-level tools (which are in charge of ensuring that the tasks of dependency resolution and metadata searching -”data about the data”- are performed).

Distribution	Low Level Tool	High Level Tool
Debian and derivatives	dpkg	apt-get / aptitude
CentOS	rpm	yum/dnf
openSUSE	rpm	zypper

- Installing a package using dnf.



What is a Repository?

A **Linux repository** is a storage location from which your system retrieves and installs OS updates and applications. Each **repository** is a collection of software hosted on a remote server and intended to be used for installing and updating software packages on **Linux** systems.

- Updating package repository cache

```
File  Edit  View  Search  Terminal  Help
[binayak@centos ~]$ sudo dnf makecache
[sudo] password for binayak:
CentOS Linux 8 - AppStream                                      648  B/s | 4.3 kB     00:06
CentOS Linux 8 - BaseOS                                         590  B/s | 3.9 kB     00:06
CentOS Linux 8 - Extras                                         232  B/s | 1.5 kB     00:06
Metadata cache created.
[binayak@centos ~]$
```

- Listing all repositories

```
[binayak@centos ~]$ sudo dnf repolist --all
repo id                         repo name                                                   status
appstream                       CentOS Linux 8 - AppStream                                  enabled
appstream-source                CentOS Linux 8 - AppStream - Source                         disabled
baseos                          CentOS Linux 8 - BaseOS                                     enabled
baseos-source                   CentOS Linux 8 - BaseOS - Source                            disabled
cr                              CentOS Linux 8 - ContinuousRelease                          disabled
debuginfo                       CentOS Linux 8 - Debuginfo                                  disabled
devel                           CentOS Linux 8 - Devel WARNING! FOR BUILDROOT USE ONLY!     disabled
extras                          CentOS Linux 8 - Extras                                     enabled
extras-source                   CentOS Linux 8 - Extras - Source                            disabled
fasttrack                       CentOS Linux 8 - FastTrack                                  disabled
ha                              CentOS Linux 8 - HighAvailability                           disabled
media-appstream                 CentOS Linux 8 - Media - AppStream                          disabled
media-baseos                    CentOS Linux 8 - Media - BaseOS                             disabled
plus                            CentOS Linux 8 - Plus                                       disabled
plus-source                     CentOS Linux 8 - Plus - Source                              disabled
powertools                      CentOS Linux 8 - PowerTools                                 disabled
[binayak@centos ~]$ sudo dnf repolist --enabled
repo id                                 repo name
appstream                               CentOS Linux 8 - AppStream
baseos                                  CentOS Linux 8 - BaseOS
extras                                  CentOS Linux 8 - Extras
[binayak@centos ~]$ sudo dnf repolist --disabled
repo id                             repo name
appstream-source                    CentOS Linux 8 - AppStream - Source
baseos-source                       CentOS Linux 8 - BaseOS - Source
cr                                  CentOS Linux 8 - ContinuousRelease
debuginfo                           CentOS Linux 8 - Debuginfo
devel                               CentOS Linux 8 - Devel WARNING! FOR BUILDROOT USE ONLY!
extras-source                       CentOS Linux 8 - Extras - Source
```

- List all the packages in all the package repositories

```
[binayak@centos ~]$ sudo dnf list --all
Last metadata expiration check: 0:12:27 ago on Saturday 12 June 2021 08:12:00 AM IST.
Installed Packages
GConf2.x86_64                                   3.2.6-22.el8                    @appstream
ModemManager.x86_64                             1.10.8-2.el8                    @baseos
ModemManager-glib.x86_64                        1.10.8-2.el8                    @baseos
NetworkManager.x86_64                           1:1.30.0-7.el8                  @baseos
NetworkManager-adsl.x86_64                      1:1.30.0-7.el8                  @baseos
NetworkManager-bluetooth.x86_64                 1:1.30.0-7.el8                  @baseos
NetworkManager-config-server.noarch             1:1.30.0-7.el8                  @baseos
NetworkManager-libnm.x86_64                     1:1.30.0-7.el8                  @baseos
NetworkManager-team.x86_64                      1:1.30.0-7.el8                  @baseos
NetworkManager-tui.x86_64                       1:1.30.0-7.el8                  @baseos
NetworkManager-wifi.x86_64                      1:1.30.0-7.el8                  @baseos
NetworkManager-wwan.x86_64                      1:1.30.0-7.el8                  @baseos
PackageKit.x86_64                               1.1.12-6.el8                    @appstream
PackageKit-command-not-found.x86_64             1.1.12-6.el8                    @appstream
PackageKit-glib.x86_64                          1.1.12-6.el8                    @appstream
PackageKit-gstreamer-plugin.x86_64              1.1.12-6.el8                    @appstream
PackageKit-gtk3-module.x86_64                   1.1.12-6.el8                    @appstream
abattis-cantarell-fonts.noarch                  0.0.25-6.el8                    @appstream
accountsservice.x86_64                          0.6.55-1.el8                    @appstream
```

