JENKINS INSTALLATION

Go to this Page and for downloading the Jenkins select the OS. I am going to perform this practical on Red Hat linux.

https://pkg.jenkins.io/redhat-stable/

Copy the command from the page.

> sudo wget -O /etc/yum.repos.d/jenkins.repo https://pkg.jenkins.io/redhat-stable/jenkins.repo
> This command will download the repository and store in local System so we can download the Jenkins by using yum.

> sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io-2023.key
> This command will import the key for Jenkins.

```
[root@Redhat ~]#  sudo wget -O /etc/yum.repos.d/jenkins.repo https://pkg.jenkins.io/redhat-stable/jenkins.repo
--2023-08-17 07:24:57--  https://pkg.jenkins.io/redhat-stable/jenkins.repo
Resolving pkg.jenkins.io (pkg.jenkins.io)... 199.232.46.133, 2a04:4e42:48::645
Connecting to pkg.jenkins.io (pkg.jenkins.io)|199.232.46.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 85
Saving to: '/etc/yum.repos.d/jenkins.repo'

/etc/yum.repos.d/jenkins.repo        100%[===============================================================>]      85  --.-KB/s    in 0s

2023-08-17 07:24:58 (5.55 MB/s) - '/etc/yum.repos.d/jenkins.repo' saved [85/85]

[root@Redhat ~]#  sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io-2023.key
[root@Redhat ~]#
```

Jenkins is built on top of java for that we need to download the java in our Operating system.

> yum install fontconfig java-11-openjdk
> Font config is also installing with Java 11 for giving the look and feel for Jenkins UI.
> yum install Jenkins
> After that we need to install the Jenkins software

Now Jenkins is installed in my OS, and to use the Jenkins we need to start its services.

```
[root@Redhat ~]# systemctl status jenkins
● jenkins.service - Jenkins Continuous Integration Server
   Loaded: loaded (/usr/lib/systemd/system/jenkins.service; disabled; vendor preset: disabled)
   Active: inactive (dead)
[root@Redhat ~]# systemctl start jenkins
[root@Redhat ~]# systemctl enable jenkins
Synchronizing state of jenkins.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable jenkins
Created symlink /etc/systemd/system/multi-user.target.wants/jenkins.service → /usr/lib/systemd/system/jenkins.service.
[root@Redhat ~]# systemctl status jenkins
● jenkins.service - Jenkins Continuous Integration Server
   Loaded: loaded (/usr/lib/systemd/system/jenkins.service; enabled; vendor preset: disabled)
   Active: active (running) since Thu 2023-08-17 07:34:13 UTC; 12s ago
 Main PID: 30997 (java)
    Tasks: 43 (limit: 20287)
   Memory: 410.7M
   CGroup: /system.slice/jenkins.service
           └─30997 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --webroot=/var/cache/jenkins/war --httpPort=8080
```

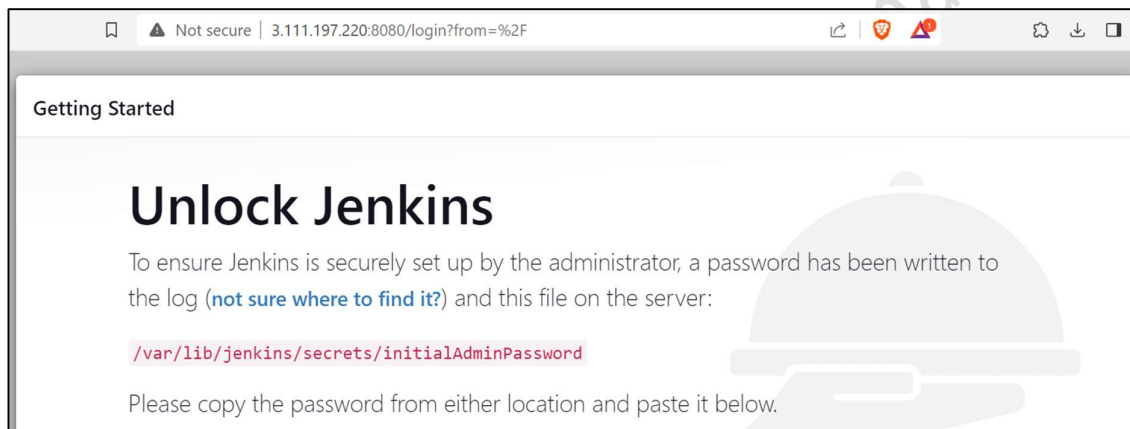I have run the following commands.

