

# "Securing a LAMP system"

---

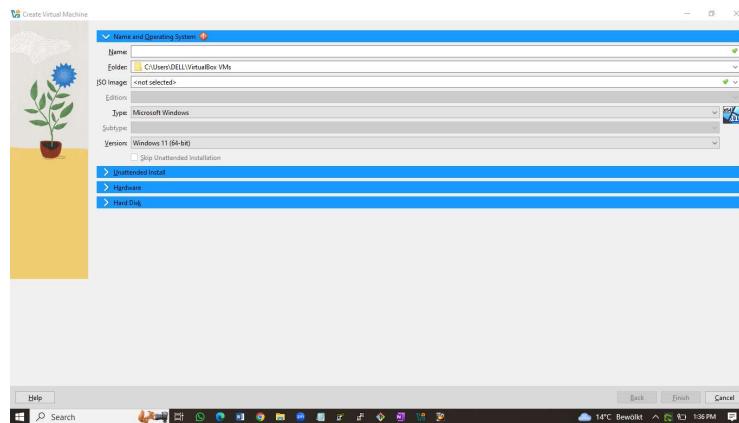
## ▪ Oracle Virtual Box Installation

- First We have install Oracle virtual Box Application.

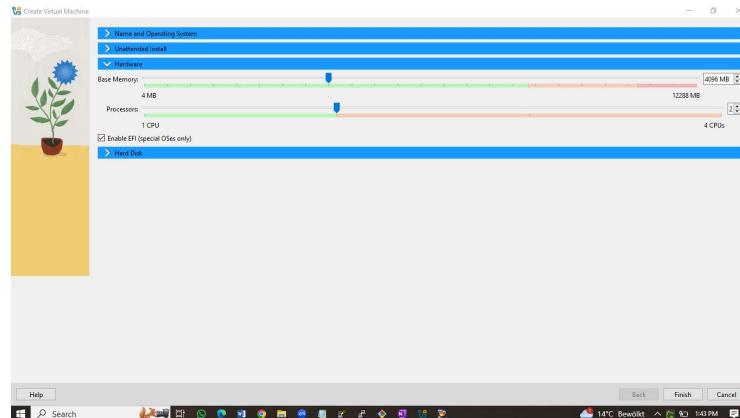


## ▪ Creating and setup the VM

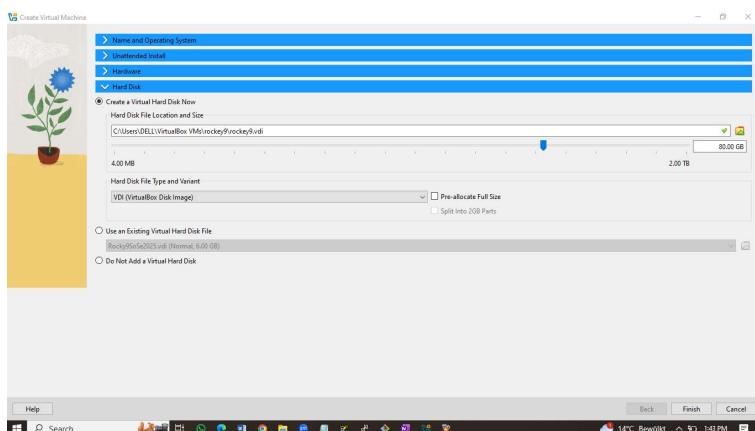
- Click On “NEW” in Virtual Box Manager



- Setup the Hardware Requirements



- Setup the Hard Disk Requirement



- Click on “Finish”
- Click on “Start”
- Press The Up and Down Arrow



- And press the “e” and perform the required changes.



- Images after perform the changes.
- Press the F10 to boot.

- **Set the password**

- Now set the password using
  - **passwd**

```
bash-5.1# passwd
Changing password for user root.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
bash-5.1#
```

- Login with root user and password which you set

```
Rocky Linux 9.5 (Blue Onyx)
Kernel 5.14.0-503.14.1.e19_5.x86_64 on an x86_64

Activate the web console with: systemctl enable --now cockpit.socket

localhost login: root
Password:
Last login: Sat Apr 26 11:28:35 on tty1
[root@localhost ~]# _
```

- **Network Configuration**

- Check status of NetworkManager
  - **systemctl status NetworkManager**
- Add a new network connection ‘DHCP-enp0s3’
  - **nmcli con add type ethernet ifname enp0s3 con-name dhcp-enps03 ipv4.method auto**
- Activate the network connection
  - **nmcli con up dhcp-enps03**
- Restart network manager
  - **systemctl restart NetworkManager**

```
[root@localhost ~]# nmcli con add type ethernet ifname enp0s3 con-name dhcp-enp0s3 ipv4.method auto
Connection 'dhcp-enp0s3' (76797130-c4d7-4fe9-9f36-26fa2313fb43) successfully added.
[root@localhost ~]# nmcli con up dhcp-enp0s3
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/3)
[root@localhost ~]# systemctl restart NetworkManager
[root@localhost ~]#
```

- Check if the network is up and received a IP address

➤ ip -c a

```
[root@vbox ~]# ip -c 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: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:8e:08:8e brd ff:ff:ff:ff:ff:ff
        inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
            valid_lft 86329sec preferred_lft 86329sec
        inet6 fe80::486d:1fbc:1e4b:7ba7/64 scope global dynamic noprefixroute
            valid_lft 86331sec preferred_lft 14331sec
        inet6 fe80::1462:b7ab:aa3e:eff5/64 scope link noprefixroute
            valid_lft forever preferred_lft forever
[root@vbox ~]#
```

- ping a known domain to test the connectivity

➤ ping labour42.de

```
[root@localhost ~]# ping labor42.de
PING labor42.de (5.9.77.55) 56(84) bytes of data.
64 bytes from server3.siebel-hosting.com (5.9.77.55): icmp_seq=1 ttl=255 time=27.0 ms
64 bytes from server3.siebel-hosting.com (5.9.77.55): icmp_seq=2 ttl=255 time=23.3 ms
64 bytes from server3.siebel-hosting.com (5.9.77.55): icmp_seq=3 ttl=255 time=23.5 ms
64 bytes from server3.siebel-hosting.com (5.9.77.55): icmp_seq=4 ttl=255 time=24.0 ms
64 bytes from server3.siebel-hosting.com (5.9.77.55): icmp_seq=5 ttl=255 time=23.0 ms
64 bytes from server3.siebel-hosting.com (5.9.77.55): icmp_seq=6 ttl=255 time=25.1 ms
64 bytes from server3.siebel-hosting.com (5.9.77.55): icmp_seq=7 ttl=255 time=22.8 ms
64 bytes from server3.siebel-hosting.com (5.9.77.55): icmp_seq=8 ttl=255 time=33.7 ms
64 bytes from server3.siebel-hosting.com (5.9.77.55): icmp_seq=9 ttl=255 time=24.0 ms
64 bytes from server3.siebel-hosting.com (5.9.77.55): icmp_seq=10 ttl=255 time=23.5 ms
64 bytes from server3.siebel-hosting.com (5.9.77.55): icmp_seq=11 ttl=255 time=23.6 ms
64 bytes from server3.siebel-hosting.com (5.9.77.55): icmp_seq=12 ttl=255 time=23.1 ms
64 bytes from server3.siebel-hosting.com (5.9.77.55): icmp_seq=13 ttl=255 time=24.9 ms
64 bytes from server3.siebel-hosting.com (5.9.77.55): icmp_seq=14 ttl=255 time=25.6 ms
```

## ▪ Perform System Updates

- Which checks updates for the installed packages

➤ **dnf upgrades**

```

samba-common          noarch      4.20.2-2.e19.5.1      basenos   167 k
samba-common-libs    x86_64     4.20.2-2.e19.5.1      basenos   99 k
samba-common-tools   x86_64     4.20.2-2.e19.5.1      basenos   402 k
samba-dcerpc         x86_64     4.20.2-2.e19.5.1      basenos   715 k
samba-idp-ldap-modules x86_64    4.20.2-2.e19.5.1      basenos   26 k
samba-nss             x86_64     4.20.2-2.e19.5.1      basenos   122 k
shadow-utils          x86_64     2:4.9-18.e19.5      basenos   1.1 M
shadow-utils-subsid  x86_64     2:4.9-18.e19.5      basenos   85 k
sns                  noarch      2:4.9-2.e19.5       basenos   879 k
sssd                 x86_64     2:9.5-4.e19.5.4      basenos   27 k
sssd-ad               x86_64     2:9.5-4.e19.5.4      basenos   215 k
sssd-client            x86_64    2:9.5-4.e19.5.4      basenos   161 k
sssd-common            x86_64    2:9.5-4.e19.5.4      basenos   1.1 M
sssd-common-pac        x86_64    2:9.5-4.e19.5.4      basenos   36 k
sssd-ipa               x86_64    2:9.5-4.e19.5.4      basenos   201 k
sssd-kcm               x86_64    2:9.5-4.e19.5.4      basenos   189 k
sssd-krb5              x86_64    2:9.5-4.e19.5.4      basenos   72 k
sssd-krb5-common       x86_64    2:9.5-4.e19.5.4      basenos   54 k
sssd-ldap              x86_64    2:9.5-4.e19.5.4      basenos   159 k
sssd-nfs-idmap         x86_64    2:9.5-4.e19.5.4      basenos   39 k
sssd-proxy              x86_64    2:9.5-4.e19.5.4      basenos   72 k
systemd               x86_64     252-46.e19.5.3      basenos   419 k
systemd-libs             x86_64   252-46.e19.5.3      basenos   671 k
systemd-pam              x86_64   252-46.e19.5.3      basenos   270 k
systemd-rpm-macros      x86_64   252-46.e19.5.3      basenos   66 k
systemd-udev            x86_64   252-46.e19.5.3      basenos   1.3 M
tar                   noarch      2:24.0-1.e19.5       basenos   348 k
tzdata                noarch      28259-1.e19           basenos   438 k
unzip                 x86_64     6.0-58.e19.5       basenos   188 k
wpa_supplicant-jsc      x86_64     2:48.1-1.e19.5      appstream 4.7 M

Transaction Summary
=====
Install  6 Packages
Upgrade 147 Packages

Total download size: 253 M
Is this ok [y/N]: y
Downloading Packages:
(1/153): grub2-tools-efi-2.06-94.e19.5.x86_64.rpm      193 kB/s | 539 kB   00:02
(2/153): grub2-tools-extra-2.06-94.e19.5.x86_64.rpm     226 kB/s | 948 kB   00:03
(3/153): kernel-core-5.14.0-503.48.1.e19.5.x86_64.rpm: Curl error (29): Timeout was reached for http://mirr0r1.he-szellingen.de/mirrors/rhel9.5/baseos/x86_64/os/Packages/kernel-core-5.14.0-503.48.1.e19.5.x86_64.rpm 42  {==}
(4/153): kernel-modules-5.14.0-503.48.1.e19.5.x86_64.rpm 1 717 kB/s | 37 MB   00:03
(5/153): kernel-modules-core-5.14.0-503.48.1.e19.5      39 M
(6/153): kernel-headers-5.14.0-503.48.1.e19.5.x86_64.rpm 36 M
(7/153): kernel-headers-core-5.14.0-503.48.1.e19.5      39 M
(8/153): kernel-tools-5.14.0-503.48.1.e19.5.x86_64.rpm 840 k
(9/153): kernel-tools-core-5.14.0-503.48.1.e19.5      18 M
(10/153): kernel-uefi-5.14.0-503.48.1.e19.5.x86_64.rpm 56 M
(11/153): kernel-uefi-core-5.14.0-503.48.1.e19.5      39 M
(12/153): kernel-xen-5.14.0-503.48.1.e19.5.x86_64.rpm 1717 kB/s | 37 MB   00:03
(13/153): kernel-xen-core-5.14.0-503.48.1.e19.5      17:03 ETM

```

- Display first line of the LSOF (*List Open File System*) output.

➤ **lsof | head -1**

COMMAND	PID	TID	TASKCMD	USER	FD	TYPE	DEVICE	SIZE/OFF	NODE NAME
[root@vbox ~]# lsof   head -1									

- Display the detailed system information

➤ **uname -a**

```

[root@vbox ~]# uname -a
Linux vbox 5.14.0-503.48.1.e19.5.x86_64 #1 SMP PREEMPT_DYNAMIC Wed Apr 30 17:30:54 UTC 2025 x86_64 x86_64 x86_64 GNU/Linux
[root@vbox ~]#

```

- List the detailed information about the /boot directory

➤ **ll /boot**

```
[root@vbox ~]# ll /boot
total 518672
-rw-r--r--. 1 root root 226284 Nov 15 2024 config-5.14.0-503.14.1.e19_5.x86_64
-rw-r--r--. 1 root root 226284 Apr 30 19:51 config-5.14.0-503.40.1.e19_5.x86_64
drwxr-xr-x. 3 root root 4096 Apr 9 16:27 efi
drwx-----. 5 root root 4096 Mar 18 12:41 grub2
-rw-----. 1 root root 168482351 Apr 9 16:29 initramfs-0-rescue-423ead5c5a63409daaf684ec41ec1b58a.img
-rw-----. 1 root root 165453678 May 19 22:48 initramfs-0-rescue-59bb9b3abbef8698f84d8dbc7b838e9.img
-rw-----. 1 root root 32986146 May 19 22:52 initramfs-5.14.0-503.14.1.e19_5.x86_64.img
-rw-----. 1 root root 31589888 Apr 9 16:31 initramfs-5.14.0-503.40.1.e19_5.x86_64kdump.img
-rw-----. 1 root root 32985031 May 19 22:56 initramfs-5.14.0-503.40.1.e19_5.x86_64.img
-rw-----. 1 root root 31527936 May 20 10:17 initramfs-5.14.0-503.40.1.e19_5.x86_64kdump.img
drwxr-xr-x. 3 root root 4096 Apr 9 16:28 loader
lrwxrwxrwx. 1 root root 52 Apr 9 16:28 symvers-5.14.0-503.14.1.e19_5.x86_64.gz -> /lib/modules/5.14.0-503.14.1.e19_5.x86_64/symvers.gz
lrwxrwxrwx. 1 root root 52 May 19 22:43 symvers-5.14.0-503.40.1.e19_5.x86_64.gz -> /lib/modules/5.14.0-503.40.1.e19_5.x86_64/symvers.gz
-rw-----. 1 root root 8876141 Nov 15 2024 System.map-5.14.0-503.14.1.e19_5.x86_64
-rw-----. 1 root root 8878021 Apr 30 19:51 System.map-5.14.0-503.40.1.e19_5.x86_64
14457672 Apr 9 16:28 vmlinuz-0-rescue-423ead5c5a63409daaf684ec41ec1b58a
-rwcr-xr-x. 1 root root 14465864 May 19 22:44 vmlinuz-0-rescue-59bb9b3abbef8698f84d8dbc7b838e9
-rwcr-xr-x. 1 root root 14457672 Nov 15 2024 vmlinuz-5.14.0-503.14.1.e19_5.x86_64
-rwcr-xr-x. 1 root root 14465864 Apr 30 19:51 vmlinuz-5.14.0-503.40.1.e19_5.x86_64
[root@vbox ~]#
```

- List (find) the files which deleted but still open in process

➤ **lsof | grep deleted**

```
[root@vbox ~]# lsof | grep deleted
dbus-brok 578          dbus    12u      REG              0,1  2097152      3 /memfd:dbus-broker-log (deleted)
[root@vbox ~]#
```

## ■ **Enable SSHD and Generate a new server (host) key**

- First will remove the old system generated keys to avoid security risk.
 

➤ **rm \*\_key\***
- Will restart the sshd server and will check the sshd server status
 

➤ **systemctl restart sshd**

➤ **systemctl status sshd**
- Now will generate a new key
 

➤ **ssh-keygen -f ssh\_host\_rsa\_key**

➤ **ssh-keygen -f ssh\_host\_ecdsa\_key**

➤ **ssh-keygen -f ssh\_host\_ed25519\_key**

```

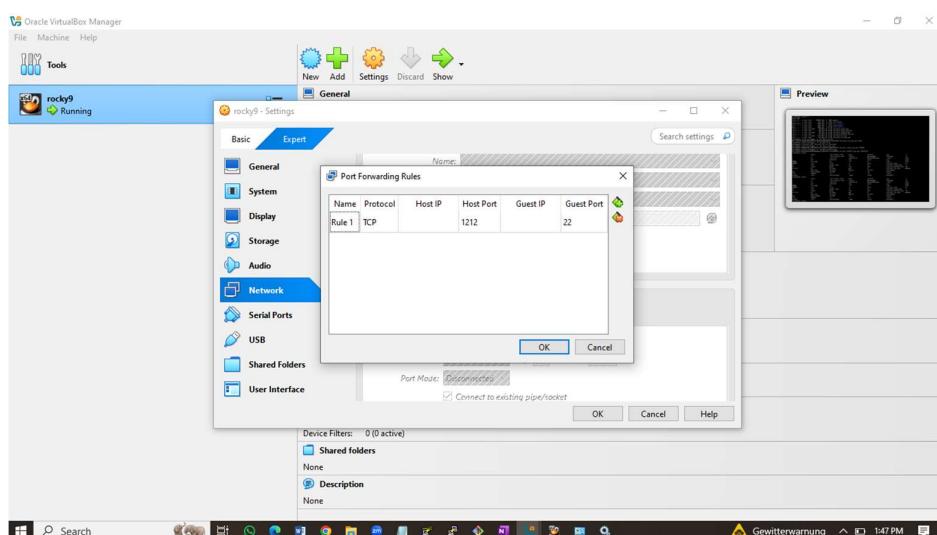
[root@vbox ssh]# rm *.key*
rm: remove regular file 'ssh_host_ecdsa_key'? y
rm: remove regular file 'ssh_host_ecdsa_key.pub'? y
rm: remove regular file 'ssh_host_ed25519.key'? y
rm: remove regular file 'ssh_host_ed25519.key.pub'? y
rm: remove regular file 'ssh_host_rsa_key'? y
rm: remove regular file 'ssh_host_rsa_key.pub'? y
[root@vbox ssh]# systemctl restart sshd
[root@vbox ssh]# systemctl status sshd
● sshd.service - OpenSSH server daemon
   Loaded: loaded (/usr/lib/systemd/system/sshd.service; enabled; preset: enabled)
   Active: active (running) since Fri 2025-05-16 12:05:28 CEST; 53s ago
     Docs: man:sshd(8)
           man:sshd_config(5)
     Main PID: 1487 (sshd)
        Tasks: 1 (limit: 11100)
       Memory: 1.4M
          CPU: 30ms
        CGroup: /system.slice/sshd.service
                   └─1487 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

May 16 12:05:28 vbox systemd[1]: Starting OpenSSH server daemon...
May 16 12:05:28 vbox sshd[1487]: Server listening on 0.0.0.0 port 22.
May 16 12:05:28 vbox sshd[1487]: Server listening on :: port 22.
May 16 12:05:28 vbox systemd[1]: Started OpenSSH server daemon.
[root@vbox ssh]# ll
total 688
-rw-r--r--. 1 root root      578894 Nov  5 2024 moduli
-rw-r--r--. 1 root root      1921 Nov  5 2024 ssh_config
drwxr-xr-x. 2 root root      4896 Apr  9 16:28 ssh_config.d
-rw-r----- 1 root root      3667 Nov  5 2024 sshd_config
drwxr-xr-x. 2 root root      4896 Apr  9 16:38 sshd_config.d
-rw-r----- 1 root ssh_keys    480 May 16 12:05 ssh_host_ecdsa_key
-rw-r----- 1 root root      162 May 16 12:05 ssh_host_ecdsa_key.pub
-rw-r----- 1 root ssh_keys    387 May 16 12:05 ssh_host_ed25519_key
-rw-r----- 1 root root      82 May 16 12:05 ssh_host_ed25519_key.pub
-rw-r----- 1 root ssh_keys    2578 May 16 12:05 ssh_host_rsa_key
-rw-r--r--  1 root root      554 May 16 12:05 ssh_host_rsa_key.pub
[root@vbox ssh]# ssh-keygen -lf ssh_host_rsa_key
0872 SHA256:AgdEHyc0Ra9Mu5zP+9d8a9nAgKhqBm9fVTIsaw49cNY ssh_host_rsa_key.pub (RSA)
[root@vbox ssh]# ssh-keygen -lf ssh_host_ecds
ssh-keygen: ssh_host_ecds: No such file or directory
[root@vbox ssh]# ssh-keygen -lf ssh_host_ecdsa_key
256 SHA256:95RgZ8CXj1j8Kj9E54x4tLxsJEB84FlldKHk-MTzG0 ssh_host_ecdsa_key.pub (ECDSA)
[root@vbox ssh]# ssh-keygen -lf ssh_host_ed25519_key
256 SHA256:8sGJv05yJaNZdQe0MSQqocceLdNG1AfPr+cZs3GMHRZB ssh_host_ed25519_key.pub (ED25519)
[root@vbox ssh]#

```

## ■ Port Mapping

- To access SSH server from our host machine we need to configure port forwarding
- For port forwarding go to the *VM > Settings > Networks*
- We created a rule 1 and added Host Port - 1212 & Guest Port - 22



- To Access SSH server from our host machine > *Open CMD*
- **ssh -l root -p 1212 localhost**
- Logging using your password and cross check the key

```
root@vbox:~  
Microsoft Windows [Version 10.0.19045.5854]  
(c) Microsoft Corporation. All rights reserved.  
  
C:\Users\DELL>ssh -l root -p 1212 localhost  
The authenticity of host '[localhost]:1212 ([127.0.0.1]:1212)' can't be established.  
ED25519 key fingerprint is SHA256:8sGJv85y3aNZdQe@MSQocceLdNGlAPr+cZs3GM4RZ8.  
This key is not known by any other names.  
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes  
Warning: Permanently added '[localhost]:1212' (ED25519) to the list of known hosts.  
Connection reset by 127.0.0.1 port 1212  
  
C:\Users\DELL>ssh -l root -p 1212 localhost  
root@localhost's password:  
Activate the web console with: systemctl enable --now cockpit.socket  
  
Last login: Fri May 16 10:43:22 2025  
[root@vbox ~]#
```

#### ▪ Identify VM using the SSH public keys

```
[root@vbox ssh]# ssh-keygen -lf ssh_host_rsa_key  
3072 SHA256:AgpAEhy0Ra9aMVSzP+9d6aSmqkhuBm9fUT1saW49chNY ssh_host_rsa_key.pub (RSA)  
[root@vbox ssh]# ssh-keygen -lf ssh_host_ecds  
ssh-keygen: ssh_host_ecds: No such host or directory  
[root@vbox ssh]# ssh-keygen -lf ssh_host_ecdsa_key  
256 SHA256:95Rg28CX8j1J0Kj9E54xUtxsJEBS4F1ldKHK/Mt2GA ssh_host_ecdsa_key.pub (ECDSA)  
[root@vbox ssh]# ssh-keygen -lf ssh_host_ed25519_key  
256 SHA256:8sGJv85y3aNZdQe@MSQocceLdNGlAPr+cZs3GM4RZ8 ssh_host_ed25519_key.pub (ED25519)  
[root@vbox ssh]#
```

```
256 SHA256:8sGJv85y3aNZdQe@MSQocceLdNGlAPr+cZs3GM4RZ8 studi03-labor42.f2.htw-berlin.de (ED25519)  
3072 SHA256:AgpAEhy0Ra9aMVSzP+9d6aSmqkhuBm9fUT1saW49chNY studi03-labor42.f2.htw-berlin.de (RSA)  
256 SHA256:95Rg28CX8j1J0Kj9E54xUtxsJEBS4F1ldKHK/Mt2GA studi03-labor42.f2.htw-berlin.de (ECDSA)
```

#### Login Via SSH

C:\Users\Ketan>ssh [root@studi03-labor42.f2.htw-berlin.de](mailto:root@studi03-labor42.f2.htw-berlin.de)

#### ▪ Setting the Hostname

Configuring the server's hostname to its Fully Qualified Domain Name (FQDN)

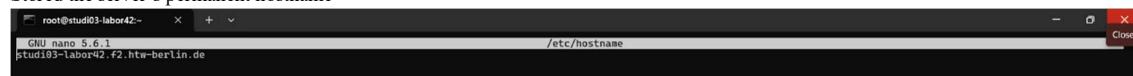
*[root@studi03-labor42 ~]# hostname -f*

It shows the server's fully qualified domain name

```
[root@studi03-labor42 ~]# hostname -f  
studi03-labor42.f2.htw-berlin.de
```

*[root@studi03-labor42 ~]# nano /etc/hostname*

Stored the server's permanent hostname



```
[root@studi03-labor42 ~]# cat /etc/hostname
```

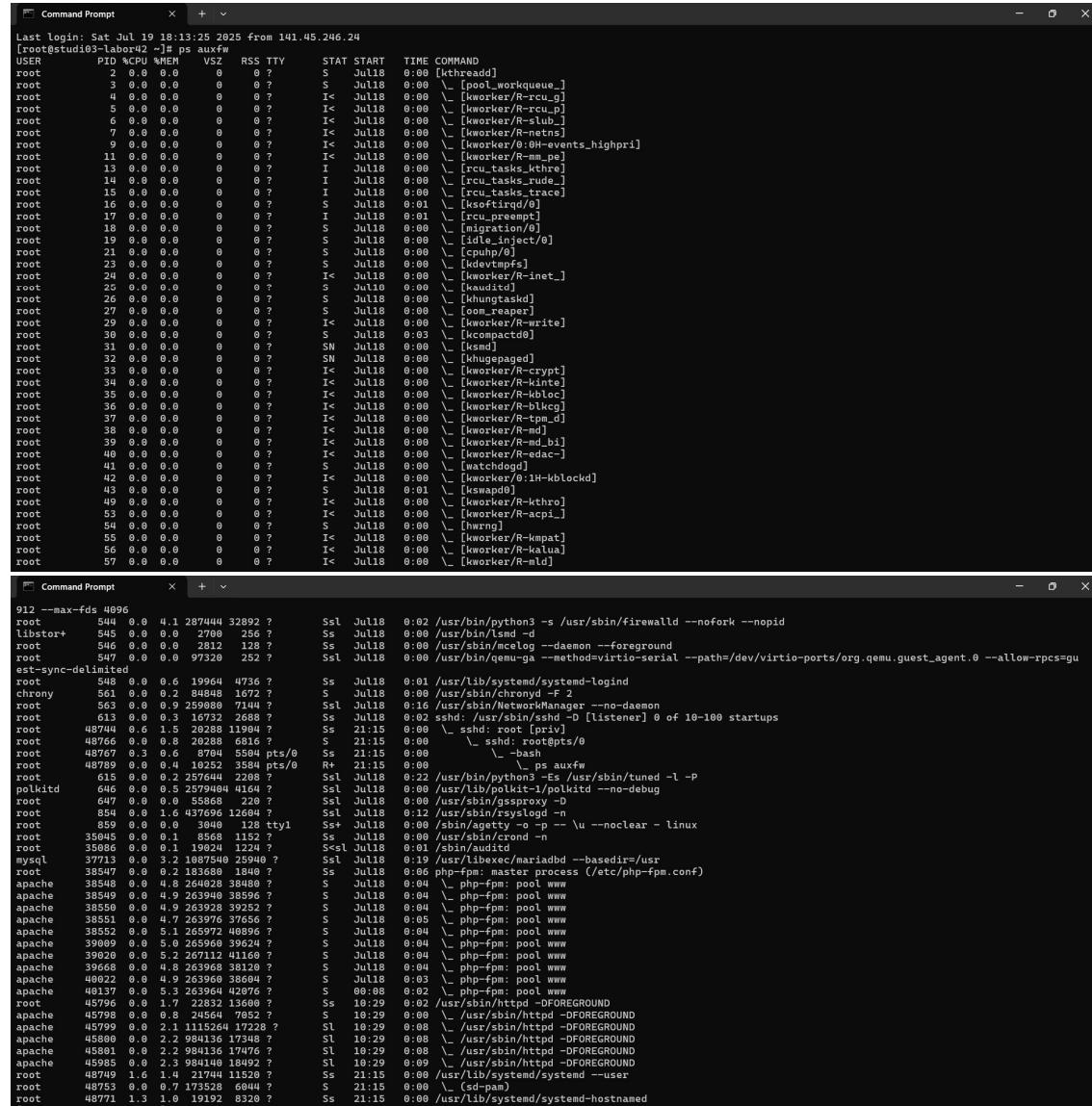
To view the content of the file

```
[root@studi03-labor42 ~]# cat /etc/hostname  
studi03-labor42.f2.hbw-berlin.de  
[root@studi03-labor42 ~]#
```

## ▪ Identifying Running and Enabled Services and Processes

```
[root@studi03-labor42 ~]# ps auxfw
```

To see all the running process



The image shows two terminal windows side-by-side. Both windows have a title bar 'Command Prompt'. The first window displays the output of the 'ps auxfw' command, listing numerous processes running on the system. The second window also displays the same command, showing a different set of processes, likely due to a different session or a different time. The processes listed include various system daemons like sshd, httpd, and cron, along with user processes and kernel threads.

```
Last login: Sat Jul 19 18:13:25 2025 from 141.45.246.24  
[root@studi03-labor42 ~]# ps auxfw  
USER PID %CPU %MEM RSS RSS TTY STAT START TIME COMMAND  
root 2 0.0 0.0 0 0 ? S Jul18 0:00 [kthreadd]  
root 3 0.0 0.0 0 0 ? S Jul18 0:00 \_\_ [pool_workqueue_]  
root 4 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-rcu_g]  
root 5 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-rcu_p]  
root 6 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-slub_]  
root 7 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-nodemsg]  
root 9 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-highpri]  
root 11 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-pe_]  
root 13 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [rcu_tasks_kthre]  
root 14 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [rcu_tasks_rude_]  
root 15 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [rcu_tasks_trace]  
root 16 0.0 0.0 0 0 ? S Jul18 0:01 \_\_ [ksoftirqd/0]  
root 17 0.0 0.0 0 0 ? I= Jul18 0:01 \_\_ [rcu_preempt]  
root 18 0.0 0.0 0 0 ? S Jul18 0:01 \_\_ [migration/0]  
root 19 0.0 0.0 0 0 ? S Jul18 0:00 \_\_ [kblockd/0]  
root 21 0.0 0.0 0 0 ? S Jul18 0:00 \_\_ [cphup/0]  
root 23 0.0 0.0 0 0 ? S Jul18 0:00 \_\_ [kdevtmpfs]  
root 24 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-intet_]  
root 25 0.0 0.0 0 0 ? S Jul18 0:00 \_\_ [kaudittd]  
root 26 0.0 0.0 0 0 ? S Jul18 0:00 \_\_ [khungtaskd]  
root 27 0.0 0.0 0 0 ? S Jul18 0:00 \_\_ [oom_reaper]  
root 29 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-write]  
root 30 0.0 0.0 0 0 ? S Jul18 0:00 \_\_ [kmemcompactd/0]  
root 31 0.0 0.0 0 0 ? SW Jul18 0:00 \_\_ [ksmd]  
root 32 0.0 0.0 0 0 ? SN Jul18 0:00 \_\_ [khugepaged]  
root 33 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-crypt]  
root 34 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-kinten]  
root 35 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-kblloc]  
root 36 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-blkg]  
root 37 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-tpm_d]  
root 38 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-mqd]  
root 39 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-bpi]  
root 40 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-edac-]  
root 41 0.0 0.0 0 0 ? S Jul18 0:00 \_\_ [watchdogd]  
root 42 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/0:1H-kblockd]  
root 43 0.0 0.0 0 0 ? S Jul18 0:01 \_\_ [kswapd0]  
root 49 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-kthro]  
root 53 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-acpl_]  
root 54 0.0 0.0 0 0 ? S Jul18 0:00 \_\_ [hwmon_]  
root 55 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-kmpat]  
root 56 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-kalma]  
root 57 0.0 0.0 0 0 ? I= Jul18 0:00 \_\_ [kworker/R-sld]  
  
[root@studi03-labor42 ~]# ps auxfw  
912 --max-fds 4096  
root 544 0.0 4.1 2874044 32892 ? Ss Jul18 0:02 /usr/bin/python3 -s /usr/sbin/firewalld --nofork --nopid  
libstor+ 545 0.0 0.0 2708 256 ? Ss Jul18 0:00 /usr/bin/lsmd -d  
root 546 0.0 0.0 2812 128 ? Ss Jul18 0:00 /usr/sbin/mcelog --daemon --foreground  
root 547 0.0 0.0 97328 252 ? Ss Jul18 0:00 /usr/bin/qemu-ga --method=virtio-serial --path=/dev/virtio-ports/org.qemu.guest_agent.0 --allow-rpc=gu  
est-sync-delimited  
root 548 0.0 0.6 19964 4736 ? Ss Jul18 0:01 /usr/lib/systemd/systemd-logind  
chrony 561 0.0 0.2 84848 1672 ? S Jul18 0:00 /usr/sbin/chronyd -F 2  
root 563 0.0 0.9 259088 7144 ? Ss Jul18 0:16 /usr/sbin/NetworkManager --no-daemon  
root 613 0.0 0.3 16732 2688 ? Ss Jul18 0:02 sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups  
root 6976 0.6 1.0 29286 1187 ? Ss Jul18 21:15 0:00 \_\_ sshd: root [priv]  
root 8766 0.0 0.8 28288 6016 ? Ss Jul18 21:15 0:00 \_\_ sshd: root@pts/0  
root #8767 0.3 0.6 3791 1580 pts/0 Ss Jul18 21:15 0:00 \_\_ ps aux#  
root 48789 0.0 0.4 10252 3584 pts/0 R+ 21:15 0:00 \_\_ ps aux#  
root 615 0.0 0.2 257644 2208 ? Ss Jul18 0:22 /usr/bin/python3 -Es /usr/sbin/tuned -l -P  
polkitd 646 0.0 0.5 2579484 4164 ? Ss Jul18 0:00 /usr/lib/polkit-1/polkitd --no-debug  
root 647 0.0 0.0 55868 220 ? Ss Jul18 0:00 /usr/sbin/gssproxy -D  
root 854 0.0 1.6 437696 12694 ? Ss Jul18 0:12 /usr/sbin/rsyslogd -n  
root 859 0.0 0.0 3840 128 tty1 S+ Jul18 0:00 /sbin/agetty -o -p -- \u0 --noclear - linux  
root 3580 0.0 0.0 5628 1172 ? Ss Jul18 0:00 /sbin/agetty -o -p -- \u0 --noclear - linux  
root 35806 0.0 0.1 19824 1224 ? Ss Jul18 0:01 /sbin/auditd  
mysql 37713 0.0 3.2 1887540 2594 ? Ss Jul18 0:19 /usr/libexec/mariadb -basedir=/usr  
root 38547 0.0 0.2 183688 1840 ? Ss Jul18 0:06 php-fpm: master process (/etc/php-fpm.conf)  
apache 38548 0.0 4.8 264028 38480 ? S Jul18 0:04 \_\_ pool www  
apache 38549 0.0 4.9 263948 38596 ? S Jul18 0:04 \_\_ pool www  
apache 38550 0.0 4.9 263928 39252 ? S Jul18 0:04 \_\_ pool www  
apache 38551 0.0 4.9 263975 37656 ? S Jul18 0:05 \_\_ pool www  
apache 38552 0.0 5.1 263975 37657 ? S Jul18 0:05 \_\_ pool www  
apache 39069 0.0 5.0 265968 39624 ? S Jul18 0:04 \_\_ pool www  
apache 39828 0.0 5.2 267112 41169 ? S Jul18 0:04 \_\_ pool www  
apache 39668 0.0 4.8 263968 38120 ? S Jul18 0:04 \_\_ pool www  
apache 40022 0.0 4.9 263968 38694 ? S Jul18 0:03 \_\_ pool www  
apache 40137 0.0 5.3 263964 42076 ? S 0:08 0:02 \_\_ pool www  
root 45796 0.0 1.7 22823 13600 ? Ss 10:29 0:02 /usr/sbin/httpd -DFOREGROUND  
apache 45798 0.0 0.8 24564 7052 ? S 10:29 0:00 \_\_ /usr/sbin/httpd -DFOREGROUND  
apache 45799 0.0 0.8 24564 7053 ? S 10:29 0:00 \_\_ /usr/sbin/httpd -DFOREGROUND  
apache 45800 0.0 2.2 284136 17348 ? S 10:29 0:00 \_\_ /usr/sbin/httpd -DFOREGROUND  
apache 45801 0.0 2.2 284136 17476 ? S 10:29 0:00 \_\_ /usr/sbin/httpd -DFOREGROUND  
apache 45985 0.0 2.3 284148 18492 ? S 10:29 0:09 \_\_ /usr/sbin/httpd -DFOREGROUND  
root 48749 1.6 1.4 21744 11520 ? Ss 21:15 0:00 /usr/lib/systemd/systemd --user  
root 48753 0.0 0.7 173528 6044 ? S 21:15 0:00 \_\_ (sd-pam)  
root 48771 1.3 1.0 19192 8320 ? Ss 21:15 0:00 /usr/lib/systemd/systemd-hostnamed
```

```
[root@studi03-labor42 ~]# systemctl list-unit-files --type=service --state=enabled
```