- Listing the total number of packages available.

```
[binayak@centos ~]$
[binayak@centos ~]$ sudo dnf list --all | wc -l
6890
[binayak@centos ~]$
```

- Listing All Installed Packages

```
[binayak@centos ~]$ sudo dnf list --installed
Installed Packages
GConf2.x86_64                                   3.2.6-22.el8                    @appstream
ModemManager.x86_64                             1.10.8-2.el8                    @baseos
ModemManager-glib.x86_64                        1.10.8-2.el8                    @baseos
NetworkManager.x86_64                           1:1.30.0-7.el8                  @baseos
NetworkManager-adsl.x86_64                      1:1.30.0-7.el8                  @baseos
NetworkManager-bluetooth.x86_64                 1:1.30.0-7.el8                  @baseos
NetworkManager-config-server.noarch             1:1.30.0-7.el8                  @baseos
NetworkManager-libnm.x86_64                     1:1.30.0-7.el8                  @baseos
NetworkManager-team.x86_64                      1:1.30.0-7.el8                  @baseos
NetworkManager-tui.x86_64                       1:1.30.0-7.el8                  @baseos
NetworkManager-wifi.x86_64                      1:1.30.0-7.el8                  @baseos
NetworkManager-wwan.x86_64                      1:1.30.0-7.el8                  @baseos
PackageKit.x86_64                               1.1.12-6.el8                    @appstream
PackageKit-command-not-found.x86_64             1.1.12-6.el8                    @appstream
PackageKit-glib.x86_64                          1.1.12-6.el8                    @appstream
PackageKit-gstreamer-plugin.x86_64              1.1.12-6.el8                    @appstream
```

- Searching for packages

```
[binayak@centos ~]$ dnf search "Programming Language"
CentOS Linux 8 - AppStream                                      2.0 MB/s | 7.4 MB     00:03
CentOS Linux 8 - BaseOS                                         731 kB/s | 2.6 MB     00:03
CentOS Linux 8 - Extras                                         4.8 kB/s | 9.6 kB     00:02
================================== Summary Matched: Programming Language ===================================
ctags.x86_64 : A C programming language indexing and/or cross-reference tool
delve.x86_64 : A debugger for the Go programming language
golang.x86_64 : The Go Programming Language
lua.x86_64 : Powerful light-weight programming language
malaga.x86_64 : A programming language for automatic language analysis
platform-python.x86_64 : Internal interpreter of the Python programming language
platform-python.i686 : Internal interpreter of the Python programming language
python2.x86_64 : An interpreted, interactive, object-oriented programming language
python2-docs.noarch : Documentation for the Python 2 programming language
python2-docs-info.noarch : Documentation for the Python 2 programming language as info pages
python3-docs.noarch : Documentation for the Python 3 programming language
python36.x86_64 : Interpreter of the Python programming language
python38.x86_64 : Interpreter of the Python programming language
rust.x86_64 : The Rust Programming Language
```

- Searching for Packages in Specific Repositories

```
[binayak@centos ~]$ sudo dnf repoquery *kvm*
[sudo] password for binayak:
Last metadata expiration check: 0:08:55 ago on Saturday 12 June 2021 08:53:04 AM IS
libvirt-daemon-kvm-0:6.0.0-35.module_el8.4.0+783+f8734d30.x86_64
qemu-kvm-15:4.2.0-48.module_el8.4.0+783+f8734d30.x86_64
qemu-kvm-block-curl-15:4.2.0-48.module_el8.4.0+783+f8734d30.x86_64
qemu-kvm-block-gluster-15:4.2.0-48.module_el8.4.0+783+f8734d30.x86_64
qemu-kvm-block-iscsi-15:4.2.0-48.module_el8.4.0+783+f8734d30.x86_64
qemu-kvm-block-rbd-15:4.2.0-48.module_el8.4.0+783+f8734d30.x86_64
qemu-kvm-block-ssh-15:4.2.0-48.module_el8.4.0+783+f8734d30.x86_64
qemu-kvm-common-15:4.2.0-48.module_el8.4.0+783+f8734d30.x86_64
qemu-kvm-core-15:4.2.0-48.module_el8.4.0+783+f8734d30.x86_64
[binayak@centos ~]$
```

