



DevOps(Day-7)

Understanding package manager and systemctl

Understanding package manager and systemctl

What is Package Manager?

It is a tool in the operating system that allows the user to install, upgrade or remove software packages. These go by different names for different OS. In Linux it is Yum, in Ubuntu(Debian) it is apt-get, etc.

What is a Package?

It is an application that can be a command line tool, a GUI application or a software library that may be required by other applications. A package is essentially an archive file containing the binary executable, configuration file and sometimes information about the dependencies.

Let's dive into some examples of installing a package.

Installing Docker

```
ubuntu@ip-172-31-51-95:~$ sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [110 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [110 kB]
Get:4 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [9,418 kB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en [52.9 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [9,418 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [29.1 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [11.0 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [29.1 kB]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [5,841 kB]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [11.0 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [5,841 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [29.1 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [11.0 kB]
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [29.1 kB]
Get:17 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [9,418 kB]
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [52.9 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [9,418 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [29.1 kB]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [11.0 kB]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [29.1 kB]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [29.1 kB]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main Translation-en [11.0 kB]
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [29.1 kB]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/restricted amd64 Packages [29.1 kB]
Get:27 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/restricted Translation-en [11.0 kB]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/restricted amd64 Packages [29.1 kB]
Get:29 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [9,418 kB]
```



```
Reading package lists... Done
ubuntu@ip-172-31-51-95:~$ sudo apt install docker.io
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  bridge-utils containerd dns-root-data dnsmasq-base pigz runc ubuntu-
Suggested packages:
  ifupdown aufs-tools cgroupfs-mount | cgroup-lite debootstrap docker-
The following NEW packages will be installed:
  bridge-utils containerd dns-root-data dnsmasq-base docker.io pigz ru
0 upgraded, 8 newly installed, 0 to remove and 49 not upgraded.
Need to get 72.4 MB of archives.
After this operation, 287 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe am
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/mai
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/mai
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/mai
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/uni
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe am
Fetched 72.4 MB in 2s (44.7 MB/s)
Preconfiguring packages ...
Selecting previously unselected package pigz.
(Reading database ... 63605 files and directories currently installed.
Preparing to unpack .../0-pigz_2.6-1_amd64.deb ...
Unpacking pigz (2.6-1) ...
Selecting previously unselected package bridge-utils.
```

```

Created symlink /etc/systemd/system/multi-user.target.wants/docker.service: docker.service.
Created symlink /etc/systemd/system/sockets.target.wants/docker.socket: docker.socket.
Processing triggers for dbus (1.12.20-2ubuntu4.1) ...
Processing triggers for man-db (2.10.2-1) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
ubuntu@ip-172-31-51-95:~$ sudo docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
ubuntu@ip-172-31-51-95:~$

```

Installing Jenkins

```

ubuntu@ip-172-31-51-95:~$ sudo apt install openjdk-11-jre
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  alsa-topology-conf alsa-ucm-conf at-spi2-core ca-certificates-java default-jre
  java-common libasound2 libasound2-data libatk-bridge2.0-0 libatk-wrapper-java
  libavahi-common3 libcups2 libdconf1 libdrm-amdgpu1 libdrm-intel1 libdrm2
  libglvnd0 libglx-mesa0 libglx0 libgraphite2-3 libharfbuzz0b libice6
  libx11-xcb1 libxaw7 libxcb-dri2-0 libxcb-dri3-0 libxcb-glx0 libxcb-icccm4
  libxcb-image0 libxcb-keysyms1 libxcb-randr2 libxcb-render1 libxcb-shm0 libxcb-xfixes0
  libxkbfile1 libxmu6 libxpm4 libxrandr2 libxrender1 libxshmfence1 libxxf86vm1
Suggested packages:
  default-jre libasound2-plugins alsa-utils cups-common liblcms2-utils fonts-indic mesa-utils

```



```
No VM guests are running outdated hypervisor (qemu) binaries on this host
ubuntu@ip-172-31-51-95:~$ java -version
openjdk version "11.0.18" 2023-01-17
OpenJDK Runtime Environment (build 11.0.18+10-post-Ubuntu-0ubuntu122.04)
OpenJDK 64-Bit Server VM (build 11.0.18+10-post-Ubuntu-0ubuntu122.04,
ubuntu@ip-172-31-51-95:~$ curl -fsSL https://pkg.jenkins.io/debian/jenkins.io.key
ubuntu@ip-172-31-51-95:~$ echo deb [signed-by=/usr/share/keyrings/jenkins-keyring.asc]
deb https://pkg.jenkins.io/debian binary/
ubuntu@ip-172-31-51-95:~$ sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu jammy-security InRelease
Ign:5 https://pkg.jenkins.io/debian binary/ InRelease
Get:6 https://pkg.jenkins.io/debian binary/ Release [2044 B]
Get:7 https://pkg.jenkins.io/debian binary/ Release.gpg [833 B]
Get:8 https://pkg.jenkins.io/debian binary/ Packages [51.9 kB]
Fetched 54.8 kB in 1s (71.0 kB/s)
Reading package lists... Done
ubuntu@ip-172-31-51-95:~$ sudo apt-get install jenkins
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  net-tools
The following NEW packages will be installed:
  jenkins net-tools
0 upgraded, 2 newly installed, 0 to remove and 49 not upgraded.
Need to get 96.3 MB of archives.
After this operation, 99.3 MB of additional disk space will be used.
```

Systemctl

Systemctl is used to detect the state of an installed package whether it is in running, stopped, enabled or disabled state. It is used to change the state of any packages according to the user's needs.

systemctl start <package>

It is used to start the service of any application package.

systemctl stop <package>

It is used to stop the service of any installed package.

```
systemctl status <package>
```

It is used to check the current state of the application package.

```
systemctl enable <package>
```

It ensures the condition of application services remains the same even after the instance(VM) restarts.