List all the service which configured to to start automatically when system starts

```

Command Prompt
systemd-remount-fs.service loaded active exited Remount Root and Kernel File Systems
systemd-sysctl.service loaded active exited Apply Kernel Variables
systemd-tmpfiles-setup-dev.service loaded active exited Create Static Device Nodes in /dev
systemd-tmpfiles-setup.service loaded active exited Create Volatile Files and Directories
systemd-udev-trigger.service loaded active exited Wait for udev To Complete Device Initialization
systemd-udevd.service loaded active running Rule-based Manager for Device Events and Files
lines 1-44/53
[root@stud03-labor42 ~]# systemctl list-unit-files --type=service --state=enabled
UNIT FILE STATE PRESET
bluetooth.service enabled enabled
bluetooth.service enabled enabled
chronyd.service enabled enabled
crond.service enabled enabled
dbus-broker.service enabled enabled
firewalld.service enabled enabled
getty0.service enabled disabled
httpd.service enabled enabled
irqbalance.service enabled enabled
lvm2-monitor.service enabled enabled
libstoragemgmt.service enabled enabled
lvm2-monitor.service enabled enabled
mariadb.service enabled disabled
mcelog.service enabled enabled
mdmonitor.service enabled enabled
microcode.service enabled enabled
NetworkManager-dispatcher.service enabled enabled
NetworkManager-wait-online.service enabled enabled
NetworkManager.service enabled enabled
NetworkManager-wait-online.service enabled enabled
nis-domainname.service enabled enabled
nvmfc-boot-connections.service enabled disabled
php-fpm.service enabled enabled
qemu-guest-agent.service enabled enabled
rsyslog.service enabled enabled
selinux-autorelabel-mark.service enabled enabled
smart.service enabled enabled
sssd.service enabled enabled
systemd-boot-update.service enabled enabled
systemd-network-generator.service enabled enabled
tuned.service enabled enabled
31 unit files listed.

```

**[root@stud03-labor42 ~]# systemctl list-units --type=service --state=running**

List all the service which are currently active and in running state

```

[root@stud03-labor42 ~]# systemctl list-units --type=service --state=running
 _Unit           _State    _SubState _Description
auditd.service loaded active running Security Auditing Service
chronyd.service loaded active running NTP client/server
crond.service loaded active running Command Scheduler
dbus-broker.service loaded active running D-Bus System Message Bus
firewalld.service loaded active running firewalld - dynamic firewall daemon
getty0.service loaded active running Getty on tty1
gssproxy.service loaded active running GSSAPI Proxy Daemon
httpd.service loaded active running The Apache HTTP Server
lvm2-monitor.service loaded active running LVM2 monitor in server daemon
mariadb.service loaded active running MariaDB 10.5 database server
mcelog.service loaded active running Machine Check Exception Logging Daemon
NetworkManager.service loaded active running Network Manager
php-fpm.service loaded active running The PHP FastCGI Process Manager
polkit.service loaded active running Authorization Manager
qemu-guest-agent.service loaded active running QEMU Guest Agent
rsyslog.service loaded active running System Logging Service
smart.service loaded active running SmartSSD Monitoring Daemon
systemd-journal.service loaded active running Journal Service
systemd-logind.service loaded active running User Login Management
systemd-udevd.service loaded active running Rule-based Manager for Device Events and Files
tuned.service loaded active running Dynamic System Tuning Daemon
user@0.service loaded active running User Manager for UID 0

LOAD = Reflects whether the unit definition was properly loaded.
ACTIVE = The high-level unit activation state, i.e. generalization of SUB.
SUB = The low-level unit activation state, depends on unit type.
22 loaded units listed
[root@stud03-labor42 ~]# client_loop: send disconnect: Connection reset

```

## ▪ Services to Consider Disabling

### bluetooth.service

This service enabling wireless communication for Bluetooth devices.

**[root@stud03-labor42 ~]# systemctl status bluetooth.service**

**[root@stud03-labor42 ~]# systemctl disable bluetooth.service**

**[root@stud03-labor42 ~]# systemctl stop bluetooth.service**

**[root@stud03-labor42 ~]# systemctl status bluetooth.service**

```

[root@stud03-labor42 ~]# systemctl status bluetooth.service
● bluetooth.service - Bluetooth service
  Loaded: loaded (/usr/lib/systemd/system/bluetooth.service; enabled; preset: enabled)
  Active: inactive (dead)
    Docs: man:bluetoothd(8)
[root@stud03-labor42 ~]# systemctl disable bluetooth.service
Removed "/etc/systemd/system/dbus-org.bluez.service".
[root@stud03-labor42 ~]# systemctl st
start status stop
[root@stud03-labor42 ~]# systemctl stop bluetooth.service
[root@stud03-labor42 ~]# systemctl sta
start status
[root@stud03-labor42 ~]# systemctl status bluetooth.service
● bluetooth.service - Bluetooth service
  Loaded: loaded (/usr/lib/systemd/system/bluetooth.service; disabled; preset: enabled)
  Active: inactive (dead)
    Docs: man:bluetoothd(8)
[root@stud03-labor42 ~]#

```

## atd.service

This service allows users to schedule commands to run once at a specific time.

```
[root@studi03-labor42 ~]# systemctl status atd.service
[root@studi03-labor42 ~]# systemctl disable atd.service
[root@studi03-labor42 ~]# systemctl stop atd.service
[root@studi03-labor42 ~]# systemctl status atd.service
```

```
[root@studi03-labor42 ~]# systemctl status atd.service
● atd.service - Deferred execution scheduler
  Loaded: loaded (/usr/lib/systemd/system/atd.service; enabled; preset: enabled)
  Active: active (running) since Wed 2025-07-16 11:22:37 CEST; 1 day 1h ago
    Docs: man:atd(8)
   Main PID: 874 (atd)
      Tasks: 1 (limit: 4668)
        Memory: 296.0K
          CPU: 5ms
        CGroup: /system.slice/atd.service
           └─874 /usr/sbin/atd -f

Jul 16 11:22:37 localhost.localdomain systemd[1]: Started Deferred execution scheduler.
[root@studi03-labor42 ~]# systemctl stop atd.service
[root@studi03-labor42 ~]# systemctl disable atd.service
Removed "/etc/systemd/system/multi-user.target.wants/atd.service".
[root@studi03-labor42 ~]# systemctl status atd.service
● atd.service - Deferred execution scheduler
  Loaded: loaded (/usr/lib/systemd/system/atd.service; disabled; preset: enabled)
  Active: inactive (dead)
    Docs: man:atd(8)

Jul 16 11:22:37 localhost.localdomain systemd[1]: Started Deferred execution scheduler.
Jul 17 12:43:50 studi03-labor42.f2.htw-berlin.de systemd[1]: Stopping Deferred execution scheduler...
Jul 17 12:43:50 studi03-labor42.f2.htw-berlin.de systemd[1]: atd.service: Deactivated successfully.
Jul 17 12:43:50 studi03-labor42.f2.htw-berlin.de systemd[1]: Stopped Deferred execution scheduler.
[root@studi03-labor42 ~]#
```

## rpcbind.service

It's a directory service for remote procedure call which helps client to find the port number serves like NFS

```
[root@studi03-labor42 ~]# systemctl status atd.service
[root@studi03-labor42 ~]# systemctl disable atd.service
[root@studi03-labor42 ~]# systemctl stop atd.service
[root@studi03-labor42 ~]# systemctl status atd.service
```

```
[root@studi03-labor42 ~]# systemctl status rpcbind.service
● rpcbind.service - RPC Bind
  Loaded: loaded (/usr/lib/systemd/system/rpcbind.service; disabled; preset: enabled)
  Active: inactive (dead) since Thu 2025-07-17 11:46:28 CEST; 6min ago
    Duration: 1d 23min 59.338s
  TriggeredBy: o rpcbind.socket
    Docs: man:rpcbind(8)
   Main PID: 512 (code=exited, status=0/SUCCESS)
     CPU: 131ms

Jul 16 11:22:29 localhost systemd[1]: Starting RPC Bind...
Jul 16 11:22:29 localhost systemd[1]: Started RPC Bind.
Jul 17 11:46:28 studi03-labor42.f2.htw-berlin.de systemd[1]: Stopping RPC Bind...
Jul 17 11:46:28 studi03-labor42.f2.htw-berlin.de systemd[1]: rpcbind.service: Deactivated successfully.
Jul 17 11:46:28 studi03-labor42.f2.htw-berlin.de systemd[1]: Stopped RPC Bind.
[root@studi03-labor42 ~]# systemctl status rpcbind.service
● rpcbind.service - RPC Bind
  Loaded: loaded (/usr/lib/systemd/system/rpcbind.service; disabled; preset: enabled)
  Active: inactive (dead) since Thu 2025-07-17 11:46:28 CEST; 6min ago
    Duration: 1d 23min 59.338s
  TriggeredBy: o rpcbind.socket
    Docs: man:rpcbind(8)
   Main PID: 512 (code=exited, status=0/SUCCESS)
     CPU: 131ms

Jul 16 11:22:29 localhost systemd[1]: Starting RPC Bind...
Jul 16 11:22:29 localhost systemd[1]: Started RPC Bind.
Jul 17 11:46:28 studi03-labor42.f2.htw-berlin.de systemd[1]: Stopping RPC Bind...
Jul 17 11:46:28 studi03-labor42.f2.htw-berlin.de systemd[1]: rpcbind.service: Deactivated successfully.
Jul 17 11:46:28 studi03-labor42.f2.htw-berlin.de systemd[1]: Stopped RPC Bind.
[root@studi03-labor42 ~]#
```

## nvmefc-boot-connections.service

This service is used to establish the connection to NVMe over fiber channel storage during booting.

```
[root@studi03-labor42 ~]# systemctl status nvmefc-boot-connections.service
[root@studi03-labor42 ~]# systemctl disable nvmefc-boot-connections.service
[root@studi03-labor42 ~]# systemctl stop nvmefc-boot-connections.service
[root@studi03-labor42 ~]# systemctl status nvmefc-boot-connections.service
```

```
[root@studi03-labor42 ~]# systemctl status nvmefc-boot-connections.service
○ nvmefc-boot-connections.service - Auto-connect to subsystems on FC-NVME devices found during boot
    Loaded: loaded (/usr/lib/systemd/system/nvmefc-boot-connections.service; enabled; preset: enabled)
    Active: inactive (dead)
    Condition: start condition failed at Fri 2025-07-18 06:20:34 CEST; 1 day 15h ago
Jul 18 06:20:34 studi03-labor42.f2.htw-berlin.de systemd[1]: Auto-connect to subsystems on FC-NVME devices found during boot was skipped because of an unmet condition
Lines 1-6/6 (END)
^C
[root@studi03-labor42 ~]# systemctl disable nvmefc-boot-connections.service
Removed "/etc/systemd/system/default.target.wants/nvmefc-boot-connections.service".
[root@studi03-labor42 ~]# systemctl stop nvmefc-boot-connections.service
[root@studi03-labor42 ~]# systemctl status nvmefc-boot-connections.service
○ nvmefc-boot-connections.service - Auto-connect to subsystems on FC-NVME devices found during boot
    Loaded: loaded (/usr/lib/systemd/system/nvmefc-boot-connections.service; disabled; preset: enabled)
    Active: inactive (dead)
    Condition: start condition failed at Fri 2025-07-18 06:20:34 CEST; 1 day 15h ago
Jul 18 06:20:34 studi03-labor42.f2.htw-berlin.de systemd[1]: Auto-connect to subsystems on FC-NVME devices found during boot was skipped because of an unmet condition
Lines 1-5/5 (END)
```

### smartd.service

This service monitors the health of the physical hard drives.

```
[root@studi03-labor42 ~]# systemctl status smartd.service
[root@studi03-labor42 ~]# systemctl disable smartd.service
[root@studi03-labor42 ~]# systemctl stop smartd.service
[root@studi03-labor42 ~]# systemctl status smartd.service
```

```
[root@studi03-labor42 ~]# systemctl status smartd.service
○ smartd.service - Self Monitoring and Reporting Technology (SMART) Daemon
    Loaded: loaded (/usr/lib/systemd/system/smartd.service; enabled; preset: enabled)
    Active: inactive (dead)
    Condition: start condition failed at Fri 2025-07-18 06:22:03 CEST; 1 day 15h ago
      Docs: man:smartd(8)
             man:smartd.conf(5)
Jul 18 06:22:03 studi03-labor42.f2.htw-berlin.de systemd[1]: Self Monitoring and Reporting Technology (SMART) Daemon was skipped because of an unmet condition
Lines 1-8/8 (END)
^C
[root@studi03-labor42 ~]# systemctl disable smartd.service
Removed "/etc/systemd/system/multi-user.target.wants/smartd.service".
[root@studi03-labor42 ~]# systemctl stop smartd.service
[root@studi03-labor42 ~]# systemctl status smartd.service
○ smartd.service - Self Monitoring and Reporting Technology (SMART) Daemon
    Loaded: loaded (/usr/lib/systemd/system/smartd.service; disabled; preset: enabled)
    Active: inactive (dead)
      Docs: man:smartd(8)
             man:smartd.conf(5)
Jul 18 06:22:03 studi03-labor42.f2.htw-berlin.de systemd[1]: Self Monitoring and Reporting Technology (SMART) Daemon was skipped because of an unmet condition
Lines 1-7/7 (END)
```

### sssd.service

It helps computer get user authentication information from a central place.

```
[root@studi03-labor42 ~]# systemctl status sssd.service
[root@studi03-labor42 ~]# systemctl disable sssd.service
[root@studi03-labor42 ~]# systemctl stop sssd.service
[root@studi03-labor42 ~]# systemctl status sssd.service
```

```
[root@studi03-labor42 ~]# systemctl status sssd.service
○ sssd.service - System Security Services Daemon
    Loaded: loaded (/usr/lib/systemd/system/sssd.service; enabled; preset: enabled)
    Active: inactive (dead)
    Condition: start condition failed at Fri 2025-07-18 06:22:03 CEST; 1 day 17h ago
Jul 18 06:22:03 studi03-labor42.f2.htw-berlin.de systemd[1]: System Security Services Daemon was skipped because no trigger condition checks were met.
[root@studi03-labor42 ~]# systemctl disable sssd.service
Removed "/etc/systemd/system/multi-user.target.wants/sssd.service".
[root@studi03-labor42 ~]# systemctl stop sssd.service
[root@studi03-labor42 ~]# systemctl status sssd.service
○ sssd.service - System Security Services Daemon
    Loaded: loaded (/usr/lib/systemd/system/sssd.service; disabled; preset: enabled)
    Active: inactive (dead)
Jul 18 06:22:03 studi03-labor42.f2.htw-berlin.de systemd[1]: System Security Services Daemon was skipped because no trigger condition checks were met.
[root@studi03-labor42 ~]#
```

- Packages to Consider Removing

```
[root@studi03-labor42 ~]# dnf list installed
```

List all the package currently running on system

Package	Architecture	Version	Repository	Size
NetworkManager	x86_64	1:1.48.10-8.el9_5	@baseos	
NetworkManager-config-server.noarch		1:1.48.10-8.el9_5	@baseos	
NetworkManager-libnm.x86_64	x86_64	1:1.48.10-8.el9_5	@baseos	
NetworkManager-team.x86_64	x86_64	1:1.48.10-8.el9_5	@baseos	
NetworkManager-tui.x86_64	x86_64	1:1.48.10-8.el9_5	@baseos	
aardvark-dns.x86_64	x86_64	2:1.12.2-1.el9_5	@appstream	
acl.x86_64	x86_64	2.3.1-4.el9	@anaconda	
alternatives.x86_64	x86_64	1.24-1.el9_5.1	@anaconda	
apr.x86_64	x86_64	1.7.0-12.el9_3	@appstream	
apr-util.x86_64	x86_64	1.6.1-23.el9	@appstream	
apr-util-bdb.x86_64	x86_64	1.6.1-23.el9	@appstream	
apr-util-openssl.x86_64	x86_64	1.6.1-23.el9	@appstream	
at.x86_64	x86_64	3.1.23-11.el9	@anaconda	
attr.x86_64	x86_64	2.5.1-3.el9	@anaconda	
audit.x86_64	x86_64	3.1.5-4.el9	@anaconda	
audit-libs.x86_64	x86_64	3.1.5-4.el9	@baseos	
augeas-libs.x86_64	x86_64	1.14.1-2.el9	@appstream	
authselect.x86_64	x86_64	1.15-2.el9	@anaconda	
authsys-libs.x86_64	x86_64	1.0.6-1.el9	@anaconda	
baseosystem.noarch	noarch	11-13.el9.0.1	@anaconda	
bash.x86_64	x86_64	5.1.8-9.el9	@anaconda	
bash-completion.noarch		1.2.11-5.el9	@anaconda	
bc.x86_64	x86_64	1.07_1-14.el9	@anaconda	
binutils.x86_64	x86_64	2.35_2-54.el9	@anaconda	
binutils-gold.x86_64	x86_64	2.35_2-54.el9	@anaconda	
blktrace.x86_64	x86_64	1.2.0-20.el9	@anaconda	
bluez.x86_64	x86_64	5_72-2.el9	@anaconda	
bolt.x86_64	x86_64	0.9.7-1.el9	@anaconda	
bptool.x86_64	x86_64	7_4.0-583.48_1.el9_5	@anaconda	
buildah.x86_64	x86_64	2:1.37_6-1.el9_5	@baseos	
bzip2.x86_64	x86_64	1.0.8-18.el9_5	@baseos	
bzip2-libs.x86_64	x86_64	1.0.8-18.el9_5	@baseos	
c-ares.x86_64	x86_64	1.19.1-2.el9_4	@anaconda	
ca-certificates.noarch		2024_2.69_v8.0.303-91.4.el9_4	@anaconda	
cairo.x86_64	x86_64	1.17.4-7.el9	@AppStream	
cairo-gobject.x86_64	x86_64	1.17.4-7.el9	@AppStream	
certbot.noarch		3.1.0-1.el9	@epel	
checkpolicy.x86_64	x86_64	3.6-1.el9	@appstream	
chrony.x86_64	x86_64	4.5-3.el9	@anaconda	

```
[root@studi03-labor42 ~]# dnf remove desktop-file-utils-0.26-6.el9.x86_64
```

It's designed for graphical desktop used

Package	Architecture	Version	Repository	Size
desktop-file-utils	x86_64	0.26-6.el9	@AppStream	246 k
pininfo	x86_64	0.6.10-29.el9	@AppStream	300 k
emacs-filesystem	noarch	1:27.2-11.el9_5.2	@AppStream	0
xdg-utils	noarch	1:1.3-11.el9	@AppStream	313 k

Transaction Summary

Remove 4 Packages
Freed space: 860 k
Is this ok [y/N]: y
Running transaction test
Transaction test succeeded
Running transaction test
Transaction test succeeded
Running transaction
Preparing : pinentry-0.6.10-29.el9.x86_64
Erasing : xdg-utils-1.3-11.el9.noarch
Erasing : desktop-file-utils-0.26-6.el9.x86_64
Erasing : emacs-filesystem-1:27.2-11.el9_5.2.noarch
Running scriptlet: emacs-filesystem-1:27.2-11.el9_5.2.noarch
Verifying : desktop-file-utils-0.26-6.el9.x86_64
Verifying : emacs-filesystem-1:27.2-11.el9_5.2.noarch
Verifying : pininfo-0.6.10-29.el9.x86_64
Verifying : xdg-utils-1.3-11.el9.noarch
Removed:
desktop-file-utils-0.26-6.el9.x86_64    emacs-filesystem-1:27.2-11.el9_5.2.noarch    pininfo-0.6.10-29.el9.x86_64    xdg-utils-1.3-11.el9.noarch
Complete!

```
[root@studi03-labor42 ~]# dnf remove gnome-desktop3.x86_64
```

It provides core functionality for full interactive GUI on computer

Package	Architecture	Version	Repository	Size
<b>Dependencies resolved</b>				
gnome-desktop	x86_64	40.4-1.el9	@ppstream	2.8 M
gnome-session	x86_64	40.1.1-9.el9	@ppstream	1.5 M
gnome-session-common	x86_64	1.20.2-1.el9	@ppstream	1.5 M
gnome-shell	x86_64	40.1.1-3.el9	@ppstream	12 M
gnome-shell-themes	x86_64	40.1.1-3.el9	@ppstream	11 M
gnome-terminal	x86_64	1.39.1-1.el9	@ppstream	14 M
gnome-terminal-common	x86_64	1.39.1-1.el9	@ppstream	27 M
gnome-terminal-kde	x86_64	2.40.3-1.el9	@ppstream	516 k
gnome-terminal-plasma	x86_64	2.36.0-5.el9	@ppstream	1.2 M
gnome-terminal-plasmoid	x86_64	0.8-21.el9	@ppstream	19 K
gnome-terminal-plasmoid-common	x86_64	5.7-1.el9	@ppstream	210 K
gnome-terminal-plasmoid-kde	x86_64	0.41-8.el9_5	@ppstream	181 k
gnome-terminal-plasmoid-kde-common	x86_64	1.4-5-4.el9	@ppstream	837 M
gnome-terminal-plasmoid-kde-common-common	x86_64	1.0-5-1.el9	@ppstream	162 k
gnome-terminal-plasmoid-kde-common-common-common	x86_64	0.10-0.el9	@ppstream	395 M
gnome-terminal-plasmoid-kde-common-common-common-common	x86_64	2.0-6-0.2.29211087gite23c213.e19	@ppstream	1.3 M
gnome-terminal-plasmoid-kde-common-common-common-common-common	x86_64	0.27.5-2.el9	@ppstream	4.0 M
gnome-terminal-plasmoid-kde-common-common-common-common-common-common	x86_64	0.27.5-2.el9	@ppstream	2.7 M
gnome-terminal-plasmoid-kde-common-common-common-common-common-common-common	x86_64	2.0-0-8.el9	@ppstream	588 K
gnome-terminal-plasmoid-kde-common-common-common-common-common-common-common-common	x86_64	1.12-9-1.el9_2.1	@ppstream	549 M
gnome-terminal-plasmoid-kde-common-common-common-common-common-common-common-common-common	x86_64	1.12-9-3.el9_5	@ppstream	7.7 M
gnome-terminal-plasmoid-kde-common-common-common-common-common-common-common-common-common-common	x86_64	1.12-9-3.el9_5	@ppstream	13 k
gnome-terminal-plasmoid-kde-common-common-common-common-common-common-common-common-common-common-common	x86_64	2.9-9-16.el9	@ppstream	218 k
gnome-terminal-plasmoid-kde-common-common-common-common-common-common-common-common-common-common-common-common	x86_64	2.9-9-16.el9_4	@faseos	214 k
gnome-terminal-plasmoid-kde-common-common-common-common-common-common-common-common-common-common-common-common-common	x86_64	2.6-0-7.el9	@ppstream	265 M
gnome-terminal-plasmoid-kde-common-common-common-common-common-common-common-common-common-common-common-common-common-common	x86_64	5.2-1.9.el9	@ppstream	359 k
gnome-terminal-plasmoid-kde-common-common-common-common-common-common-common-common-common-common-common-common-common-common-common	x86_64	40.8-32.el9_5	@ppstream	106 k
gnome-control-center	x86_64	1.18.6-2.el9	@ppstream	8 M
gnome-control-center-common	x86_64	1.18.6-2.el9	@ppstream	167 M
gnome-control-center-plasmoid	x86_64	1.22.1-2.el9	@ppstream	54 M
gnome-control-center-plasmoid-common	x86_64	1.22.1-3.el9_5	@ppstream	4.8 M
gnome-control-center-plasmoid-common-common	x86_64	3.24.31-5.el9	@ppstream	7.3 M
gnome-control-center-plasmoid-common-common-common	x86_64	3.24.31-5.el9	@ppstream	66 k
gnome-control-center-plasmoid-common-common-common-common	x86_64	0.17-13.el9	@ppstream	20 M
gnome-control-center-plasmoid-common-common-common-common-common	x86_64	4.6-0-3.el9	@ppstream	72 M
gnome-control-center-plasmoid-common-common-common-common-common-common	x86_64	2.1-23.el9	@ppstream	19 M
gnome-control-center-plasmoid-common-common-common-common-common-common-common	x86_64	2.12-3.el9	@ppstream	114 k
gnome-control-center-plasmoid-common-common-common-common-common-common-common-common	x86_64	2.0-10-8.el9	@ppstream	391 k

	x86_64	2.12-3.e19	@appstream	399 k
lcms2	x86_64	1.0.18-8.e19	@appstream	171 k
libICE	x86_64	1.2.3-18.e19	@appstream	93 k
libI18n	x86_64	1.1.1.1-19.e19	@appstream	15 k
libIkxComposite	x86_64	0.4.5-7.e19	@appstream	41 k
libKcursor	x86_64	1.2.0-7.e19	@appstream	58 k
libKDamage	x86_64	1.1.5-7.e19	@appstream	36 k
libKFixes	x86_64	5.0.3-16.e19	@appstream	35 k
libKImage	x86_64	1.0.1-19.e19	@appstream	73 k
libKImageRama	x86_64	1.1.4-18.e19	@appstream	19 k
libKRandr	x86_64	1.5.2-8.e19	@appstream	52 k
libKText	x86_64	1.2.3-16.e19	@appstream	38 k
libKv	x86_64	1.0.11-16.e19	@appstream	26 k
libKXf86vm	x86_64	1.0.1-11.e19	@appstream	30 k
libKasyncns	x86_64	0.8-22.e19	@appstream	59 k
libcanberra	x86_64	0.36-27.e19	@appstream	281 k
libcanberra-gtk3	x86_64	0.36-27.e19	@appstream	74 k
libdrm	x86_64	2.47.12-1.e19	@appstream	406 k
libEGL	x86_64	1.5.2-19.e19	@appstream	1.3 M
libEGL	x86_64	0.6.22-6.e19	@appstream	2.3 M
libEGL	x86_64	0.12.3-1.e19	@appstream	225 k
libEGL	x86_64	1.1.3.4-1.e19	@appstream	778 k
libEGL	x86_64	1.1.3.4-1.e19	@appstream	69 k
libEGL	x86_64	1.1.3.4-1.e19	@appstream	119 k
libEGL	x86_64	1.1.3.4-1.e19	@appstream	679 k
libEGL	x86_64	1.14.47-5.e19	@appstream	941 k
libEGL	x86_64	0.3.2-3.e19	@appstream	193 k
libEGL	x86_64	1.1.3.4-1.e19	@appstream	177 k
libEGL	x86_64	2.0.2.3-10.e19	@appstream	79 k
libEGL	x86_64	0.7.9-8.e19	@appstream	99 k
libEGL	x86_64	2.1.3.4-6.e19	@appstream	49 k
libEGL	x86_64	1.18.0-1.e19	@appstream	1.2 M
libEGL	x86_64	0.1.1-1.e19	@base	40 k
libEGL	x86_64	1.4-9.e19	@appstream	81 k
libEGL	x86_64	1.0.31-8.e19.5.2	@appstream	521 k
libEGL	x86_64	1.1.1.1-31.e19	@appstream	463 k
libEGL	x86_64	4.4.0-13.e19	@appstream	673 k
libEGL	x86_64	2.1.3-1.e19	@appstream	70 k
libEGL	x86_64	3.1.2-3.e19.1	@appstream	1.0 M
libEGL	x86_64	1.0.40-34.e19	@appstream	423 k
libEGL	x86_64	1.1.3.7-5.e19	@appstream	993 k
libEGL	x86_64	1.21.0-1.e19	@appstream	78 k
libEGL	x86_64	1.21.0-1.e19	@appstream	57 k
libEGL	x86_64	1.21.0-1.e19	@appstream	16 k
libEGL	x86_64	1.21.0-1.e19	@appstream	86 k
libEGL	x86_64	1.2.0-8.e19	@appstream	769 k
libEGL	x86_64	1.0.3-4.e19	@appstream	317 k
libEGL	x86_64	1.1.1-10.e19	@appstream	1.6 M
libEGL	x86_64	1.1.1-10.e19	@appstream	102 M
libEGL	x86_64	1.1.34-9.e19.5.3	@appstream	752 k
libEGL	x86_64	16.1.8-3.e19	@appstream	102 M

