

Exercise 1 - Create a Self-signed Certificate

A certificate is a technique of safeguarding communication between two entities or between users and a Web server. It is difficult to interpret the information once a certificate, such as an SSL or TLS certificate, encrypts the communication during transmission. capturing the moment If a certificate is not used, information sent over the Internet is sent in an unencrypted format. clear-text format that can be readily intercepted SSL is no longer in use and has been phased out. TLS has taken its place. You have the option of using a third-party certificate or creating a self-signed certificate.

In this exercise, you will learn to create a self-signed certificate.

Topology

VMWARE WORKSTATION VIRTUAL ADAPTER



DOMAIN = networktute.com

NTKALIVM1 = Kali 2022.1 - Standalone Server

Prerequisite

- *VMware Workstation 16 Pro*
 - When making this tutorial, we used the “Windows Server 2019” VM Template and “Windows 10 & later” VM Template. Since VMware didn’t have the updated templates.
- *Kali Linux 2022.1*

Task 1: Create a Self-signed Certificate

A self-signed certificate can be produced by anybody and is utilized for individual or internal use in an organization. Web browsers, in any case, do not trust self-signed certificates.

Now Let's, create a self-signed certificate.

NOTE: Since this is Test environment we will use a common password "toor". But Please make sure you always your complex password to prevent problems.

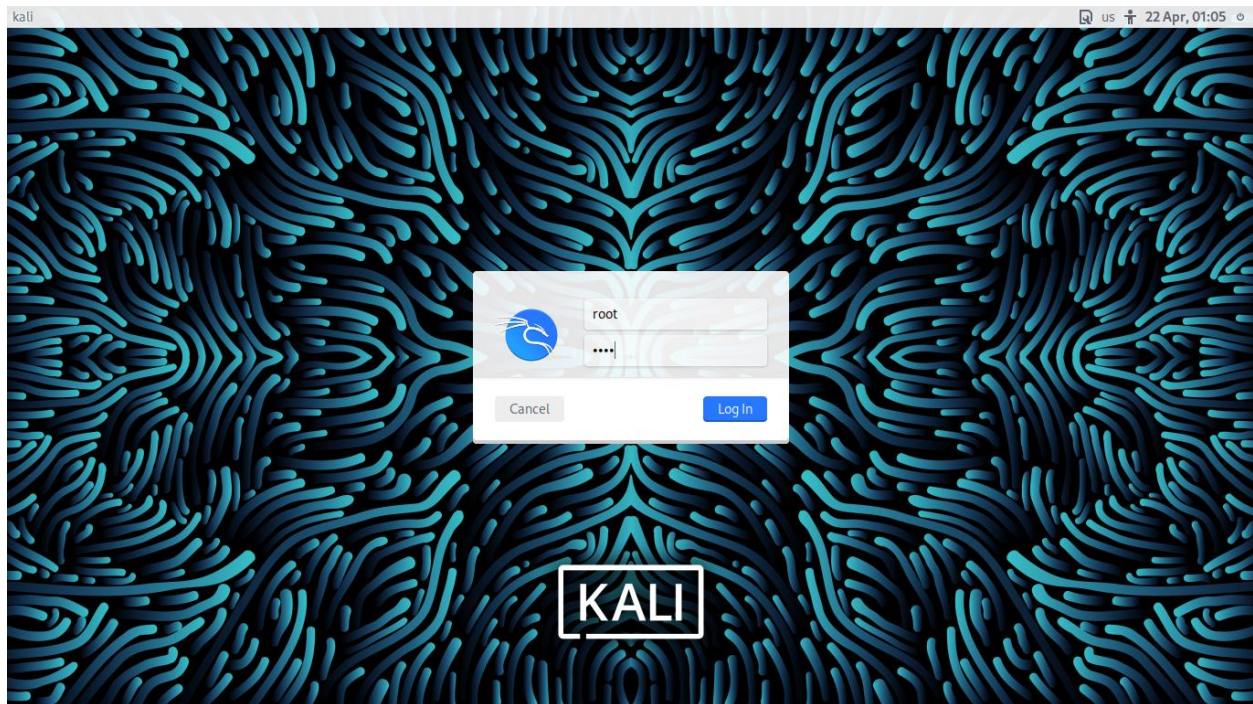
Step 1:

Connect to NTKALIVM1.

In the **Enter your username** text box, type the following: **root**

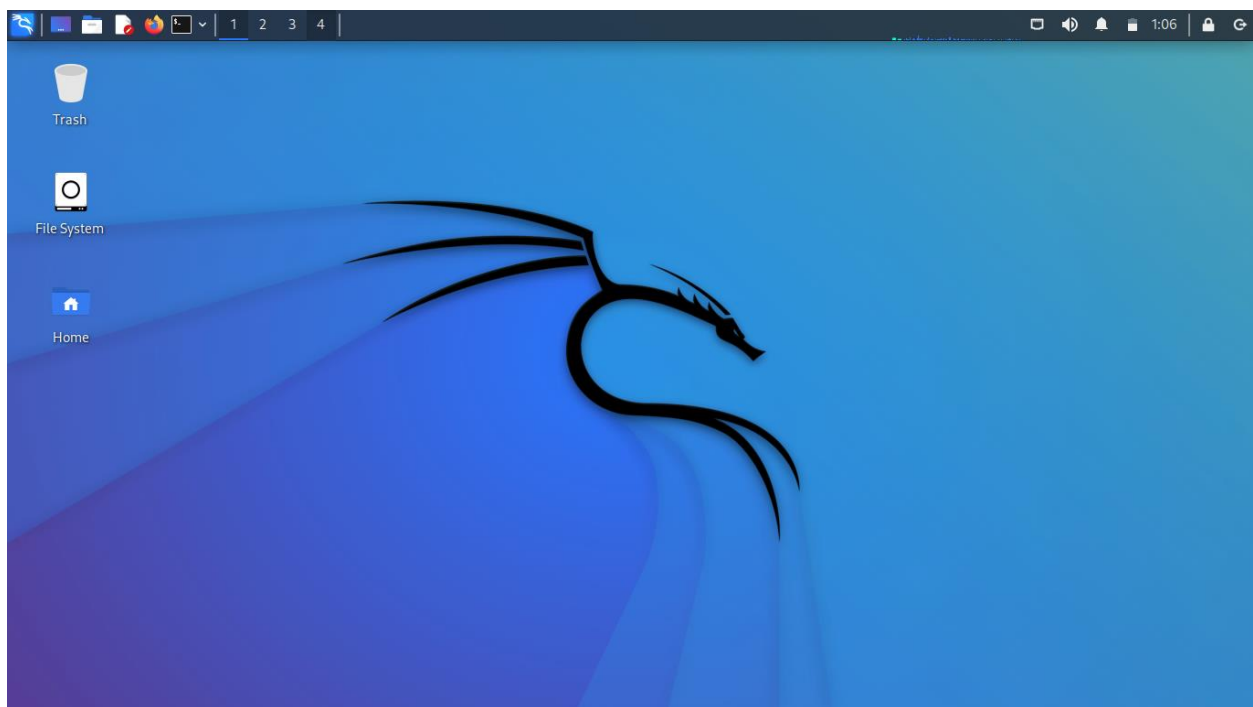
In the **Enter your password** text box, type the following: **toor**

Click **Log In** or press **Enter**.