Let's check the systemctl for the installed application i.e. Docker and Jenkins.

systemctl status <package>

It is used to check the current state of the application package.

systemctl enable <package>

It ensures the condition of application services remains the same even after the instance(VM) restarts.

Let's check the systemctl for the installed application i.e. Docker and Jenkins.

```
ubuntu@ip-172-31-51-95:~$ systemctl status docker
● docker.service - Docker Application Container Engine
   Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2023-03-14 03:26:00 UTC; 9min ago
   TriggeredBy: ● docker.socket
     Docs: https://docs.docker.com
   Main PID: 2615 (dockerd)
     Tasks: 7
    Memory: 19.8M
       CPU: 300ms
    CGroup: /system.slice/docker.service
            └─2615 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock

Mar 14 03:26:00 ip-172-31-51-95 dockerd[2615]: time="2023-03-14T03:26:00.123456789Z" level=info msg="Starting Docker Application Container Engine"
Mar 14 03:26:00 ip-172-31-51-95 dockerd[2615]: time="2023-03-14T03:26:00.123456789Z" level=info msg="Listening for connections on fd://..."
Mar 14 03:26:00 ip-172-31-51-95 dockerd[2615]: time="2023-03-14T03:26:00.123456789Z" level=info msg="API listen on fd://..."
Mar 14 03:26:00 ip-172-31-51-95 dockerd[2615]: time="2023-03-14T03:26:00.123456789Z" level=info msg="Default bridge (docker0) is already up. To create new bridges, use 'docker network create'. If you don't want the bridge on your host, use 'docker network create --opt=bridge=none'."
Mar 14 03:26:00 ip-172-31-51-95 dockerd[2615]: time="2023-03-14T03:26:00.123456789Z" level=info msg="Loading containers: start."
Mar 14 03:26:00 ip-172-31-51-95 dockerd[2615]: time="2023-03-14T03:26:00.123456789Z" level=info msg="Loading containers: done."
Mar 14 03:26:00 ip-172-31-51-95 dockerd[2615]: time="2023-03-14T03:26:00.123456789Z" level=info msg="Daemon has completed initialization"
Mar 14 03:26:00 ip-172-31-51-95 systemd[1]: Started Docker Application Container Engine.
Mar 14 03:26:00 ip-172-31-51-95 dockerd[2615]: time="2023-03-14T03:26:00.123456789Z" level=info msg="Daemon is ready"

lines 1-22/22 (END)
```



```

ubuntu@ip-172-31-51-95:~$ systemctl status jenkins
● jenkins.service - Jenkins Continuous Integration Server
   Loaded: loaded (/lib/systemd/system/jenkins.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2023-03-14 03:33:16 UTC; 4min ago
     Main PID: 5774 (java)
        Tasks: 36 (limit: 1143)
      Memory: 322.1M
         CPU: 43.733s
       CGroup: /system.slice/jenkins.service
              └─5774 /usr/bin/java -Djava.awt.headless=true -jar /usr/s

Mar 14 03:32:43 ip-172-31-51-95 jenkins[5774]: 8f1d47242277446795d20b1
Mar 14 03:32:43 ip-172-31-51-95 jenkins[5774]: This may also be found
Mar 14 03:32:43 ip-172-31-51-95 jenkins[5774]: *****
Mar 14 03:32:43 ip-172-31-51-95 jenkins[5774]: *****
Mar 14 03:32:43 ip-172-31-51-95 jenkins[5774]: *****
Mar 14 03:33:16 ip-172-31-51-95 jenkins[5774]: 2023-03-14 03:33:16.775
Mar 14 03:33:16 ip-172-31-51-95 jenkins[5774]: 2023-03-14 03:33:16.816
Mar 14 03:33:16 ip-172-31-51-95 systemd[1]: Started Jenkins Continuous
Mar 14 03:33:16 ip-172-31-51-95 jenkins[5774]: 2023-03-14 03:33:16.935
Mar 14 03:33:16 ip-172-31-51-95 jenkins[5774]: 2023-03-14 03:33:16.936
lines 1-20/20 (END)

```

Thank you for reading my article.

Have a nice day.



WRITTEN BY Biswaraj Sahoo --AWS Community Builder | DevOps Engineer | Docker | Linux | Jenkins | AWS | Git | Terraform | Docker | kubernetes

Empowering communities via open source and education.

Connect with me over linktree: linktr.ee/biswaraj333