	x86_64	1.21.0-1.el9	appstream	37 k
libwayland-cursor	x86_64	1.21.0-1.el9	appstream	16 k
libwayland-egl	x86_64	1.21.0-1.el9	appstream	88 k
libwayland-server	x86_64	1.21.0-1.el9	appstream	910 k
libxdg	x86_64	1.0.3-1.el9	appstream	16 k
libhbdbcommon	x86_64	1.0.3-4.el9	appstream	317 k
libxshmfence	x86_64	1.3-10.el9	appstream	16 k
lxlxtst	x86_64	1.1.34-9.el9_5.3	appstream	752 k
livemedia	x86_64	1.0.1-8.el9	appstream	182 k
lumina-monitor	x86_64	2.1-1.el9	appstream	70 k
mesa-dri-drivers	x86_64	24.1.2-3.el9	appstream	33 M
mesa-filesystem	x86_64	24.1.2-3.el9	appstream	3.6 k
mesa-libEGL	x86_64	24.1.2-3.el9	appstream	382 k
mesa-libGlc	x86_64	24.1.2-2.el9	appstream	500 k
mesa-libRage	x86_64	20.1.3-3.el9	appstream	65 k
mesa-libgbapi	x86_64	24.1.2-3.el9	appstream	217 k
openjpeg2	x86_64	2.4.0-7.el9	appstream	377 k
opus	x86_64	1.3.1-10.el9	appstream	355 k
osinfo	x86_64	0.1.1-1.el9	appstream	650 k
osinfo-db	noarch	20240701-2.el9	appstream	3.6 M
osinfo-db-tools	x86_64	1.10.0-1.el9	appstream	177 k
ostree	x86_64	2024.9-1.el9_5	appstream	1.1 M
ostree-libs	x86_64	2024.9-1.el9_5	appstream	351 k
pipeWire	x86_64	1.0.1-1.el9	appstream	177 k
pipeWirealsa	x86_64	1.0.1-1.el9	appstream	38 k
pipeWire-jack-audio-connection-kit	x86_64	1.0.1-1.el9	appstream	548 k
pipeWire-jack-audio-connection-kit-libs	x86_64	1.0.1-1.el9	appstream	7.6 M
pipeWire-libs	x86_64	1.0.1-1.el9	appstream	427 k
pipeWire-pulseaudio	x86_64	1.0.1-1.el9	appstream	5.6 M
poppler	x86_64	2.20.0-1.el9	appstream	11 M
poppler-data	noarch	0.4.9-9.el9.0.1	appstream	477 k
poppler-glib	x86_64	21.01.0-21.el9	appstream	3.2 M
pulseaudio-libs	x86_64	15.0-2.el9	appstream	63 M
rocky-backgrounds	x86_64	99.0-2.el9	appstream	140 k
rocky-icon-themes	x86_64	0.1-12.el9	appstream	460 k
sound-theme-freesktop	noarch	0.8-17.el9	appstream	330 k
totem-pl-parser	x86_64	3.26.6-2.el9	appstream	2.0 M
tracker	x86_64	3.1.2-3.el9_1	appstream	4.6 M
tracker-miners	x86_64	3.1.2-4.el9_3	appstream	109 k
transmission	x86_64	0.99.1-1.el9	appstream	729 k
webrtc-audio-processing	x86_64	0.3.1-8.el9_0.1	appstream	301 k
wireplumber	x86_64	0.4.14-1.el9_0.1	appstream	1.2 M
wireplumber-l10n	x86_64	0.4.14-1.el9_0.1	appstream	80 k
xdg-dbus-proxy	x86_64	0.0.3-1.el9	appstream	1.0 M
xdg-desktop-portal	x86_64	1.12.0-1.el9	appstream	478 k
xdg-desktop-portal-gtk	x86_64	1.12.0-3.el9	appstream	478 k
xkeyboard-config	noarch	2.33-2.el9	appstream	5.8 M

```
[root@stud03-labor42- ~]# Transaction Summary
=====  
Remove 124 Packages  
  
Free space: 378 M  
Is this ok [y/N]: y  
Running transaction check  
Transaction check succeeded.  
Running transaction test  
Transaction test succeeded.  
Running transaction  
Preparing :  
  Erasing : flatpak-1.12.9-3.el9_5.x86_64 1/120  
  Erasing : gnome-session-40.11.9-el9.x86_64 2/124  
  Erasing : gnome-desktop3-48.4-1.el9.x86_64 3/124  
Running scriptlet: xdg-desktop-portal-gtk-1.12.0-3.el9.x86_64  
  Erasing : xdg-desktop-portal-gtk-1.12.0-3.el9.x86_64 4/124  
  Erasing : gtk3-3.24.51-5.el9.x86_64 5/124  
Running scriptlet: xdg-desktop-portal-1.12.6-1.el9.x86_64  
  Erasing : xdg-desktop-portal-1.12.6-1.el9.x86_64 6/124  
  Erasing : wireplumber-lib=1.0-1.el9.x86_64 7/124  
Running scriptlet: wireplumber-1.0-1.el9.x86_64  
Removed "/etc/systemd/user/pipewire.service.wants/wireplumber.service".  
Removed "/etc/systemd/user/pipewire-session-manager.service".  
  
Erasing : wireplumber-0.4.14-1.el9_0.1.x86_64 8/124  
  Erasing : pipewire-alsa=1.0.1-1.el9.x86_64 9/124  
  Erasing : pipewire-jack-audio-connection-kit-lib=1.0.1-1.el9.x86_64 10/124  
  Erasing : pipewire-jack-audio-connection-kit-1.0.1-1.el9.x86_64 11/124  
  Erasing : pipewire-lib=1.0.1-1.el9.x86_64 12/124  
  Erasing : pipewire-pulseaudio=1.0-1.el9.x86_64 13/124  
  Erasing : pipewire-1.0-1.el9.x86_64 14/124  
  Erasing : libcanberra-gtk3-0.30-27.el9.x86_64 15/124  
Running scriptlet: libcanberra-0.30-27.el9.x86_64  
  Erasing : libcanberra-0.30-27.el9.x86_64 16/124  
  Erasing : libcanberra-0.30-27.el9.x86_64 17/124  
  Erasing : pulseaudio-lib=1.0-2.el9.x86_64 18/124  
  Erasing : libsndfile-1.0.31-8.el9_5.2.x86_64 19/124  
Running scriptlet: geoclue2-2.6.0-7.el9.x86_64  
  Erasing : geoclue2-2.6.0-7.el9.x86_64 20/124  
Running scriptlet: geoclue2-2.6.0-7.el9.x86_64  
  Erasing : libglibvnd-libs-1.1.3-4-1.el9.x86_64 21/124  
  Erasing : at-sp12-core-2.48.3-1.el9.x86_64 22/124  
  Erasing : gdk-pixbuf2-modules-2.42.6-4.el9_4.x86_64 23/124  
  Erasing : exiv2-2.27.5-1.el9.x86_64 24/124  
  Erasing : gdm-service-themes-49.1-3.el9.noarch  
  Erasing : libXtst-1.2.3-16.el9.x86_64 25/124  
  Erasing : flac-libs-1.3.10-1.el9_2.1.x86_64 26/124  
  Erasing : libXcursor-1.2.0-7.el9.x86_64 27/124  
  Erasing : libXcursor-1.2.0-7.el9.x86_64 28/124
```

```
[root@stud03-labor42- ~]# flac -l .3.3-10.e19.2.1.x86_64
Erasing : flac-libs-1.3.3-10.e19.2.1.x86_64
Erasing : libXcursor-1.2.0-7.e19.x86_64
Erasing : libXdamage-1.1.5-7.e19.x86_64
Erasing : libXinerama-1.1.3-1.e19.x86_64
Running scriptlet: tracker-3.1.2-3.e19.1.x86_64
Erasing : tracker-3.1.2-3.e19.1.x86_64
Running scriptlet: tracker-3.1.2-3.e19.1.x86_64
Running scriptlet: tracker-miners-3.1.2-4.e19.1.x86_64
Erasing : tracker-miners-3.1.2-4.e19.1.x86_64
Running scriptlet: tracker-miners-3.1.2-4.e19.3.x86_64
Erasing : librsvgtracker-3.1.2-3.e19.1.x86_64
Erasing : gstreamer1-plugins-base-1.22.1-3.e19.5.x86_64
Erasing : libosmocore-1.10.0-1.e19.x86_64
Erasing : libglib-2.40.1-1.e19.1.x86_64
Erasing : mesa-libGL-24.1.2-3.e19.x86_64
Erasing : libgypgs-0.3.2-3.e19.x86_64
Erasing : poppler-glib-21.01.0-21.e19.x86_64
Erasing : poppler-data-0.4.9-9.e19.x86_64
Erasing : libtiff-4.0.9-3.e19.x86_64
Erasing : libglvnd-eql-1:1.3.4-1.e19.x86_64
Erasing : mesa-libEGL-24.1.2-3.e19.x86_64
Erasing : mesa-libgbm-24.1.2-3.e19.x86_64
Erasing : mesa-libgbm-drivers-24.1.2-3.e19.x86_64
Erasing : mesa-libgbm-drivers-24.1.2-3.e19.x86_64
Erasing : libdrm-2.4.121.1-1.e19.x86_64
Erasing : libthorax-1:1.1.1-31.e19.x86_64
Erasing : libuvonc-0.1.0-1.e19.x86_64
Erasing : libxrandr-cursor-1.1.0-1.e19.x86_64
Erasing : libxgeiv2-0.12.3-1.e19.x86_64
Erasing : libxcbcommon-1.0.3-4.e19.x86_64
Erasing : libxcb-1.2.3-10.e19.x86_64
Erasing : libxkbcommon-0.1.0-1.e19.x86_64
Erasing : xkeyboard-config-2.33-2.e19.noarch
Erasing : mesa-filesystem-24.1.2-3.e19.x86_64
Erasing : poppler-data-0.4.9-9.e19.0.1.noarch
Erasing : osinfo-dbus-1.0.0-1.e19.noarch
Erasing : libosmocore-4.6.0-3.e19.noarch
Erasing : adwaita-cursor-theme-40.1.1-3.e19.noarch
Erasing : sound-theme-freedesktop-0.8-17.e19.noarch
Running scriptlet: sound-theme-freedesktop-0.8-17.e19.noarch
Erasing : nvidia-control-panel-1.19.1-1.e19.noarch
Erasing : gdm-control-center-filesystem-40.0-32.e19.5.noarch
Erasing : rocky-backgrounds-98.15-2.e19.noarch
Erasing : flatpak-selinux-1.12.9-3.e19.5.noarch
Running scriptlet: flatpak-selinux-1.12.9-3.e19.5.noarch
Erasing : flatpak-selinux-1.12.9-3.e19.5.noarch
Erasing : libICE-1.0.16-8.e19.x86_64
Erasing : exiv2-libs-0.27.5-2.e19.x86_64
Erasing : libwayland-client-1.21.0-1.e19.x86_64
Erasing : libogg-2.1.3.4-6.e19.x86_64
[27/124
28/124
29/124
30/124
31/124
31/124
31/124
32/124
32/124
33/124
34/124
35/124
37/124
38/124
39/124
40/124
41/124
42/124
43/124
44/124
45/124
46/124
47/124
48/124
49/124
50/124
51/124
52/124
53/124
54/124
55/124
56/124
57/124
58/124
59/124
60/124
61/124
61/124
62/124
63/124
64/124
65/124
65/124
66/124
67/124
68/124
69/124
70/124]
```

```
[root@stud03-lab042 ~]# + + +  
Erasing : libwayland-client-1.21.0-1.el9.x86_64  
Erasing : libogg-2.1.3.4-6.el9.x86_64  
Erasing : libpcimaccess-0.16-7.el9.x86_64  
Erasing : llvmlibs-18.1.8-3.el9.x86_64  
Erasing : libwayland-server-1.21.0-1.el9.x86_64  
Erasing : libX11-xcb-1.7.0-9.el9.x86_64  
Erasing : libXcursor-1.1.1-1.el9.x86_64  
Erasing : libglvnd-1.1.3-4.el9.x86_64  
Erasing : libglight-libos-2.1-23.el9.x86_64  
Erasing : libwebp-1.2.6-8.el9.x86_64  
Erasing : libxml2-2.12.0-1.el9.x86_64  
Erasing : libxmlsec-2.4.1-1.el9.x86_64  
Erasing : libXfixes-5.0.3-16.el9.x86_64  
Erasing : libXFree86vm-1.1.4-18.el9.x86_64  
Erasing : libxslt-1.1.34-9.el9.5.x86_64  
Erasing : libxinfo-db-tools-1.10.0-1.el9.x86_64  
Erasing : libXinerama-1.1-1.el9.x86_64  
Erasing : libXi-1.0.11-16.el9.x86_64  
Erasing : alsalib-1.2-1.2.1-1.el9.x86_64  
Erasing : graphene-1.10.6-2.el9.x86_64  
Erasing : gstreamer1-1.22.1-2.el9.x86_64  
Erasing : gpusl-1.3.1-18.el9.x86_64  
Erasing : grotl-1.0.0-1.el9.x86_64  
Erasing : libvisual-1.9.40-0.59.el9.x86_64  
Erasing : libwayland-egl-1.21.0-1.el9.x86_64  
Erasing : libxepi-2.6.0-8.2.20211007git2c3213.el9.x86_64  
Erasing : libxfi-0.6.22-6.el9.x86_64  
Erasing : giflib-5.1.1-1.el9.x86_64  
Erasing : libiptcdata-1.0.5-18.el9.x86_64  
Erasing : totem-pl-parser-3.26.6-2.el9.x86_64  
Running scriptlet: upower-0.99.13-2.el9.x86_64  
Removed "/etc/systemd/system/graphical.target.wants/upower.service".  
  
Erasing : upower-0.99.13-2.el9.x86_64  
Running scriptlet: upower-0.99.13-2.el9.x86_64  
Erasing : avahi-glib-0.8-21.el9.x86_64  
Erasing : ModemManager-glib-1.28.2-1.el9.x86_64  
Erasing : libnotify-0.7.9-9.el9.x86_64  
Erasing : gnutls-3.6.14-1.el9.x86_64  
Erasing : libasynccns-0.8-22.el9.x86_64  
Erasing : atk-2.36.0-5.el9.x86_64  
Erasing : libtool-ltdl-2.4.6-46.el9.x86_64  
Running scriptlet: rtkit-0.11-29.el9.x86_64  
Removed "/etc/systemd/system/graphical.target.wants/rtkit-daemon.service".  
  
Erasing : rtkit-0.11-29.el9.x86_64  
Running scriptlet: rtkit-0.11-29.el9.x86_64  
Erasing : bluez-libs-5.72-2.el9.x86_64  
Erasing : fdk-aac-free-2.0.0-8.el9.x86_64  
[root@stud03-lab042 ~]
```



```

root@studios3-labor42:~# apt-get -s install libvisual-0.4-8 libvisual0.4-8-24.e19.x86_64
Verifying : libvisual-0.4-8-24.e19.x86_64
Verifying : libvisual-0.4-8-5.e19.x86_64
Verifying : libwayland-client-1.21.0-3.e19.x86_64
Verifying : libwayland-cursor-1.21.0-1.e19.x86_64
Verifying : libwayland-egl-1.21.0-1.e19.x86_64
Verifying : libwayland-server-1.21.0-1.e19.x86_64
Verifying : libxkbcommon-0.3-4.e19.x86_64
Verifying : libxshmfence-1.3-19.e19.x86_64
Verifying : libxslt-1.1.34-9.e19.5.3.x86_64
Verifying : llvm-libs-18.1.8-3.e19.x86_64
Verifying : mesa-dri-drivers-24.1.2-3.e19.x86_64
Verifying : mesa-firmware-24.1.2-3.e19.x86_64
Verifying : mesa-libGL-24.1.2-3.e19.x86_64
Verifying : mesa-libGLESv2-24.1.2-3.e19.x86_64
Verifying : mesa-libgbm-24.1.2-3.e19.x86_64
Verifying : opus-1.3.1-10.e19.x86_64
Verifying : opus-1.3.1-10.e19.5.3.x86_64
Verifying : orc-0.4.31-8.e19.x86_64
Verifying : osinfo-db-tools-1.18.0-1.e19.x86_64
Verifying : ostree-libs-2024.9-1.e19.5.x86_64
Verifying : pipewire-1.0.1-1.e19.x86_64
Verifying : pipewire-1.0.1-1.e19.x86_64
Verifying : pipewire-jack-audio-connection-kit-1.0.1-1.e19.x86_64
Verifying : pipewire-jack-audio-connection-kit-libs-1.0.1-1.e19.x86_64
Verifying : pipewire-libs-1.0.1-1.e19.x86_64
Verifying : pipewire-pulseaudio-1.0.1-1.e19.x86_64
Verifying : poppler-qt5-20.01.0-21.e19.x86_64
Verifying : poppler-data-0.4.9-9.e19.0.1.noarch
Verifying : poppler-glib-21.01.0-21.e19.x86_64
Verifying : pulseaudio-libs-15.0-2.e19.x86_64
Verifying : rocky-backgrounds-99.15-2.e19.noarch
Verifying : sound-theme-freedesktop-0.8-17.e19.noarch
Verifying : totem-pl-parser-3.26.6-2.e19.x86_64
Verifying : tracker-3.1.2-3.e19.1.x86_64
Verifying : tracker-miners-1.2-4.e19.3.x86_64
Verifying : upower-0.99.13-2.e19.x86_64
Verifying : xdg-audio-processing-0.3.1-8.e19.0.1.x86_64
Verifying : wireplumber-0.4.14-1.e19.0.1.x86_64
Verifying : wireplumber-libs-0.4.14-1.e19.0.1.x86_64
Verifying : xdg-dbus-proxy-0.1.3-1.e19.x86_64
Verifying : xdg-desktop-portal-1.12.6-1.e19.x86_64
Verifying : xdg-desktop-portal-gtk-1.12.6-3.e19.x86_64
Verifying : xkeyboarconfig-2.33-2.e19.noarch

Removed:

```

```

root@studios3-labor42:~# apt-get -s install xdg-desktop-portals-1.12.6-1.e19.x86_64
Verifying : xdg-desktop-portal-1.12.6-1.e19.x86_64
Verifying : xdg-desktop-portal-gtk-1.12.6-3.e19.x86_64
Verifying : xkeyboarconfig-2.33-2.e19.noarch

Removed:
ModemManager-0.18-1.20.2-1.e19.x86_64
alsa-1.2.2-12.1.0.1.e19.x86_64
alsa-2.36.0-5.e19.x86_64
bubblewrap-0.4-8.e19.5.x86_64
dconf-0.40.0-6.e19.x86_64
exiv2-libs-0.27.5-2.e19.x86_64
fuse-2.9.9-16.e19.x86_64
glib-2.42.1.e19.x86_64
gnome-session-48.1.1-9.e19.x86_64
gstreamer1-1.22.1-2.e19.x86_64
gtkd-0.1.1-1.e19.x86_64
jbigkit1-libs-2.1-23.e19.x86_64
libBIM-1.2.3-10.e19.x86_64
libcursor-1.2.6-7.e19.x86_64
libXcursor-1.0-8.e19.x86_64
libXrandr-1.4.3-16.e19.x86_64
libXScrnSaver-0.6-22.e19.x86_64
libsysncs-0.6-22.e19.x86_64
libldrm-2.4.121.1.e19.x86_64
libgeiiv2-0.12.3-1.e19.x86_64
liblivelink-0.1.1-1.e19.x86_64
liblouis-0.3-3.e19.x86_64
libNotify-0.7.9-8.e19.x86_64
libpcaccess-0.16-7.e19.x86_64
libtheora-1.1.1-31.e19.x86_64
libtwolame-0.3.1-10.e19.x86_64
libwayland-client-1.21.0-1.e19.x86_64
libwayland-server-1.21.0-1.e19.x86_64
libxshmfence-1.3-10.e19.x86_64
low-memory-monitor-2.1-4.e19.x86_64
mesa-dri-drivers-24.1.2-3.e19.x86_64
mesa-libgbm-24.1.2-3.e19.x86_64
orc-0.4.31-8.e19.x86_64
ostree-libs-2024.9-1.e19.5.x86_64
pipewire-jack-audio-connection-kit-1.0.1-1.e19.x86_64
pipewire-jack-audio-connection-kit-libs-1.0.1-1.e19.x86_64
pulseaudio-libs-0.2-21.e19.x86_64
pulseaudio-glib-21.01.0-21.e19.x86_64
rtkit-0.11-29.e19.x86_64
tracker-3.1.2-3.e19.1.x86_64
webrtc-audio-processing-0.3.1-8.e19.0.1.x86_64
xdg-dbus-proxy-0.1.3-1.e19.x86_64
xkeyboarconfig-2.33-2.e19.noarch

adwaita-icon-theme-40.1.1-3.e19.noarch
at-spi2-core-2.48.3-3.e19.x86_64
avahi-glib-0.8-21.e19.x86_64
colorl-libs-1.4.5-4.e19.x86_64
exempi-2.6.0-0.2.20211007gite23c213.e19.x86_64
fdk-aac-free-2.0.8-5.e19.x86_64
fdk-aac-free-2.0.8-5.e19.x86_64
fiftp-0.1.1-1.e19.x86_64
fiftp-0.1.1-1.e19.x86_64
gdalui2-modules-2.42.6-4.e19.4.x86_64
gnome-control-center-firmware-48.0-32.e19.5.noarch
graphene-1.10.6-2.e19.x86_64
gstreamer1-plugins-base-1.22.1-3.e19.5.x86_64
Httponly-0.1.1-1.e19.1.1-1.e19.x86_64
lcws2-2.12-3.e19.x86_64
libX11-xcb-1.7.0-9.e19.x86_64
libXdamage-1.1.5-7.e19.x86_64
libXdmag-1.1.5-7.e19.x86_64
libXinerama-1.1.4-1.e19.x86_64
libXrandr-1.4.3-16.e19.x86_64
libXScrnSaver-0.6-22.e19.x86_64
libcanberra-0.36-27.e19.x86_64
libepoxy-1.5.5-4.e19.x86_64
libglvnd-1.1.3-4-1.e19.x86_64
libglvnd-glx-1.1.3-4-1.e19.x86_64
libglvnd-glx-1.1.3-4-1.e19.x86_64
libglvnd-1.1.3-4-10.e19.x86_64
libogg-2.1.3-4-6.e19.x86_64
libsbc-1.4-9.e19.x86_64
libtiff-4.0-13.e19.x86_64
libtwolame-0.3.1-10.e19.x86_64
libwayland-client-1.21.0-1.e19.x86_64
libwayland-server-1.21.0-1.e19.x86_64
libxshmfence-1.3-10.e19.x86_64
libxslt-1.1.34-9.e19.5.3.x86_64
mesa-dri-drivers-24.1.2-3.e19.x86_64
mesa-libgbm-24.1.2-3.e19.x86_64
openjpeg-2.4.6-7.e19.x86_64
osinfo-db-tools-1.20.0-1.e19.x86_64
pipewire-1.0.1-1.e19.x86_64
pipewire-jack-audio-connection-kit-libs-1.0.1-1.e19.x86_64
pulseaudio-libs-0.2-21.e19.x86_64
pulseaudio-lib-15.0-2.e19.x86_64
sound-theme-freedesktop-0.8-17.e19.noarch
tracker-miners-3.1.2-4.e19.3.x86_64
wireplumber-0.4.14-1.e19.0.1.x86_64
upower-0.99.13-2.e19.x86_64
wireplumber-libs-0.4.14-1.e19.0.1.x86_64
xdg-desktop-portal-gtk-1.12.6-3.e19.x86_64

adwaita-icon-theme-40.1.1-3.e19.noarch
at-spi2-core-2.48.3-3.e19.x86_64
avahi-glib-0.8-21.e19.x86_64
composefs-libs-1.0.5-1.e19.x86_64
exim-2.0.7-2.e19.x86_64
flac-abs-1.0.3-10.e19.2.1.x86_64
flac-abs-1.0.3-10.e19.2.1.x86_64
gnome-control-center-firmware-48.0-32.e19.5.x86_64
geoclue-2.6.0-7.e19.x86_64
gsm-1.19.6-19.e19.x86_64
gtk-update-icon-cache-2.40.31-5.e19.x86_64
ibus-1.7.1-1.e19.1.1-1.e19.x86_64
libCCF-1.0.10-8.e19.x86_64
libcomposite-0.4.5-7.e19.x86_64
libfixes-5.0.3-16.e19.x86_64
librandr-1.4.3-16.e19.x86_64
libxf86drm-1.1.4-1.e19.x86_64
libxf86xtra-gtk3-0.36-27.e19.x86_64
libxevi-0.6.22.6.e19.x86_64
libglvnd-egl-1.1.3-4-1.e19.x86_64
libglvnd-egl-1.1.3-4-1.e19.x86_64
libldec-2.0.2.3-9.e19.x86_64
liblsinfe-1.10.0-1.e19.x86_64
libsndfile-1.0.31-8.e19.5.2.x86_64
libsool-ttd-2.4.6-46.e19.x86_64
libudev-1.7.1-1.e19.x86_64
libwayland-egl-1.21.0-1.e19.x86_64
libxshmfence-0.3-4.e19.x86_64
llvm-libs-18.1.8-3.e19.x86_64
mesa-dri-drivers-24.1.2-3.e19.x86_64
mesa-libgbm-24.1.2-3.e19.x86_64
osinfo-db-tools-1.18.0-1.e19.x86_64
pipewire-alsa-1.0.1-1.e19.x86_64
pipewire-libs-1.0.1-1.e19.x86_64
poppler-qt5-20.01.0-21.e19.x86_64
rocky-backgrounds-99.15-2.e19.noarch
totem-pl-parser-3.26.6-2.e19.x86_64
upower-0.99.13-2.e19.x86_64
wireplumber-libs-0.4.14-1.e19.0.1.x86_64
xdg-desktop-portal-gtk-1.12.6-3.e19.x86_64

Complete!

```

[root@studi03-labor42 ~]# dnf remove gsettings-desktop-schemas.x86\_64

Its define a core configuration settings for GUI

```
root@studi03-labor42:~# dnf remove gsettings-desktop-schemas.x86_64
Dependencies resolved.

=====
Package           Architecture Version      Repository  Size
=====
Removing:
gsettings-desktop-schemas x86_64   40.0-6.el9   @anaconda  4.5 M
Removing dependent packages:
cockpit          x86_64   1.2.6-1.el9   @AppStream  2.8 M
cockpit          x86_64   323.1-1.el9_5  @anaconda  59 k
cockpit-bridge   x86_64   323.1-1.el9_5  @anaconda  1.4 M
cockpit-pakka    x86_64   323.1-1.el9_5  @AppStream  923 k
cockpit-podman   noarch   93.1-1.el9_5   @AppStream  561 k
cockpit-storaged noarch   323.1-1.el9_5  @AppStream  776 k
cockpit-system   noarch   323.1-1.el9_5  @anaconda  5.1 M
cockpit-ws       x86_64   323.1-1.el9_5  @anaconda  1.6 M
Removing unused dependencies:
abatis-cantarell-fnts  noarch   0.301-4.el9   @AppStream  705 k
adobe-source-code-pro-fnts noarch   2.030.1.050-12.el9.1 @anaconda  1.8 M
checkpolicy      x86_64   3.6-1.el9    @AppStream  1.5 M
clevis-luks     x86_64   20-200.el9   @AppStream  129 k
clevis-luks     x86_64   20-200.el9   @AppStream  72 k
device-mapper-multipath x86_64   0.8.7-32.el9  @anaconda  323 k
device-mapper-multipath-libs x86_64   0.8.7-32.el9  @anaconda  883 k
gns3d           x86_64   1.0-1.el9    @AppStream  696 k
glusterfs-networking x86_64   2.1.0-3.el9   @anaconda  649 k
iscsi-initiator-utils x86_64   6.2.1.9-1.git65a472.el9 @anaconda  1.5 M
iscsi-initiator-utils-iscsiui o  x86_64   6.2.1.9-1.git65a472.el9 @anaconda  167 k
ioms-utils-libs  x86_64   0.101-4.el9   @anaconda  488 k
jess              x86_64   14-1.el9    @AppStream  133 k
journalglib      x86_64   1.6-6.el9    @anaconda  519 k
libappstream-glib x86_64   0.7.18-5.el9_4 @AppStream  1.4 M
libatasmart      x86_64   0.19-22.el9  @AppStream  122 k
libblkdev         x86_64   2.28-10.el9  @AppStream  339 k
libblkdev-crypt0 x86_64   2.28-10.el9  @AppStream  51 k
libblkdev-fs      x86_64   2.28-10.el9  @AppStream  64 k
libblkdev-loop   x86_64   2.28-10.el9  @AppStream  19 k
libblkdev-lvm    x86_64   2.28-10.el9  @AppStream  68 k
libblkdev-madrid x86_64   2.28-10.el9  @AppStream  33 k
libblkdev-nvme   x86_64   2.28-10.el9  @AppStream  43 k
libblkdev-sap    x86_64   2.28-10.el9  @AppStream  23 k
libblkdev-utols  x86_64   2.28-10.el9  @AppStream  54 k
libbytesize      x86_64   2.5-3.el9    @AppStream  85 k
libjose          x86_64   14-1.el9    @AppStream  154 k
libluksmeta     x86_64   9-12.el9    @AppStream  46 k
=====
Transaction Summary
Remove 65 Packages
Remove 65 Packages
Free space: 70 M
Is there enough free space? [y/N] y
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing:   [ 1/65 ]
    Erasing : cockpit-323.1-1.el9_5.x86_64
    Erasing : cockpit-storaged-323.1-1.el9_5.noarch
    Erasing : cockpit-system-323.1-1.el9_5.noarch
    Erasing : cockpit-pakka-323.1-1.el9_5.noarch
    Erasing : cockpit-podman-93.1-1.el9_5.noarch
    Erasing : clevis-luks-20-200.el9.x86_64
    Erasing : setroubleshoot-plugins-3.3.14-4.el9.noarch
    Erasing : cockpit-podman-93.1-1.el9_5.noarch
  Running scriptlet: device-mapper-multipath-0.8.7-32.el9.x86_64
  1/65
  2/65
  3/65
  4/65
  5/65
  6/65
  7/65
  8/65
  9/65
```

```

root@studio03-labor42:~# dnf autoremove -y
Running scriptlet: device-mapper-multipath-0.8.7-7.el9.x86_64
Erasing : device-mapper-multipath-0.8.7-32.el9.x86_64
Running scriptlet: setroubleshoot-server-3.3-32.el9.x86_64
Erasing : clevis-26-200.el9.x86_64
Running scriptlet: cockpit-ws-323.1-1.el9.x86_64
Erasing : cockpit-ws-323.1-1.el9.x86_64
Running scriptlet: jose-14-1.el9.x86_64
Erasing : cockpit-bridge-323.1-1.el9.x86_64
Erasing : PackageKit-1.2.6-1.el9.x86_64
Erasing : libappstream-glib-0.7.18-5.el9.x86_64
Erasing : libappstream-glib-0.7.18-5.el9.x86_64
Running scriptlet: iscsi-initiator-utils-6.2.1.9-1.gitaa65a472.el9.x86_64
Removed: /etc/systemd/system/syntinit.target.wants/iscsi-onboot.service".
Removed: /etc/systemd/system/syntinit.target.wants/iscsi-starter.service".
Removed: /etc/systemd/system/sockets.target.wants/iscsicd.socket".
Failed to stop iscsi-shutdown.service: Operation refused, unit iscsi-shutdown.service' for details.
See system logs and 'systemctl status iscsi-shutdown.service' for details.

Erasing : iscsi-initiator-utils-6.2.1.9-1.gitaa65a472.el9.x86_64
Running scriptlet: iscsi-initiator-utils-6.2.1.9-1.gitaa65a472.el9.x86_64
Erasing : udisk2-1.9.4-11.el9.x86_64
Erasing : udisk2-1.9.4-11.el9.x86_64
Erasing : libblockdev-crypto-2.28-10.el9.x86_64
Erasing : libblockdev-fs-2.28-10.el9.x86_64
Erasing : libblockdev-mdraid-2.28-10.el9.x86_64
Erasing : libblockdev-2.28-10.el9.x86_64
Erasing : libblockdev-snap-2.28-10.el9.x86_64
Erasing : libblockdev-snap-2.28-10.el9.x86_64
Erasing : libblockdev-lvm-2.28-10.el9.x86_64
Erasing : libbsoup-2.72.0-8.el9.x86_64
Erasing : glibmm-worKing-2.48.1-1.el9.x86_64
Erasing : libproxy-0.4.12-1.el9.x86_64
Erasing : gsettings-desktop-schemas-40.0-6.el9.x86_64
Erasing : webkit2gtk3-jsc-2.48.1-1.el9.x86_64
Erasing : adobe-source-code-pro-fonts-2.030.1.050-12.el9.1.noarch
Erasing : abattis-cantarel-fonts-0.301-4.el9.noarch
Removed: /etc/systemd/system/graphical.target.wants/udisks2.service".

Erasing : udisks2-2.9.4-11.el9.x86_64
Running scriptlet: udisks2-2.9.4-11.el9.x86_64
Erasing : libblockdev-2.28-10.el9.x86_64
Erasing : libblockdev-crypto-2.28-10.el9.x86_64
Erasing : libblockdev-fs-2.28-10.el9.x86_64
Erasing : libblockdev-mdraid-2.28-10.el9.x86_64
Erasing : libblockdev-2.28-10.el9.x86_64
Erasing : libblockdev-snap-2.28-10.el9.x86_64
Erasing : libblockdev-lvm-2.28-10.el9.x86_64
Erasing : libbsoup-2.72.0-8.el9.x86_64
Erasing : glibmm-worKing-2.48.1-1.el9.x86_64
Erasing : libproxy-0.4.12-1.el9.x86_64
Erasing : libibus-0.9-12.el9.x86_64
Running scriptlet: iscsi-initiator-utils-iscsiuio-6.2.1.9-1.gitaa65a472.el9.x86_64
Removed: /etc/systemd/system/sockets.target.wants/iscsiuio.socket".

Erasing : abattis-cantarel-fonts-0.301-4.el9.noarch
Erasing : libatomic-1.1.5-5.el9.x86_64
Erasing : libatomic-1.1.5-5.el9.x86_64
Erasing : libblockdev-2.28-10.el9.x86_64
Erasing : libbytesize-2.5-3.el9.0.1.x86_64
Erasing : volume_key-libs-0.3.12-15.el9.x86_64
Erasing : gdisk-1.0.7-1.el9.x86_64
Erasing : libibus-0.9-12.el9.x86_64
Erasing : libudisks2-2.9.4-11.el9.x86_64
Erasing : python3-audit-3.1.5-1.el9.x86_64
Erasing : chkpolicy-3.6-1.el9.x86_64
Erasing : python3-libsemanage-3.6-2.el9.x86_64
Erasing : python3-libsemanage-3.6-2.el9.x86_64
Erasing : libibus-0.9-12.el9.x86_64
Running scriptlet: iscsi-initiator-utils-iscsiuio-6.2.1.9-1.gitaa65a472.el9.x86_64
Removed: /etc/systemd/system/sockets.target.wants/iscsiuio.socket".

Erasing : iscsi-initiator-utils-iscsiuio-6.2.1.9-1.gitaa65a472.el9.x86_64
Running scriptlet: iscsi-initiator-utils-iscsiuio-6.2.1.9-1.gitaa65a472.el9.x86_64
Erasing : insns-libs-0.101-4.el9.x86_64
Erasing : json-glib-1.6.6-1.el9.x86_64
Erasing : libstbemem-0-18.585-1.el9.x86_64
Erasing : libtalloc-2.4.1-1.el9.x86_64
Erasing : libtalloc-14-1.el9.x86_64
Erasing : tpm2-tools-5.2-4.el9.x86_64
Erasing : python3-libxml2-2.9.13-6.el9.5_2.x86_64
Erasing : python3-libxml2-2.9.13-6.el9.5_2.x86_64
Erasing : python3-psutil-5.8.0-12.el9.x86_64
Running scriptlet: iscsi-initiator-utils-iscsiuio-6.2.1.9-1.gitaa65a472.el9.x86_64
Verifying : PackageKit-1.2.6-1.el9.x86_64
Verifying : PackageKit-glib-1.2.6-1.el9.x86_64
Verifying : abattis-cantarel-fonts-0.301-4.el9.noarch
Verifying : libibus-0.9-12.el9.x86_64
Running scriptlet: libibus-0.9-12.el9.x86_64
Verifying : libibus-14-1.el9.x86_64
Erasing : libtalloc-14-1.el9.x86_64
Erasing : tpm2-tools-5.2-4.el9.x86_64
Erasing : python3-libxml2-2.9.13-6.el9.5_2.x86_64
Erasing : python3-psutil-5.8.0-12.el9.x86_64
Running scriptlet: iscsi-initiator-utils-iscsiuio-6.2.1.9-1.gitaa65a472.el9.x86_64
Verifying : PackageKit-glib-1.2.6-1.el9.x86_64
Verifying : abattis-cantarel-fonts-0.301-4.el9.noarch
Verifying : libibus-0.9-12.el9.x86_64
Running scriptlet: libibus-0.9-12.el9.x86_64
Verifying : libibus-14-1.el9.x86_64
Verifying : checkpolicy-3.6-1.el9.x86_64
Verifying : clevis-26-200.el9.x86_64
Verifying : clevis-luks-26-200.el9.x86_64
Verifying : cockpit-accounts-323.1-1.el9.5.noarch
Verifying : cockpit-bridge-323.1-1.el9.5.noarch
Verifying : cockpit-packagekit-323.1-1.el9.5.noarch
Verifying : cockpit-podman-93.1-1.el9.5.noarch
Verifying : cockpit-storaged-323.1-1.el9.5.noarch
Verifying : cockpit-ws-323.1-1.el9.5.x86_64
Verifying : device-mapper-multipath-0.8.7-32.el9.x86_64
Verifying : device-mapper-multipathlibs-0.8.7-32.el9.x86_64
Verifying : gdisk-1.8.7-5.el9.x86_64
Verifying : libappstream-glib-0.7.18-5.el9.x86_64
Verifying : glibmm-worKing-2.48.1-1.el9.x86_64
Verifying : gsettings-desktop-schemas-40.0-6.el9.x86_64
Verifying : iscsi-initiator-utils-6.2.1.9-1.gitaa65a472.el9.x86_64