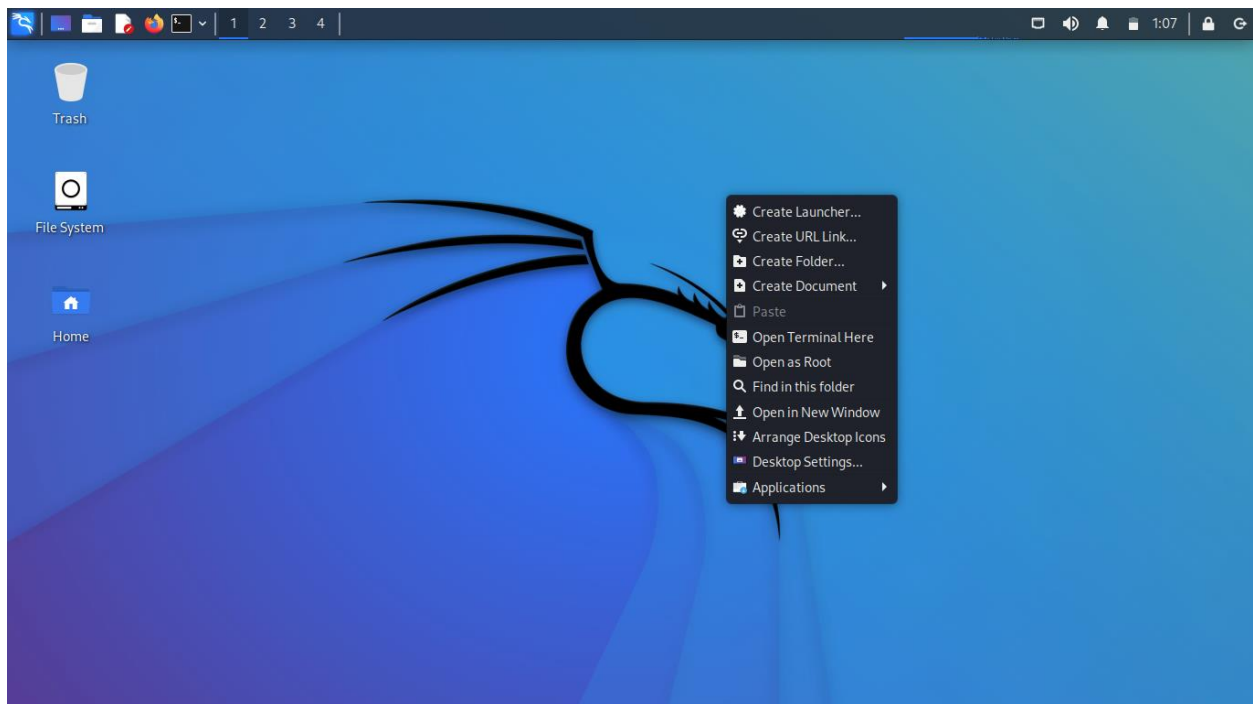
Step 2:

After a successful login, the desktop is displayed.



Step 3:

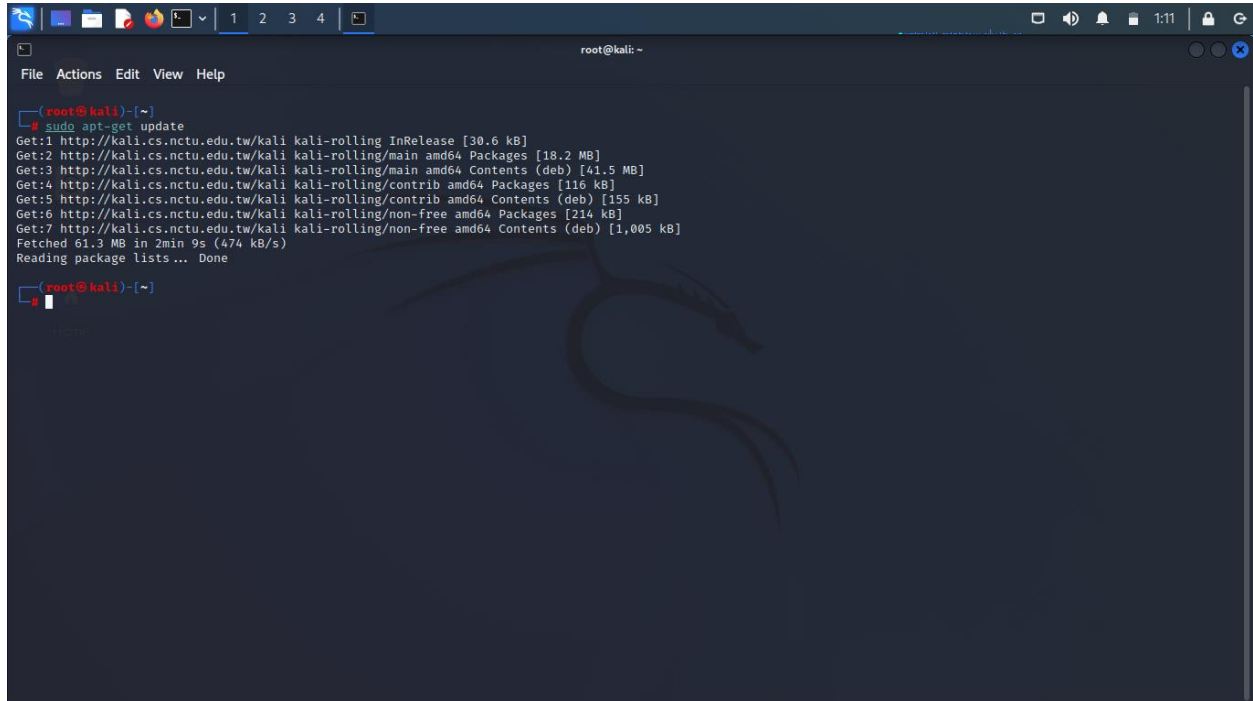
On the desktop, right-click and select **Open Terminal Here**.