- Searching for Packages that Provides Specific File

```
[binayak@centos ~]$ sudo dnf provides */ifconfig
Last metadata expiration check: 0:12:43 ago on Saturday 12 June 2021 08:53:04 AM IST.
net-tools-2.0-0.52.20160912git.el8.x86_64 : Basic networking tools
Repo        : @System
Matched from:
Filename    : /usr/sbin/ifconfig

net-tools-2.0-0.52.20160912git.el8.x86_64 : Basic networking tools
Repo        : baseos
Matched from:
Filename    : /usr/sbin/ifconfig

[binayak@centos ~]$
```

- Removing a package

```
[binayak@centos ~]$ sudo dnf remove java
Dependencies resolved.
================================================================================
 Package                 Architecture Version                        Repository        Size
================================================================================
Removing:
 java-1.8.0-openjdk      x86_64       1:1.8.0.292.b10-1.el8_4        @appstream       845 k
Removing unused dependencies:
 copy-jdk-configs        noarch       3.7-4.el8                      @appstream        16 k
 java-1.8.0-openjdk-headless x86_64   1:1.8.0.292.b10-1.el8_4        @appstream       117 M
 javapackages-filesystem noarch       5.3.0-1.module_el8.0.0+11+5b8c10bd @appstream    1.9 k
 lksctp-tools            x86_64       1.0.18-3.el8                   @baseos          252 k
 ttmkfdir                x86_64       3.0.9-54.el8                   @appstream       140 k
 tzdata-java             noarch       2021a-1.el8                    @appstream       365 k
 xorg-x11-fonts-Type1    noarch       7.5-19.el8                     @appstream       863 k

Transaction Summary
================================================================================
Remove  8 Packages

Freed space: 119 M
Is this ok [y/N]: y
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
```

- check for whether software updates are available, performing updates, cleaning cache.

```
[binayak@centos ~]$ sudo dnf check-update
Last metadata expiration check: 0:02:33 ago on Saturday 12 June 2021 09:13:42 AM IST.
[binayak@centos ~]$  sudo dnf upgrade-minimal
Last metadata expiration check: 0:03:04 ago on Saturday 12 June 2021 09:13:42 AM IST.
No security updates needed, but 0 updates available
Dependencies resolved.
Nothing to do.
Complete!
[binayak@centos ~]$ sudo dnf upgrade
Last metadata expiration check: 0:03:20 ago on Saturday 12 June 2021 09:13:42 AM IST.
Dependencies resolved.
Nothing to do.
Complete!
[binayak@centos ~]$ sudo dnf clean all
21 files removed
[binayak@centos ~]$
```

- **Yellow Dog Updater, Modified (YUM)**

The YUM tool was developed for the Yellow Dog Linux system as a replacement for the Yellow Dog Updater (YUP). RedHat found the YUM tool to be a valuable addition to their systems. Today, YUM is the default package and repository management tool for a number of operating systems.

You can use the following commands to interact with YUM:

yum install package-name(s) - Installs the specified package(s) along with any required dependencies.

yum erase package-name(s) - Removes the specified package(s) from your system.

yum search search-pattern - Searches the list of package names and descriptions for packages that match the search pattern and provides a list of package names, with architectures and a brief description of the package contents. Note that regular expression searches are not permitted.

#yum deplist package-name(s) - Lists all of the libraries and modules that the named package depends on, along with the names of the packages (including versions) that provide those dependencies.

yum check-update - Refreshes the local cache of the yum database so that dependency information and the latest packages are always up to date.

yum info package-name(s) - The results of the info command provides the name, description of the package, as well as a link to the upstream home page for the software, release versions and the installed size of the software.

yum reinstall package-name(s) - Erases and then downloads a new copy of the package file and re-installs the software on your system.

yum localinstall local-rpm-file - Checks the dependencies of a local .rpm file and then installs it.

yum update optional-package-name(s) - Downloads and installs all updates including bug fixes, security releases, and upgrades, as provided by the distributors of your operating system. Note that you can specify package names with the update command.

yum upgrade - Upgrades all packages installed in your system to the latest release.

- **RPM Package Manager (RPM)**

YUM and DNF are simply front-ends to a lower-level tool called RPM, similar to apt-get's relationship with dpkg. You will likely not need to interact with RPM very often, but there are a few commands that you may find useful.