```

```

root@studio03-labor42:~# dnf autoremove -y
Erasing : abattis-cantarel-fonts-0.301-4.el9.noarch
Erasing : libatomic-1.1.5-5.el9.x86_64
Erasing : libatomic-1.1.5-5.el9.x86_64
Erasing : libblockdev-2.28-10.el9.x86_64
Erasing : libbytesize-2.5-3.el9.0.1.x86_64
Erasing : volume_key-libs-0.3.12-15.el9.x86_64
Erasing : gdisk-1.0.7-1.el9.x86_64
Erasing : libibus-0.9-12.el9.x86_64
Erasing : libudisks2-2.9.4-11.el9.x86_64
Erasing : python3-audit-3.1.5-1.el9.x86_64
Erasing : chkpolicy-3.6-1.el9.x86_64
Erasing : python3-libsemanage-3.6-2.el9.x86_64
Erasing : python3-libsemanage-3.6-2.el9.x86_64
Erasing : libibus-0.9-12.el9.x86_64
Running scriptlet: iscsi-initiator-utils-iscsiuio-6.2.1.9-1.gitaa65a472.el9.x86_64
Removed: /etc/systemd/system/sockets.target.wants/iscsiuio.socket".

Erasing : iscsi-initiator-utils-iscsiuio-6.2.1.9-1.gitaa65a472.el9.x86_64
Running scriptlet: iscsi-initiator-utils-iscsiuio-6.2.1.9-1.gitaa65a472.el9.x86_64
Erasing : insns-libs-0.101-4.el9.x86_64
Erasing : json-glib-1.6.6-1.el9.x86_64
Erasing : libstbemem-0-18.585-1.el9.x86_64
Erasing : libtalloc-2.4.1-1.el9.x86_64
Erasing : libtalloc-14-1.el9.x86_64
Erasing : tpm2-tools-5.2-4.el9.x86_64
Erasing : python3-libxml2-2.9.13-6.el9.5_2.x86_64
Erasing : python3-libxml2-2.9.13-6.el9.5_2.x86_64
Erasing : python3-psutil-5.8.0-12.el9.x86_64
Running scriptlet: iscsi-initiator-utils-iscsiuio-6.2.1.9-1.gitaa65a472.el9.x86_64
Verifying : PackageKit-1.2.6-1.el9.x86_64
Verifying : PackageKit-glib-1.2.6-1.el9.x86_64
Verifying : abattis-cantarel-fonts-0.301-4.el9.noarch
Verifying : libibus-0.9-12.el9.x86_64
Running scriptlet: libibus-0.9-12.el9.x86_64
Verifying : libibus-14-1.el9.x86_64
Erasing : libtalloc-14-1.el9.x86_64
Erasing : tpm2-tools-5.2-4.el9.x86_64
Erasing : python3-libxml2-2.9.13-6.el9.5_2.x86_64
Erasing : python3-psutil-5.8.0-12.el9.x86_64
Running scriptlet: iscsi-initiator-utils-iscsiuio-6.2.1.9-1.gitaa65a472.el9.x86_64
Verifying : PackageKit-glib-1.2.6-1.el9.x86_64
Verifying : abattis-cantarel-fonts-0.301-4.el9.noarch
Verifying : libibus-0.9-12.el9.x86_64
Running scriptlet: libibus-0.9-12.el9.x86_64
Verifying : libibus-14-1.el9.x86_64
Verifying : checkpolicy-3.6-1.el9.x86_64
Verifying : clevis-26-200.el9.x86_64
Verifying : clevis-luks-26-200.el9.x86_64
Verifying : cockpit-accounts-323.1-1.el9.5.noarch
Verifying : cockpit-bridge-323.1-1.el9.5.noarch
Verifying : cockpit-packagekit-323.1-1.el9.5.noarch
Verifying : cockpit-podman-93.1-1.el9.5.noarch
Verifying : cockpit-storaged-323.1-1.el9.5.noarch
Verifying : cockpit-ws-323.1-1.el9.5.x86_64
Verifying : device-mapper-multipath-0.8.7-32.el9.x86_64
Verifying : device-mapper-multipathlibs-0.8.7-32.el9.x86_64
Verifying : gdisk-1.8.7-5.el9.x86_64
Verifying : libappstream-glib-0.7.18-5.el9.x86_64
Verifying : glibmm-worKing-2.48.1-1.el9.x86_64
Verifying : gsettings-desktop-schemas-40.0-6.el9.x86_64
Verifying : iscsi-initiator-utils-6.2.1.9-1.gitaa65a472.el9.x86_64

```

```
[root@studi03-labor42 ~]# dnf remove sound-theme-freedesktop.noarch
```

It contains audio files that are used for graphical desktop environment

```
[root@studi03-labor42 ~]# dnf remove xdg-desktop-portal.x86_64
```

It helps computer apps connect with the desktop features.

```
[root@studi03-labor42 ~]# dnf remove xdg-desktop-portal-gtk.x86_64
```

IT helps HTK based application properly work with the desktop features

```

Complete!
[root@studi03-labor42 ~]# dnf remove sound-theme-freedesktop.noarch
No match for argument: sound-theme-freedesktop.noarch
Dependencies resolved.
Nothing to do.
Complete!
[root@studi03-labor42 ~]# dnf remove xdg-desktop-portal.x86_64
No match for argument: xdg-desktop-portal.x86_64
No packages marked for removal.
Dependencies resolved.
Nothing to do.
Complete!
[root@studi03-labor42 ~]# dnf remove xdg-desktop-portal-gtk.x86_64
No match for argument: xdg-desktop-portal-gtk.x86_64
No packages marked for removal.
Dependencies resolved.
Nothing to do.
Complete!
[root@studi03-labor42 ~]#

```

**/root@studi03-labor42 ~]# dnf remove libtirpc.x86\_64**

IT helps programs to communicate each other over network

Package	Architecture	Version	Repository	Size
<b>Removing:</b>				
<b>libtirpc</b>	x86_64	1.3.3-9.el9	@anaconda	202 k
<b>Removing dependent packages:</b>				
cifs-utils	x86_64	7.0-5.el9	@anaconda	229 k
lsof	x86_64	4.94-0.3.el9	@anaconda	629 k
nfs-utils	x86_64	1:2.5.4-27.el9.5.1	@baseos	1.2 M
quota	x86_64	1:4.09-2.el9	@anaconda	715 k
sssd	x86_64	4.28-2.2.el9.5.1	@baseos	5.3 M
sssd	x86_64	2.9.5-4.el9.5.4	@baseos	54 k
<b>Removing unused dependencies:</b>				
adcli	x86_64	0.9.2-1.el9	@anaconda	338 k
avahi-libs	x86_64	0.8-21.el9	@anaconda	55 k
bind-libs	x86_64	32.9.16.23-24.el9.5.3	@ppstream	3.5 M
bind-license	noarch	32.9.16.23-24.el9.5.3	@ppstream	18 k
bind-utils	x86_64	32.9.16.23-24.el9.5.3	@ppstream	644 k
cups-libs	x86_64	1:2.3.3op2-31.el9.5	@anaconda	678 k
cyrus-sasl-gssapi	x86_64	2.1.27-2.el9	@anaconda	44 k
dns-libs	x86_64	0.8-1.el9	@ppstream	55 k
libicu	x86_64	67.1-9.el9	@anaconda	33 M
libipa_hbac	x86_64	2.9.5-4.el9.5.4	@baseos	61 k
libmaxminddb	x86_64	1.5.2-4.el9	@AppStream	63 k
libnettap1	x86_64	4.28-2.2.el9.5.1	@baseos	498 k
libnbdclient	x86_64	4.28-2.2.el9.5.1	@baseos	179 k
libnv	x86_64	1:1.42-2.el9.4	@AppStream	396 k
libnbdclient	x86_64	4.28-2.2.el9.5.1	@baseos	73 k
quota-nls	noarch	1:4.09-2.el9	@anaconda	274 k
rpcbind	x86_64	1.2.6-7.el9	@anaconda	111 k
samba-client-libs	x86_64	4.28-2.2.el9.5.1	@baseos	20 k
samba-common	noarch	4.28-2.2.el9.5.1	@baseos	199 k
samba-common-libs	x86_64	4.28-2.2.el9.5.1	@baseos	282 k
samba-common-tools	x86_64	4.28-2.2.el9.5.1	@baseos	1.4 M
samba-decprc	x86_64	4.28-2.2.el9.5.1	@baseos	3.8 M
samba-krb-ldap-modules	x86_64	4.28-2.2.el9.5.1	@baseos	46 k
samba-libs	x86_64	4.28-2.2.el9.5.1	@baseos	447 k
sssd-ad	x86_64	2.9.5-4.el9.5.4	@baseos	453 k
sssd-common-pac	x86_64	2.9.5-4.el9.5.4	@baseos	241 k
sssd-ipa	x86_64	2.9.5-4.el9.5.4	@baseos	729 k
sssd-krb5	x86_64	2.9.5-4.el9.5.4	@baseos	67 k
sssd-krb5-common	x86_64	2.9.5-4.el9.5.4	@baseos	222 k
sssd-ldap	x86_64	2.9.5-4.el9.5.4	@baseos	181 k
sssd-proxy	x86_64	2.9.5-4.el9.5.4	@baseos	165 k
<b>Transaction Summary</b>				

```

root@studio3-labor42:~ Transaction Summary
Remove  38 Packages
Freed space: 73 M
Is this ok [y/N]? y
Performing transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing transaction
    Running scriptlet: samba-4.20.2-2.el9.5.1.x86_64
    Erasing : samba-4.20.2-2.el9.5.1.x86_64
    Running scriptlet: samba-4.20.2-2.el9.5.1.x86_64
    Erasing : samba-4.20.2-2.el9.5.1.x86_64
    Erasing : bind-libs-4.20.2-2.el9.5.1.x86_64
    Erasing : samba-libs-4.20.2-2.el9.5.1.x86_64
    Erasing : libnetapi-4.20.2-2.el9.5.1.x86_64
    Erasing : samba-ldap-ldap-modules-4.20.2-2.el9.5.1.x86_64
    Running scriptlet: nfs-utils-1.2.5-4-27.el9.5.1.x86_64
Removed '/etc/systemd/system/multi-user.target.wants/nfs-client.target'.
Removed '/etc/systemd/system/multi-user.target.wants/nfs-client.target'.
  Erasing : nfs-utils-1.2.5-4-27.el9.5.1.x86_64
warning: directory /var/lib/nfs/rpc_pipefiles: remove failed: Device or resource busy
  Running scriptlet: nfs-utils-1.2.5-4-27.el9.5.1.x86_64
    Erasing : ssqd-2.9.5-4.el9.5.4.x86_64
    Erasing : ssqd-ad-7.9.5-4.el9.5.4.x86_64
    Erasing : ssqd-ipa-2.9.5-4.el9.5.4.x86_64
    Erasing : bind-utils-32.9.16.23-24.el9.5.3.x86_64
    Erasing : bind-libs-32.9.16.23-24.el9.5.3.x86_64
    Erasing : ssqd-common-pac-2.9.5-4.el9.5.4.x86_64
    Running scriptlet: rpcbind-1.2.6-7.el9.x86_64
    Erasing : rpcbind-1.2.6-7.el9.x86_64
    Running scriptlet: quota-1.4.09-2.el9.x86_64
    Erasing : quota-1.4.09-2.el9.x86_64
    Erasing : cups-libs-2.2.3-30.p2-31.el9.5.x86_64
    Erasing : libcurl-7.65.0-1.el9.x86_64
    Running scriptlet: cifs-utils-7.0-6.el9.x86_64
    Erasing : cifs-utils-7.0-6.el9.x86_64
    Erasing : samba-common-libs-4.20.2-2.el9.5.1.x86_64
    Erasing : samba-client-libs-4.20.2-2.el9.5.1.x86_64
    Erasing : bind-libs-4.20.2-2.el9.5.1.x86_64
    Erasing : adcli-0.9.5-2-1.el9.x86_64
    Erasing : ssqd-krb5-2.9.5-4.el9.5.4.x86_64
    Erasing : ssqd-ldap-2.9.5-4.el9.5.4.x86_64
    Erasing : samba-common-4.20.2-2.el9.5.1.noarch
  Erasing : bind-license-32.9.16.23-24.el9.5.3.noarch
  Erasing : ssqd-krb5-common-2.9.5-4.el9.5.4.x86_64
  Erasing : cyrus-sasl-gssapi-2.1.27-21.el9.x86_64
  Erasing : avahi-libs-0.8-21.el9.x86_64
  Erasing : libtirpc-1.3.3-9.el9.x86_64
  Erasing : fstrm-0.6.1-3.el9.x86_64
  Erasing : libmaximdd-1.5.2-4.el9.x86_64
  Erasing : libuv-1.26.0-2.el9.4.x86_64
  Erasing : libcurl-7.65.0-1.el9.x86_64
  Erasing : ssqd-proxy-2.9.5-4.el9.5.4.x86_64
  Running scriptlet: ssqd-proxy-2.9.5-4.el9.5.4.x86_64
  Verifying : adcli-0.9.2-1.el9.x86_64
  Verifying : bind-libs-4.20.2-2.el9.5.1.x86_64
  Verifying : bind-license-32.9.16.23-24.el9.5.3.x86_64
  Verifying : bind-utils-32.9.16.23-24.el9.5.3.x86_64
  Verifying : cups-utils-7.0-5.el9.x86_64
  Verifying : cups-libs-2.2.3-30.p2-31.el9.5.x86_64
  Verifying : cyrus-sasl-gssapi-2.1.27-21.el9.x86_64
  Verifying : fstrm-0.6.1-3.el9.x86_64
  Verifying : libicu-67.1-9.el9.x86_64
  Verifying : libipa-hbac-2.9.5-4.el9.5.4.x86_64
  Verifying : libmaximdd-1.5.2-4.el9.5.4.x86_64
  Verifying : libuv-1.26.0-2.el9.4.x86_64
  Verifying : libtirpc-1.3.3-9.el9.x86_64
  Verifying : libuv-1.1.42.0-2.el9.4.x86_64
  Verifying : libuv-1.1.42.0-2.el9.5.1.x86_64
  Verifying : lsof-4.90.0-3.el9.x86_64
  Verifying : nfs-utils-1.2.5-4-27.el9.5.1.x86_64
  Verifying : quota-1.4.09-2.el9.x86_64
  Verifying : quota-1.4.09-2.el9.5.1.noarch
  Verifying : rpcbind-1.2.6-7.el9.x86_64
  Verifying : samba-4.20.2-2.el9.5.1.x86_64
  Verifying : samba-client-libs-4.20.2-2.el9.5.1.x86_64
  Verifying : samba-common-4.20.2-2.el9.5.1.noarch
  Verifying : samba-common-libs-4.20.2-2.el9.5.1.x86_64
  Verifying : samba-3cfcrypt-4.20.2-2.el9.5.1.x86_64
  Verifying : samba-ldap-ldap-modules-4.20.2-2.el9.5.1.x86_64
  Verifying : samba-libs-4.20.2-2.el9.5.1.x86_64
  Verifying : ssqd-4.15-4.el9.x86_64
  Verifying : ssqd-ad-7.9.5-4.el9.x86_64
  Verifying : ssqd-common-pac-2.9.5-4.el9.5.4.x86_64
  Verifying : ssqd-ipa-2.9.5-4.el9.5.4.x86_64
  Verifying : ssqd-krb5-2.9.5-4.el9.5.4.x86_64
  Verifying : ssqd-krb5-common-2.9.5-4.el9.5.4.x86_64
  Verifying : ssqd-proxy-2.9.5-4.el9.5.4.x86_64

```

```
root@studi03-labor42: ~ + ~
```

Verifying : bind-license-32:9.16.23-24,e19\_5.3.noarch  
Verifying : bind-utils-32:9.16.23-24,e19\_5.3.x86\_64  
Verifying : cifs-utils-7.0-5.e19.x86\_64  
Verifying : cups-libs-2.3.0-21.e19\_5.x86\_64  
Verifying : cyrus-sasl-gssapi-2.1.27-21.e19.x86\_64  
Verifying : fstrm-0.6.1-3.e19.x86\_64  
Verifying : libicu-67.1-9.e19.x86\_64  
Verifying : libipa\_hbac-7.9-0.e19\_5.1.x86\_64  
Verifying : libnetap-4.20-2-2.e19\_5.1.x86\_64  
Verifying : libmsmclient-4.20-2-2.e19\_5.1.x86\_64  
Verifying : libtipc-1.3-3-9.e19.x86\_64  
Verifying : libubiquity-4.20-2-2.e19\_5.1.x86\_64  
Verifying : lsof-4.94-9.e19.x86\_64  
Verifying : nfs-utils-1.2.5-4-27.e19\_5.1.x86\_64  
Verifying : quota-1.4.99-2.e19.x86\_64  
Verifying : quota-1.4.99-2.e19.x86\_64  
Verifying : quota-1.4.99-2.e19.x86\_64  
Verifying : rpcbind-1.2-6-7.e19.x86\_64  
Verifying : samba-4.20-2-2.e19\_5.1.x86\_64  
Verifying : samba-client-libs-4.20-2-2.e19\_5.1.x86\_64  
Verifying : samba-common-4.20-2-2.e19\_5.1.noarch  
Verifying : samba-common-4.20-2-2.e19\_5.1.x86\_64  
Verifying : samba-common-tools-4.20-2-2.e19\_5.1.x86\_64  
Verifying : samba-dcerpc-4.20-2-2.e19\_5.1.x86\_64  
Verifying : samba-ldb-idap-modules-4.20-2-2.e19\_5.1.x86\_64  
Verifying : samba-krb5-common-2.9.5-4.e19\_5.4.x86\_64  
Verifying : sssd-2.9.5-4.e19\_5.4.x86\_64  
Verifying : sssd-ad-2.9.5-4.e19\_5.4.x86\_64  
Verifying : sssd-common-pac-2.9.5-4.e19\_5.4.x86\_64  
Verifying : sssd-ipa-4.20-2-2.e19\_5.1.x86\_64  
Verifying : sssd-krb5-common-2.9.5-4.e19\_5.4.x86\_64  
Verifying : sssd-idap-2.9.5-4.e19\_5.4.x86\_64  
Verifying : sssd-proxy-2.9.5-4.e19\_5.4.x86\_64

Removed:  
adcli-0.9.2-1.e19.x86\_64  
bind-utils-32:9.16.23-24,e19\_5.3.x86\_64  
fstrm-0.6.1-3.e19.x86\_64  
libicu-67.1-9.e19.x86\_64  
libnetap-4.20-2-2.e19\_5.1.x86\_64  
libmsmclient-4.20-2-2.e19\_5.1.x86\_64  
quota-nls-1.14.0-9.e19.noarch  
samba-common-4.20-2-2.e19\_5.1.noarch  
samba-ldb-idap-modules-4.20-2-2.e19\_5.1.x86\_64  
ssscommon-pac-2.9.5-4.e19\_5.4.x86\_64  
sssd-2.9.5-4.e19\_5.4.x86\_64

avahi-libl-libs-0.8-21.e19.x86\_64  
cifs-utils-7.0-5.e19.x86\_64  
libicu-67.1-9.e19.x86\_64  
libipa\_hbac-2.9-5-4.e19\_5.1.x86\_64  
libtipc-1.3-3-9.e19.x86\_64  
lsof-4.94-9.e19.x86\_64  
rpcbind-1.2-6-7.e19.x86\_64  
samba-common-libs-4.20-2-2.e19\_5.1.x86\_64  
samba-common-libs-4.20-2-2.e19\_5.1.x86\_64  
sssd-2.9.5-4.e19\_5.4.x86\_64  
sssd-proxy-2.9.5-4.e19\_5.4.x86\_64

bind-libs-32:9.16.23-24,e19\_5.3.x86\_64  
cups-libs-1.2.3.3op2-31.e19\_5.x86\_64  
libipa\_hbac-2.9-5-4.e19\_5.1.x86\_64  
libtipc-1.3-3-9.e19.x86\_64  
nfs-utils-1.2.5-4-27.e19\_5.1.x86\_64  
samba-4.20-2-2.e19\_5.1.x86\_64  
samba-common-tools-4.20-2-2.e19\_5.1.x86\_64  
sssd-2.9.5-4.e19\_5.4.x86\_64  
sssd-krb5-2.9.5-4.e19\_5.4.x86\_64

bind-license-32:9.16.23-24,e19\_5.3.noarch  
cyrus-sasl-gssapi-2.1.27-21.e19.x86\_64  
libmaxminddb-1.5.2-4.e19.x86\_64  
libmaxminddb-1.5.2-4.e19.x86\_64  
quot-1.4.99-2.e19.x86\_64  
samba-client-libs-4.20-2-2.e19\_5.1.x86\_64  
samba-dcerpc-4.20-2-2.e19\_5.1.x86\_64  
ssscommon-pac-2.9.5-4.e19\_5.4.x86\_64  
sssd-ad-2.9.5-4.e19\_5.4.x86\_64  
sssd-krb5-common-2.9.5-4.e19\_5.4.x86\_64

```
[root@studi03-labor42 ~]# dnf remove rpcbind.x86_64
```

It helps computer find and connect to specific network service running on another computer

```
[root@studi03-labor42 ~]# dnf remove samba-dcerpc.x86_64
```

It helps Linux computer to communicate with others for sharing files and other services

```
Complete!
[root@studiod3-labor42 ~]# dnf remove rpcbind.x86_64
No match for argument: rpcbind.x86_64
No packages marked for removal.
Dependencies resolved.
Nothing to do.
Complete!
[root@studiod3-labor42 ~]# dnf remove samba-dcerpc.x86_64
No match for argument: samba-dcerpc.x86_64
No packages marked for removal.
Dependencies resolved.
Nothing to do.
Complete!
[root@studiod3-labor42 ~]#
```

```
[root@studi03-labor42 ~]# dnf remove libnfsidmap.x86_64
```

It helps nfs sharing show the correct user and group name for files

```
[root@studi03-labor42 ~]# dnf remove nfs-utils.x86_64
```

It provides a tool that let linux computers share files over network or access files shared by other

```
[root@studi03-labor42 ~]# dnf remove nfs4-acl-tools.x86_64
```

IT provides a tool to set file permissions on network using the nfs sharing method.

```
[root@studios-OptiPlex-5090 ~]# dnf remove sssd-nfs-idmap.x86_64
```

It helps computer to use central user system to correctly show user names on files shared with nfs

```

root@studi03-labor42:~# dnf remove nfs-utils.x86_64
Erasing : libnfsidmap-1:2.5.4-27.el9_5.1.x86_64
Running scriptlet: libnfsidmap-1:2.5.4-27.el9_5.1.x86_64
Verifying : libnfsidmap-1:2.5.4-27.el9_5.1.x86_64
Verifying : sssd-nfs-idmap-2.9.5-4.el9_5.4.x86_64
Removed: libnfsidmap-1:2.5.4-27.el9_5.1.x86_64
2/2
Complete!
[root@studi03-labor42 ~]# dnf remove nfs-utils.x86_64
No match for argument: nfs-utils.x86_64
Dependencies resolved.
Nothing to do.
Complete!
[root@studi03-labor42 ~]# dnf remove nfs4-acl-tools.x86_64
Dependencies resolved.

Transaction Summary
=====
Package           Architecture      Version       Repository   Size
=====>
Removing:        nfs4-acl-tools   x86_64        0.4.2-3.el9      @anaconda 112 k
Transaction Summary
=====
Remove 1 Package

Freed space: 112 k
Is this ok [y/N]: y
Running transaction check
  Transaction check succeeded.
Running transaction test
  Transaction test succeeded.
Running transaction
  Preparing   :
  Erasing    : nfs4-acl-tools-0.4.2-3.el9.x86_64
  Running scriptlet: nfs4-acl-tools-0.4.2-3.el9.x86_64
  Verifying   : nfs4-acl-tools-0.4.2-3.el9.x86_64
1/1
1/1
1/1
1/1
Removed:
nfs4-acl-tools-0.4.2-3.el9.x86_64
1/1

Complete!
[root@studi03-labor42 ~]# dnf remove sssd-nfs-idmap.x86_64
No match for argument: sssd-nfs-idmap.x86_64
Dependencies resolved.
Nothing to do.
Complete!
[root@studi03-labor42 ~]# 

[root@studi03-labor42 ~]# dnf remove libnfsidmap.x86_64
Dependencies resolved.

Transaction Summary
=====
Package           Architecture      Version       Repository   Size
=====>
Removing:        libnfsidmap     x86_64        1:2.5.4-27.el9_5.1      @baseos 183 k
Removing dependent packages:
  sssd-nfs-idmap   x86_64        2.9.5-4.el9_5.4      @baseos 47 k
Transaction Summary
=====
Remove 2 Packages

Freed space: 230 k
Is this ok [y/N]: y
Running transaction check
  Transaction check succeeded.
Running transaction test
  Transaction test succeeded.
Running transaction
  Preparing   :
  Erasing    : sssd-nfs-idmap-2.9.5-4.el9_5.4.x86_64
  Erasing    : libnfsidmap-1:2.5.4-27.el9_5.1.x86_64
1/1
1/2
2/2

```

*/root@studi03-labor42 ~# dnf remove at.x86\_64*

It schedule a command to run once at a specific time

```

[root@studi03-labor42 ~]# dnf remove at.x86_64
Dependencies resolved.

Transaction Summary
=====
Package           Architecture      Version       Repository   Size
=====>
Removing:        at              x86_64        3.1.23-11.el9      @anaconda 124 k
Transaction Summary
=====
Remove 1 Package

Freed space: 124 k
Is this ok [y/N]: y
Running transaction check
  Transaction check succeeded.
Running transaction test
  Transaction test succeeded.
Running transaction
  Preparing   :
  Running scriptlet: at-3.1.23-11.el9.x86_64
  Erasing    : at-3.1.23-11.el9.x86_64
  Running scriptlet: at-3.1.23-11.el9.x86_64
  Verifying   : at-3.1.23-11.el9.x86_64
1/1
1/1
1/1
1/1
1/1
Removed:
at-3.1.23-11.el9.x86_64
1/1

Complete!
[root@studi03-labor42 ~]#

```

## ▪ Check Firewall Status and Open Ports

```
[root@studi03-labor42 ~]# systemctl status firewalld
```

It check it the firewalld service running on your system, it tell whether its active inactive or disable

```
[root@studi03-labor42 ~]# firewall-cmd --list-all
```

It shows the all the firewall settings currently active

```
[root@studi03-labor42 ~]# systemctl status firewalld
● firewalld.service - firewalld - dynamic firewall daemon
  Loaded: loaded (/usr/lib/systemd/system/firewalld.service; enabled; preset: enabled)
  Active: active (running) since Fri 2025-07-18 06:22:14 CEST; 1 day 6h ago
    PID: 544 (firewalld)
   Tasks: 3 (limit: 4668)
  Memory: 30.4M
     CPU: 1.758s
    Group: /system.slice/firewalld.service
           └─ 544 /usr/bin/python3 -s /usr/sbin/firewalld --nofork --nopid

Jul 18 06:22:03 studi03-labor42.f2.pte-berlin.de systemd[1]: Starting firewalld - dynamic firewall daemon...
Jul 18 06:22:03 studi03-labor42.f2.pte-berlin.de systemd[1]: firewalld.service started firewalld - dynamic firewall daemon.
Jul 19 09:33:18 studi03-labor42.f2.pte-berlin.de firewalld[544]: WARNING: ALREADY_ENABLED: http
Jul 19 09:33:31 studi03-labor42.f2.pte-berlin.de firewalld[544]: WARNING: ALREADY_ENABLED: https
[root@studi03-labor42 ~]# firewall-cmd --list-all
public (active)
  target: default
  icmp-block-inversion: no
  interfaces: ens3
  sources:
    services: cockpit dhcpcv6-client http https ssh telnet
    ports:
    protocols:
      forward: yes
      masquerade: no
    forward-ports:
    source-ports:
    source-rules:
    icmp-blocks:
    rich rules:
[root@studi03-labor42 ~]# |
```

## ▪ Firewall service considered to remove

```
[root@studi03-labor42 ~]# firewall-cmd --permanent --remove-service=telnet
```

It's a network protocol and command line tool used for remote access to computers

```
[root@studi03-labor42 ~]# firewall-cmd --permanent --remove-service=telnet
success
```

```
[root@studi03-labor42 ~]# firewall-cmd --permanent --remove-service=cockpit
```