Step 4:

To create a self-signed certificate, you need to install the **openssl** package

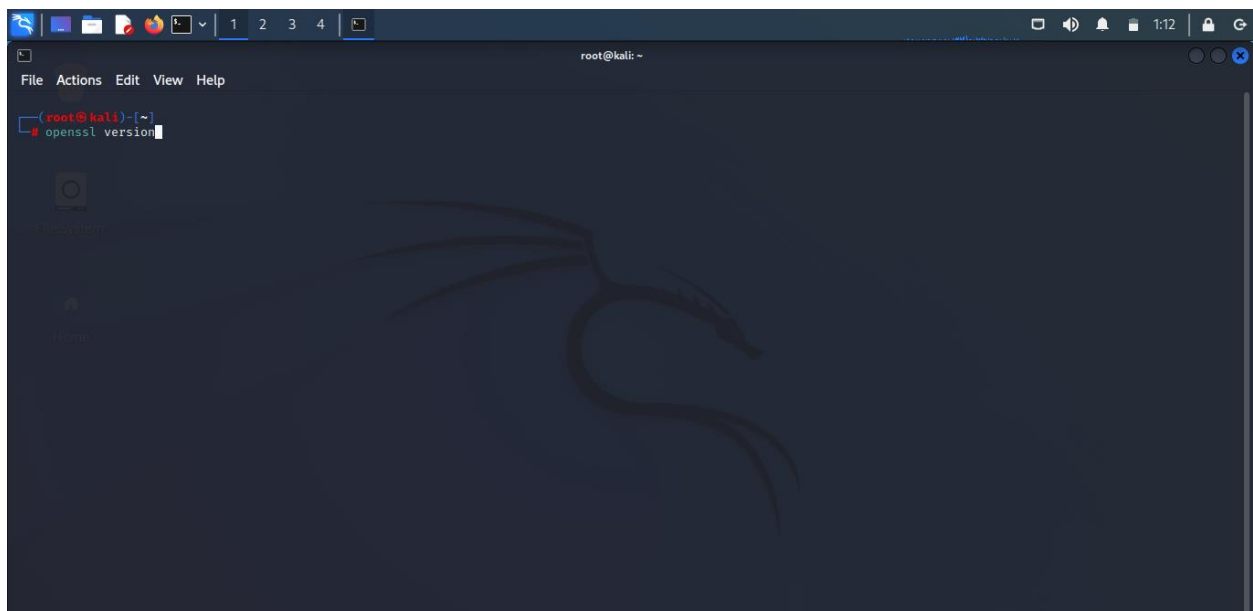
Before proceeding with the installation, Let's do a system update by Typing: ***sudo apt-get update***

A terminal window titled 'root@kali: ~' with a menu bar (File, Actions, Edit, View, Help). The terminal shows the command 'sudo apt-get update' being executed. The output lists several package sources and their sizes, including kali-rolling InRelease, Packages, Contents (deb), and Packages (deb) for main, contrib, and non-free repositories. It indicates that 61.3 MB was fetched in 2 minutes and 9 seconds at a rate of 474 kB/s. The terminal ends with 'Reading package lists ... Done' and a new prompt.

```
root@kali: ~  
File Actions Edit View Help  
  
root@kali:~# sudo apt-get update  
Get:1 http://kali.cs.nctu.edu.tw/kali kali-rolling InRelease [30.6 kB]  
Get:2 http://kali.cs.nctu.edu.tw/kali kali-rolling/main amd64 Packages [18.2 MB]  
Get:3 http://kali.cs.nctu.edu.tw/kali kali-rolling/main amd64 Contents (deb) [41.5 MB]  
Get:4 http://kali.cs.nctu.edu.tw/kali kali-rolling/contrib amd64 Packages [116 kB]  
Get:5 http://kali.cs.nctu.edu.tw/kali kali-rolling/contrib amd64 Contents (deb) [155 kB]  
Get:6 http://kali.cs.nctu.edu.tw/kali kali-rolling/non-free amd64 Packages [214 kB]  
Get:7 http://kali.cs.nctu.edu.tw/kali kali-rolling/non-free amd64 Contents (deb) [1,005 kB]  
Fetched 61.3 MB in 2min 9s (474 kB/s)  
Reading package lists ... Done  
  
root@kali:~#
```

Step 5:

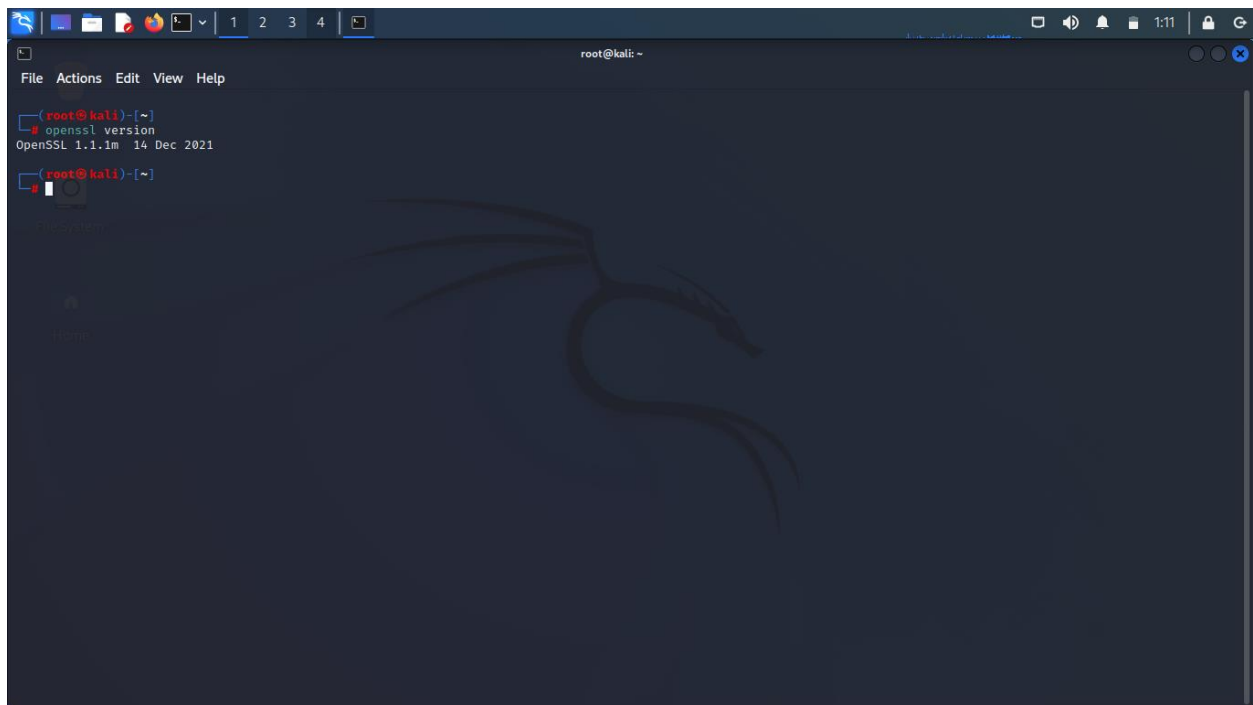
You can check if **openssl** is already installed. Type the following command: ***openssl version***

A terminal window titled 'root@kali: ~' with a menu bar (File, Actions, Edit, View, Help). The terminal shows the command 'openssl version' being entered at the prompt. The terminal is mostly empty except for the command and the prompt.

```
root@kali: ~  
File Actions Edit View Help  
  
root@kali:~# openssl version
```

Step 6:

Notice that the output displays the openssl version.



```
root@kali: ~  
File Actions Edit View Help  
root@kali)~  
# openssl version  
OpenSSL 1.1.1m 14 Dec 2021  
root@kali)~
```