> **Systemctl start Jenkins**
>   o   This command will start the Jenkin service.
> **Systemctl enable Jenkins**
>   o   This command will make the service of Jenkins permanently.
> **Systemctl status Jenkins**
>   o   This command will help us to see the current status of Jenkins.

In the above image we can see the Jenkins will using port number 8080. So, for using the Jenkins I am using my OS IP and the port number 8080 to go to the WEB UI Page of Jenkins. We can use the Jenkins by using CLI and API, but currently I am using WEB UI.

Now if you try to visit the page then you are not able to connect because of firewall issue. Jenkins will be working on port 8080 but in my system I have not allowed the outside world to come to my OS IP and use the port 8080.

Name	Security group rule ID	Port range	Protocol	Source	Security groups
–	sgr-05cf74f4b53fcd5de	22	TCP	0.0.0.0/0	launch-wizard-5
–	sgr-095471d5ad6d4bcda	8080	TCP	49.248.148.202/32	launch-wizard-5

After that, Now I am able to view my Jenkins on My Current IP with port number 8080.

Not secure | 3.111.197.220:8080/login?from=%2F

Getting Started

Unlock Jenkins

To ensure Jenkins is securely set up by the administrator, a password has been written to the log (not sure where to find it?) and this file on the server:

`/var/lib/jenkins/secrets/initialAdminPassword`

Please copy the password from either location and paste it below.

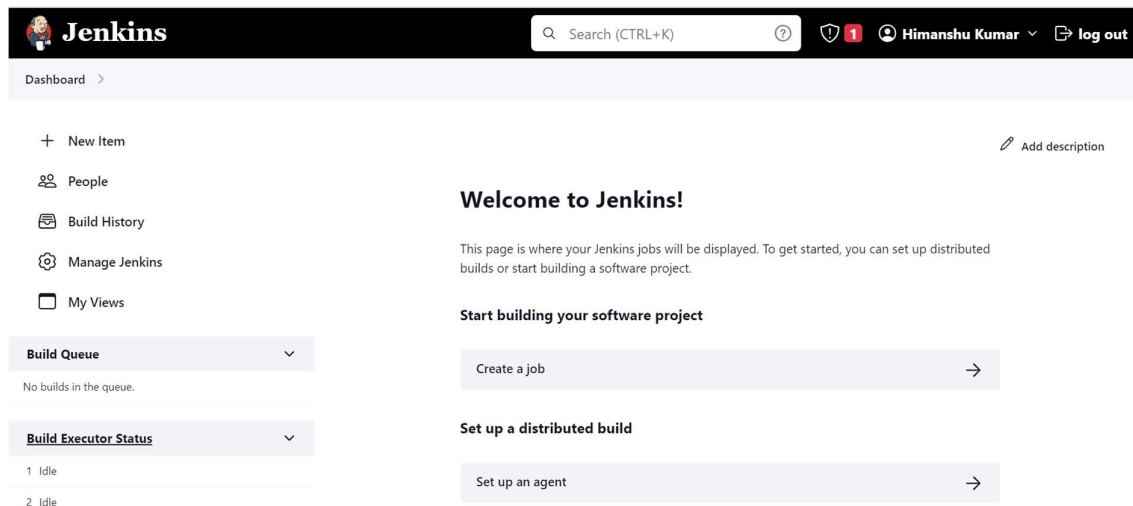Here we need to paste the password from the given location.

```
[root@ip-172-31-32-78 ~]# cat /var/lib/jenkins/secrets/initialAdminPassword
afcd437a632346988a6920d9b69d5925
[root@ip-172-31-32-78 ~]#
[root@ip-172-31-32-78 ~]#
[root@ip-172-31-32-78 ~]#
```

Paste the above password in the given location and click on continue. Then I am selecting Install Suggested Plugins.