The following commands should be run as root. The flags are expanded here, but the abbreviated syntax is also included:

rpm --install --verbose --hash local-rpm-file-name.rpm or rpm -ivh filename.rpm - Installs an rpm from the file. rpm is also capable of installing RPM files from http and ftp sources as well as local files.

rpm --erase package-name(s) or rpm -e - Removes the given package. Usually will not complete if package-name matches more than one package, but will remove more than one match if used with the --allmatches flag.

rpm --query --all or rpm -qa - lists the name of all packages currently installed.

rpm --query package-name(s) or rpm -q - allows you to confirm whether a given package is installed in your system.

rpm --query --info package-name(s) or rpm -qi - displays the information about an installed package.

rpm --query --list package-name(s) or rpm -ql - generates a list of files installed by a given package. This is complemented by:

rpm --query --file filename - checks to see what installed package "owns" a given file.

Note that RPM does not automatically check for dependencies, so you must install them manually. For more information please consult these external sources:

- **Rebuild Corrupted RPM Database in CentOS 7**

First Method

```
#!/bin/bash

mkdir /var/lib/rpm/backup

cp -a /var/lib/rpm/__db* /var/lib/rpm/backup/

rm -f /var/lib/rpm/__db.[0-9][0-9]*

rpm --quiet -qa
```

rpm --rebuilddb

yum clean all

==========

Alternate Method

First start by backing up your current RPM database before proceeding (you might need it in the future), using the following commands.

mkdir /backups/

tar -zcvf /backups/rpmdb-$(date +"%d%m%Y").tar.gz /var/lib/rpm

Next, verify the integrity of the master package metadata file /var/lib/rpm/Packages; this is the file that needs rebuilding, but first remove /var/lib/rpm/__db* files to prevent stale locks using following commands.

rm -f /var/lib/rpm/__db*

/usr/lib/rpm/rpmdb_verify /var/lib/rpm/Packages

In case the above operation fails, meaning you still encounter errors, then you should dump and load a new database. Also verify the integrity of the freshly loaded Packages file as follows.

cd /var/lib/rpm/

mv Packages Packages.back

/usr/lib/rpm/rpmdb_dump Packages.back | /usr/lib/rpm/rpmdb_load Packages

/usr/lib/rpm/rpmdb_verify Packages

Now to check the database headers, query all installed packages using the -q and -a flags, and try to carefully observe any error(s) sent to the stderror.

rpm -qa >/dev/null   #output is discarded to enable printing of errors only

Last but not least, rebuild the RPM database using the following command, the -vv option allows for displaying lots of debugging information.

rpm -vv --rebuilddb

- ## Docker Installation

```
yum install -y yum-utils
yum-config-manager --add-repo https://download.docker.com/linux/centos/docker-ce.repo
yum install docker-ce docker-ce-cli containerd.io
systemctl enable docker
systemctl start docker
docker --version
```

Installation of LAMP Stack using bash script

- Open terminal and change to root user using “su -”.
- Then open vi and enter the following code.
- Save it by :w
- Give this file run permission by chmod +x filename.