It's a web based graphical user interface which allows to manages services, users & perform administrative task

```
[root@studi03-labor42 ~]# firewall-cmd --permanent --remove-service=cockpit
success
```

```
[root@studi03-labor42 ~]# firewall-cmd --list-all
```

```
[root@studi03-labor42 ~]# firewall-cmd --list-all
public (active)
  target: default
  icmp-block-inversion: no
  interfaces: ens3
  sources:
    services: dhcpcv6-client http https ssh
    ports:
    protocols:
      forward: yes
      masquerade: no
    forward-ports:
    source-ports:
    icmp-blocks:
    rich rules:
[root@studi03-labor42 ~]# |
```

## ▪ Install Apache Web Server

**[root@studi03-labor42 ~]# dnf install httpd**

It installed Apache web server software packages

```

root@studi03-labor42:~# dnf install httpd
No match for argument: httpd-
Error: Unable to find a match: httpd-
[root@studi03-labor42 ~]# dnf install httpd
Last metadata expiration check: 0:20:49 ago on Fri 18 Jul 2025 04:35:04 PM CEST.
Dependencies resolved.
=====
| Package           | Architecture | Version      | Repository | Size
|=====|
| Installing:      |
|   httpd           | x86_64       | 2.4.62-4.el9 | appstream  | 45 k
| Installing dependencies: |
|   apr              | x86_64       | 1.7.0-12.el9_3 | appstream  | 122 k
|   apr-util         | x86_64       | 1.6.1-23.el9  | appstream  | 94 k
|   apr-util-bdb    | x86_64       | 1.6.1-23.el9  | appstream  | 12 k
|   httpd            | x86_64       | 2.4.62-4.el9  | appstream  | 114 k
|   httpd-filesystem | noarch      | 2.4.62-4.el9  | appstream  | 12 k
|   httpd-tools      | x86_64       | 2.4.62-4.el9  | appstream  | 78 k
|   rocky-logos-httpd | noarch      | 98.16-1.el9   | appstream  | 24 k
| Installing weak dependencies: |
|   apr-util-openssl | x86_64       | 1.6.1-23.el9  | appstream  | 14 k
|   mod_http2        | x86_64       | 2.0.26-4.el9  | appstream  | 163 k
|   mod_lua          | x86_64       | 2.4.62-4.el9  | appstream  | 58 k
| Transaction Summary |
| Install 11 Packages |
Total download size: 2.0 M
Installed size: 1 M
Is this ok [y/N]: y
Downloading Packages:
(1/11): apr-util-1.6.1-23.el9.x86_64.rpm: 59 kB/s | 12 kB  00:00
(2/11): httpd-2.4.62-4.el9.x86_64.rpm: 176 kB/s | 45 kB  00:00
(3/11): apr-util-1.6.1-23.el9.x86_64.rpm: 689 kB/s | 94 kB  00:00
(4/11): apr-util-bdb-1.6.1-23.el9.x86_64.rpm: 1.17 MB/s | 12 kB  00:00
(5/11): httpd-tools-2.4.62-4.el9.x86_64.rpm: 732 kB/s | 78 kB  00:00
(6/11): mod_http2-2.0.26-4.el9.x86_64.rpm: 2.5 MB/s | 163 kB 00:00
(7/11): mod_lua-2.4.62-4.el9.x86_64.rpm: 787 kB/s | 58 kB  00:00
(8/11): apr-util-openssl-1.6.1-23.el9.x86_64.rpm: 1.97 MB/s | 14 kB  00:00
(9/11): httpd-filesystem-2.4.62-4.el9.noarch: 1.7 MB/s | 12 kB  00:00
(10/11): httpd-core-2.4.62-4.el9.x86_64.rpm: 151 kB/s | 12 kB  00:00
(11/11): httpd-2.4.62-4.el9.x86_64.rpm: 1.6 MB/s | 1.4 MB 00:00
Total                                         1.9 MB/s | 2.0 MB 00:01
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing: : 1/1
  Transaction check succeeded.
  Running transaction test
  Transaction test succeeded.
  Running transaction
  Preparing: : 1/1
  Installing : apr-1.7.0-12.el9_3.x86_64
  Installing : apr-util-openssl-1.6.1-23.el9.x86_64
  Installing : apr-util-1.6.1-23.el9.x86_64
  Installing : apr-util-bdb-1.6.1-23.el9.x86_64
  Installing : httpd-2.4.62-4.el9.x86_64
  Running scriptlet: httpd-filesystem-2.4.62-4.el9.noarch
  Installing : httpd-filesystem-2.4.62-4.el9.noarch
  Installing : httpd-core-2.4.62-4.el9.x86_64
  Installing : mod_lua-2.4.62-4.el9.x86_64
  Installing : apr-util-openssl-1.6.1-23.el9.x86_64
  Installing : mod_http2-2.0.26-4.el9.x86_64
  Installing : mod_lua-2.4.62-4.el9.x86_64
  Running scriptlet: httpd-2.4.62-4.el9.x86_64
  Verifying : apr-util-bdb-1.6.1-23.el9.x86_64
  Verifying : httpd-2.4.62-4.el9.x86_64
  Verifying : httpd-core-2.4.62-4.el9.x86_64
  Verifying : apr-util-1.6.1-23.el9.x86_64
  Verifying : rocky-logos-httpd-98.16-1.el9.noarch
  Verifying : httpd-tools-2.4.62-4.el9.x86_64
  Verifying : mod_http2-2.0.26-4.el9.x86_64
  Verifying : mod_lua-2.4.62-4.el9.x86_64
  Verifying : apr-util-openssl-1.6.1-23.el9.x86_64
  Verifying : apr-1.7.0-12.el9_3.x86_64
  Verifying : httpd-filesystem-2.4.62-4.el9.noarch
  Complete! : 11/11
  [root@studi03-labor42 ~]#

```

```

root@studi03-labor42:~# dnf install httpd
No match for argument: httpd-
Error: Unable to find a match: httpd-
[root@studi03-labor42 ~]# dnf install httpd
Last metadata expiration check: 0:20:49 ago on Fri 18 Jul 2025 04:35:04 PM CEST.
Dependencies resolved.
=====
| Package           | Architecture | Version      | Repository | Size
|=====|
| Installing:      |
|   httpd           | x86_64       | 2.4.62-4.el9 | appstream  | 45 k
| Installing dependencies: |
|   apr              | x86_64       | 1.7.0-12.el9_3 | appstream  | 122 k
|   apr-util         | x86_64       | 1.6.1-23.el9  | appstream  | 94 k
|   apr-util-bdb    | x86_64       | 1.6.1-23.el9  | appstream  | 12 k
|   httpd            | x86_64       | 2.4.62-4.el9  | appstream  | 114 k
|   httpd-filesystem | noarch      | 2.4.62-4.el9  | appstream  | 12 k
|   httpd-tools      | x86_64       | 2.4.62-4.el9  | appstream  | 78 k
|   rocky-logos-httpd | noarch      | 98.16-1.el9   | appstream  | 24 k
| Installing weak dependencies: |
|   apr-util-openssl | x86_64       | 1.6.1-23.el9  | appstream  | 14 k
|   mod_http2        | x86_64       | 2.0.26-4.el9  | appstream  | 163 k
|   mod_lua          | x86_64       | 2.4.62-4.el9  | appstream  | 58 k
| Transaction Summary |
| Install 11 Packages |
Total download size: 2.0 M
Installed size: 1 M
Is this ok [y/N]: y
Downloading Packages:
(1/11): apr-util-1.6.1-23.el9.x86_64: 59 kB/s | 12 kB  00:00
(2/11): httpd-2.4.62-4.el9.x86_64: 176 kB/s | 45 kB  00:00
(3/11): apr-util-1.6.1-23.el9.x86_64: 689 kB/s | 94 kB  00:00
(4/11): apr-util-bdb-1.6.1-23.el9.x86_64: 1.17 MB/s | 12 kB  00:00
(5/11): httpd-tools-2.4.62-4.el9.x86_64: 732 kB/s | 78 kB  00:00
(6/11): mod_http2-2.0.26-4.el9.x86_64: 2.5 MB/s | 163 kB 00:00
(7/11): mod_lua-2.4.62-4.el9.x86_64: 787 kB/s | 58 kB  00:00
(8/11): apr-util-openssl-1.6.1-23.el9.x86_64: 1.97 MB/s | 14 kB  00:00
(9/11): httpd-filesystem-2.4.62-4.el9.noarch: 1.7 MB/s | 12 kB  00:00
(10/11): httpd-core-2.4.62-4.el9.x86_64: 151 kB/s | 12 kB  00:00
(11/11): httpd-2.4.62-4.el9.x86_64: 1.6 MB/s | 1.4 MB 00:00
Total                                         1.9 MB/s | 2.0 MB 00:01
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing: : 1/1
  Transaction check succeeded.
  Running transaction test
  Transaction test succeeded.
  Running transaction
  Preparing: : 1/1
  Installing : apr-1.7.0-12.el9_3.x86_64
  Installing : apr-util-openssl-1.6.1-23.el9.x86_64
  Installing : apr-util-1.6.1-23.el9.x86_64
  Installing : apr-util-bdb-1.6.1-23.el9.x86_64
  Installing : httpd-2.4.62-4.el9.x86_64
  Running scriptlet: httpd-filesystem-2.4.62-4.el9.noarch
  Installing : httpd-filesystem-2.4.62-4.el9.noarch
  Installing : httpd-core-2.4.62-4.el9.x86_64
  Installing : mod_lua-2.4.62-4.el9.x86_64
  Installing : apr-util-openssl-1.6.1-23.el9.x86_64
  Running scriptlet: httpd-2.4.62-4.el9.x86_64
  Verifying : apr-util-bdb-1.6.1-23.el9.x86_64
  Verifying : httpd-2.4.62-4.el9.x86_64
  Verifying : httpd-core-2.4.62-4.el9.x86_64
  Verifying : apr-util-1.6.1-23.el9.x86_64
  Verifying : rocky-logos-httpd-98.16-1.el9.noarch
  Verifying : httpd-tools-2.4.62-4.el9.x86_64
  Verifying : mod_http2-2.0.26-4.el9.x86_64
  Verifying : mod_lua-2.4.62-4.el9.x86_64
  Verifying : apr-util-openssl-1.6.1-23.el9.x86_64
  Verifying : apr-1.7.0-12.el9_3.x86_64
  Verifying : httpd-filesystem-2.4.62-4.el9.noarch
  Complete! : 11/11
  [root@studi03-labor42 ~]#

```

**[root@studi03-labor42 ~]# systemctl status httpd**

It check it the Apache web server service running on your system, it tell whether its active/inactive or disable

**[root@studi03-labor42 ~]# systemctl start httpd**

It start the Apache web server service

**[root@studi03-labor42 ~]# systemctl enable httpd**

It configure Apache webserver to start automatically every time the servers is boots up

**[root@studi03-labor42 ~]# systemctl status httpd**

It check it the Apache web server service running on your system, it tell whether its active/inactive or disable

```

[Complete]
[root@studi03-labor42 ~]# systemctl status httpd
● httpd.service - The Apache HTTP Server
   ▾ Loaded: loaded (/usr/lib/systemd/system/httpd.service; disabled; preset: disabled)
     ▾ Active: inactive (dead)
       Docs: man:httpd.service(8)

[root@studi03-labor42 ~]# systemctl enable httpd
Created symlink /etc/systemd/system/multi-user.target.wants/httpd.service → /usr/lib/systemd/system/httpd.service.

[root@studi03-labor42 ~]# systemctl start httpd
[root@studi03-labor42 ~]# systemctl status httpd
● httpd.service - The Apache HTTP Server
   ▾ Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; preset: disabled)
     ▾ Active: active (running) since Fri 2025-07-18 17:09:49 CEST; 26s ago
       Docs: man:httpd.service(8)
   Main PID: 34738 (httpd)
      Tasks: 177 (limit: 4668)
        CPU: 94ms
       Memory: 24.8M
          CPU: 94ms
     CGroup: /system.slice/httpd.service
             ├─34738 /usr/sbin/httpd --foreground
             ├─34736 /usr/sbin/httpd --foreground
             ├─34737 /usr/sbin/httpd --foreground
             ├─34738 /usr/sbin/httpd --foreground
             ├─34739 /usr/sbin/httpd --foreground

Jul 18 17:09:40 studi03-labor42.f2.htmw-berlin.de systemd[1]: Starting The Apache HTTP Server...
Jul 18 17:09:40 studi03-labor42.f2.htmw-berlin.de systemd[1]: Started The Apache HTTP Server.
Jul 18 17:09:40 studi03-labor42.f2.htmw-berlin.de httpd[34735]: Server configured, listening on: port 80
[root@studi03-labor42 ~]#

```

**[root@studi03-labor42 ~]# firewall-cmd --zone=public --add-service=http --permanent**

It tell servers firewall to permanently allow incoming traffic for the http service (Port 80)

**[root@studi03-labor42 ~]# firewall-cmd --zone=public --add-service=https --permanent**

It tell servers firewall to permanently allow incoming traffic for the https service (Port 443)

**[root@studi03-labor42 ~]# firewall-cmd --reload**

IT reload the firewall rules apply changes without restarting the entire firewall service

```

[root@studi03-labor42 ~]# firewall-cmd --zone=public --add-service=http --permanent
success
[root@studi03-labor42 ~]# firewall-cmd --zone=public --add-service=https --permanent
success
[root@studi03-labor42 ~]# firewall-cmd --reload
success
[root@studi03-labor42 ~]#

```

## ▪ Install MariaDB Database Server

**[root@studi03-labor42 ~]# dnf install mariadb-server**

It installed Mariadb server software packages

Package	Architecture	Version	Repository	Size
<b>Installing:</b>				
mariadb-server	x86_64	3:10.5.27-1.el9_5.0.2	appstream	9.7 M
audit	x86_64	3:1.5-4.el9	baseos	253 k
audit-tlibs	x86_64	3:1.5-4.el9	baseos	121 k
libselinux	x86_64	3:6-3.el9	baseos	85 k
libselinux-utils	x86_64	3:6-3.el9	baseos	161 k
policykit-1-libselinux	x86_64	3:6-5.el9_6	baseos	117 k
policykit-1-libselinux	x86_64	3:6-3.el9	appstream	186 k
<b>Installing dependencies:</b>				
checkpolicy	x86_64	3:6-1.el9	appstream	352 k
mariadb	x86_64	3:10.5.27-1.el9_5.0.2	appstream	1.6 M
mariadb-common	x86_64	3:10.5.27-1.el9_5.0.2	appstream	327 k
mariadb-connector-c	x86_64	3.2.6-1.el9	appstream	195 k
mariadb-connector-c-config	noarch	3:2.6-1.el9_8	appstream	9.8 k
mariadb-ermsg	x86_64	3:10.5.27-1.el9_5.0.2	appstream	211 k
mysql-selinux	noarch	1:0.13-1.el9_5	appstream	36 k
perl-AutoLoader	x86_64	5.89-661.el9	appstream	20 k
perl-CGI	x86_64	1:88-481.el9	appstream	178 k
perl-Carp	noarch	1:59-460.el9	appstream	29 k
perl-Class-Struct	noarch	0.66-481.el9	appstream	21 k
perl-DBD-MariaDB	x86_64	1:21.16-1.el9_0	appstream	151 k
perl-Digest	x86_64	1:103-462.el9	appstream	900 k
perl-Data-Dumper	x86_64	2.174-462.el9	appstream	55 k
perl-Digest	noarch	1:19-4.el9	appstream	25 k
perl-Digest-MD5	x86_64	2.58-4.el9	appstream	36 k
perl-DynaLoader	x86_64	1:47-481.el9	appstream	24 k
perl-Encode	x86_64	4.10-462.el9	appstream	1.7 M
perl-Evio	x86_64	1:38-481.el9	appstream	13 k
perl-Exporter	noarch	5.74-461.el9	appstream	31 k
perl-Fcntl	x86_64	1:13-481.el9	appstream	19 k
perl-File-Basename	noarch	2.85-461.el9	appstream	16 k
perl-File-Compare	noarch	2.38-481.el9	appstream	19 k
perl-File-Path	noarch	2.19-4.el9	appstream	35 k
perl-File-Temp	noarch	1:0.231.100-4.el9	appstream	59 k
perl-File-stat	noarch	1.09-481.el9	appstream	16 k
perl-FileHandle	noarch	2.03-481.el9	appstream	14 k
perl-Getopt-Long	noarch	1.15-52.el9	appstream	60 k
perl-Getopt-Std	noarch	1.12-481.el9	appstream	14 k
perl-HTTP-Tiny	noarch	0.076-462.el9	appstream	53 k
perl-IO	x86_64	1.43-481.el9	appstream	85 k
perl-IO-Socket-IP	noarch	0.41-5.el9	appstream	42 k

```

root@studio3-labor42:~# apt-get -y upgrade
[...]
perl-IPC-Open3          noarch      1:21-481.el9          appstream
perl-MIME-Signed         noarch      1:1.9998-18+460.el9  appstream
perl-Math-BigInt        noarch      1.59-481.el9          appstream
perl-Math-Complex        noarch      20208520-6.el9       appstream
perl-Mozilla-CA          noarch      1.94-1.el9           appstream
perl-Net-SSLey           x86_64     1.10-1.el9           appstream
perl-PathTools           x86_64     3.78-461.el9          appstream
perl-Pod-Escapes         noarch      1:1.87-468.el9       appstream
perl-Pod-Perldoc         noarch      3.28.01-461.el9       appstream
perl-Pod-Simple          noarch      1:3.42-4.el9          appstream
perl-POSIX                noarch      4.0-481.el9           appstream
perl-Scalar-List-Utils   x86_64     4:1.56-462.el9       appstream
perl-SelectSaver          noarch      1.02-481.el9          appstream
perl-Socket               x86_64     4:2.031-4.el9       appstream
perl-Storable             noarch      1:1.08-480.el9       appstream
perl-Tk                   noarch      1.88-481.el9          appstream
perl-Sys-Hostname         x86_64     1.23-481.el9          appstream
perl-Term-ANSIColor      noarch      5.01-461.el9          appstream
perl-Term-Cap              noarch      1.17-468.el9          appstream
perl-Term-ReadLine         noarch      3.0-481.el9           appstream
perl-Time-Local            noarch      2013.0523-460.el9     appstream
perl-URI                  noarch      5.09-3.el9           appstream
perl-base                 noarch      2.27-481.el9          appstream
perl-constant              noarch      1:1.16-481.el9       appstream
perl-crypt                 noarch      0.60.0000-481.el9     appstream
perl-interpret              noarch      4:5.32.1-481.el9     appstream
perl-libnet                 noarch      3.13-4.el9           appstream
perl-libs                  x86_64     4:5.32.1-481.el9     appstream
perl-mro                  x86_64     1:1.31-481.el9       appstream
perl-overload              noarch      1.31-481.el9           appstream
perl-overloading            noarch      0.02-481.el9          appstream
perl-parent                 noarch      1:0.238-468.el9     appstream
perl-podlators              noarch      1:4.14-469.el9       appstream
perl-primitive              noarch      1.05-481.el9          appstream
perl-reverser              noarch      3.6-2.1.el9           appstream
policycoreutils-python-utils noarch      3.1.5-4.el9           appstream
python3-audit               x86_64     3.1.5-7.el9           appstream
python3-distro              x86_64     1.5.8-7.el9           appstream
python3-distro-configure    noarch      3.0-481.el9           appstream
python3-polycoreutils       noarch      3.6-2.1.el9           appstream
python3-setools              x86_64     4:4.4-1.el9           appstream
baseses
Installing weak dependencies:
mariadb-backup             x86_64     3:10.5.27-1.el9.5.0.2 appstream
mariadb-galaxyapi-server    x86_64     3:10.5.27-1.el9.5.0.2 appstream
mariadb-server-utils        x86_64     3:10.5.27-1.el9.5.0.2 appstream
perl-NDM_File               x86_64     1.15-481.el9          appstream
Transaction Summary

```

```

root@studio3-labor42:~# apt-get -y upgrade
[...]
Transaction Summary
Install  81 Packages
Upgrade  6 Packages
Total download size: 30 M
Is this ok [y/N]: y
Downloaded Packages:
(1/87): perl-Getopt-Long-2.52-4.el9.noarch.rpm          333 kB/s | 60 kB  00:00
(2/87): perl-Term-Cap-1.17-468.el9.noarch.rpm          379 kB/s | 22 kB  00:00
(3/87): mariadb-connector-c-8.0.21-1.el9.x86_64.rpm     721 kB/s | 195 kB  00:00
(4/87): python3-argparse-3.14.1-1.el9.noarch.rpm       1.1 MB/s | 552 kB  00:00
(5/87): perl-LWP-Protocol-https-1.97-469.el9.noarch.rpm  36 kB/s | 20 kB  00:00
(6/87): perl-Symbol-1.08-481.el9.noarch.rpm           25 kB/s | 13 kB  00:00
(7/87): perl-Interpreter-5.32.1-481.el9.x86_64.rpm     118 kB/s | 70 kB  00:00
(8/87): perl-Getopt-Std-1.2-481.el9.noarch.rpm          179 kB/s | 14 kB  00:00
(9/87): perl-Socket-1.33-481.el9.x86_64.rpm           200 kB/s | 50 kB  00:00
(10/87): mariadb-common-10.5.27-1.el9.5.0.2.x86_64.rpm  132 kB/s | 27 kB  00:00
(11/87): perl-File-Stat-1.09-481.el9.noarch.rpm        123 kB/s | 13 kB  00:00
(12/87): perl-Net-SSLey-1.94-1.el9.x86_64.rpm          956 kB/s | 391 kB  00:00
(13/87): perl-overload-3.13-481.el9.noarch.rpm          594 kB/s | 44 kB  00:00
(14/87): perl-Devel-Check-1.00-481.el9.noarch.rpm       1.4 MB/s | 700 kB  00:00
(15/87): perl-overloading-0.02-481.el9.noarch.rpm        138 kB/s | 11 kB  00:00
(16/87): mariadb-server-utils-10.5.27-1.el9.5.0.2.x86_64.rpm  2.5 MB/s | 210 kB  00:00
(17/87): mariadb-connector-c-config-3.2.6-1.el9.x86_64.rpm  84 kB/s | 9.8 kB  00:00
(18/87): perl-parent-0.238-481.el9.noarch.rpm          99 kB/s | 9 kB  00:00
(19/87): perl-File-Stat-1.09-481.el9.x86_64.rpm        1.1 MB/s | 108 kB  00:00
(20/87): perl-Scalar-List-Utils-1.56-462.el9.x86_64.rpm  182 kB/s | 78 kB  00:00
(21/87): python3-polycoreutils-3.6-2.1.el9.noarch.rpm    2.6 MB/s | 2.0 MB  00:00
(22/87): perl-File-stat-1.09-481.el9.noarch.rpm        135 kB/s | 16 kB  00:00
(23/87): perl-PathTools-1.22-481.el9.x86_64.rpm        1.5 MB/s | 18 kB  00:00
(24/87): perl-PathTools-1.31-481.el9.x86_64.rpm        3.0 MB/s | 2.0 kB  00:00
(25/87): perl-Pod-Perldoc-3.28.01-481.el9.noarch.rpm   372 kB/s | 63 kB  00:00
(26/87): perl-HTTP-Tiny-0.076-462.el9.noarch.rpm       480 kB/s | 53 kB  00:00
(27/87): perl-Digest-1.19-4.el9.noarch.rpm             25 kB/s | 25 kB  00:00
(28/87): perl-Exporter-5.67-481.el9.noarch.rpm         389 kB/s | 31 kB  00:00
(29/87): perl-File-Stat-1.09-481.el9.x86_64.rpm       150 kB/s | 15 kB  00:00
(30/87): perl-MIME-Base64-3.16-4.el9.x86_64.rpm        385 kB/s | 30 kB  00:00
(31/87): perl-Text-TabsWrap-2013.0523-460.el9.noarch.rpm 228 kB/s | 23 kB  00:00
(32/87): perl-POSIX-1.94-481.el9.x86_64.rpm           1.1 MB/s | 95 kB  00:00
(33/87): perl-Math-Complex-1.57-481.el9.x86_64.rpm     393 kB/s | 78 kB  00:00
(34/87): perl-PathTools-1.6-5-1.el9.5.x86_64.rpm       857 kB/s | 78 kB  00:00
(35/87): perl-IPC-Open3-1.21-481.el9.noarch.rpm        222 kB/s | 21 kB  00:00
(36/87): perl-Sys-Hostname-1.23-481.el9.x86_64.rpm     158 kB/s | 16 kB  00:00
(37/87): perl-NDM_File-1.15-481.el9.x86_64.rpm         218 kB/s | 21 kB  00:00
(38/87): policycoreutils-2.10.1-481.el9.x86_64.rpm      702 kB/s | 77 kB  00:00
(39/87): perl-File-Stat-1.16-1.el9.x86_64.rpm          3.4 MB/s | 352 kB  00:00
(40/87): perl-Fcntl-1.13-481.el9.x86_64.rpm           193 kB/s | 19 kB  00:00
(41/87): perl-SelectSaver-1.02-481.el9.noarch.rpm       125 kB/s | 10 kB  00:00

```

```

root@studios3-labor42:~# rpm -Uvh *.rpm
(43/87): perl-File-Path-2.18-4.el9.noarch.rpm
(44/87): perl-File-Movable-3-21-4.el9.x86_64.rpm
(45/87): perl-AutoLoader-5.74-481.el9.noarch.rpm
(46/87): perl-Data-Dumper-2.174-462.el9.x86_64.rpm
(47/87): python3-audit-3.1.5-4.el9.x86_64.rpm
(48/87): perl-File-Copy-3.62-4.el9.noarch.rpm
(49/87): perl-File-Sort-3-02-4.el9.noarch.rpm
(50/87): perl-vars-1.05-481.el9.noarch.rpm
(51/87): perl-File-Temp-0.231.100-4.el9.noarch.rpm
(52/87): mariadb-backup-11.5.27-1.el9.5.0.2.x86_64.rpm
(53/87): perl-Digest-MD5-2.58-4.el9.x86_64.rpm
(54/87): perl-Config-General-2.70-4.el9.noarch.rpm
(55/87): perl-Errno-1.30-481.el9.x86_64.rpm
(56/87): perl-subs-1.03-481.el9.noarch.rpm
(57/87): perl-Math-BigInt-1.9998_18-469.el9.noarch.rpm
(58/87): perl-Mozilla-CA-20200529-6.el9.noarch.rpm
(59/87): perl-IO-Handle-0.80-4.el9.x86_64.rpm
(60/87): perl-Pod-Usage-2.01-4.el9.noarch.rpm
(61/87): python3-distro-1.5.0-7.el9.noarch.rpm
(62/87): perl-Class-Struct-0.66-481.el9.noarch.rpm
(63/87): libselinux-python-1.8.13-1.el9.5.noarch.rpm
(64/87): perl-LWP-Mechanize-6.07-4.el9.x86_64.rpm
(65/87): perl-Carp-1.59-469.el9.noarch.rpm
(66/87): perl-DynaLoader-1.47-481.el9.x86_64.rpm
(67/87): perl-Time-Local-1.390-7.el9.noarch.rpm
(68/87): perl-IPC-Open3-1.03-4.el9.noarch.rpm
(69/87): perl-libnet-3.13-4.el9.noarch.rpm
(70/87): perl-mro-1.23-481.el9.x86_64.rpm
(71/87): perl-Encode-3.08-462.el9.x86_64.rpm
(72/87): perl-DBD-MariaDB-1.21.16.el9.0.x86_64.rpm
(73/87): perl-Config-General-2.70-4.el9.noarch.rpm
(74/87): perl-IO-HS-0.43-481.el9.x86_64.rpm
(75/87): mariadb-qa-api-server-10.5.27-1.el9.5.0.2.x86_64.rpm
(76/87): perl-Text-ParseWords-3.30-460.el9.noarch.rpm
(77/87): mariadb-libs-10.5.27-1.el9.5.0.2.x86_64.rpm
(78/87): perl-POSIX-1.07-460.el9.noarch
(79/87): mariadb-ermsg-10.5.27-1.el9.5.0.2.x86_64.rpm
(80/87): perl-ID-Socket-IP-0.01-5.el9.noarch.rpm
(81/87): libselinux-utils-3.6-3.el9.x86_64.rpm
(82/87): libselinux-3.6-3.el9.x86_64.rpm
(83/87): mariadb-libs-10.5.1-1.el9.5.0.2.x86_64.rpm
(84/87): audit-libs-3.1.5-4.el9.x86_64.rpm
(85/87): libsemanage-3.6-5.el9.6.x86_64.rpm
(86/87): libselinux-3.6-3.el9.x86_64.rpm
(87/87): python3-libselinux-3.6-3.el9.x86_64.rpm

Total                                         387 kB/s   36 kB   66:00
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
4.8 MB/s | 30 MB  00:00

```

```

root@studios3-labor42:~# Transaction check succeeded.
root@studios3-labor42:~# Running transaction test
root@studios3-labor42:~# Transaction test succeeded.
root@studios3-labor42:~# Running transaction
root@studios3-labor42:~# Preparing :
root@studios3-labor42:~#   Installing : perl-Digest-1.19-4.el9.noarch
root@studios3-labor42:~#   Installing : perl-Digest-MD5-2.58-4.el9.x86_64
root@studios3-labor42:~#   Installing : perl-File-Handle-2.03-481.el9.noarch
root@studios3-labor42:~#   Installing : perl-Data-Dumper-2.174-462.el9.x86_64
root@studios3-labor42:~#   Installing : perl-libnet-3.13-4.el9.noarch
root@studios3-labor42:~#   Installing : perl-base-2.27-481.el9.noarch
root@studios3-labor42:~#   Installing : perl-URI-5.89-3.el9.noarch
root@studios3-labor42:~#   Installing : perl-if-0.60.889-481.el9.noarch
root@studios3-labor42:~#   Installing : perl-Pod-Escapes-1.1-07-469.el9.noarch
root@studios3-labor42:~#   Installing : perl-Text-Tabs+Wrap-2013.0525-469.el9.noarch
root@studios3-labor42:~#   Installing : perl-IPC-Open3-1.03-4.el9.noarch
root@studios3-labor42:~#   Installing : perl-Time-Local-2.1.398-7.el9.noarch
root@studios3-labor42:~#   Installing : perl-File-Path-2.18-4.el9.noarch
root@studios3-labor42:~#   Installing : perl-ID-Socket-SSL-2.073-2.el9.noarch
root@studios3-labor42:~#   Installing : perl-Sub-Uncurry-0.01-481.el9.noarch
root@studios3-labor42:~#   Installing : perl-subs-1.03-481.el9.noarch
root@studios3-labor42:~#   Installing : perl-Term-ANSIColor-5.01-461.el9.noarch
root@studios3-labor42:~#   Installing : perl-POSIX-1.94-481.el9.x86_64
root@studios3-labor42:~#   Installing : perl-Text-Wrap-1.72-469.el9.noarch
root@studios3-labor42:~#   Installing : perl-File-Temp-0.231.100-4.el9.noarch
root@studios3-labor42:~#   Installing : perl-IPC-Open3-1.21-481.el9.noarch
root@studios3-labor42:~#   Installing : perl-File-Temp-1.0-231.100-4.el9.noarch
root@studios3-labor42:~#   Installing : perl-HTTP-Tiny-0.076-462.el9.noarch
root@studios3-labor42:~#   Installing : perl-Path-Iterator-1.03-4.el9.noarch
root@studios3-labor42:~#   Installing : perl-File-Module-0.01-481.el9.noarch
root@studios3-labor42:~#   Installing : perl-Socket-4.2.031-4.el9.x86_64
root@studios3-labor42:~#   Installing : perl-SelectSaver-1.02-481.el9.noarch
root@studios3-labor42:~#   Installing : perl-Flockstat-1.09-481.el9.noarch
root@studios3-labor42:~#   Installing : perl-PerlPortability-0.01-461.el9.noarch
root@studios3-labor42:~#   Installing : perl-overloading-1.14-100-460.el9.noarch
root@studios3-labor42:~#   Installing : perl-Fcntl-1.13-481.el9.x86_64
root@studios3-labor42:~#   Installing : perl-mro-1.23-481.el9.x86_64
root@studios3-labor42:~#   Installing : perl-File-List-3.00-460.el9.noarch
root@studios3-labor42:~#   Installing : perl-Text-ParseWords-3.30-460.el9.noarch
root@studios3-labor42:~#   Installing : perl-Pod-Usage-4.2.01-4.el9.noarch
root@studios3-labor42:~#   Installing : perl-parent-1.0-238-469.el9.noarch
root@studios3-labor42:~#   Installing : perl-Getopt-Std-1.12-481.el9.noarch
root@studios3-labor42:~#   Installing : perl-Scalar-List-Utils-2.06-462.el9.x86_64
root@studios3-labor42:~#   Installing : perl-Locale-Env-3.16-4.el9.x86_64
root@studios3-labor42:~#   Installing : perl-vars-1.05-481.el9.noarch
root@studios3-labor42:~#   Installing : perl-Errno-1.30-481.el9.x86_64

root@studios3-labor42:~# 1/1
root@studios3-labor42:~# 1/93
root@studios3-labor42:~# 2/93
root@studios3-labor42:~# 3/93
root@studios3-labor42:~# 4/93
root@studios3-labor42:~# 5/93
root@studios3-labor42:~# 6/93
root@studios3-labor42:~# 7/93
root@studios3-labor42:~# 8/93
root@studios3-labor42:~# 9/93
root@studios3-labor42:~# 10/93
root@studios3-labor42:~# 11/93
root@studios3-labor42:~# 12/93
root@studios3-labor42:~# 13/93
root@studios3-labor42:~# 14/93
root@studios3-labor42:~# 15/93
root@studios3-labor42:~# 16/93
root@studios3-labor42:~# 17/93
root@studios3-labor42:~# 18/93
root@studios3-labor42:~# 19/93
root@studios3-labor42:~# 20/93
root@studios3-labor42:~# 21/93
root@studios3-labor42:~# 22/93
root@studios3-labor42:~# 23/93
root@studios3-labor42:~# 24/93
root@studios3-labor42:~# 25/93
root@studios3-labor42:~# 26/93
root@studios3-labor42:~# 27/93
root@studios3-labor42:~# 28/93
root@studios3-labor42:~# 29/93
root@studios3-labor42:~# 30/93
root@studios3-labor42:~# 31/93
root@studios3-labor42:~# 32/93
root@studios3-labor42:~# 33/93
root@studios3-labor42:~# 34/93
root@studios3-labor42:~# 35/93
root@studios3-labor42:~# 36/93
root@studios3-labor42:~# 37/93
root@studios3-labor42:~# 38/93
root@studios3-labor42:~# 39/93
root@studios3-labor42:~# 40/93
root@studios3-labor42:~# 41/93
root@studios3-labor42:~# 42/93
root@studios3-labor42:~# 43/93
root@studios3-labor42:~# 44/93
root@studios3-labor42:~# 45/93