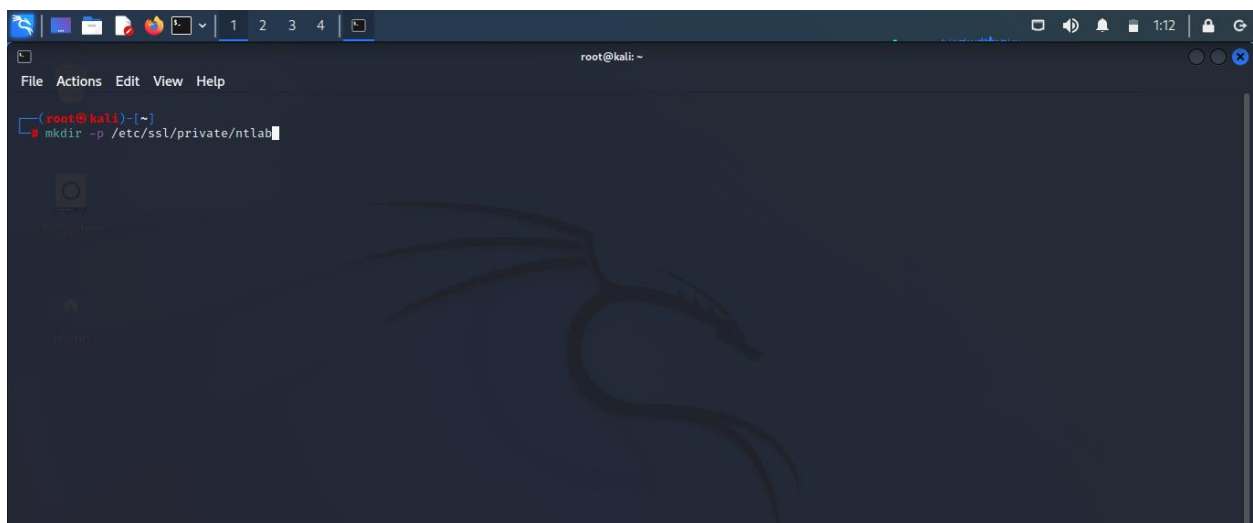
Step 7:

Clear the screen by entering the following command: ***clear***

First, you need to create a new directory for storing the private key. Type the following command:

```
mkdir -p /etc/ssl/private/ntlab
```

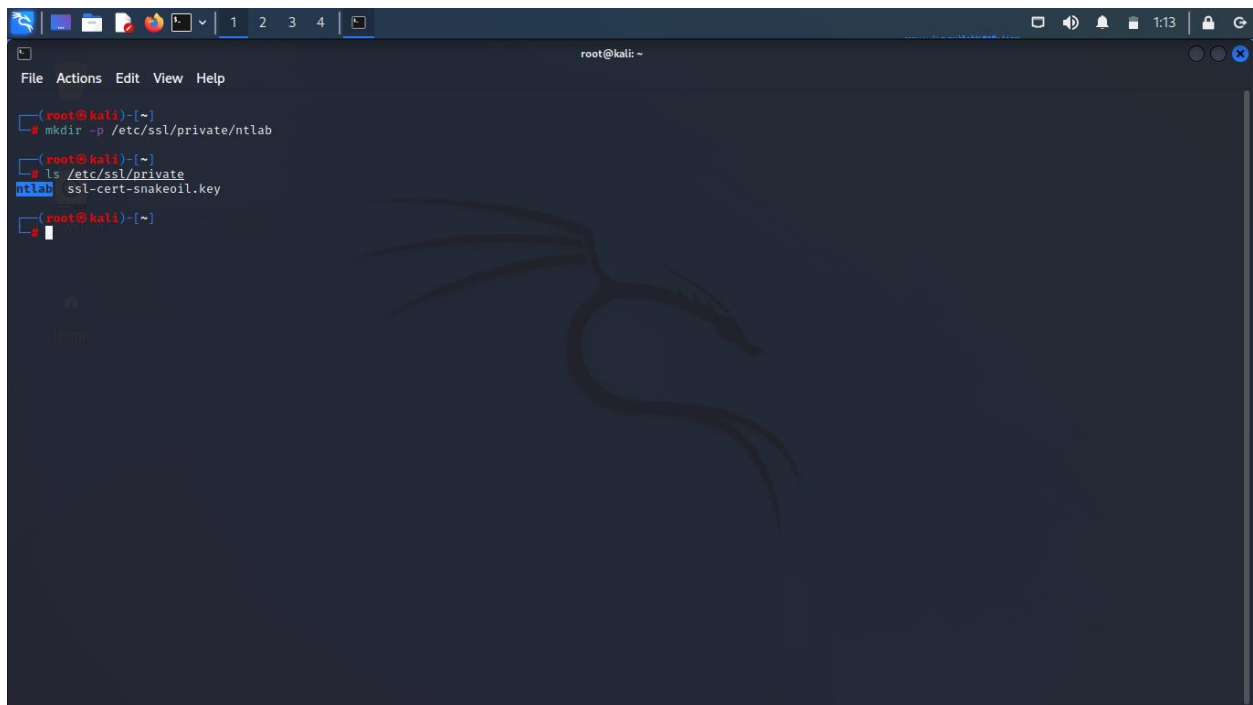
Press **Enter**.



```
root@kali: ~  
File Actions Edit View Help  
root@kali)~  
# mkdir -p /etc/ssl/private/ntlab
```

Step 8:

The directory is now created.

A terminal window titled 'root@kali: ~' with a menu bar (File, Actions, Edit, View, Help) and a top bar showing tabs 1, 2, 3, 4. The terminal shows the following commands and output:

```
(root@kali)-[~]  
# mkdir -p /etc/ssl/private/ntlab  
(root@kali)-[~]  
# ls /etc/ssl/private  
ntlab  ssl-cert-snakeoil.key  
(root@kali)-[~]  
#
```

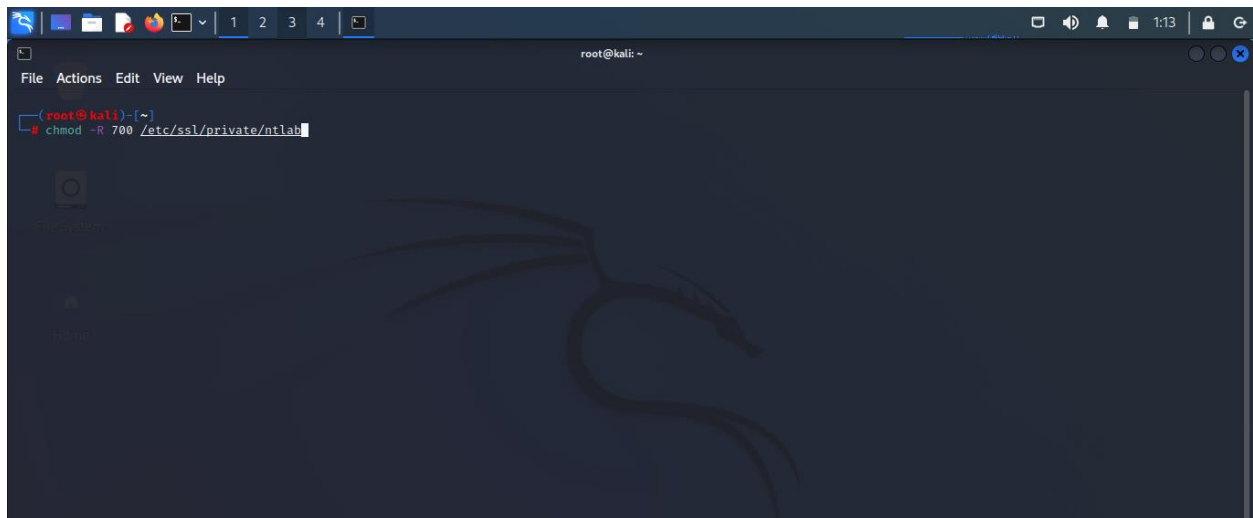
The background of the terminal features a faint Kali Linux dragon logo.