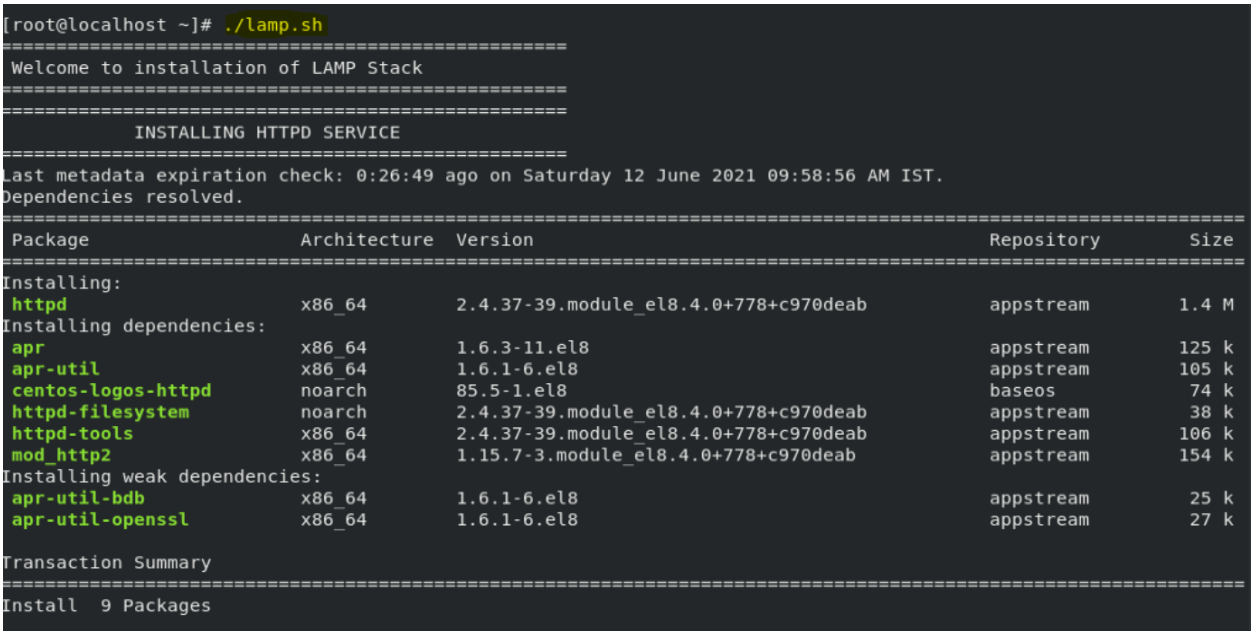
CODE

```
echo "=================================================="
echo " Welcome to installation of LAMP Stack"
echo "=================================================="

echo "=================================================="
echo "           INSTALLING HTTPD SERVICE               "
echo "=================================================="
yum install httpd -y #Installing Apache
systemctl restart httpd.service  # Restarting httpd service.

echo "=================================================="
echo "              INSTALLING PHP                      "
echo "=================================================="
yum install php -y  #Installing PhP
systemctl restart httpd.service  #Restarting httpd service.
echo -e "<?php\nphpinfo();\n?>"  > /var/www/html/phpinfo.php #Adding phpinfo() function to
phpinfo.php file to test the installation of php
php /var/www/html/phpinfo.php

echo "=================================================="
echo "             INSTALLING MARIADB                   "
echo "=================================================="

yum install mariadb-server mariadb -y  #Installing MariaDB
systemctl start mariadb.service  #Start and configure MariaDB to start automatically at boot.
```

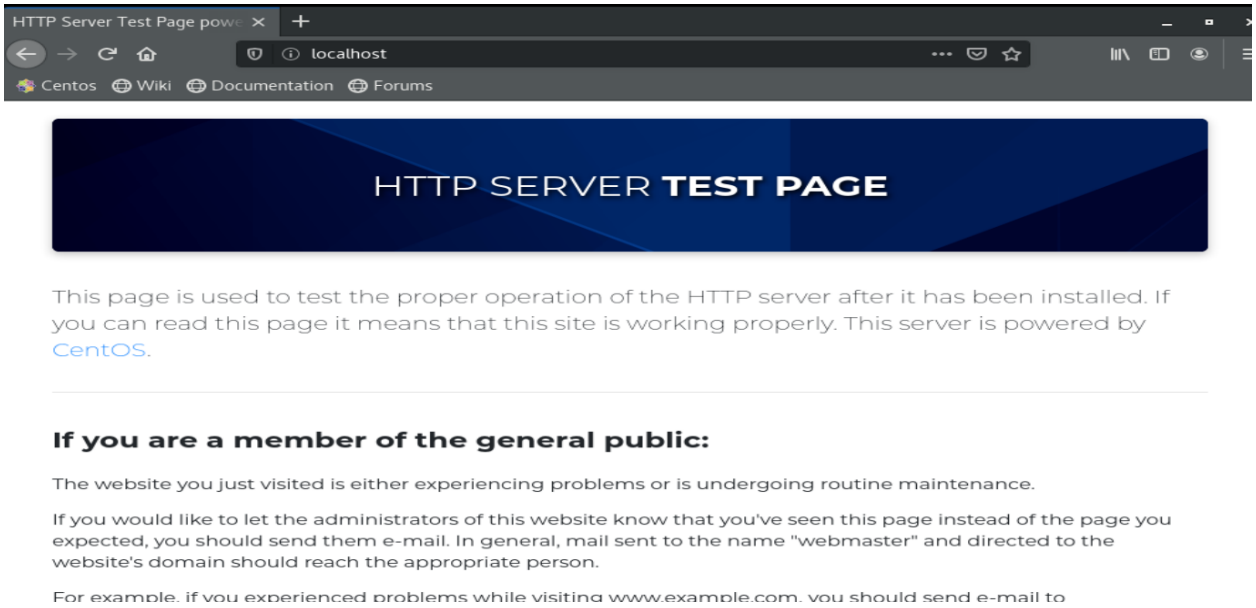
systemctl enable mariadb.service

echo "==="
echo "   MARIADB SECURE INSTALLATION   "
echo "==="