Getting Started

✔ Folders	OWASP Markup Formatter	Build Timeout	Credentials Binding	Ionicons API
Timestamper	Workspace Cleanup	Ant	Gradle	Folders
Pipeline	GitHub Branch Source	Pipeline: GitHub Groovy Libraries	Pipeline: Stage View	OWASP Markup Formatter
Git	SSH Build Agents	Matrix Authorization Strategy	PAM Authentication	** bouncycastle API
LDAP	Email Extension	Mailer		** Instance Identity

```
Ionicons API
Folders
OWASP Markup Formatter
** bouncycastle API
** Instance Identity
** JavaBeans Activation Framework
   (JAF) API
** JavaMail API
** Structs
** Pipeline: Step API
** Token Macro
Build Timeout

** - required dependency
```

Now Jenkins will download the necessary plugins. And after that set your credentials like username and password and email address.
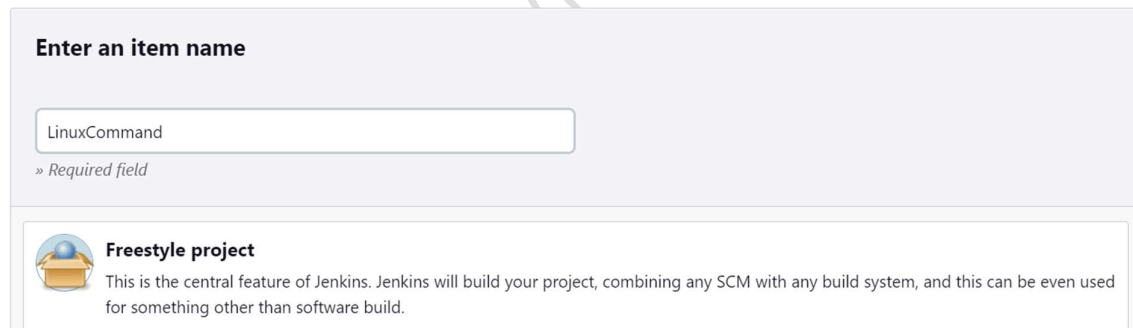
JOBS IN JENKINS

This is the Dashboard of the Jenkins and form here I am going to create one Job where I would like to run some Linux commands like date.
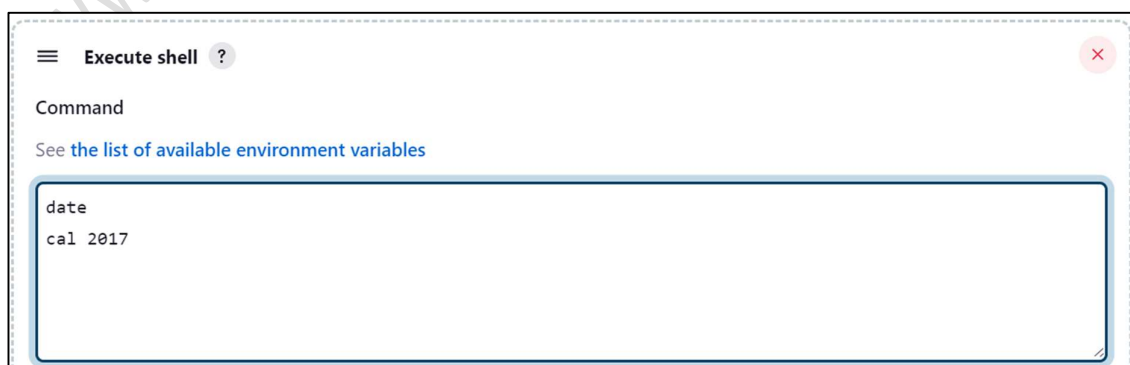
Step 1) Click on Create a Job