Step 9:

You need to ensure that the directory is not readable by anyone except the root user. Type the following command:

```
chmod -R 700 /etc/ssl/private/ntlab
```

Press **Enter**.

A terminal window titled 'root@kali: ~' with a menu bar (File, Actions, Edit, View, Help) and a top bar showing tabs 1, 2, 3, 4. The terminal shows the following command and output:

```
(root@kali)-[~]  
# chmod -R 700 /etc/ssl/private/ntlab
```

The background of the terminal features a faint Kali Linux dragon logo.

Step 10:

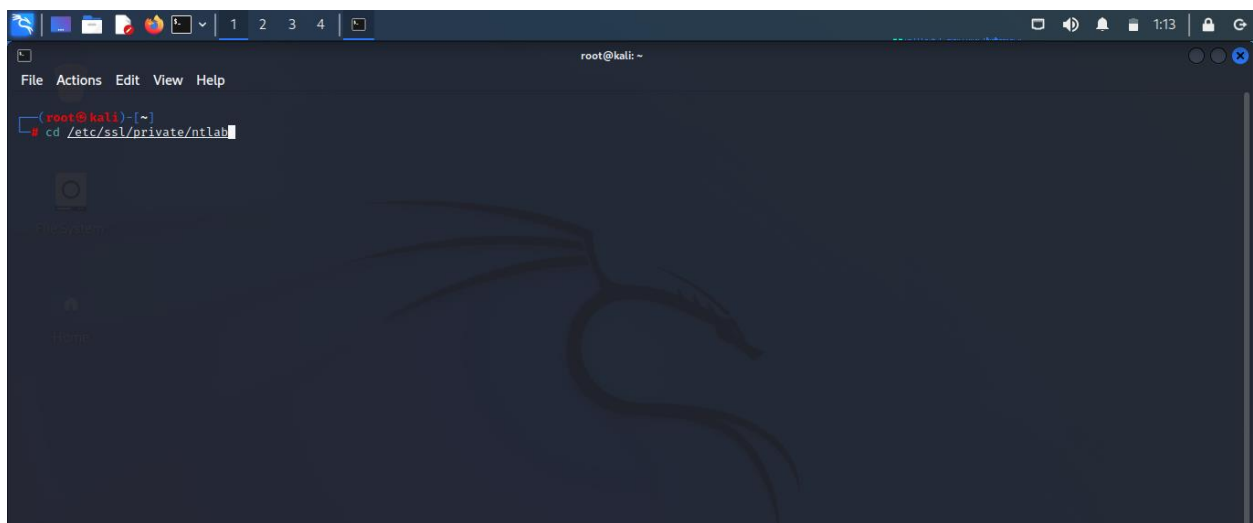
Only the root user now has read, write, and execute permissions on this directory. Other users do not have any permissions.

Step 11:

You need to now navigate to the newly-created directory. Type the following command:

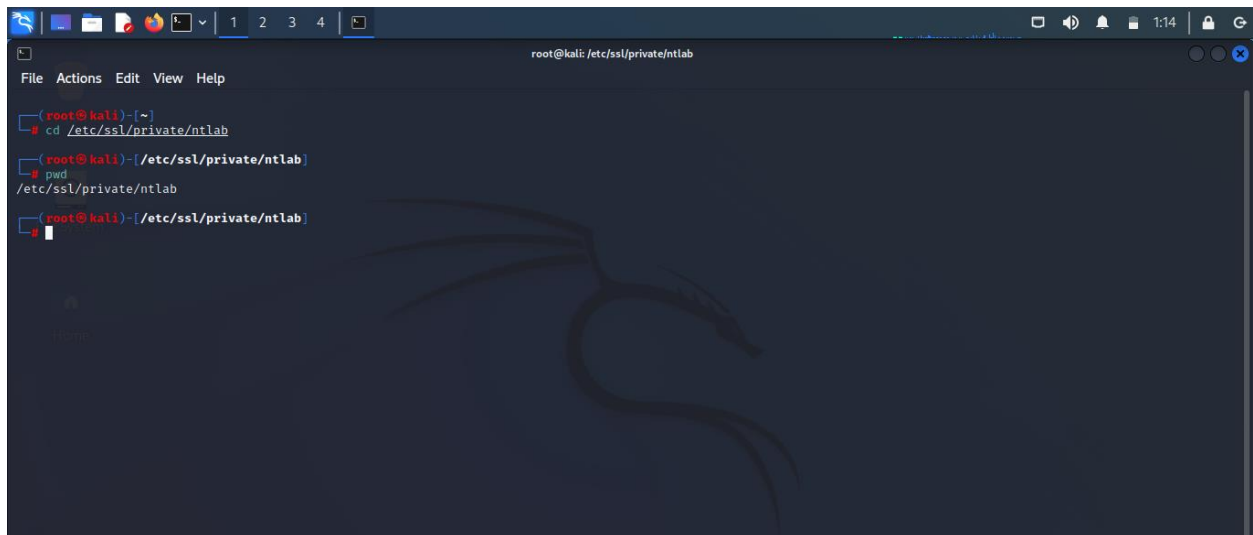
```
cd /etc/ssl/private/ntlab
```

Press **Enter**.



Step 12:

Notice that you have navigated to the directory successfully.



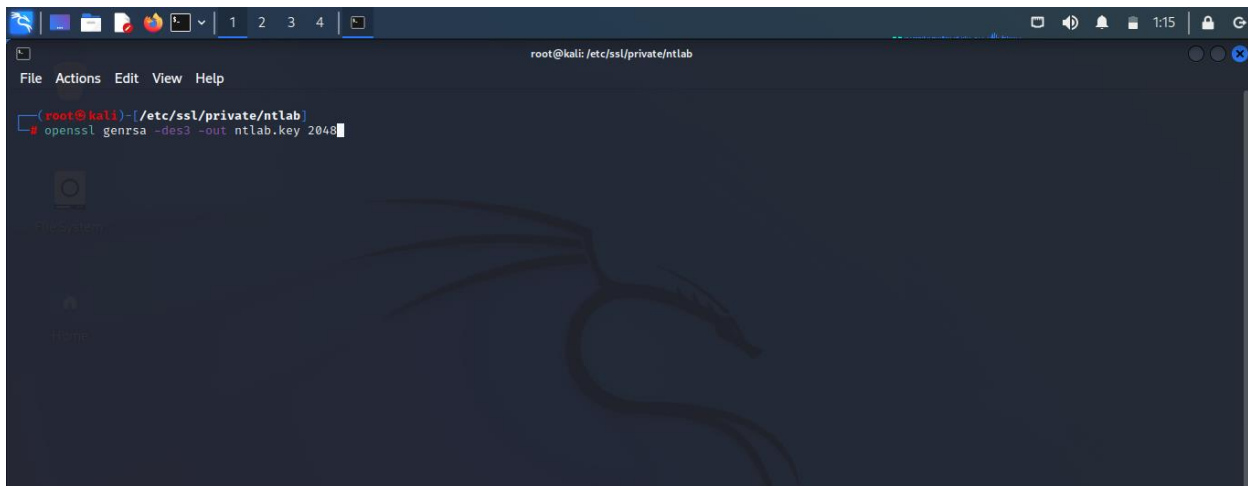
Step 13:

Clear the screen by entering the following command: *clear*

You will now generate the key with the **openssl** command. Type the following command:

```
openssl genrsa -des3 -out ntlab.key 2048
```

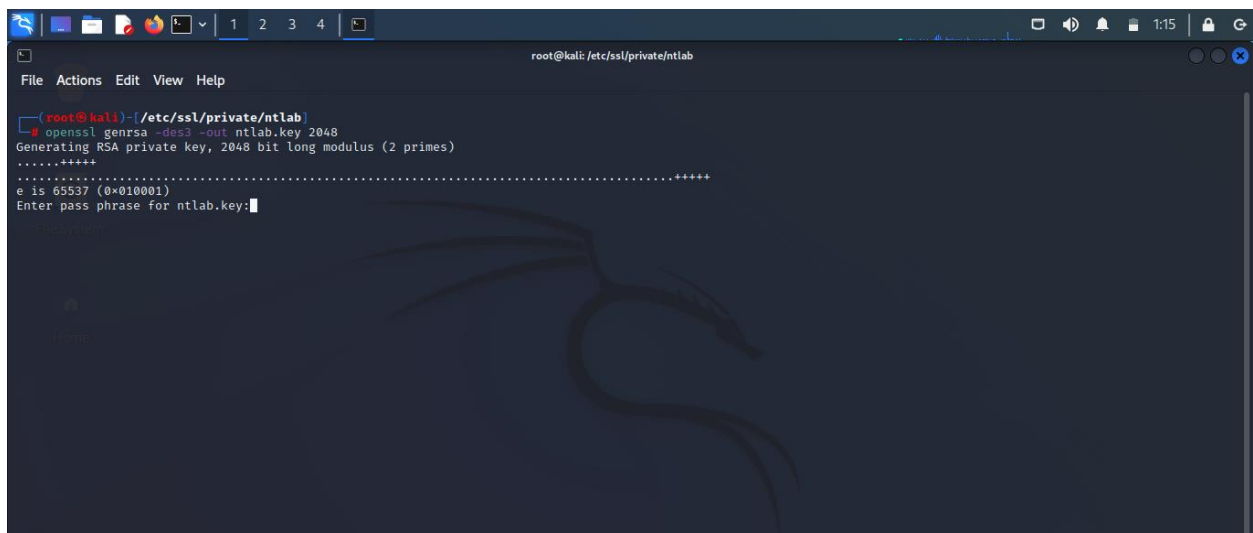
Press **Enter**.



```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help
root@kali: /etc/ssl/private/ntlab
# openssl genrsa -des3 -out ntlab.key 2048
```

Step 14:

Notice that you are now prompted for a password.



```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help
root@kali: /etc/ssl/private/ntlab
# openssl genrsa -des3 -out ntlab.key 2048
Generating RSA private key, 2048 bit long modulus (2 primes)
.....+++++
.....+++++
e is 65537 (0x010001)
Enter pass phrase for ntlab.key:
```


Step 15:

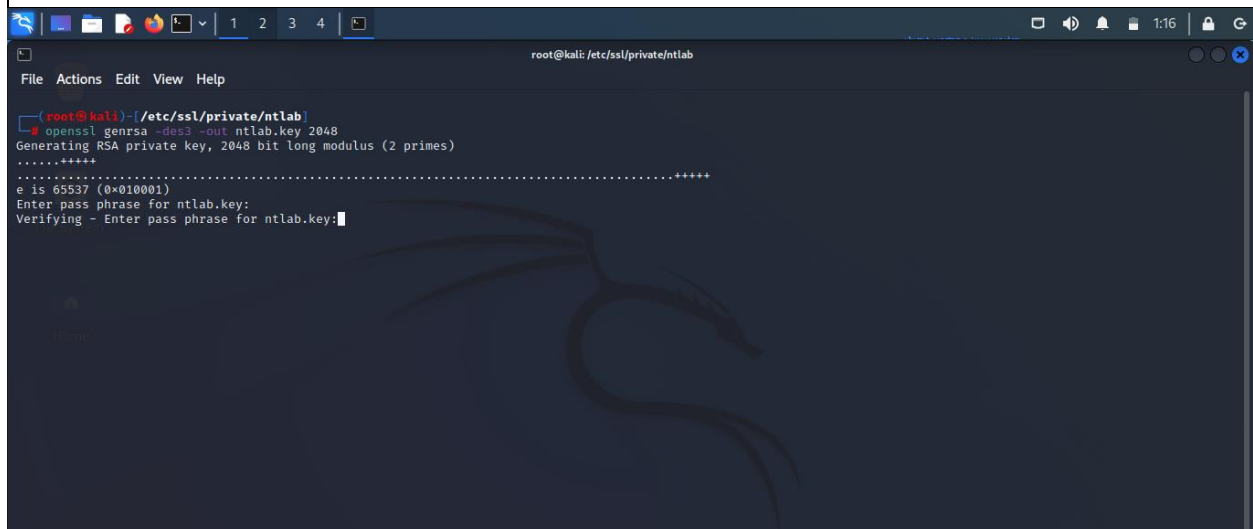
You need to now enter the passphrase. When prompted, type the following passphrase: **toor**

Press **Enter**.

You will be prompted for the re-confirmation of the passphrase. Type the following: **toor**

Press **Enter**.

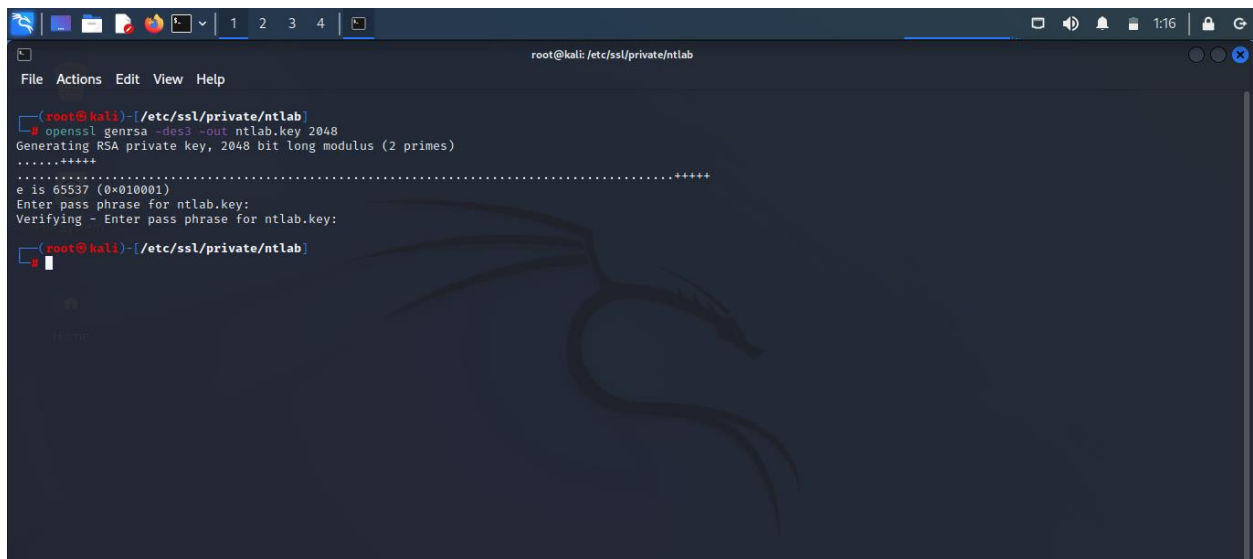
Note: The cursor will not move when provoked to enter a pass express in the terminal and it'll not be shown whereas creating the key with the openssl command.



```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help
root@kali:~# openssl genrsa -des3 -out ntlab.key 2048
Generating RSA private key, 2048 bit long modulus (2 primes)
.....+++++
e is 65537 (0x010001)
Enter pass phrase for ntlab.key:
Verifying - Enter pass phrase for ntlab.key:
```