```

```
root@studi03-labor42:~# perl-Text-ParseWords-3.30-460.e19.noarch
Verifying : perl-Text-ParseWords-3.30-460.e19.noarch
Verifying : perl-File-Basename-2.85-481.e19.noarch
Verifying : mariadb-errmsg-3:10.5.27-1.e19_5.0.2.x86_64
Verifying : perl-IO-Socket-ID-0.4-1.e19.noarch
Verifying : libselinux-utils-3.6-3.e19.x86_64
Verifying : libselinux-utils-3.6-1.e19.x86_64
Verifying : libselinux-3.6-3.e19.x86_64
Verifying : libselinux-3.6-1.e19.x86_64
Verifying : libselinux-3.6-1.e19.x86_64
Verifying : audit-3.1.5-4.e19.x86_64
Verifying : audit-3.1.5-4.e19.x86_64
Verifying : audit-libs-3.1.5-4.e19.x86_64
Verifying : audit-libs-3.1.5-1.e19.x86_64
Verifying : libsemanage-3.6-5.e19.x86_64
Verifying : libsemanage-3.6-2.e19.5.x86_64
Verifying : libsemanage-3.6-2.e19.6.x86_64
Verifying : python3-libselinux-3.6-3.e19.x86_64
Verifying : python3-libselinux-3.6-1.e19.x86_64

Upgraded:
audit-3.1.5-4.e19.x86_64 audit-libs-3.1.5-4.e19.x86_64 libselinux-3.6-3.e19.x86_64 libselinux-utils-3.6-3.e19.x86_64 libsemanage-3.6-5.e19.6.x86_64 python3-libselinux-3.6-3.e19.x86_64

Installed:
cassandra-policy-3.6-1.e19.x86_64
mariadb-common-3:10.5.27-1.e19_5.0.2.x86_64
mariadb-errmsg-3:10.5.27-1.e19_5.0.2.x86_64
mariadb-server-3:10.5.27-1.e19_5.0.2.x86_64
perl-IPC-Cmp-1.0-1.e19.noarch
perl-DBI-Waitable-2.1-16.e19.0.x86_64
perl-Digest-1.19-9.e19.noarch
perl-Encode-3.08-462.e19.x86_64
perl-Fcntl-1.64-481.e19.x86_64
perl-File-Path-2.14-481.e19.noarch
perl-FileHandle-3.03-481.e19.noarch
perl-HTTP-Tiny-0.076-462.e19.noarch
perl-IO-Socket-SSL-0.2-19.e19.noarch
perl-Math-BigInt-1.9999-1.e460.e19.noarch
perl-Math-Complex-1.56-481.e19.noarch
perl-PathTools-3.7-461.e19.x86_64
perl-Pod-Simple-1.3-42.e19.noarch
perl-SelectSaver-4.0-481.e19.noarch
perl-Symbol-1.08-481.e19.noarch
perl-Time-Clock-1.08-481.e19.noarch
perl-Time-Local-1.2-3.100-7.e19.noarch
perl-constant-1.33-461.e19.noarch
perl-libnet-3.13-4.e19.noarch
perl-overload-3.1-481.e19.noarch
perl-pkglib-1.0-481.e19.noarch
policycoreutils-python3-1.3-2.1.e19.noarch
python3-libsemanage-3.6-5.e19.6.x86_64

Complete!
[root@studi03-labor42 ~]#
```

```
[root@studi03-labor42 ~]# systemctl status mariadb
```

It check it the Mariadb service running on your system, it tell whether its active inactive or disabled

```
[root@studi03-labor42 ~]# systemctl start mariadb
```

It start the Mariadb service

```
[root@studi03-labor42 ~]# systemctl enable mariadb
```

It configures MySQL to start automatically every time the server boots up.

```
[root@studi03-labor42 ~]# systemctl status mariadb
```

It checks if the MariaDB service is running on your system, it tells whether it's active/inactive or disabled.

```
Completing!
[root@studios3-labor02 ~]# systemctl status mariadb
● mariadb.service - MariaDB 10.5 database server
   Loaded: loaded (/usr/lib/systemd/system/mariadb.service; disabled; preset: disabled)
     Active: inactive (dead)
   Docs: man:mariadb(8)
         https://mariadb.com/en/library/systemd/
[root@studios3-labor02 ~]# systemctl start mariadb
[root@studios3-labor02 ~]# systemctl enable mariadb
Created symlink /etc/systemd/system/mysqld.service → /usr/lib/systemd/system/mariadb.service.
Created symlink /etc/systemd/system/mariadb.service → /usr/lib/systemd/system/mariadb.service.
Created symlink /etc/systemd/system/multi-user.target.wants/mariadb.service → /usr/lib/systemd/system/mariadb.service
[root@studios3-labor02 ~]# systemctl status mariadb
● mariadb =-> MariaDB 10.5 database server
   Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled; preset: disabled)
     Active: active (running) since Fri 2025-07-18 17:18:37 CEST; 24s ago
   Docs: man:mariadb(8)
         https://mariadb.com/en/library/systemd/
Main PID: 37713 (mariadbd)
Tasks: 13 (limit: 4668)
Memory: 68.2M
CPU: 466ms
CGroup: /system.slice/mariadb.service
           └─37713 /usr/libexec/mariadbd --basedir=/usr

Jul 18 17:18:17 studios3-labor02.f2.hwt-berlin.de mariadb-prepare-db-dir[37678]: The second is mysql@localhost, it has
Jul 18 17:18:17 studios3-labor02.f2.hwt-berlin.de mariadb-prepare-db-dir[37678]: you need to be the system 'mysql' user
Jul 18 17:18:17 studios3-labor02.f2.hwt-berlin.de mariadb-prepare-db-dir[37678]: After connecting you can set the password
Jul 18 17:18:17 studios3-labor02.f2.hwt-berlin.de mariadb-prepare-db-dir[37678]: via ALTER USER 'mysql' IDENTIFIED BY 'password';
Jul 18 17:18:17 studios3-labor02.f2.hwt-berlin.de mariadb-prepare-db-dir[37678]: See the MariaDB Knowledgebase at https://
Jul 18 17:18:17 studios3-labor02.f2.hwt-berlin.de mariadb-prepare-db-dir[37678]: Please report any problems at https://
Jul 18 17:18:17 studios3-labor02.f2.hwt-berlin.de mariadb-prepare-db-dir[37678]: The latest information about MariaDB
Jul 18 17:18:17 studios3-labor02.f2.hwt-berlin.de mariadb-prepare-db-dir[37678]: can be found at https://mariadb.org/
Jul 18 17:18:17 studios3-labor02.f2.hwt-berlin.de mariadb-prepare-db-dir[37678]: Consider joining MariaDB's strong
Jul 18 17:18:17 studios3-labor02.f2.hwt-berlin.de mariadb-prepare-db-dir[37678]: community at https://mariadb.org/get-involved/
[root@studios3-labor02 ~]#
```

**[root@studi03-labor42 ~]# mysql\_secure\_installation**

This script helps to secure our mariadb installation

```
root@studi03-labor42:~# mysql_secure_installation
NOTE: RUNNING ALL PARTS OF THIS SCRIPT IS RECOMMENDED FOR ALL MariaDB
      SERVERS IN PRODUCTION USE! PLEASE READ EACH STEP CAREFULLY!
In order to log into MariaDB to secure it, we'll need the current
password for the root user. If you've just installed MariaDB, and
haven't set the root password yet, you should just press enter here.

Enter current password for root (enter for none):
OK, successfully used password, moving on...
Setting the root password or using the unix_socket ensures that nobody
can log into the MariaDB root user without the proper authorisation.

You already have your root account protected, so you can safely answer 'n'.
Switch to unix_socket authentication [Y/n] n
... skipping.

You already have your root account protected, so you can safely answer 'n'.
Change the root password? [Y/n] n
... skipping.

By default, a MariaDB installation has an anonymous user, allowing anyone
to log into MariaDB without having to have a user account created for
them. This is intended only for testing, and to make the installation
go a bit smoother. You should remove them before moving into a
production environment.

Remove anonymous users? [Y/n] y
... Success!

Normally, root should only be allowed to connect from 'localhost'. This
ensures that someone cannot guess at the root password from the network.

Disallow root login remotely? [Y/n] y
... Success!

By default, MariaDB comes with a database named 'test' that anyone can
access. This is also intended only for testing, and should be removed
before moving into a production environment.
```

```
before moving into a production environment.

Remove test database and access to it? [Y/n] y
- Dropping test database...
... Success!
- Removing privileges on test database...
... Success!

Reloading the privilege tables will ensure that all changes made so far
will take effect immediately.

Reload privilege tables now? [Y/n] y
... Success!

Cleaning up...

All done! If you've completed all of the above steps, your MariaDB
installation should now be secure.

Thanks for using MariaDB!
[root@studi03-labor42 ~]#
```

**[root@studi03-labor42 ~]# mysql -u root -p**

It allow to login mariadb server and execute the sql commands

```
Thanks for using MariaDB!
[root@studi03-labor42 ~]# mysql -u root -p
Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 9
Server version: 10.5.27-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)]> CREATE DATABASE Projectx CHARACTER SET utf8mb4 COLLATE utf8mb4_general_ci;
Query OK, 1 row affected (0.000 sec)

MariaDB [(none)]> CREATE USER 'Projectx'@'localhost' IDENTIFIED BY 'Projectx@localhost';
Query OK, 0 rows affected (0.039 sec)

MariaDB [(none)]> GRANT ALL PRIVILEGES ON wordpress_db.* TO 'Projectx'@'localhost';
Query OK, 0 rows affected (0.037 sec)

MariaDB [(none)]> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.001 sec)

MariaDB [(none)]> EXIT;
Bye
[root@studi03-labor42 ~]#
```

## ▪ Install PHP

```
[root@studi03-labor42 ~]# dnf install php php-mysqlnd php-fpm php-json php-gd
php-mbstring php-xml php-dom php-zip php-pdo php-opcache php-cli
```

It installed php software packages

```
root@studi03-labor42:~ [1/19]# dnf install php php-mysqlnd php-fpm php-json php-gd
php-mbstring php-xml php-dom php-zip php-pdo php-opcache php-cli
Last metadata expiration check: 1:06:14 ago on Fri 18 Jul 2025 04:35:04 PM CEST.
Dependencies resolved.
=====
Package           Architecture   Version      Repository    Size
=====
Installing:
  php             x86_64        8.0.30-3.el9_6      appstream   8.2 k
  php-cli         x86_64        8.0.30-3.el9_6      appstream   3.1 M
  php-common      x86_64        8.0.30-3.el9_6      appstream   666 k
  php-fpm          x86_64        8.0.30-3.el9_6      appstream   1.6 M
  php-gd           x86_64        8.0.30-3.el9_6      appstream   39 k
  php-mbstring     x86_64        8.0.30-3.el9_6      appstream   466 k
  php-mysqlnd      x86_64        8.0.30-3.el9_6      appstream   158 k
  php-opcache      x86_64        8.0.30-3.el9_6      appstream   510 k
  php-xml          x86_64        8.0.30-3.el9_6      appstream   81 k
  php-dom          x86_64        1.19.2-6.el9_0.1    appstream   52 k
  php-zip          x86_64        1.19.2-6.el9_0.1    appstream   132 k
  php-pdo          x86_64        8.0.30-3.el9_6      appstream
  php-opcache     noarch       2:1.20.1-22.el9_6.3 noarch      9.6 k
  libxml2          x86_64        2.3.2-3.el9        appstream
  jbigkit-libs     x86_64        2.1-23.el9        appstream
  libXpm          x86_64        3.5.13-18.el9     appstream
  libtiff          x86_64        4.0.10-1.el9      appstream
  libjpeg          x86_64        1.2.0-8.el9       appstream
  libxslt          x86_64        1.1.34-13.el9_6   appstream
  libzip           x86_64        1.7.3-8.el9       appstream
  nginx-filesystem noarch       2:1.20.1-22.el9_6.3 noarch
Transaction Summary
=====
Install 19 Packages

Total download size: 7.3 M
Installed size: 39 M
Is this ok [Y/N]: y
Downloading Packages:
(1/19): libxml2-2.3.2-3.el9.x86_64.rpm           257 kB/s | 55 kB   00:00
(2/19): php-opcache-8.0.30-3.el9_6.x86_64.rpm     1.6 MB/s | 510 kB   00:00
(3/19): libtiff-4.0.10-1.el9.x86_64.rpm           337 kB/s | 134 kB   00:00
(4/19): libjpeg-1.2.0-8.el9.x86_64.rpm            7956 kB/s | 1.37 kB   00:00
(5/19): libxslt-1.1.34-13.el9_6.x86_64.rpm        2.1 MB/s | 276 kB   00:00
(6/19): jbigkit-libs-2.1-23.el9.x86_64.rpm        481 kB/s | 52 kB   00:00
(7/19): libzip-1.7.3-8.el9.x86_64.rpm             1.0 MB/s | 61 kB   00:00
(8/19): php-fpm-8.0.30-3.el9_6.x86_64.rpm        4.1 MB/s | 1.6 MB   00:00
(9/19): nginx-filesystem-2:1.20.1-22.el9_6.3.noarch.rpm 82 kB/s | 9.6 kB   00:00
```

```
(10/19): php-common-8.0.30-3.el9_6.x86_64.rpm           6.1 MB/s | 666 kB   00:00
(11/19): gd-2.3.2-3.el9.x86_64.rpm                     1.2 MB/s | 131 kB   00:00
(12/19): php-pdo-8.0.30-3.el9_6.x86_64.rpm            79.2 kB/s | 8.2 kB   00:00
(13/19): php-mysqlnd-8.0.30-3.el9_6.x86_64.rpm        7778 kB/s | 1.51 kB   00:00
(14/19): php-mpcl-zip-1.19.2-6.el9.8.1.x86_64.rpm     549 kB/s | 52 kB   00:00
(15/19): php-mbstring-8.0.30-3.el9_6.x86_64.rpm       4.3 MB/s | 466 kB   00:00
(16/19): php-gd-8.0.30-3.el9_6.x86_64.rpm            384 kB/s | 39 kB   00:00
(17/19): php-mysqlind-8.0.30-3.el9_6.x86_64.rpm       1.5 MB/s | 150 kB   00:00
(18/19): libxslt-1.1.34-13.el9_6.x86_64.rpm          2.0 MB/s | 239 kB   00:00
(19/19): php-cli-8.0.30-3.el9_6.x86_64.rpm           3.8 MB/s | 3.1 MB   00:00

Total
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing : php-common-8.0.30-3.el9_6.x86_64
  Installing : php-pdo-8.0.30-3.el9_6.x86_64
  Installing : libmbmp-1.2.0-8.el9.x86_64
  Installing : php-opcache-8.0.30-3.el9_6.x86_64
  Installing : php-cgi-8.0.30-3.el9_6.x86_64
  Installing : php-mbstring-8.0.30-3.el9_6.x86_64
  Installing : libxslt-1.1.34-13.el9_6.x86_64
  Installing : php-xml-8.0.30-3.el9_6.x86_64
  Running scriptlet: nginx-filesystem-2:1.20.1-22.el9_6.3.noarch
  Installing : libzip-1.1.34-13.el9_6.x86_64
  Installing : php-fpm-8.0.30-3.el9_6.x86_64
  Running scriptlet: php-fpm-8.0.30-3.el9_6.x86_64
  Installing : libzip-1.7.3-8.el9.x86_64
  Installing : jbigkit-libs-2.1-23.el9.x86_64
  Installing : libtiff-4.0.10-1.el9.x86_64
  Installing : libxml2-2.3.2-3.el9.x86_64
  Installing : php-xml-8.0.30-3.el9_6.x86_64
  Installing : php-mysqlind-8.0.30-3.el9_6.x86_64
  Running scriptlet: php-mysqlind-8.0.30-3.el9_6.x86_64
  Verifying   : php-opcache-8.0.30-3.el9_6.x86_64
  Verifying   : libxml2-3.5.13-10.el9.x86_64
  Verifying   : php-xml-8.0.30-3.el9_6.x86_64
  Verifying   : libtiff-4.0.10-1.el9.x86_64
  Verifying   : php-fpm-8.0.30-3.el9_6.x86_64
```

```
[root@studi03-labor42 ~]# nano /etc/httpd/conf.d/php-fpm.conf
```

It creates a configuration file to tell Apache how to handle PHP requests using the PHP-FPM service.

```
root@studi03-lab042:~# nano /etc/httpd/conf.d/php-fpm.conf
GNU nano 5.6.2
<FilesMatch \.php$>
    SetHandler "proxy:unix:/run/php/www.sock|fcgi://localhost/"
</filesMatch>
```

```
[root@studi03-labor42 ~]# systemctl status php-fpm
```

It check if the php-fpm service running on your system, it tell whether its active/inactive or disabled

```
[root@studi03-labor42 ~]# systemctl start php-fpm
```

It start the php-fpm service

```
[root@studi03-labor42 ~]# systemctl enable php-fpm
```

It configures php-fpm to start automatically every time the server boots up.

```
[root@studi03-labor42 ~]# systemctl status php-fpm
```

**[root@studios lab0142]# systemctl status php-fpm**

```
[root@studi03-labor42 ~]# nano /etc/httpd/conf.d/php-fpm.conf
[root@studi03-labor42 ~]# systemctl status php-fpm
● php-fpm.service - The PHP FastCGI Process Manager
   Loaded: loaded (/usr/lib/systemd/system/php-fpm.service; disabled; preset: disabled)
     Active: inactive (dead)
[root@studi03-labor42 ~]# systemctl start php-fpm
[root@studi03-labor42 ~]# systemctl enable php-fpm
Created symlink /etc/systemd/system/multi-user.target.wants/php-fpm.service → /usr/lib/systemd/system/php-fpm.service.
[root@studi03-labor42 ~]# systemctl status php-fpm
● php-fpm.service - The PHP FastCGI Process Manager
   Loaded: loaded (/usr/lib/systemd/system/php-fpm.service; enabled; preset: disabled)
     Active: active (running) since Fri 2025-07-18 19:03:08 CEST; 1min 9s ago
       Main PID: 38507 (php-fpm)
          Status: "Processes active: 0, idle: 5, Requests: 0, slow: 0, Traffic: 0req/sec"
             Tasks: 6 (limit: 4668)
            Memory: 17.6M
           CPU: 17.6M
          CGroup: /system.slice/php-fpm.service
                  ├─38507 php-fpm: master process (/etc/php-fpm.conf)
                  ├─38508 "php-fpm: pool www"
                  ├─38549 "php-fpm: pool www"
                  ├─38550 "php-fpm: pool www"
                  ├─38551 "php-fpm: pool www"
                  └─38552 "php-fpm: pool www"

Jul 18 19:03:08 studi03-labor42.f2.htw-berlin.de systemd[1]: Starting The PHP FastCGI Process Manager...
Jul 18 19:03:08 studi03-labor42.f2.htw-berlin.de systemd[1]: Started The PHP FastCGI Process Manager.
[root@studi03-labor42 ~]# cat /etc/httpd/conf.d/php-fpm.conf
<FilesMatch \.php$>
    SetHandler "proxy:unix:/run/php-fpm/www.sock|fcgi://localhost/"
</FilesMatch>
[root@studi03-labor42 ~]# |
```

**[root@studi03-labor42 ~]# systemctl restart httpd**

Restarting httpd service it simply applies new Apache configuration.

- **Install and Configure WordPress**

**[root@studi03-labor42 ~]# cd /var/www/html/**

Change the current directory to Apache's default web root

**[root@studi03-labor42 html]# wget <https://wordpress.org/latest.tar.gz>**

Download the latest Wordpress archive from the official website

**[root@studi03-labor42 html]# ls -l**

List

**[root@studi03-labor42 html]# tar -xzf latest.tar.gz**

Extract the downloaded tar.gz it will create Wordpress directory

**[root@studi03-labor42 html]# ls -l**

List

**[root@studi03-labor42 html]# mv wordpress/\* .**

Move all the content from the Wordpress directory directly in to /var/www/html/

```

[root@studi03-labor42:var/www/html]# wget https://wordpress.org/latest.tar.gz
--2025-07-18 19:10:55-- https://wordpress.org/latest.tar.gz
Resolving wordpress.org (wordpress.org)... 198.143.164.252
Connecting to wordpress.org (wordpress.org)|198.143.164.252|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 26925441 (26M) [application/octet-stream]
Saving to: 'latest.tar.gz'

latest.tar.gz          100%[=====] 25.68M 16.3MB/s   in 1.6s

2025-07-18 19:10:57 (16.3 MB/s) - `latest.tar.gz' saved [26925441/26925441]

[root@studi03-labor42:var/www/html]# ls -l
total 26296
-rw-r--r-- 1 root root 26925441 Jul 15 17:17 latest.tar.gz
[root@studi03-labor42:var/www/html]# tar -xvf latest.tar.gz
[root@studi03-labor42:var/www/html]# ls -l
total 26300
-rw-r--r-- 1 root root 26925441 Jul 15 17:17 latest.tar.gz
drwxr-xr-x  2 root root    4096 Jul 15 17:17 wordpress
[root@studi03-labor42:var/www/html]# mv wordpress/* .
[root@studi03-labor42:var/www/html]# ls -l
total 26536
-rw-r--r-- 1 root root    405 Feb  6 2020 index.php
-rw-r--r-- 1 root root 19983 Mar  6 15:24 license.txt
-rw-r--r-- 1 root root 7423 Mar  6 15:45 readme.html
drwxr-xr-x  2 root root    4096 Jul 15 17:17 wordpress
-rw-r--r-- 1 root root 7387 Feb 13 2024 wp-activate.php
drwxr-xr-x  9 root root 4096 Jul 15 17:09 wp-admin
-rw-r--r-- 1 root root 351 Feb  6 2020 wp-blog-header.php
-rw-r--r-- 1 root root 2323 Jun 14 2023 wp-comments-post.php
-rw-r--r-- 1 root root 3336 Oct 15 2024 wp-config-sample.php
drwxr-xr-x  4 root root 4096 Jul 14 11:24 wp-content
-rw-r--r-- 1 root root 5617 Aug  2 2024 wp-cron.php
drwxr-xr-x 30 root root 16384 Jul 15 17:09 wp-includes
-rw-r--r-- 1 root root 3937 Mar 11 2024 wp-load.php
-rw-r--r-- 1 root root 51414 Feb  3 17:55 wp-login.php
-rw-r--r-- 1 root root 8727 Feb  8 17:00 wp-mail.php
-rw-r--r-- 1 root root 30881 Mar  4 14:06 wp-settings.php
-rw-r--r-- 1 root root 34516 Mar 10 19:16 wp-signup.php
-rw-r--r-- 1 root root 5182 Oct 18 2024 wp-trackback.php
-rw-r--r-- 1 root root 3285 Nov  8 2024 xmlrpc.php
[root@studi03-labor42:var/www/html]#

```

**[root@studi03-labor42 html]# chown -R apache:apache /var/www/html/**

It changes the owner and group of all files and directories in /var/www/html/ to apache.

**[root@studi03-labor42 html]# find /var/www/html/ -type d -exec chmod 755 {} +**

It set the permission to directories to 755 (owner - read/write/execute) and (group/others - read/execute)

**[root@studi03-labor42 html]# find /var/www/html/ -type f -exec chmod 644 {} +**

It set permission to files to 644 (owner - read/write) and( group/others - read-only)

**[root@studi03-labor42 html]# ls -l**

```

[root@studi03-labor42:var/www/html]# chown -R apache:apache /var/www/html/
[root@studi03-labor42:var/www/html]# ls -l
total 26536
-rw-r--r-- 1 apache apache    405 Feb  6 2020 index.php
-rw-r--r-- 1 apache apache 26925441 Jul 15 17:17 latest.tar.gz
-rw-r--r-- 1 apache apache 19983 Mar  6 15:24 license.txt
-rw-r--r-- 1 apache apache 7423 Mar  6 15:45 readme.html
drwxr-xr-x  2 apache apache    4096 Jul 15 17:17 wordpress
-rw-r--r-- 1 apache apache 7387 Feb 13 2024 wp-activate.php
drwxr-xr-x  9 apache apache 4096 Jul 15 17:09 wp-admin
-rw-r--r-- 1 apache apache 351 Feb  6 2020 wp-blog-header.php
-rw-r--r-- 1 apache apache 2323 Jun 14 2023 wp-comments-post.php
-rw-r--r-- 1 apache apache 3336 Oct 15 2024 wp-config-sample.php
drwxr-xr-x  4 apache apache 4096 Jul 14 11:24 wp-content
-rw-r--r-- 1 apache apache 5617 Aug  2 2024 wp-cron.php
drwxr-xr-x 30 apache apache 16384 Jul 15 17:09 wp-includes
-rw-r--r-- 1 apache apache 2937 Mar 11 2024 wp-load.php
-rw-r--r-- 1 apache apache 3937 Mar 11 2024 wp-mail.php
-rw-r--r-- 1 apache apache 51414 Feb  3 17:55 wp-login.php
-rw-r--r-- 1 apache apache 8727 Feb  8 17:00 wp-mail.php
-rw-r--r-- 1 apache apache 30881 Mar  4 14:06 wp-settings.php
-rw-r--r-- 1 apache apache 34516 Mar 10 19:16 wp-signup.php
-rw-r--r-- 1 apache apache 5182 Oct 18 2024 wp-trackback.php
-rw-r--r-- 1 apache apache 3285 Nov  8 2024 xmlrpc.php
[root@studi03-labor42:var/www/html]#

```

#### ▪ Configure WordPress to Connect to Database

```
[root@studi03-labor42 html]# cp wp-config-sample.php wp-config.php
```

It creates the copy of the configuration file

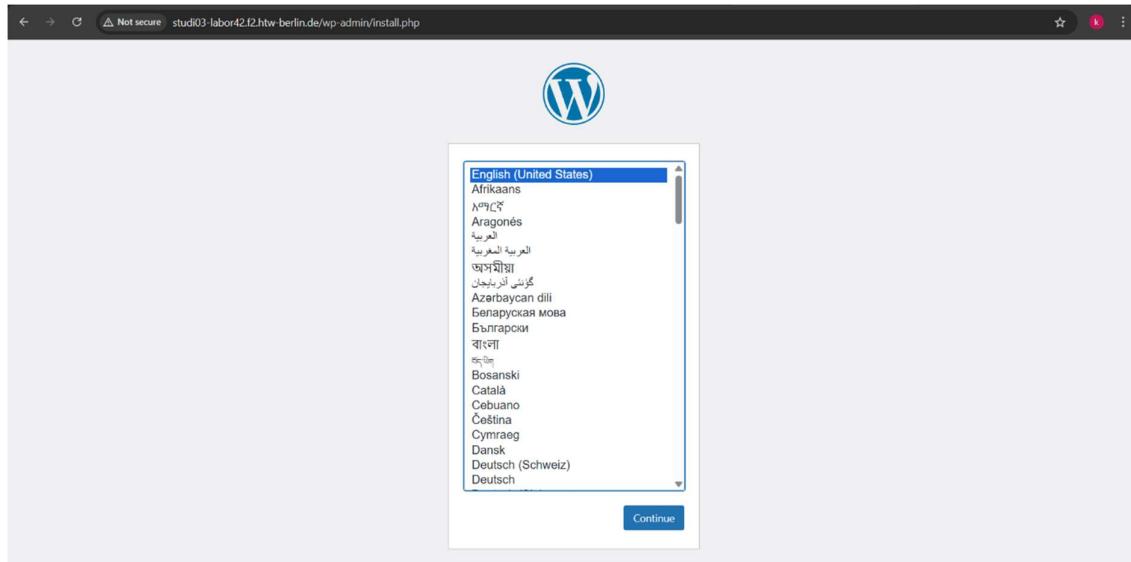
```
[root@studi03-labor42 html]# ls -l wp-config.php
```

```
[root@studi03-labor42 html]# nano wp-config.php
```

It opens the file in nano text editor

Here we update the database details and we added unique authentication key and salts to enhance security.