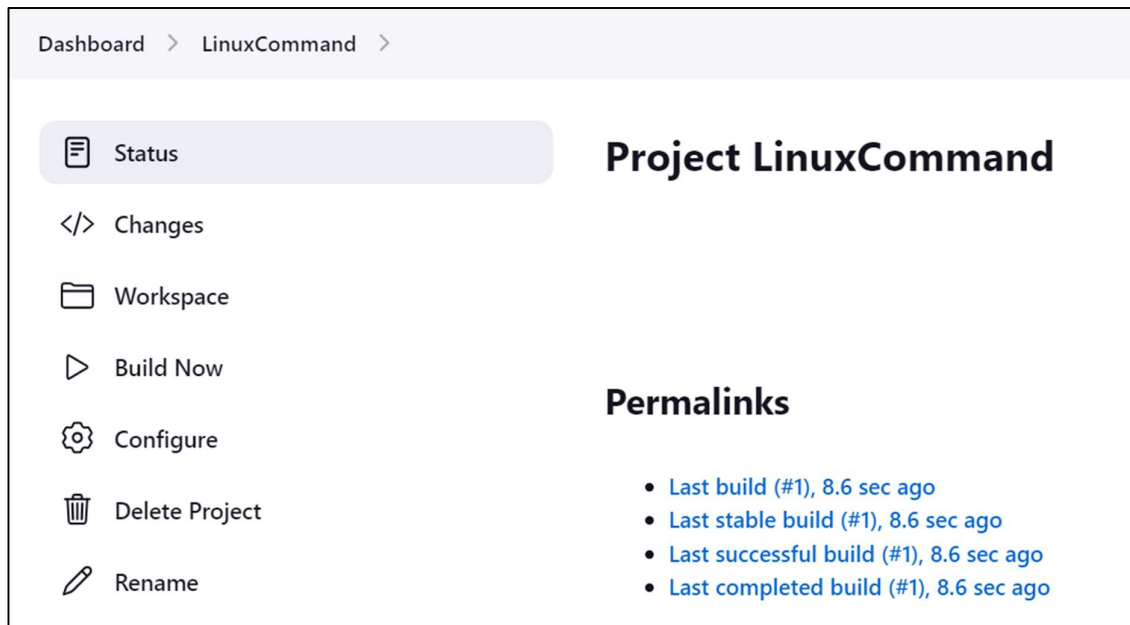Step 2) Enter Job Name and select Freestyle Project and click on OK.

Step 3) From the Configuration-> Select Build environment ->Select Build Steps: Add Build Steps -> Execute Shell. Then Enter the commands that you want to perform. Then click on save and apply.

After this we can see multiple options for our Job. From that click on Build Now.
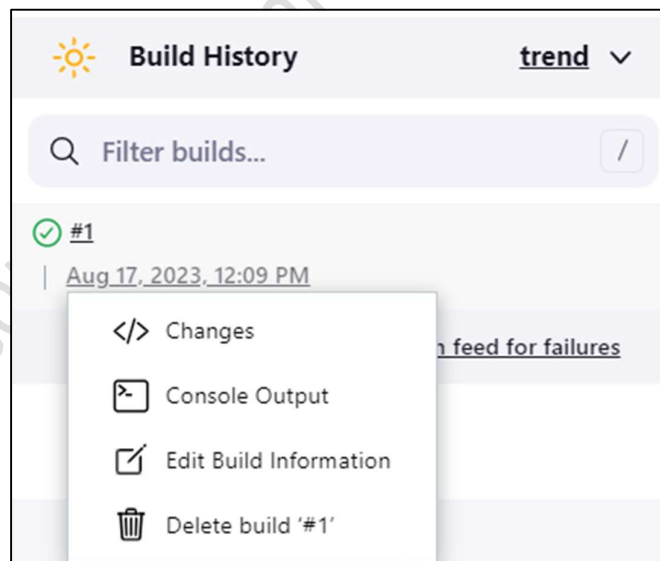
After that we can see that the Job is Successfully built and we can see this from the Build History and It have multiple options like **Changes, Console Output, Edit Build Information, Delete Build.**

From that Option Click on Console Output to see the output for the Job that we have just run.