Step 16:

The password has now been set.



```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help
root@kali:~# openssl genrsa -des3 -out ntlab.key 2048
Generating RSA private key, 2048 bit long modulus (2 primes)
.....+++++
e is 65537 (0x010001)
Enter pass phrase for ntlab.key:
Verifying - Enter pass phrase for ntlab.key:
root@kali:~#
```

Step 17:

Clear the screen by entering the following command: ***clear***

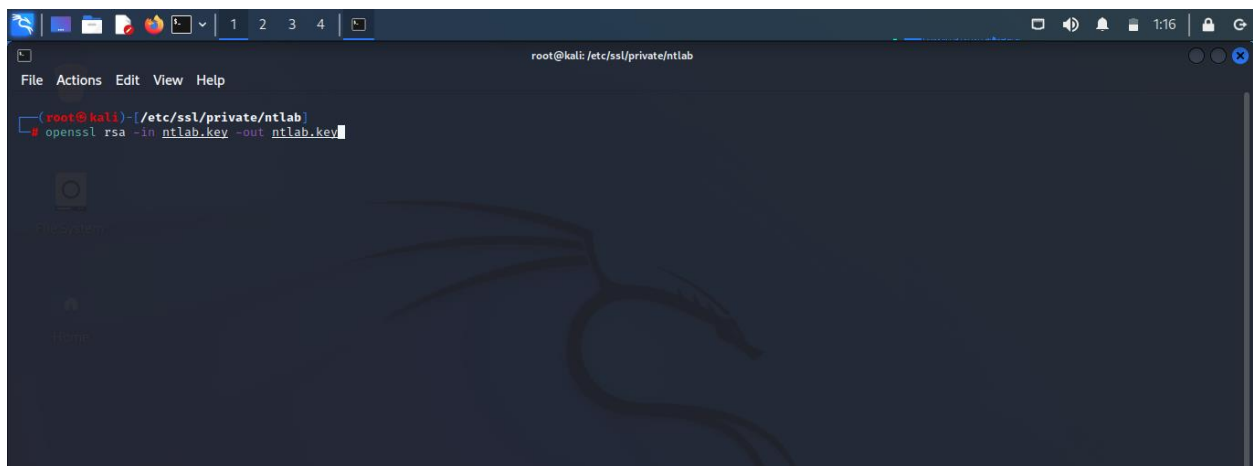
You should now remove the passphrase from the private key. Type the following command:

```
openssl rsa -in ntlab.key -out ntlab.key
```

Press **Enter**.

When prompted, type the following passphrase: ***toor***

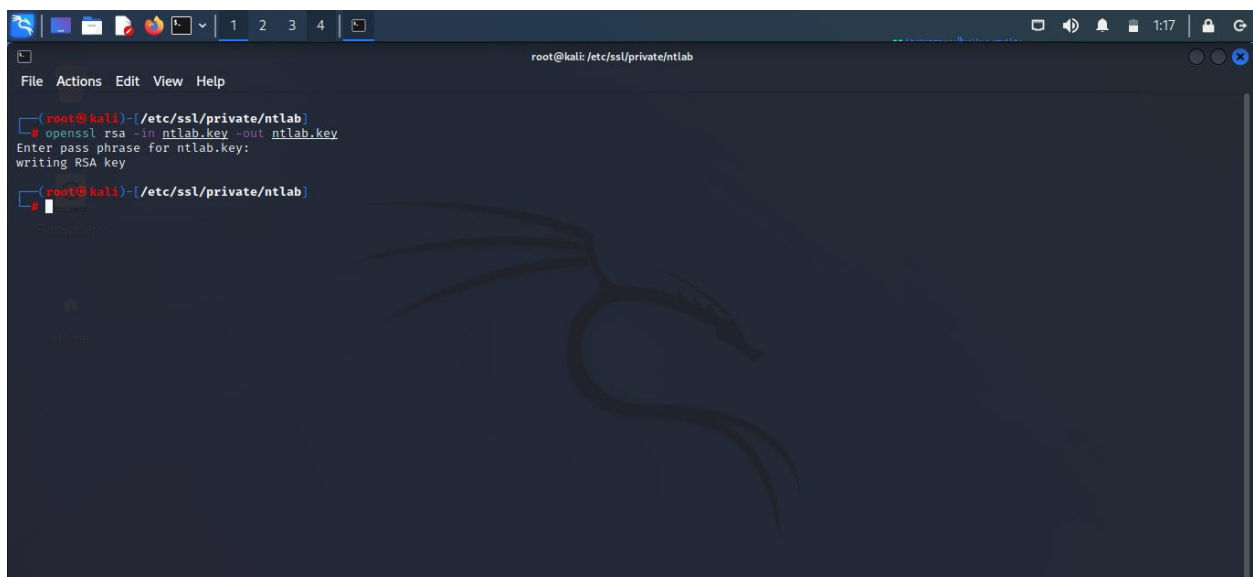
Press **Enter**.



```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help
root@kali)~# openssl rsa -in ntlab.key -out ntlab.key
```

Step 18:

The passphrase is now removed from **ntlab.key**.



```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help
root@kali)~# openssl rsa -in ntlab.key -out ntlab.key
Enter pass phrase for ntlab.key:
writing RSA key
root@kali)~#
```