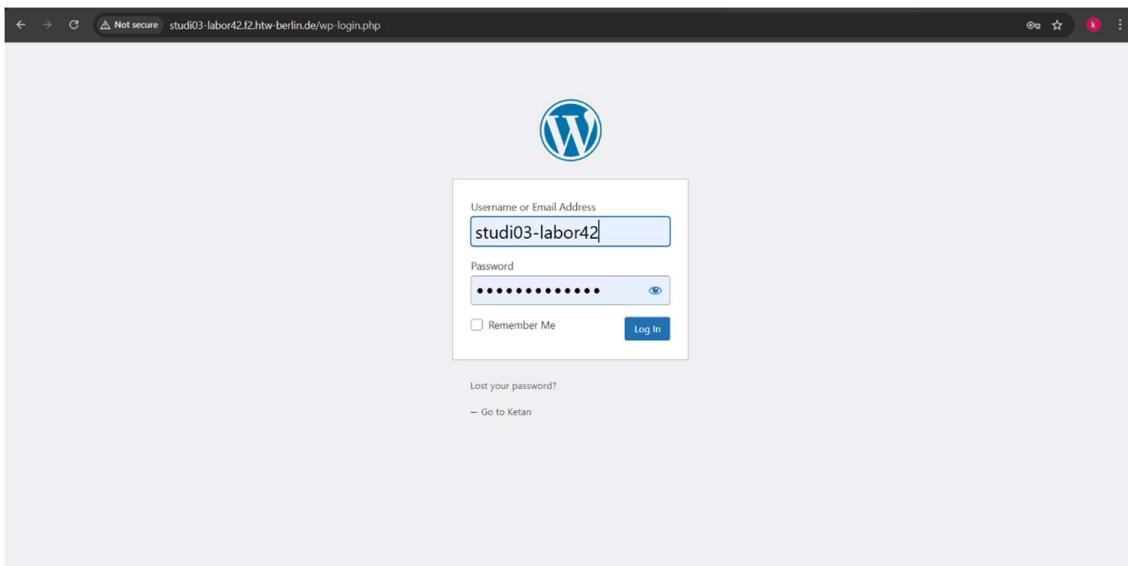
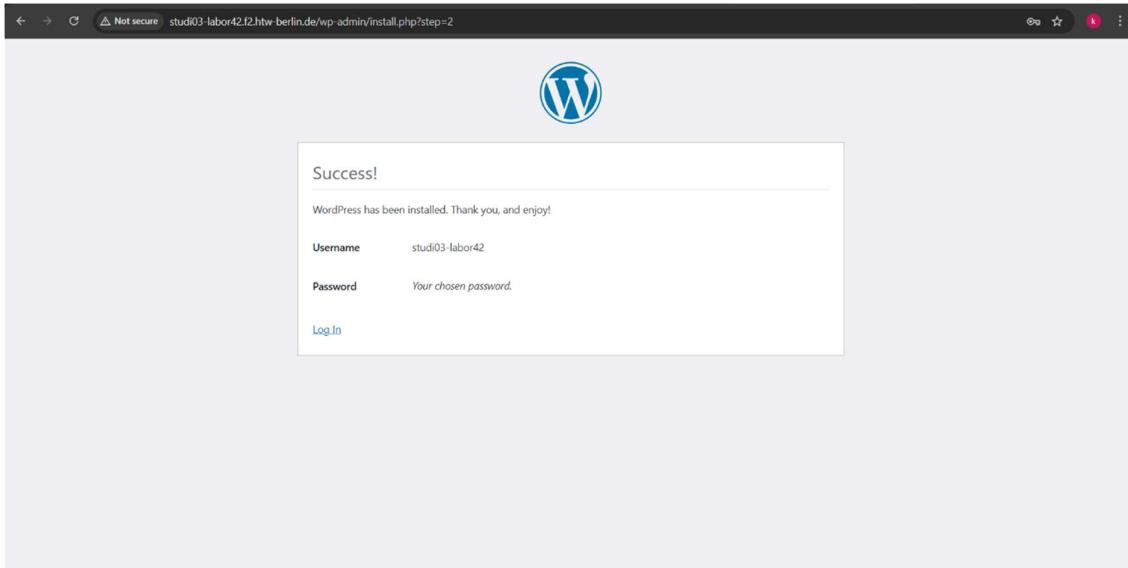
- **Finalize WordPress Setup via Web Browser and Configure HTTPS**

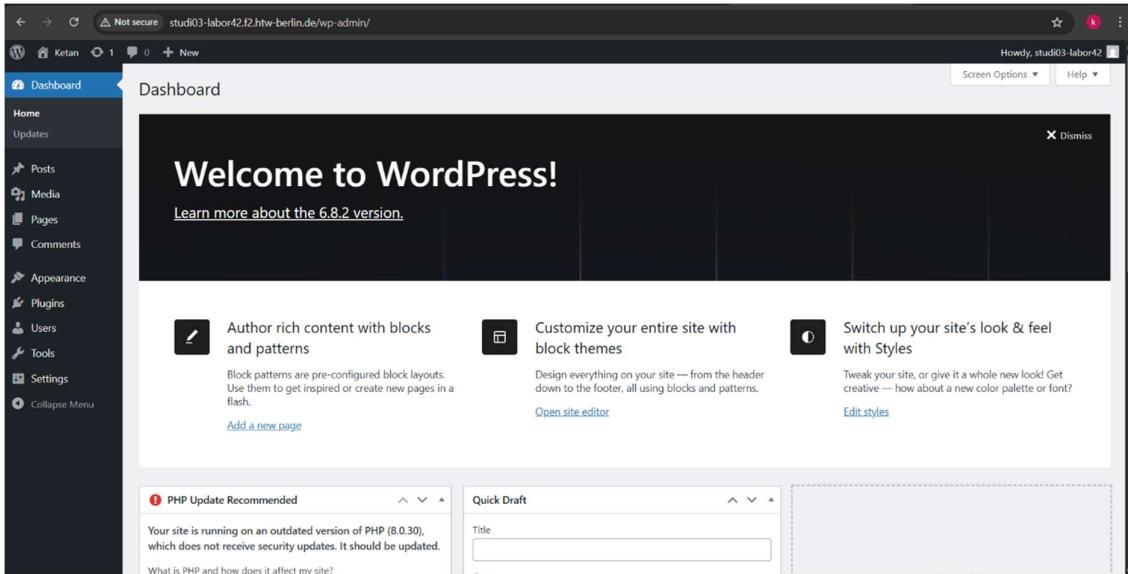


A screenshot of the WordPress welcome screen. The URL is `studi03-labor42.f2.htw-berlin.de/wp-admin/install.php?step=1`. The page title is "Welcome". It says: "Welcome to the famous five-minute WordPress installation process! Just fill in the information below and you'll be on your way to using the most extendable and powerful personal publishing platform in the world." Below this is a section titled "Information needed" with instructions: "Please provide the following information. Do not worry, you can always change these settings later." The form fields are:

- Site Title: Ketan
- Username: studi03-labor42
- Password: (redacted) Strong
- Your Email: Ketan.Dhamane@Student.HTW-Berlin.de
- Search engine visibility:  Discourage search engines from indexing this site It is up to search engines to honor this request.

At the bottom is a blue "Install WordPress" button.





## ▪ Configure HTTPS (SSL/TLS) for WordPress

**[root@studi03-labor42 ~]# dnf install mod\_ssl openssl**

It install necessary software packages to enable SSL-TLS functionality with Apache

```
[root@studi03-labor42 ~]# dnf install mod_ssl openssl
Last metadata expiration check: 2:45:13 ago on Fri 18 Jul 2025 07:49:20 PM CEST.
Package openssl-1:3.2.2-6.el9_5.1.x86_64 is already installed.
Dependencies resolved.
=====
== Package           Architecture   Version          Repository      Size ==
=====
Installing:        mod_ssl       x86_64          1:2.4.62-4.el9    appstream     109 k
Transaction Summary
=====
Install 1 Package

Total download size: 109 K
Installed size: 272 K
Is this ok [y/N]: y
Downloading Packages:
mod_ssl-2.4.62-4.el9.x86_64.rpm                                         352 kB/s | 109 kB   00:00
Total                                         219 kB/s | 109 kB   00:00
Preparing :
  Installing : mod_ssl-1:2.4.62-4.el9.x86_64
  Running scriptlet: mod_ssl-1:2.4.62-4.el9.x86_64
  Verifying   : mod_ssl-1:2.4.62-4.el9.x86_64
Installed:
  mod_ssl-1:2.4.62-4.el9.x86_64
Complete!
[root@studi03-labor42 ~]#
```

**[root@studi03-labor42 ~]# mkdir -p /etc/httpd/ssl/**

It create a dedicated directory to store our SSL/TLS certificate.

**[root@studi03-labor42 ~]# openssl req -x509 -nodes -days 365 -newkey rsa:2048 -keyout /etc/httpd/ssl/apache-selfsigned.key -out /etc/httpd/ssl/apache-selfsigned.crt**

It generate a self-signed SSL-TLS certificate and corresponding private keys

```

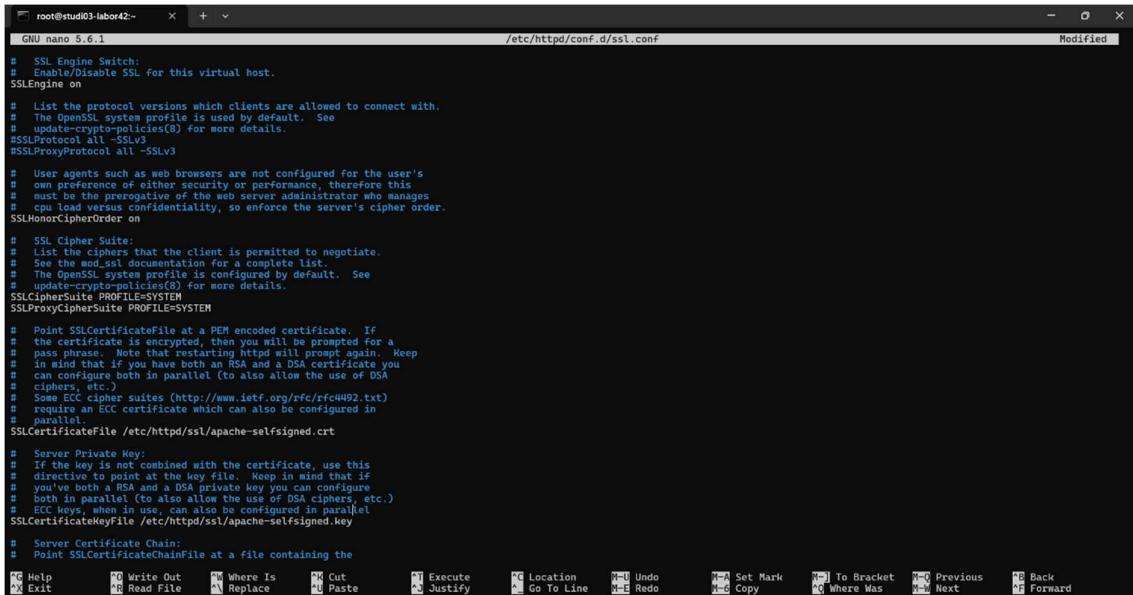
Complete!
[root@studi03-labor42 ~]# mkdir -p /etc/httpd/ssl/
[root@studi03-labor42 ~]# openssl req -x509 -nodes -days 365 -newkey rsa:2048 -keyout /etc/httpd/ssl/apache-selfsigned.key -out /etc/httpd/ssl/apache-selfsigned.crt
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields, but you can leave some blank
For some fields there will be a default value.
If you enter '.', the field will be left blank.
Country Name (2 letter code) [XX]:DE
State or Province Name (e.g. "New York") []:Berlin
Locality Name (e.g. city) [Default City]:Berlin
Organization Name (e.g. company) [Default Company Ltd]:HTW
Organizational Unit Name (e.g. section) []:IT
Common Name (e.g. your name or your server's hostname) []:studi03-labor42
Email Address []
[root@studi03-labor42 ~]|

```

## ▪ Configure Apache to Use the Self-Signed Certificate

**[root@studi03-labor42 ~]# nano /etc/httpd/conf.d/ssl.conf**

It opens the primary apache ssl configuration file to ensure



```

root@studi03-labor42~ x + v /etc/httpd/conf.d/ssl.conf Modified
GNU nano 5.6.1

# SSL Engine Switch:
#   Enable/disable SSL for this virtual host.
SSLEngine on

# List the protocol versions which clients are allowed to connect with.
# The OpenSSL system profile is used by default.
# update-crypto-policies(8) for more details.
#SSLProtocol all -SSLv3
#SSLProxyProtocol all -SSLv3

# User agents such as web browsers are not configured for the user's
# security needs. Security needs must be determined by the administrator
# must be the prerogative of the web server administrator who manages
# cpu load versus confidentiality, so enforce the server's cipher order.
SSLHonorCipherOrder on

# SSL Cipher Suite:
# List the ciphers that the client is permitted to negotiate.
# See the mod_ssl documentation for a complete list.
# The OpenSSL system profile is configured by default. See
# update-crypto-policies(8) for more details.
#SSLCipherSuite PROFILE=SYSTEM
#SSLProxyCipherSuite PROFILE=SYSTEM

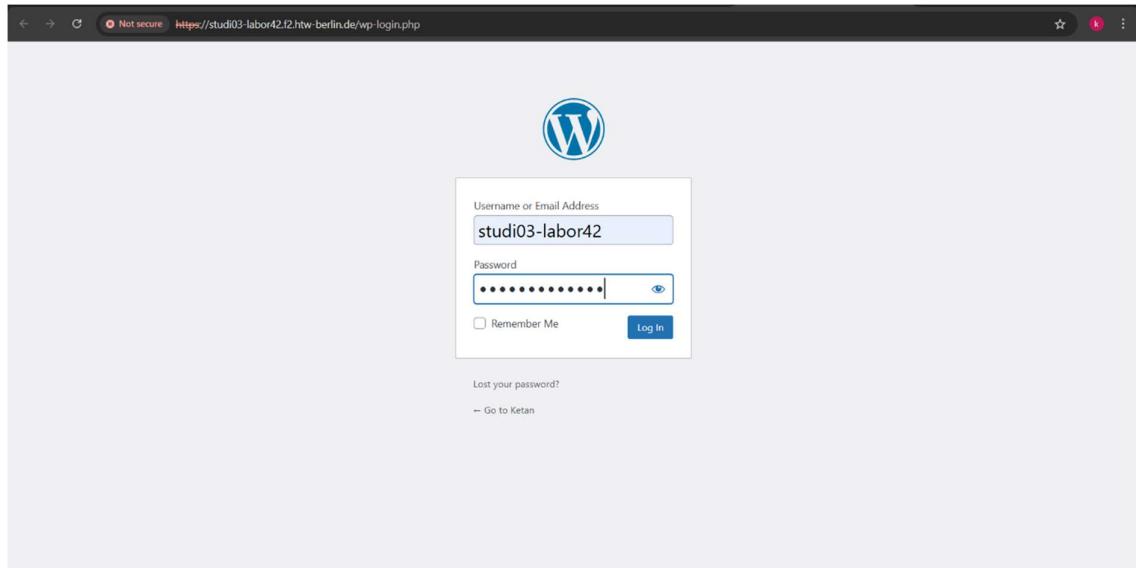
# Point SSLCertificateFile at a PEM encoded certificate. If
# the certificate is encrypted, then it will be prompted for a
# password. Note that if the key file is also encrypted, you will
# keep in mind that if you have both an RSA and a DSA certificate you
# can configure both in parallel (to also allow the use of DSA
# ciphers, etc.)
# Some ECC cipher suites (http://www.ietf.org/rfc/rfc6993.txt)
# require an ECC certificate which can also be configured in
# parallel.
SSLCertificateFile /etc/httpd/ssl/apache-selfsigned.crt

# Server Private Key:
# Point SSLCertificateKeyFile at a file containing the

```

**[root@studi03-labor42 ~]# systemctl restart httpd**

Now we can access our WordPress page via **<https://studi03-labor42.f2.htw-berlin.de/>**



- Secure CMS Pages with Trusted TLS

**[root@studi03-labor42 ~]# dnf install epel-release**

It install the epel-release package

```
[root@studi03-labor42 ~]# cat /etc/os-release | grep VERSION_ID
VERSION_ID="9.5"
[root@studi03-labor42 ~]# dnf install epel-release
Last metadata expiration check: 0:54:27 ago on Sat 19 Jul 2025 08:30:54 AM CEST.
Dependencies resolved.
=====
Transaction Summary
=====
Installing:
epel-release.noarch 9-7.el9
=====
Transaction Summary
Install 1 Package
Total download size: 19 k
Installed size: 26 k
Is this ok [y/N]: y
Downloading Packages:
epel-release-9-7.el9.noarch.rpm
=====
Total
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
Preparing : 1/1
  Installing : epel-release-9-7.el9.noarch 1/1
  Running scriptlets: epel-release-9-7.el9.noarch 1/1
Many EPEL packages require the CodeReady Builder (CRB) repository.
It is recommended that you run /usr/bin/crb enable to enable the CRB repository.
Verifying : 1/1
=====
Installed:
epel-release-9-7.el9.noarch
=====
Complete!
[root@studi03-labor42 ~]#
```

**[root@studi03-labor42 ~]# dnf repolist**

It will list the active repository

**[root@studi03-labor42 ~]# dnf makecache**

It downloading and updating the metadata from various repositories

```
[root@studi03-labor42 ~]# dnf repolist
repo id          repo name
appstream         Rocky Linux 9 - AppStream
baseos           Rocky Linux 9 - BaseOS
epel             Extra Packages for Enterprise Linux 9 - x86_64
epel-cisco-openh264 Extra Packages for Enterprise Linux 9 openh264 (From Cisco) - x86_64
extras           Rocky Linux 9 - Extras
=====
[root@studi03-labor42 ~]# dnf makecache
Extra Packages for Enterprise Linux 9 - x86_64
Metadata cache created.
[root@studi03-labor42 ~]# dnf makecache
Extra Packages for Enterprise Linux 9 - x86_64
Extra Packages for Enterprise Linux 9 openh264 (From Cisco) - x86_64
Rocky Linux 9 - BaseOS
Rocky Linux 9 - AppStream
Rocky Linux 9 - Extras
Metadata cache created.
8.7 MB/s | 20 MB  00:02
73 kB/s | 41 kB  00:00
975 B/s | 2.5 kB  00:02
21 kB/s | 4 kB   00:00
10 kB/s | 4.5 kB  00:00
12 kB/s | 2.9 kB  00:00
```

\

## ▪ Install Certbot and Apache Plugin

**[root@studi03-labor42 ~]# dnf install certbot python3-certbot-apache**

It install certbot package

```
root@studi03-labor42:~ - + ×
Rocky Linux 9 - Extras
Metadata cache created.
[root@studi03-labor42 ~]# dnf install certbot python3-certbot-apache
Last metadata expiration check: 0:01:09 ago on Sat 19 Jul 2025 09:28:36 AM CEST.
Dependencies resolved.
=====
Transaction Summary
Install 21 Packages
Total download size: 3.8 M
Installed size: 3.8 M
Is this ok [Y/N]: y
Downloading Packages:
(1/21): python-josepy-doc-1.14.0-1.el9.noarch.rpm          49 kB/s | 14 kB   00:00
(2/21): certbot-3.1.0-1.el9.noarch.rpm                     143 kB/s | 49 kB   00:00
(3/21): python3-pyOpenSSL-21.0.0-1.el9.noarch.rpm          130 kB/s | 27 kB   00:00
(4/21): python3-certbot-0.1.0-1.el9.noarch.rpm            1.2 MB/s | 683 kB  00:00
(5/21): python3-augeas-0.5.0-25.el9.noarch.rpm             209 kB/s | 27 kB   00:00
(6/21): python3-configargparse-1.7.1-1.el9.noarch.rpm      379 kB/s | 44 kB   00:00
(7/21): python3-josepy-1.14.0-1.el9.noarch.rpm            538 kB/s | 43 kB   00:00
(8/21): python3-parsedatetime-2.6-5.el9.noarch.rpm        877 kB/s | 59 kB   00:00
(9/21): python3-pyOpenSSL-21.0.0-1.el9.noarch.rpm          886 kB/s | 79 kB   00:00
(10/21): python3-pycparser-2.20-6.el9.noarch.rpm           886 kB/s | 90 kB   00:00
=====
Installing:
certbot                                         noarch    3.1.0-1.el9          epel                  49 kB
python3-certbot-apache                         noarch    3.1.0-1.el9          epel                  284 kB
Installing dependencies:
augeas-libs                                       x86_64   1.14.1-2.el9         appstream            373 kB
fontawesome-fonts                             noarch   1.4.7-0+13.el9       appstream            284 kB
python3-acme                                    noarch   0.5.0-25.el9         epel                  159 kB
python3-augeas                                 noarch   0.5.0-25.el9         appstream            27 kB
python3-certbot                               noarch   3.1.0-1.el9         epel                  683 kB
python3-cfctl                                   x86_64   1.14.5-5.el9         baseos                241 kB
python3-configargparse                         noarch   1.7.1-1.el9         epel                  44 kB
python3-configobj                            noarch   5.0.1-1.el9          appstream            65 kB
python3-cryptorandom                          x86_64   36.0.1-4.el9         baseos                1.2 MB
python3-importlib-metadata                     noarch   4.12.0-2.el9         epel                  43 kB
python3-josepy                                noarch   1.14.0-1.el9         epel                  59 kB
python3-parsedatetime                         noarch   2.6-5.el9           epel                  133 kB
python3-ply                                    noarch   2.10.0-1.el9         baseos                98 kB
python3-pyOpenSSL                            noarch   21.0.0-1.el9         epel                  124 kB
python3-pycparser                           noarch   2.28-6.el9           baseos                18 kB
python3-pyrfc3399                            noarch   1.1-11.el9          epel                  47 kB
python3-pytz                                noarch   2021.1-5.el9         appstream            26 kB
python3-pyparser                           noarch   3.28.1-2.el9         epel
=====
Installing weak dependencies:
python-josepy-doc                            noarch   1.14.0-1.el9          epel                  14 kB
=====
Transaction Summary
Install 21 Packages
Total download size: 3.8 M
Installed size: 3.8 M
Is this ok [Y/N]: y
Downloading Packages:
(1/21): python-josepy-doc-1.14.0-1.el9.noarch.rpm          49 kB/s | 14 kB   00:00
(2/21): certbot-3.1.0-1.el9.noarch.rpm                     143 kB/s | 49 kB   00:00
(3/21): python3-pyOpenSSL-21.0.0-1.el9.noarch.rpm          130 kB/s | 27 kB   00:00
(4/21): python3-certbot-0.1.0-1.el9.noarch.rpm            1.2 MB/s | 683 kB  00:00
(5/21): python3-augeas-0.5.0-25.el9.noarch.rpm             209 kB/s | 27 kB   00:00
(6/21): python3-configargparse-1.7.1-1.el9.noarch.rpm      379 kB/s | 44 kB   00:00
(7/21): python3-josepy-1.14.0-1.el9.noarch.rpm            538 kB/s | 43 kB   00:00
(8/21): python3-parsedatetime-2.6-5.el9.noarch.rpm        877 kB/s | 59 kB   00:00
(9/21): python3-pyOpenSSL-21.0.0-1.el9.noarch.rpm          886 kB/s | 79 kB   00:00
(10/21): python3-pycparser-2.20-6.el9.noarch.rpm           886 kB/s | 90 kB   00:00
=====
```

```
root@studi03-labor42:~ - + ×
(8/21): python3-parsedatetime-2.6-5.el9.noarch.rpm          808 kB/s | 79 kB   00:00
(9/21): python3-pyOpenSSL-21.0.0-1.el9.noarch.rpm          886 kB/s | 98 kB   00:00
(10/21): python3-pycparser-2.20-6.el9.noarch.rpm           310 kB/s | 27 kB   00:00
(11/21): python3-certbot-0.1.0-1.el9.noarch.rpm            1.2 MB/s | 683 kB  00:00
(12/21): python3-zipp-3.20.1-2.el9.noarch.rpm              219 kB/s | 26 kB   00:00
(13/21): python3-pycparser-2.20-6.el9.noarch.rpm           659 kB/s | 124 kB  00:00
(14/21): python3-ply-3.11-14.el9.0.1.noarch.rpm           891 kB/s | 103 kB  00:00
(15/21): python3-augeas-0.5.0-25.el9.noarch.rpm            242 kB/s | 20 kB   00:00
(16/21): python3-cryptography-36.0.1-4.el9.x86_64.rpm     4.1 MB/s | 1.2 MB  00:00
(17/21): python3-pytz-2021.1-5.el9.noarch.rpm              180 kB/s | 47 kB   00:00
(18/21): python3-configobj-5.0.6-25.el9.noarch.rpm         303 kB/s | 62 kB   00:00
(19/21): fontawesome-fonts-1.4.7-0+13.el9.noarch.rpm       1.4 MB/s | 284 kB  00:00
(20/21): python3-augeas-0.5.0-25.el9.noarch.rpm            241 kB/s | 27 kB   00:00
(21/21): augeas-libs-1.14.1-2.el9.x86_64                 232 kB/s | 373 kB  00:00
=====
Total
Extra Packages for Enterprise Linux 9 - x86_64
Importing GPG key 0x3228067C:
Userid: "Fedora (epel9) <epel@fedoraproject.org>"
Fingerprint: FFB8 D134 4597 106E C8B1 3891 8A38 72BF 3228 467C
From : /etc/pki/rpm-gpg/RPM-GPG-KEY-EPEL-9
If this ok [Y/N]: y
Key imported successfully
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
Preparing :
  Installing : python3-pytz-2021.1-5.el9.noarch
  Installing : python3-pyrfc3399-1.1-11.el9.noarch
  Installing : python3-pycparser-2.20-6.el9.noarch
  Installing : augeas-libs-1.14.1-2.el9.x86_64
  Installing : python3-augeas-0.5.0-25.el9.noarch
  Installing : python3-ply-3.11-14.el9.0.1.noarch
  Installing : python3-cryptography-36.0.1-4.el9.x86_64
  Installing : python3-pyOpenSSL-21.0.0-1.el9.noarch
  Installing : python3-zipp-3.20.1-2.el9.noarch
  Installing : python3-parsedatetime-2.6-5.el9.noarch
  Installing : python3-configargparse-1.7.1-1.el9.noarch
  Installing : python-josepy-doc-1.14.0-1.el9.noarch
  Installing : python3-josepy-1.14.0-1.el9.noarch
  Installing : python3-acme-0.5.0-25.el9.noarch
  Installing : certbot-0.1.0-1.el9.noarch
  Installing : certbot-3.1.0-1.el9.noarch
Running scriptlets: certbot-3.1.0-1.el9.noarch
=====
1/21
2/21
3/21
4/21
5/21
6/21
7/21
8/21
9/21
10/21
11/21
12/21
13/21
14/21
15/21
16/21
17/21
18/21
19/21
20/21
```

```

root@studi03-labor42:~# python3 -m pip install --no-cache-dir certbot[renew]
Collecting certbot[renew]
  Installing python3-pyOpenSSL==21.0.0-1.el9.noarch
  Installing python3-zipp==3.20.1-2.el9.noarch
  Installing python3-parsedatetime==2.6-5.el9.noarch
  Installing python3-configargparse==1.7.1-1.el9.noarch
  Installing python3-josepy==1.14.0-1.el9.noarch
  Installing python3-acme==3.1.0-1.el9.noarch
  Installing certbot==3.1.0-1.el9.noarch
  Running scriptlet: certbot-3.1.0-1.el9.noarch
Created symlink /etc/systemd/system/timers.target.wants/certbot-renew.timer → /usr/lib/systemd/system/certbot-renew.timer.

Certbot auto renewal timer is not started by default.
Run 'systemctl start certbot-renew.timer' to enable automatic renewals.

Installing python3-certbot-apache==3.1.0-1.el9.noarch
Running scriptlet: certbot-3.1.0-1.el9.noarch
Verifying python3-josepy==1.14.0-1.el9.noarch
Verifying python3-acme==3.1.0-1.el9.noarch
Verifying python3-certbot==3.1.0-1.el9.noarch
Verifying python3-parsedatetime==2.6-5.el9.noarch
Verifying python3-configargparse==1.7.1-1.el9.noarch
Verifying python3-importlib-metadata==4.12.0-2.el9.noarch
Verifying python3-josepy==1.14.0-1.el9.noarch
Verifying python3-parsedatetime==2.6-5.el9.noarch
Verifying python3-pyOpenSSL==21.0.0-1.el9.noarch
Verifying python3-pycf3339==1.1-11.el9.noarch
Verifying python3-zipp==3.20.1-2.el9.noarch
Verifying python3-pycparser==2.20-6.el9.noarch
Verifying python3-cryptography==3.6.0-1.el9.x86_64
Verifying python3-ply==3.11-14.el9.0.1.noarch
Verifying python3-cffi==1.14.0-5.el9.x86_64
Verifying python3-pytz==2021.1-5.el9.noarch
Verifying augeas-libs==1.14.1-2.el9.x86_64
Verifying python3-configargparse==2.6-5.el9.noarch
Verifying fontawesome-fonts==1.4.7.0-13.el9.noarch
Verifying python3-augeas==0.5.0-25.el9.noarch
Verifying python3-configargparse==1.7.1-1.el9.noarch
Verifying python3-josepy==1.14.0-1.el9.noarch
Verifying python3-pycparser==2.20-6.el9.noarch
Complete!
[root@studi03-labor42 ~]#

```

## ▪ Configure / Check Server Firewall

*[root@studi03-labor42 ~]# systemctl status firewalld*

*[root@studi03-labor42 ~]# firewall-cmd --permanent --add-service=http*

*[root@studi03-labor42 ~]# firewall-cmd --permanent --add-service=https*

*[root@studi03-labor42 ~]# firewall-cmd --reload*

*[root@studi03-labor42 ~]# firewall-cmd --list-all*

```

[root@studi03-labor42 ~]# systemctl status firewalld
● firewalld.service - firewalld - dynamic firewall daemon
   Loaded: loaded (/usr/lib/systemd/system/firewalld.service; enabled; preset: enabled)
   Active: active (running) since Fri 2025-07-18 06:22:14 CEST; 1 day 3h ago
     Docs: man:firewalld(8)
      Main PID: 594 (firewalld)
        Tasks: 3 (limit: 4668)
       Memory: 580.0K
          CPU: 1.114s
         Group: 0
        CPU affinity: /system.slice/firewalld.service
           CPU: 0.000us /usr/bin/python3 -s /usr/sbin/firewalld --nofork --nopid

Jul 18 06:22:03 studi03-labor42.f2.hte-berlin.de systemd[1]: Starting firewalld - dynamic firewall daemon...
Jul 18 06:22:03 studi03-labor42.f2.hte-berlin.de systemd[1]: Started firewalld - dynamic firewall daemon.
[root@studi03-labor42 ~]# firewall-cmd --permanent --add-service=http
Warning: ALREADY_ENABLED: http
success
[root@studi03-labor42 ~]# firewall-cmd --permanent --add-service=https
Warning: ALREADY_ENABLED: https
success
[root@studi03-labor42 ~]# firewall-cmd --reload
success
[root@studi03-labor42 ~]# firewall-cmd --list-all
public (disabled)
  target: default
  icmp-block-inversion: no
  interfaces: ens3
  sources:
  services: cockpit dhcpv6-client http https ssh telnet
  ports:
  protocols:
  forward: yes
  masquerade: no
  forward-ports:
  source-nat:
  icmp-blocks:
  rich rules:

```

## ▪ Obtain Let's Encrypt Certificate

```
[root@studi03-labor42 ~]# certbot -apache
```

Certbot will automatically obtain and install a free SSL/TLS certificate from let's encrypt for our Apache web browser

```
[root@studi03-labor42 ~]# certbot -apache
Saving debug log to /var/log/letsencrypt/letsencrypt.log
Enter email address (used for receiving renewal notices) [Enter 'c' to cancel]: Ketan.Dhamane@student.htw-berlin.de

Please read the Terms of Service at
https://letsencrypt.org/documents/LE-SA-v1.5-February-24-2025.pdf. You must
agree in order to register with the ACME server. Do you agree?
-----  
(Y)es/(N)o: y

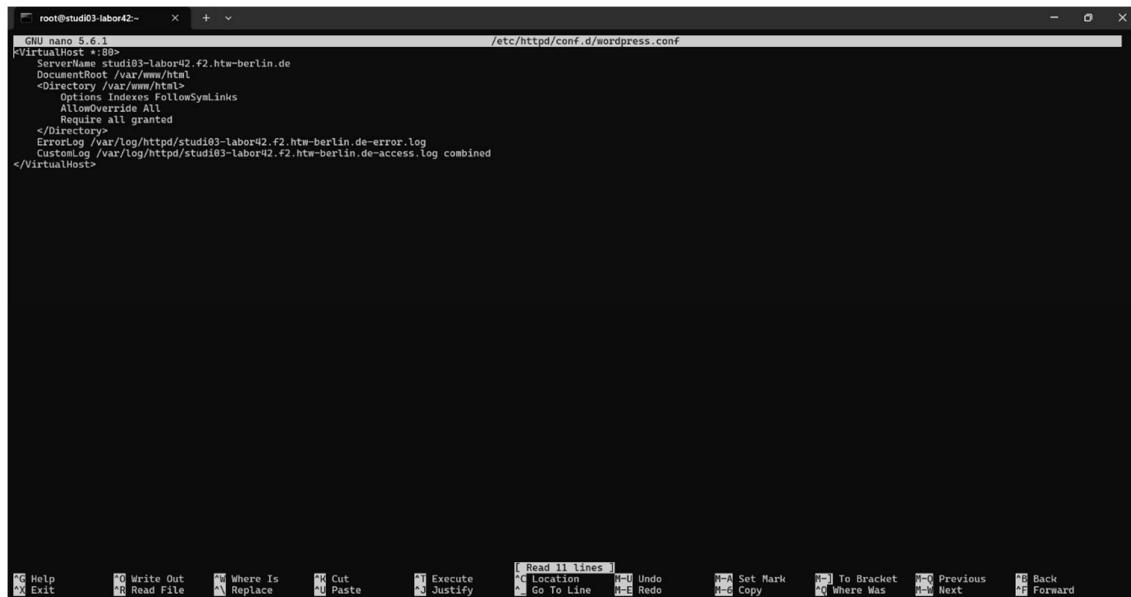
Would you be willing, once your first certificate is successfully issued, to
share your email address with the Electronic Frontier Foundation, a founding
partner of the Let's Encrypt project and the non-profit organization that
develops Certbot? We'd like to send you email about our work encrypting the web,
EFF news, campaigns, and ways to support digital freedom.
-----  
(Y)es/(N)o: n
Account registered

Please enter the domain name(s) you would like on your certificate (comma and/or
space separated) [Enter 'c' to cancel]: studi03-labor42.f2.htw-berlin.de
Requesting a certificate for studi03-labor42.f2.htw-berlin.de
Unable to find a virtual host listening on port 80 which is currently needed for Certbot to prove to the CA that you control your domain. Please add a virtual host for port 80.
Ask for help or search for solutions at https://community.letsencrypt.org. See the logfile /var/log/letsencrypt/letsencrypt.log or re-run Certbot with -v for more details.
[root@studi03-labor42 ~]#
```

## ▪ Edit Apache Virtual Host Configuration

```
[root@studi03-labor42 ~]# nano /etc/httpd/conf.d/wordpress.conf
```

It opens a file in texteditor, Our apache is not perfectly configured with the virtual host listing port 80 for our domain name.



```
GNU nano 5.6.1                               /etc/httpd/conf.d/wordpress.conf
.VirtualHost 80
  ServerName studi03-labor42.f2.htw-berlin.de
  DocumentRoot /var/www/html
  <Directory /var/www/html>
    Options Indexes FollowSymLinks
    AllowOverride All
    Require all granted
  </Directory>
  ErrorLog /var/log/httpd/studi03-labor42.f2.htw-berlin.de-error.log
  CustomLog /var/log/httpd/studi03-labor42.f2.htw-berlin.de-access.log combined
</VirtualHost>
```

```
[root@studi03-labor42 ~]# apachectl configtest
```