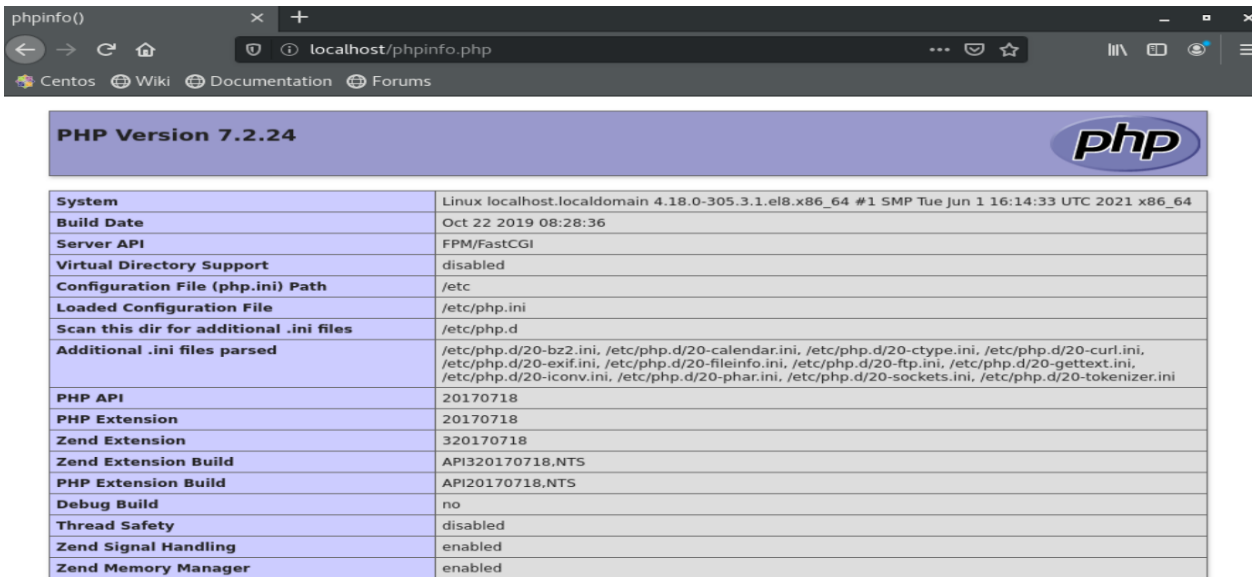
/usr/bin/mysql_secure_installation #Initializing Secure installation of MariaDB



- You can test your httpd installation by opening browser and enter URL : **localhost**



- For testing php installation you need to open browser and type : **localhost/phpinfo.php**



System	Linux localhost.localdomain 4.18.0-305.3.1.el8.x86_64 #1 SMP Tue Jun 1 16:14:33 UTC 2021 x86_64
Build Date	Oct 22 2019 08:28:36
Server API	FPM/FastCGI
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc
Loaded Configuration File	/etc/php.ini
Scan this dir for additional .ini files	/etc/php.d
Additional .ini files parsed	/etc/php.d/20-bz2.ini, /etc/php.d/20-calendar.ini, /etc/php.d/20-ctype.ini, /etc/php.d/20-curl.ini, /etc/php.d/20-exif.ini, /etc/php.d/20-fileinfo.ini, /etc/php.d/20-ftp.ini, /etc/php.d/20-gettext.ini, /etc/php.d/20-iconv.ini, /etc/php.d/20-phar.ini, /etc/php.d/20-sockets.ini, /etc/php.d/20-tokenizer.ini
PHP API	20170718
PHP Extension	20170718
Zend Extension	320170718
Zend Extension Build	API320170718,NTS
PHP Extension Build	API20170718,NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	enabled
Zend Memory Manager	enabled

This demonstrates that php code is working.