This Job is started by Himanshu Kumar and they show the output for both the commands and after that it will show the Status as Success.

```
Started by user Himanshu Kumar
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/LinuxCommand
[LinuxCommand] $ /bin/sh -xe /tmp/jenkins15222914737902118686.sh
+ date
Thu Aug 17 12:09:53 UTC 2023
+ cal 2017
                                     2017
        January              February               March                April                  May                  June
Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa
 1  2  3  4  5  6  7             1  2  3  4             1  2  3  4                      1       1  2  3  4  5  6                1  2  3
 8  9 10 11 12 13 14    5  6  7  8  9 10 11    5  6  7  8  9 10 11    2  3  4  5  6  7  8    7  8  9 10 11 12 13    4  5  6  7  8  9 10
15 16 17 18 19 20 21   12 13 14 15 16 17 18   12 13 14 15 16 17 18    9 10 11 12 13 14 15   14 15 16 17 18 19 20   11 12 13 14 15 16 17
22 23 24 25 26 27 28   19 20 21 22 23 24 25   19 20 21 22 23 24 25   16 17 18 19 20 21 22   21 22 23 24 25 26 27   18 19 20 21 22 23 24
29 30 31               26 27 28               26 27 28 29 30 31      23 24 25 26 27 28 29   28 29 30 31           25 26 27 28 29 30
                                                                     30
          July                 August              September              October              November             December
Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa   Su Mo Tu We Th Fr Sa
                   1          1  2  3  4  5                   1  2    1  2  3  4  5  6  7             1  2  3  4                   1  2
 2  3  4  5  6  7  8    6  7  8  9 10 11 12    3  4  5  6  7  8  9    8  9 10 11 12 13 14    5  6  7  8  9 10 11    3  4  5  6  7  8  9
 9 10 11 12 13 14 15   13 14 15 16 17 18 19   10 11 12 13 14 15 16   15 16 17 18 19 20 21   12 13 14 15 16 17 18   10 11 12 13 14 15 16
16 17 18 19 20 21 22   20 21 22 23 24 25 26   17 18 19 20 21 22 23   22 23 24 25 26 27 28   19 20 21 22 23 24 25   17 18 19 20 21 22 23
23 24 25 26 27 28 29   27 28 29 30 31         24 25 26 27 28 29 30   29 30 31              26 27 28 29 30         24 25 26 27 28 29 30
30 31                                                                                                             31
Finished: SUCCESS
```

Now, If we have a requirement to install any type of software by using Jenkins which is not a recommended. For this we have different kinds of applications like ansible, puppet. But Can we do this by using Jenkins? Let's see.

For this I am going to create 1 new job as freestype where I am going to give the job name as webserver and my requiremenet is to install the webserver software "httpd" and then start the services for the webserver.

Configure

- General
- Source Code Management
- Build Triggers
- Build Environment
- **Build Steps**
- Post-build Actions

Build Steps

≡ **Execute shell** ?

Command

See the list of available environment variables

```
yum install httpd
```

Advanced ⌄

Now if I try to build this job, then this job will fail. Because in linux when I try to run this command it will ask for user input to press y and N.

```
[root@ip-172-31-32-78 ~]# yum install httpd
Last metadata expiration check: 3:40:11 ago on Thu Aug 17 09:30:52 2023.
Dependencies resolved.
================================================================================
 Package                        Architecture       Version
================================================================================
Installing:
 httpd                          x86_64             2.4.56-1.amzn2023
Installing dependencies:
 apr                            x86_64             1.7.2-2.amzn2023.0.2
 apr-util                       x86_64             1.6.3-1.amzn2023.0.1
 generic-logos-httpd            noarch             18.0.0-12.amzn2023.0.3
 httpd-core                     x86_64             2.4.56-1.amzn2023
 httpd-filesystem               noarch             2.4.56-1.amzn2023
 httpd-tools                    x86_64             2.4.56-1.amzn2023
 mailcap                        noarch             2.1.49-3.amzn2023.0.3
Installing weak dependencies:
 apr-util-openssl               x86_64             1.6.3-1.amzn2023.0.1
 mod_http2                      x86_64             2.0.11-2.amzn2023
 mod_lua                        x86_64             2.4.56-1.amzn2023

Transaction Summary
================================================================================
Install  11 Packages

Total download size: 2.0 M
Installed size: 6.1 M
Is this ok [y/N]:
```

Upon reviewing the console output, we observe an error indicating that Jenkins lacks the necessary permissions to execute the Yum command and install software. To resolve this, we can grant Jenkins additional permissions, enabling it to execute such commands seamlessly.