It test apache configuration for syntax error before restarting

```
[root@studi03-labor42 ~]# systemctl restart httpd
```

It applies new configuration

```
[root@studi03-labor42 ~]# certbot -apache
```

```
[root@studi03-labor42 ~]# apachectl configtest
Syntax OK
[root@studi03-labor42 ~]# systemctl restart httpd
[root@studi03-labor42 ~]# certbot -apache
Saving debug log to /var/log/letsencrypt/letsencrypt.log

Which names would you like to activate HTTPS for?
We recommend selecting either all domains, or all domains in a VirtualHost/server block.
-----  
1: studi03-labor42.f2.htw-berlin.de  
Select the appropriate numbers separated by commas and/or spaces, or leave input
blank to select all options shown (Enter 'c' to cancel): 1
Requesting a certificate for studi03-labor42.f2.htw-berlin.de

Successfully received certificate.
Certificate is saved at: /etc/letsencrypt/live/studi03-labor42.f2.htw-berlin.de/fullchain.pem
Key is saved at:      /etc/letsencrypt/live/studi03-labor42.f2.htw-berlin.de/privkey.pem
This certificate expires on 2025-10-17.
These files will be updated when the certificate renews.
Certbot has set up a scheduled task to automatically renew this certificate in the background.

Deploying certificate
Successfully deployed certificate for studi03-labor42.f2.htw-berlin.de to /etc/httpd/conf.d/wordpress-le-ssl.conf
Congratulations! You have successfully enabled HTTPS on https://studi03-labor42.f2.htw-berlin.de

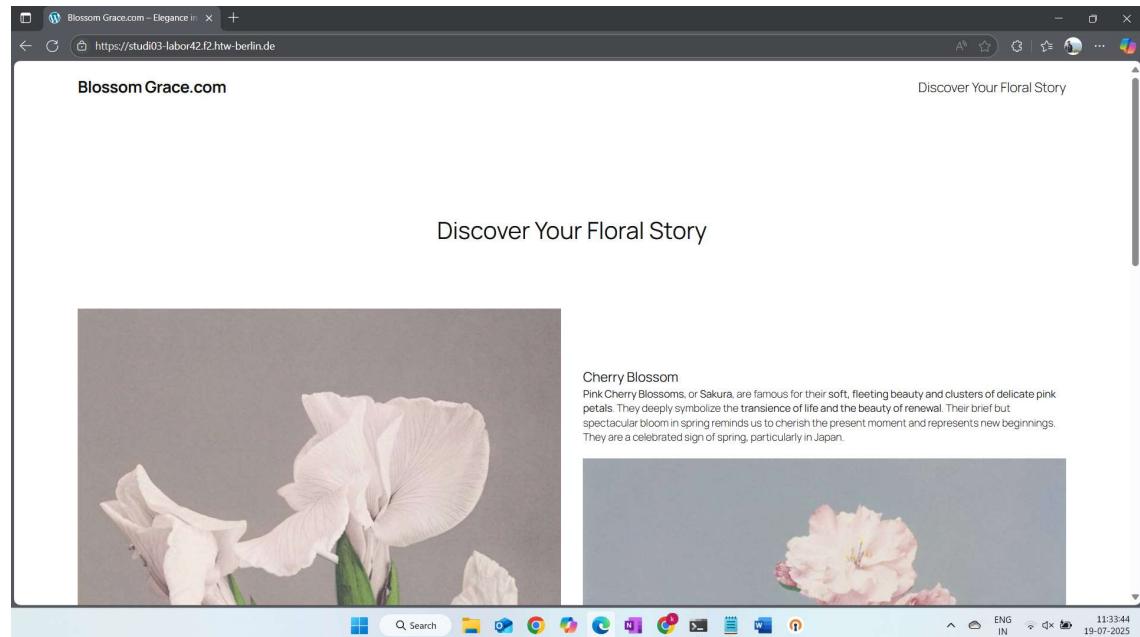
If you like Certbot, please consider supporting our work by:
 * Donating to ISRG / Let's Encrypt:   https://letsencrypt.org/donate
 * Donating to EFF:                   https://eff.org/donate-le
-----  
[root@studi03-labor42 ~]#
```

```
[root@studi03-labor42 ~]# grep -r "SSLCertificateFile" /etc/httpd/conf.d/
```

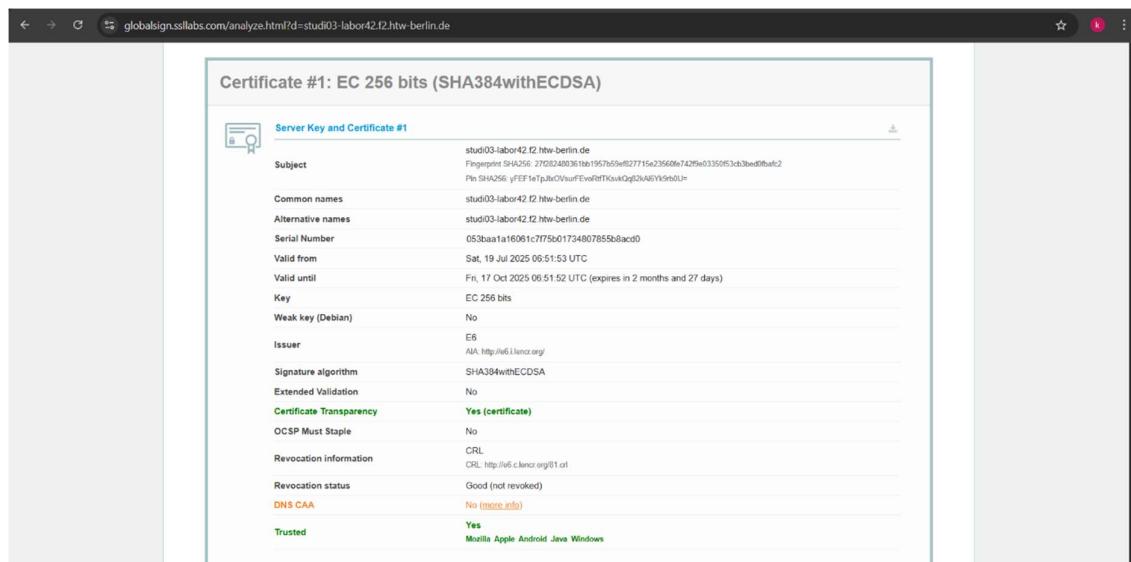
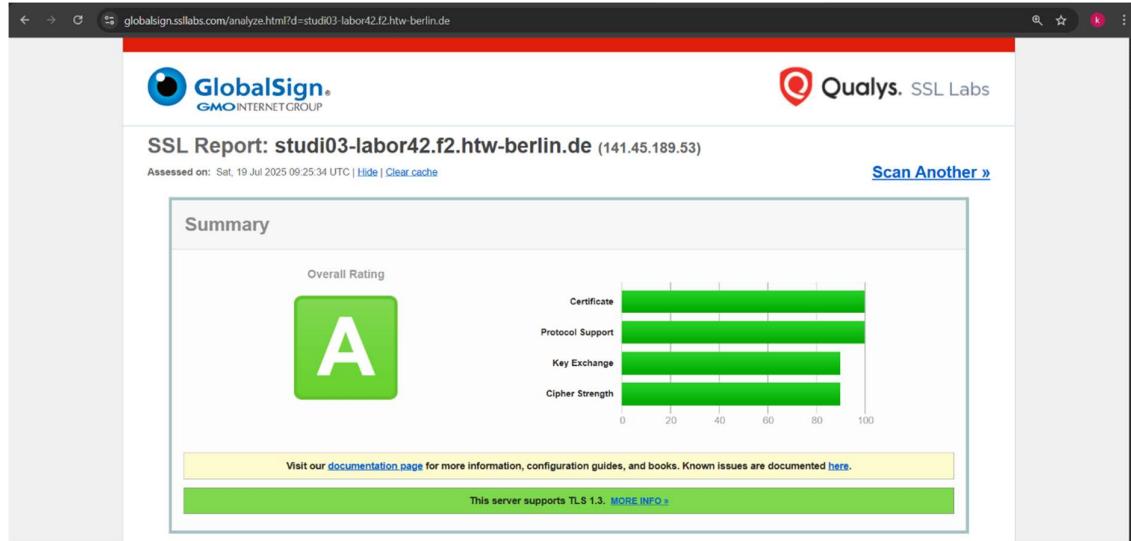
certbot automatically updated apache configuration file, here we verify does our server configured to use new certificate or not

```
[root@studi03-labor42 ~]# grep -r "SSLCertificateFile" /etc/httpd/conf.d/
/etc/httpd/conf.d/ssl.conf:# Point SSLCertificateFile at a PEM encoded certificate. If
/etc/httpd/conf.d/ssl.conf:#SSLCertificateFile /etc/httpd/ssl/apache-selfsigned.crt
/etc/httpd/conf.d/ssl.conf:# the referenced file can be the same as SSLCertificateFile
/etc/httpd/conf.d/wordpress-le-ssl.conf:SSLCertificateFile /etc/letsencrypt/live/studi03-labor42.f2.htw-berlin.de/fullchain.pem
[root@studi03-labor42 ~]#
```

Now we can see secure indicator on our browsers address bar



## ▪ Test TLS Configuration with SSL Labs



**Additional Certificates (if supplied)**

Certificates provided: 2 (2061 bytes)  
Chain issues: None

#2

Subject: E6  
Fingerprint SHA256: 7e1ec288a0d0e37430629f4aa9d97d5c1c09fb3e513d36fbdbab27ab5  
Pw SHA256: 088a9c23KymY/dTQmew988832Du1KoyP3YfV9c+

Valid until: Fri, 12 Mar 2027 23:59:59 UTC (expires in 1 year and 7 months)  
Key: EC 384 bits  
Issuer: ISRG Root X1  
Signature algorithm: SHA256withRSA

**Certification Paths**

[Click here to expand](#)

**Configuration**

**Protocols**

Protocol	Enabled
TLS 1.3	Yes
TLS 1.2	Yes
TLS 1.1	No
TLS 1.0	No
SSL 3	No
SSL 2	No

**Cipher Suites**

# TLS 1.3 (server has no preference)

- TLS\_AES\_128\_GCM\_SHA256 (0x1301) ECDH+25519 (eq. 3072 bits RSA) FS 128
- TLS\_AES\_128\_GCM\_SHA256 (0x1304) ECDH+25519 (eq. 3072 bits RSA) FS 128
- TLS\_AES\_256\_GCM\_SHA384 (0x1302) ECDH+25519 (eq. 3072 bits RSA) FS 256
- TLS\_CHACHA20\_POLY1305\_SHA256 (0x1303) ECDH+25519 (eq. 3072 bits RSA) FS 256

# TLS 1.2 server has no preference

- TLS\_ECDHE\_ECDSA\_WITH\_AES\_128\_GCM\_SHA256 (0xc02b) ECDH+secp256r1 (eq. 15360 bits RSA) FS 128
- TLS\_ECDHE\_ECDSA\_WITH\_AES\_256\_GCM\_SHA384 (0xc02c) ECDH+secp256r1 (eq. 15360 bits RSA) FS 256
- TLS\_ECDHE\_ECDSA\_WITH\_CHACHA20\_POLY1305\_SHA256 (0xccca) ECDH+secp256r1 (eq. 15360 bits RSA) FS 256

**Handshake Simulation**

User Agent	Cipher Suite	Protocol	Version	Key Exchange	Signature	Compression
Android 4.4.2	EC 256 (SHA384)	TLS 1.2	TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384	ECDH+secp256r1	FS	-
Android 5.0.0	EC 256 (SHA384)	TLS 1.2	TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256	ECDH+secp256r1	FS	-
Android 6.0	EC 256 (SHA384)	TLS 1.2 > http/1.1	TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256	ECDH+secp256r1	FS	-
Android 7.0	EC 256 (SHA384)	TLS 1.2 > http/1.1	TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256	ECDH+25519	FS	-
Android 8.0	EC 256 (SHA384)	TLS 1.3 > http/1.1	TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256	ECDH+25519	FS	-
Android 8.1	-	TLS 1.3	TLS_CHACHA20_POLY1305_SHA256	ECDH+25519	FS	-
Android 9.0	-	TLS 1.3	TLS_CHACHA20_POLY1305_SHA256	ECDH+25519	FS	-
BlowfishPreview_Jan 2015	EC 256 (SHA384)	TLS 1.2	TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384	ECDH+secp256r1	FS	-
Chrome 49 / XP SP3	Server sent fatal alert: handshake_failure	-	-	-	-	-
Chrome 69 / Win 7 R	EC 256 (SHA384)	TLS 1.2 > http/1.1	TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256	ECDH+25519	FS	-
Chrome 70 / Win 10	-	TLS 1.3	TLS_AES_128_GCM_SHA256	ECDH+25519	FS	-
Chrome 80 / Win 10 R	-	TLS 1.3	TLS_AES_128_GCM_SHA256	ECDH+25519	FS	-
Firefox 31.5 ESR / Win 7	EC 256 (SHA384)	TLS 1.2	TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256	ECDH+secp256r1	FS	-
Firefox 47 / Win 7 R	EC 256 (SHA384)	TLS 1.2 > http/1.1	TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256	ECDH+secp256r1	FS	-

		TLS 1.2 > http/1.1	TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 ECDH:k25519 FS
Chrome 70 / Win 10	-	TLS 1.3	TLS_AES_128_GCM_SHA256 ECDH:k25519 FS
Chrome 80 / Win 10	R	TLS 1.3	TLS_AES_128_GCM_SHA256 ECDH:k25519 FS
Firefox 31.5 / SSR / Win 7	EC 256 (SHA384)	TLS 1.2	TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 ECDH:k25519 FS
Firefox 47 / Win 7	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 ECDH:k25519 FS
Firefox 49 / XP SP3	EC 256 (SHA384)	TLS 1.2 > http/1.1	TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 ECDH:k25519 FS
Firefox 62 / Win 7	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 ECDH:k25519 FS
Firefox 73 / Win 10	R	-	TLS 1.3 TLS_AES_128_GCM_SHA256 ECDH:k25519 FS
Goobiebot Feb 2018	EC 256 (SHA384)	TLS 1.2	TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 ECDH:k25519 FS
IE 11 / Win 7	R	EC 256 (SHA384)	TLS 1.2 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 ECDH:k25519 FS
IE 11 / Win 8.1	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 ECDH:k25519 FS
IE 11 / Win Phone 8.1	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 ECDH:k25519 FS
IE 11 / Win Phone 8.1 Update	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 ECDH:k25519 FS
IE 11 / Win 10	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 ECDH:k25519 FS
Edge 13 / Win 10	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 ECDH:k25519 FS
Edge 15 / Win 10	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 ECDH:k25519 FS
Edge 18 / Win 10	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 ECDH:k25519 FS
Edge 13 / Win Phone 10	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 ECDH:k25519 FS
Java 8u161	EC 256 (SHA384)	TLS 1.2	TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 ECDH:k25519 FS
Java 11.0.3	-	TLS 1.3	TLS_AES_128_GCM_SHA256 ECDH:k25519 FS
Java 12.0.1	-	TLS 1.3	TLS_AES_128_GCM_SHA256 ECDH:k25519 FS
OpenSSL_1.0.3l	R	EC 256 (SHA384)	TLS 1.2 TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 ECDH:k25519 FS
OpenSSL_1.0.2g	R	EC 256 (SHA384)	TLS 1.2 TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 ECDH:k25519 FS
OpenSSL_1.0.0k	R	EC 256 (SHA384)	TLS 1.2 TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 ECDH:k25519 FS
OpenSSL_1.1.1c	R	-	TLS 1.3 TLS_AES_256_GCM_SHA384 ECDH:k25519 FS
Safari 6 / iOS 6.0.1		Server sent fatal alert: handshake_failure	
Safari 7 / iOS 7.1	R		Server sent fatal alert: handshake_failure
Safari 7 / iOS X.10.9	R		Server sent fatal alert: handshake_failure
Safari 8 / iOS 8.4	R		Server sent fatal alert: handshake_failure
Safari 8 / iOS X.10.10	R		Server sent fatal alert: handshake_failure
Safari 9 / iOS 9	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 ECDH:k25519 FS
Safari 9 / iOS X.10.11	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 ECDH:k25519 FS
Safari 10 / iOS 10	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 ECDH:k25519 FS
Safari 10 / iOS X.10.12	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 ECDH:k25519 FS
Safari 11.2 / Mac OS 10.14.6	Beta	-	TLS 1.3 TLS_CHACHA20_POLY1305_SHA256 ECDH:k25519 FS
Safari 12.1.1 / iOS 12.1.1	R	-	TLS 1.3 TLS_CHACHA20_POLY1305_SHA256 ECDH:k25519 FS
Apple AT3.9 / iOS 9	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 ECDH:k25519 FS
Yahoo Slurp Jan 2015	EC 256 (SHA384)	TLS 1.2	TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 ECDH:k25519 FS
YandexBot Jan 2015	EC 256 (SHA384)	TLS 1.2	TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 ECDH:k25519 FS

Safari 6 / iOS 6.0.1		Server sent fatal alert: handshake_failure	
Safari 7 / iOS 7.1	R	Server sent fatal alert: handshake_failure	
Safari 7 / iOS X.10.9	R	Server sent fatal alert: handshake_failure	
Safari 8 / iOS 8.4	R	Server sent fatal alert: handshake_failure	
Safari 8 / iOS X.10.10	R	Server sent fatal alert: handshake_failure	
Safari 9 / iOS 9	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 ECDH:k25519 FS
Safari 9 / iOS X.10.11	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 ECDH:k25519 FS
Safari 10 / iOS 10	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 ECDH:k25519 FS
Safari 10 / iOS X.10.12	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 ECDH:k25519 FS
Safari 11.2 / Mac OS 10.14.6	Beta	-	TLS 1.3 TLS_CHACHA20_POLY1305_SHA256 ECDH:k25519 FS
Safari 12.1.1 / iOS 12.1.1	R	-	TLS 1.3 TLS_CHACHA20_POLY1305_SHA256 ECDH:k25519 FS
Apple AT3.9 / iOS 9	R	EC 256 (SHA384)	TLS 1.2 > http/1.1 TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 ECDH:k25519 FS
Yahoo Slurp Jan 2015	EC 256 (SHA384)	TLS 1.2	TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 ECDH:k25519 FS
YandexBot Jan 2015	EC 256 (SHA384)	TLS 1.2	TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 ECDH:k25519 FS

If Not simulated clients (Protocol mismatch)

Click here to expand

(1) Clients that do not support Forward Secrecy (FS) are excluded when determining support for it.  
(2) No support for virtual SSL hosting (SNI). Connects to the default site if the server uses SNI.  
(3) Only first connection attempt simulated. Browsers sometimes retry with a lower protocol version.  
(R) Denotes a reference browser or client, with which we expect better effective security.  
(A) We use defaults, but some platforms do not use their best protocols and features (e.g., Java 6 & 7, older IE).  
>All Certificate trust is not checked in handshake simulation, we only perform TLS handshake.

Protocol Details

Secure Renegotiation	Supported
Secure Client-Initiated Renegotiation	No
Insecure Client-Initiated Renegotiation	No
BEAST attack	Mitigated server-side ( <a href="#">more info</a> )

BEST attack	Integrated server-side (more info)
POODLE (SSLv3)	No, SSL 3 not supported (more info)
POODLE (TLS)	No (more info)
Zombie POODLE	No (more info)
GOLDENDOOLE	No (more info)
OpenSSL L-Length	No (more info)
Sleeping POODLE	No (more info)
Downgrade attack prevention	Yes, TLS_FALLBACK_SCSV supported (more info)
SSL/TLS compression	No
RC4	No
Heartbeat (extension)	No
Heartbleed (vulnerability)	No (more info)
Ticketleak (vulnerability)	No (more info)
OpenSSL CCS vuln. (CVE-2014-0224)	No (more info)
OpenSSL Padding Oracle vuln. (CVE-2016-2107)	No (more info)
ROBOT (vulnerability)	No (more info)
Forward Secrecy	Yes (with most browsers) ROBUST (more info)
ALPN	Yes https://
NPN	No
Session resumption (caching)	No (IDs empty)
Session resumption (tickets)	No
OCSP stapling	No
Strict Transport Security (HSTS)	No
HSTS Prefloading	Not in: Chrome Edge Firefox IE
Public Key Pinning (HPKP)	No (more info)
Public Key Pinning Report-Only	No
Public Key Pinning (Static)	No (more info)
Long handshake intolerance	No
TLS extension intolerance	No

globalsign.ssllabs.com/analyze.html?d=stud03-labor42.f2.htw-berlin.de

Long handshake intolerance	No
TLS extension intolerance	No
TLS version intolerance	No
Incorrect SNI alerts	No
Uses common DH primes	No, DHE suites not supported
DH public server param ('y') reuse	No, DHE suites not supported
ECDH public server param reuse	No
Supported Named Groups	secp256r1
SSL 2 handshake compatibility	No
0-RTT enabled	No

**HTTP Requests**

https://stud03-labor42.f2.htw-berlin.de/ (HTTP/1.1 200 OK)

**Miscellaneous**

Test date	Sat, 19 Jul 2025 09:24:23 UTC
Test duration	71,254 seconds
HTTP status code	200
HTTP Server signature	Apache/2.4.62 (Rocky Linux) OpenSSL/3.2.2
Server hostname	stud03-labor42.f2.htw-berlin.de

SSL Report v2.4.1

Copyright © 2009-2025 Qualys, Inc. All Rights Reserved. [Privacy Policy](#). [Try Qualys for free!](#) Experience the award-winning [Qualys Cloud Platform](#) and the entire collection of [Qualys Cloud Apps](#), including [certificate security](#) solutions. [Terms and Conditions](#)

- **Identify VM and Log In via SSH**

Successfully identified the VM by comparing locally generated ssh host key with those provided in the file and logged in the local machine using the SSH.

```
C:\Users\Ketan>ssh root@studi03-labor42.f2.htw-berlin.de
```

- **Setting the Hostname**

In this step configure server's hostname to its fully qualified domain name which is important for proper network identification and communication.

```
[root@studi03-labor42 ~]# hostname -f
```

It displays the server's currently configured Fully Qualified Domain Name

```
[root@studi03-labor42 ~]# nano /etc/hostname
```

The /etc/hostname file stores the server's permanent hostname name

- **Document Services and Processes, Disable Unneeded Autostart, and Remove Unused Programs**

Every running service and installed packages represent a potential vulnerability. By identifying needed services and unneeded services we can reduce the attack surface by disabling and removing the unneeded service or packages. Also, it improves system performance and stability. Overall, it's an important process for hardening.

```
[root@studi03-labor42 ~]# ps auxfw
```

Firstly, List All Running Processes, by listing all currently running processes on the system, we can easily analyse the needed and unneeded processes.

```
[root@studi03-labor42 ~]# systemctl list-unit-files --type=service --state=enabled
```

Secondly, List Enabled Services, by listing all enabled services we can easily find out the services which are configured to start automatically when the system boots.

```
[root@studi03-labor42 ~]# systemctl list-units --type=service --state=running
```

Thirdly, List Running Services, by listing these we can see all currently active and in running state services.

- **Services to Consider Disabling**

- **bluetooth.service**

It provides support for Bluetooth devices. Our server does not require Bluetooth connectivity.

- **atd.service**

It used to schedule and run a command one time. But the cron is commonly used for recurring tasks on servers. atd is less needed.

- **rpcbind.service**  
It's a directory service for remote procedure call client which helps client to find the port number serves like nfs. It's only necessary if server is actively using or providing rpc based services.
- **nvmefc-boot-connections.service**  
It manages the NVMe over fiber channel boot connection so it's specific to storage area network and our vm doesn't require this.
- **smartd.service**  
It monitors the health of the hard disk and solid state drives. It's useful for physical hardware. In virtualized environment disk health is managed by hypervisor.
- **sssd.service**  
Basically, it provides the set of daemons to manage access to remote directory services and authentication for larger enterprise directory system. So, users manage locally so it's completely unnecessary.

#### ▪ Packages to Consider Removing

Below packages typically related to the desktop environment, these packages are core component of graphical desktop environment. Our webserver is operate without graphical user interface so it's entirely unnecessary for our service.

- **desktop-file-utils**
- **gnome-desktop3**
- **gsettings-desktop-schemas**
- **sound-theme-freedesktop**
- **xdg-desktop-portal**
- **xdg-desktop-portal-gtk**

Below packages are primarily associated with the network file system and samba protocol for network file sharing. Our LAMP web server does not act as nfs or samba client/server. This service involves complex network protocols so which is a source of security vulnerabilities

- **libtirpc**
- **rpcbind**
- **samba-dcerpc**
- **libnfsidmap**
- **nfs-utils**
- **nfs4-acl-tools**
- **sssd-nfs-idmap**

Below package It's a tool for scheduling a one-time task, and if we are not using the atd.service to run that package so the keeping the at client is not needed.

- **at.x86\_64**

- **Check Firewall Settings and Block Unnecessary Connections**

Setting up the server's firewall is important aspect in the hardening process.

primary goal of the firewall configuration is Access control in this we define explicit allow-list essential service like http, https, ssh. Also, we can achieve attack surface reduction by blocking unused ports.

```
[root@studi03-labor42 ~]# systemctl status firewalld
```

It check the firewall status

```
[root@studi03-labor42 ~]# firewall-cmd --list-all
```

It shows the all current firewall settings

```
[root@studi03-labor42 ~]# firewall-cmd --reload
```

Apply the changes

- **Firewall service considered to remove**

- **telnet**

It's a way to remotely connect to the computers. It's a highly in secure because it sends all information including password and user name in plain text format.

- **Cockpit**

It's a web-based tool that lets you manages your servers using the graphical interface in web browser. It provides complect web interface ant is not needed for web server.

This is how we ensure that only essential services like ssh for management and http & https for website running.

- **Transform Linux into a Functioning LAMP Stack and Install WordPress**

Transform Linux server system in to the web hosting platform by installing LAMP stack and then adding WordPress on the top to create dynamic website

- **Install Apache Web Server**

```
[root@studi03-labor42 ~]# dnf install httpd
```

Apache is an open-source HTTP server that serves as the core web server software in a LAMP stack. Its primary function is to process HTTP requests received from web browsers and deliver web content.

- **Install MariaDB Database Server**

```
[root@studi03-labor42 ~]# dnf install mariadb-server
```

WordPress needs a database to store all its dynamic information. MariaDB provides this essential storage

- **Secure MariaDB Installation**

```
[root@studi03-labor42 ~]# mysql_secure_installation
```

It's a special script that guides you through important security steps for new MariaDB installation. Its important hardening step for database.

- **Login to MariaDB**

```
[root@studi03-labor42 ~]# mysql -u root -p
```

It allows to log into the MariaDB server

- **Install PHP**

```
[root@studi03-labor42 ~]# dnf install php php-mysqlnd php-fpm php-json  
php-gd php-mbstring php-xml php-dom php-zip php-pdo php-opcache php-  
cli
```

It install the core PHP language and many essential PHP extensions

PHP-FPM is a special engine that runs PHP code for WordPress. Apache web server sends the PHP code to PHP-FPM for it to process, then PHP-FPM sends the results back to Apache to deliver the complete webpage.

- **Configure Apache to use PHP-FPM**

```
[root@studi03-labor42 ~]# nano /etc/httpd/conf.d/php-fpm.conf
```

It opens a new configuration file for Apache. Inside this file, you tell Apache to send all requests for .php files to the php-fpm service for processing. Also, it improves both performance and security.

- **Install and Configure WordPress Core Files**

```
[root@studi03-labor42 ~]# cd /var/www/html/
```

It changes the current working directory in the terminal to /var/www/html/. This is Apache's default web root directory.

- **Download WordPress Archive**

```
[root@studi03-labor42 html]# wget https://wordpress.org/latest.tar.gz
```

It downloads the latest version of WordPress as a compressed archive tar.gz file from its official website.

- **Extract WordPress Archive**

```
[root@studi03-labor42 html]# tar -xzf latest.tar.gz
```

IT extracts the contents of the downloaded latest.tar.gz file. This typically creates a new directory named wordpress/ containing all the WordPress core files.

- **Move WordPress Files to Web Root**

```
[root@studi03-labor42 html]# mv wordpress/* .
```

It moves all the files and folders *from inside* the newly created wordpress/ directory directly into the current directory /var/www/html/

- **WordPress File Permissions and Ownership**

```
[root@studi03-labor42 html]# chown -R apache:apache /var/www/html/
```

It changes the owner and group of all WordPress files and folders inside /var/www/html/ to apache.

- **Set Directory Permissions**

```
[root@studi03-labor42 html]# find /var/www/html/ -type d -exec chmod 755 {} +
```

It sets permissions for all directories within your WordPress installation to 755

```
[root@studi03-labor42 html]# find /var/www/html/ -type f -exec chmod 644 {} +
```

It sets permissions for all files within your WordPress installation to 644

- **Configure WordPress to Connect to Database**

#### **Copy Sample Configuration**

```
[root@studi03-labor42 html]# cp wp-config-sample.php wp-config.php
```

WordPress provides a sample configuration file. This command creates a working copy that will customize

- **Edit Configuration File**

```
[root@studi03-labor42 html]# nano wp-config.php
```

Here we enter the critical information WordPress Like Database details & Unique Authentication Keys and Salts

- **Finalize WordPress Setup via Web Browser and Configure HTTPS**

Here we access servers in a web browser to complete the WordPress installation. It makes your WordPress site fully functional and securely accessible to the public

- **Set Up External Access to CMS Pages with Trusted TLS Certificate & Automatic Renewal**

In this step we try to secure website with an SSL/TLS certificate. This means all data sent to and from your site is encrypted, so it's private and safe. It also makes browsers trust our site, which is great for visitors and even helps with search rankings. We set it up to renew automatically so your site stays secure without you having to do anything.

- **Initial Setup with a Self-Signed Certificate**

```
[root@studi03-labor42 ~]# dnf install mod_ssl openssl
```

This command installs two key software packages mod\_ssl & openssl. These are the foundational tools required for Apache to communicate securely using SSL/TLS

- **Create SSL Directory**

```
[root@studi03-labor42 ~]# mkdir -p /etc/httpd/ssl/
```

This command creates a dedicated directory etc/httpd/ssl/ to securely store your SSL/TLS certificate and its private key.

- **Generate Self-Signed Certificate**

```
[root@studi03-labor42 ~]# openssl req -x509 -nodes -days 365 -newkey rsa:2048 -keyout /etc/httpd/ssl/apache-selfsigned.key -out /etc/httpd/ssl/apache-selfsigned.crt
```

This creates a basic encrypted connection

- **Configure Apache to Use Self-Signed Certificate**

```
[root@studi03-labor42 ~]# nano /etc/httpd/conf.d/ssl.conf
```

It opens Apache's main SSL configuration file.

- **Test HTTPS Access:**

It verifies that Apache is serving content over HTTPS

<https://studi03-labor42.f2.htw-berlin.de/>

- **Secure CMS Pages with Trusted TLS**

- **Enable EPEL Repository**

```
[root@studi03-labor42 ~]# dnf install epel-release
```

```
[root@studi03-labor42 ~]# dnf repolist
```

```
[root@studi03-labor42 ~]# dnf makecache
```

These commands add and update the EPEL (Extra Packages for Enterprise Linux) repository. Certbot is typically found in this repository

- **Install Certbot and Apache Plugin**

```
[root@studi03-labor42 ~]# dnf install certbot python3-certbot-apache
```

IT Installs the Certbot client and its specific plugin designed to work with Apache web servers.

- **Obtain and Install Let's Encrypt Certificate**

```
[root@studi03-labor42 ~]# certbot --apache
```

This command initiates the Certbot process

It Communicates with Let's Encrypt to verify domain ownership Obtains a free, publicly trusted SSL/TLS certificate for domain and Automatically configures Apache to use this new certificate for HTTPS

- **Edit Apache Virtual Host Configuration**

```
[root@studi03-labor42 ~]# nano /etc/httpd/conf.d/wordpress.conf
```

This opens your WordPress-specific Apache configuration file here we configured with the virtual host listing port 80 for our domain name.

- **Test Apache Configuration**

```
[root@studi03-labor42 ~]# apachectl configtest
```

This command checks your Apache configuration files for any syntax errors without actually restarting the service

- **Verify Certificate Configuration**

```
[root@studi03-labor42 ~]# grep -r "SSLCertificateFile" /etc/httpd/conf.d/
```

verification step to confirm that Certbot successfully updated Apache's configuration files to point to the newly obtained Let's Encrypt certificate

- **Observe Secure Indicator in Browser:**

It is the final visual confirmation that your site is now served over a publicly trusted HTTPS connection, indicated by a padlock icon in your browser's address bar and no security warnings

- **Test TLS Configuration with SSL Labs**

This third-party tool performs a deep analysis of your server's SSL/TLS configuration, identifying any potential weaknesses.

(<https://www.ssllabs.com/ssltest/analyze.html>).