- Inorder to check MariaDB installation

```
[root@localhost ~]# mysql -u root -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 13
Server version: 10.3.28-MariaDB MariaDB Server

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
+--------------------+
3 rows in set (0.041 sec)

MariaDB [(none)]>
```

- In case any of the installations is not working , check whether its service is running or not.
- If the service is running yet the package is not working, restart the service.

```
[root@localhost ~]# systemctl status httpd
● httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; disabled; vendor preset: disabled)
  Drop-In: /usr/lib/systemd/system/httpd.service.d
           └─php-fpm.conf
   Active: active (running) since Sat 2021-06-12 10:26:06 IST; 1h 45min ago
     Docs: man:httpd.service(8)
 Main PID: 24443 (httpd)
   Status: "Total requests: 12; Idle/Busy workers 100/0;Requests/sec: 0.00189; Bytes served/sec:   95 B/sec"
    Tasks: 213 (limit: 17530)
   Memory: 24.8M
   CGroup: /system.slice/httpd.service
           ├─24443 /usr/sbin/httpd -DFOREGROUND
           ├─24446 /usr/sbin/httpd -DFOREGROUND
           ├─24447 /usr/sbin/httpd -DFOREGROUND
           ├─24448 /usr/sbin/httpd -DFOREGROUND
           └─24449 /usr/sbin/httpd -DFOREGROUND

Jun 12 10:26:06 localhost.localdomain systemd[1]: httpd.service: Succeeded.
Jun 12 10:26:06 localhost.localdomain systemd[1]: Stopped The Apache HTTP Server.
Jun 12 10:26:06 localhost.localdomain systemd[1]: Starting The Apache HTTP Server...
Jun 12 10:26:06 localhost.localdomain httpd[24443]: AH00558: httpd: Could not reliably determine the server's f>
Jun 12 10:26:06 localhost.localdomain systemd[1]: Started The Apache HTTP Server.
Jun 12 10:26:06 localhost.localdomain httpd[24443]: Server configured, listening on: port 80
lines 1-23/23 (END)
```

```
[root@localhost ~]# systemctl stop httpd
[root@localhost ~]# systemctl status httpd
● httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; disabled; vendor preset: disabled)
  Drop-In: /usr/lib/systemd/system/httpd.service.d
           └─php-fpm.conf
   Active: inactive (dead)
     Docs: man:httpd.service(8)

Jun 12 10:26:05 localhost.localdomain systemd[1]: Stopping The Apache HTTP Server...
Jun 12 10:26:06 localhost.localdomain systemd[1]: httpd.service: Succeeded.
Jun 12 10:26:06 localhost.localdomain systemd[1]: Stopped The Apache HTTP Server.
Jun 12 10:26:06 localhost.localdomain systemd[1]: Starting The Apache HTTP Server...
Jun 12 10:26:06 localhost.localdomain httpd[24443]: AH00558: httpd: Could not reliably determine the server's f>
Jun 12 10:26:06 localhost.localdomain systemd[1]: Started The Apache HTTP Server.
Jun 12 10:26:06 localhost.localdomain httpd[24443]: Server configured, listening on: port 80
Jun 12 12:15:32 localhost.localdomain systemd[1]: Stopping The Apache HTTP Server...
Jun 12 12:15:33 localhost.localdomain systemd[1]: httpd.service: Succeeded.
Jun 12 12:15:33 localhost.localdomain systemd[1]: Stopped The Apache HTTP Server.
lines 1-17/17 (END)
```

```
[root@localhost ~]# systemctl restart httpd
[root@localhost ~]# systemctl status httpd
● httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; disabled; vendor preset: disabled)
  Drop-In: /usr/lib/systemd/system/httpd.service.d
           └─php-fpm.conf
   Active: active (running) since Sat 2021-06-12 12:16:49 IST; 2s ago
     Docs: man:httpd.service(8)
 Main PID: 27547 (httpd)
   Status: "Started, listening on: port 80"
    Tasks: 213 (limit: 17530)
   Memory: 24.9M
   CGroup: /system.slice/httpd.service
           ├─27547 /usr/sbin/httpd -DFOREGROUND
           ├─27548 /usr/sbin/httpd -DFOREGROUND
           ├─27549 /usr/sbin/httpd -DFOREGROUND
           ├─27550 /usr/sbin/httpd -DFOREGROUND
           └─27551 /usr/sbin/httpd -DFOREGROUND

Jun 12 12:16:49 localhost.localdomain systemd[1]: Starting The Apache HTTP Server...
Jun 12 12:16:49 localhost.localdomain httpd[27547]: AH00558: httpd: Could not reliably determine the server's f>
Jun 12 12:16:49 localhost.localdomain systemd[1]: Started The Apache HTTP Server.
Jun 12 12:16:49 localhost.localdomain httpd[27547]: Server configured, listening on: port 80
```