Currently I am using this system as root user. Where I have unlimited power.

```
[root@ip-172-31-32-78 ~]# id jenkins
uid=992(jenkins) gid=992(jenkins) groups=992(jenkins)
[root@ip-172-31-32-78 ~]# whoami
root
[root@ip-172-31-32-78 ~]# id root
uid=0(root) gid=0(root) groups=0(root)
```

I am giving the permission to Jenkins to run any types of command in the system. This is not the recommended practice. Open the file in linux OS. vim /etc/sudoers.

```
[root@ip-172-31-32-78 ~]# vim /etc/sudoers
[root@ip-172-31-32-78 ~]#
```

And then If I try to run the command using jenkins. And Trying to see who am I.

In the Project Go to Configure

Dashboard > Webserver Setup >

Project Webserver Setup

- Status
- </> Changes
- Workspace
- ▷ Build Now
- Configure
- Delete Project
- Rename

Permalinks

- Last build (#2), 21 min ago
- Last stable build (#1), 22 min ago
- Last successful build (#1), 22 min ago
- Last failed build (#2), 21 min ago

Configure

- General
- Source Code Management
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- Post-build Actions

Build Steps

≡ **Execute shell** ?   ✕

Command

See the list of available environment variables

```
sudo whoami
```

Saving the Command and building the project. In the Console output it will show the output as root.

✅ **Console Output**

```
Started by user Himanshu Kumar
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/Webserver Setup
[Webserver Setup] $ /bin/sh -xe /tmp/jenkins6952788649036606766.sh
+ sudo whoami
root
Finished: SUCCESS
```

Now I am going to install the Httpd software and then start the httpd services and making it permanent. For that I have written the commands. And click on save and click on Build Now.

Configure

- General
- Source Code Management
- Build Triggers
- Build Environment
- Build Steps
- Post-build Actions

Build Steps

≡ **Execute shell** ?   ✕

Command

See the list of available environment variables

```
sudo yum install httpd -y
sudo systemctl enable httpd --now
sudo systemctl status httpd
```

✅ Console Output

```
Started by user Himanshu Kumar
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/Webserver Setup
[Webserver Setup] $ /bin/sh -xe /tmp/jenkins3661257163371993519.sh
+ sudo yum install httpd -y
Last metadata expiration check: 4:05:10 ago on Thu Aug 17 09:30:52 2023.
Dependencies resolved.
================================================================================
 Package              Arch     Version                    Repository     Size
================================================================================
Installing:
 httpd                x86_64   2.4.56-1.amzn2023          amazonlinux    48 k
+ sudo systemctl enable httpd --now
Created symlink /etc/systemd/system/multi-user.target.wants/httpd.service →
/usr/lib/systemd/system/httpd.service.
+ sudo systemctl status httpd
● httpd.service - The Apache HTTP Server
     Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; preset: disabled)
     Active: active (running) since Thu 2023-08-17 13:36:07 UTC; 158ms ago
       Docs: man:httpd.service(8)
   Main PID: 3996 (httpd)
Aug 17 13:36:07 ip-172-31-32-78.ap-south-1.compute.internal systemd[1]: Starting httpd.service - The Apache HTTP
Server...
Aug 17 13:36:07 ip-172-31-32-78.ap-south-1.compute.internal systemd[1]: Started httpd.service - The Apache HTTP
Server.
Aug 17 13:36:07 ip-172-31-32-78.ap-south-1.compute.internal httpd[3996]: Server configured, listening on: port 80
Finished: SUCCESS
```

In the Console Output we can see the Httpd software is installed and Jenkins will also enable the httpd service permanently. And we can verify that from the system also.

```
[root@ip-172-31-32-78 ~]#
[root@ip-172-31-32-78 ~]# rpm -q httpd
httpd-2.4.56-1.amzn2023.x86_64
[root@ip-172-31-32-78 ~]#
[root@ip-172-31-32-78 ~]#
```