- **Downloading PowerShell and ksh and installing them**

```
[binayak@centos ~]$ curl https://packages.microsoft.com/config/rhel/7/prod.repo | sudo tee /etc/yum.repos.d/micr
osoft.repo
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   193  100   193    0     0     57      0  0:00:03  0:00:03 --:--:--    57[sudo] password for binayak:


[sudo] password for binayak:
[packages-microsoft-com-prod]
name=packages-microsoft-com-prod
baseurl=https://packages.microsoft.com/rhel/7/prod/
enabled=1
gpgcheck=1
gpgkey=https://packages.microsoft.com/keys/microsoft.asc
[binayak@centos ~]$ sudo yum install -y powershell
packages-microsoft-com-prod                                                 462 kB/s | 5.6 MB     00:12
Last metadata expiration check: 0:00:16 ago on Thursday 17 June 2021 12:26:46 AM IST.
Dependencies resolved.
================================================================================================================
 Package               Architecture      Version                   Repository                             Size
================================================================================================================
Installing:
 powershell            x86_64            7.1.3-1.rhel.7            packages-microsoft-com-prod            65 M

Transaction Summary
================================================================================================================
Install  1 Package

Total download size: 65 M
Installed size: 170 M
Downloading Packages:
powershell-7.1.3-1.rhel.7.x86_64.rpm 23% [========                          ]  85 kB/s |  15 MB     09:52 ETA
```

```
[binayak@centos ~]$ pwsh
PowerShell 7.1.3
Copyright (c) Microsoft Corporation.

https://aka.ms/powershell
Type 'help' to get help.

PS /home/binayak> get-process

 NPM(K)     PM(M)       WS(M)      CPU(s)       Id  SI ProcessName
 ------     -----       -----      ------       --  -- -----------
      0      2.60        2.54        0.00     2236 …31 (sd-pam)
      0      0.00        9.30        0.26     1011 …11 accounts-daemon
      0      0.00        0.00        0.00      181    0 acpi_thermal_pm
      0      0.00        1.66        0.00      910 910 alsactl
      0      1.16        7.46        0.00     2368 …68 at-spi-bus-launcher
      0      0.93        8.14        0.03     2379 …68 at-spi2-registryd
      0      0.00        0.00        0.00      480    0 ata_sff
      0      0.00        2.39        0.01     1138 …38 atd
      0      0.41        2.10        0.29      858 858 auditd
      0      0.02        0.40        0.00      934 888 avahi-daemon: chroot helper
      0      0.00        4.48        0.46      888 888 avahi-daemon: running [centos.local]
      0      0.09        5.70        2.89     5588 …88 bash
```

- **Find your interface**

The first thing we must do is find out the name of our ethernet interface. A static IP address cannot be configured without this name. To do this, log into your server and issue the command **ip a.** The output of this command (Figure A) will include the name of the interface.

```
[binayak@centos network-scripts]$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 00:0c:29:e3:d2:2f brd ff:ff:ff:ff:ff:ff
    inet 192.168.177.139/24 brd 192.168.177.255 scope global dynamic noprefixroute ens33
       valid_lft 1719sec preferred_lft 1719sec
    inet6 fe80::20c:29ff:fee3:d22f/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
3: virbr0: <BROADCAST,MULTICAST> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 52:54:00:63:aa:c1 brd ff:ff:ff:ff:ff:ff
4: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc fq_codel state DOWN group default qlen 1000
    link/ether 52:54:00:63:aa:c1 brd ff:ff:ff:ff:ff:ff
[binayak@centos network-scripts]$
```

As you can see, from my output, the name of my interface is ens33. Now that we know the name of our interface, we can configure the static address.

- **Configuring the static IP address**

Our network information is listed with the ip a command.

Within the directory /etc/sysconfig/network-scripts/ you should find the file ifcfg-INTERFACENAME (Where INTERFACENAME is the name of your interface). In my instance,

the file is ifcfg-ens33. It is important that you configure that file, and not the ifcfg-eth file.

Open the correct file for editing with the command sudo nano /etc/sysconfig/network-scripts/ifcfg-ens33. We need to modify that file in order to not only change the protocol

from dhcp to static, but to add the specific IP address. So when you open up that file, you'll want to change:
BOOTPROTO=dhcp
To:
BOOTPROTO=static

Now you'll need to add the entries to set not only the IP address, but the netmask, gateway, and DNS addresses. At the bottom of that file, add the following:
IPADDR=192.168.1.200
NETMASK=255.255.255.0
GATEWAY=192.168.1.1
DNS1=1.0.0.1
DNS2=1.1.1.1
DNS3=8.8.4.4

NOTE:
Save and close that file. In order to make the changes take effect, issue the command sudo systemctl restart network. Once the networking system has restarted, issue the command ip a to see that your IP address has changed to reflect your configuration.