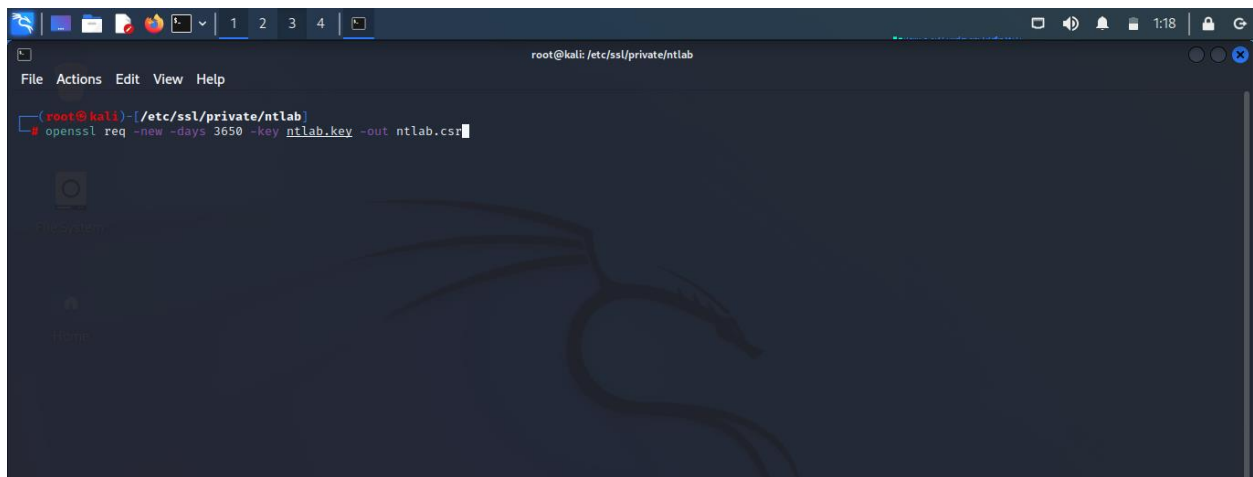
Step 19:

Clear the screen by entering the following command: **clear**

As the next step, you need to generate the Certificate Signing Request (CSR). Type the following command:

```
openssl req -new -days 3650 -key ntlab.key -out ntlab.csr
```

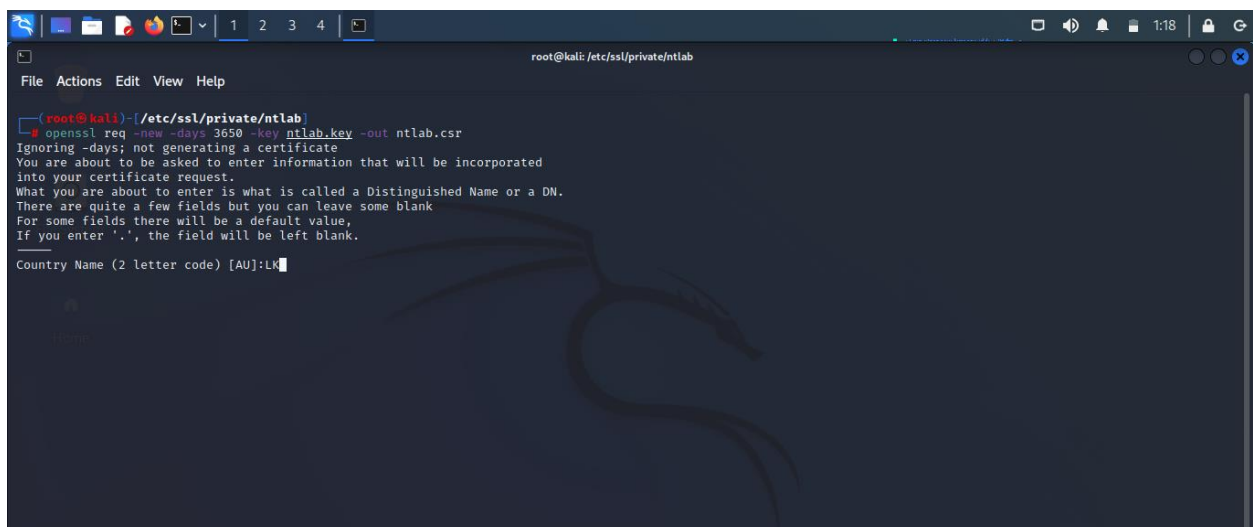
Press **Enter**.

A terminal window titled 'root@kali: /etc/ssl/private/ntlab' with a menu bar (File, Actions, Edit, View, Help). The command 'openssl req -new -days 3650 -key ntlab.key -out ntlab.csr' has been entered and executed. The terminal background features a Kali Linux dragon logo. The window's title bar includes standard Linux window controls and system icons on the right (network, volume, notifications, date/time 1:18, and a lock icon).

Step 20:

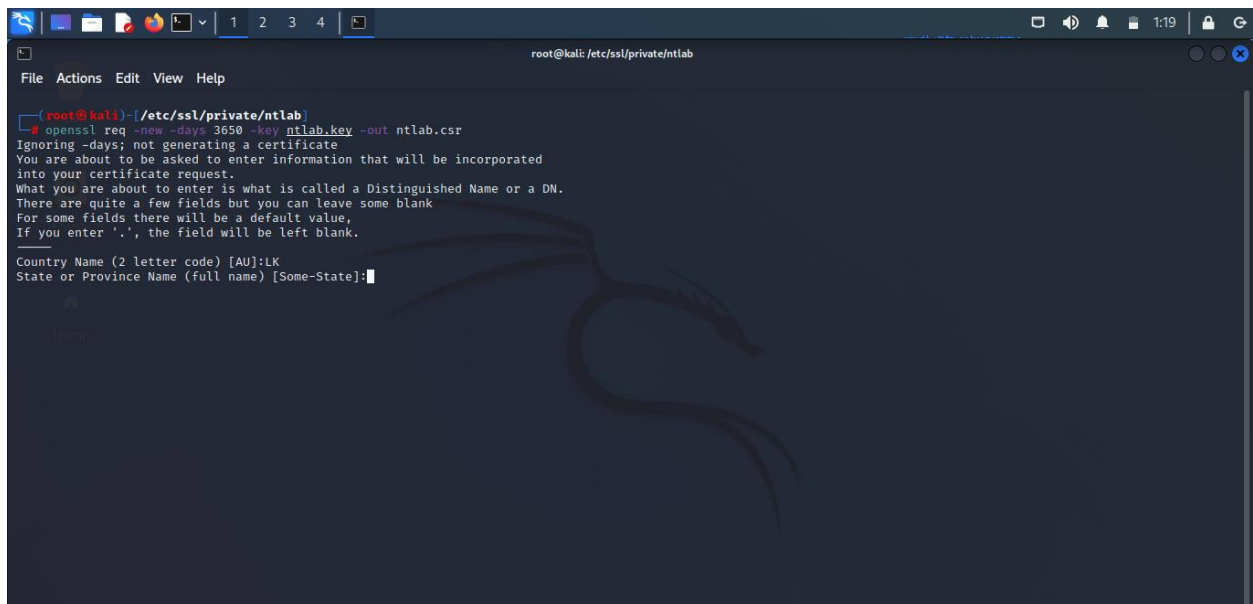
When prompted for the country name, type the following command: **LK**

Press **Enter**.

A terminal window titled 'root@kali: /etc/ssl/private/ntlab' showing the output of the 'openssl req' command. The prompt 'Country Name (2 letter code) [AU]:' is displayed, with 'LK' entered. The terminal background features a Kali Linux dragon logo. The window's title bar includes standard Linux window controls and system icons on the right (network, volume, notifications, date/time 1:18, and a lock icon).

Step 21:

You are now prompted for state or province name.



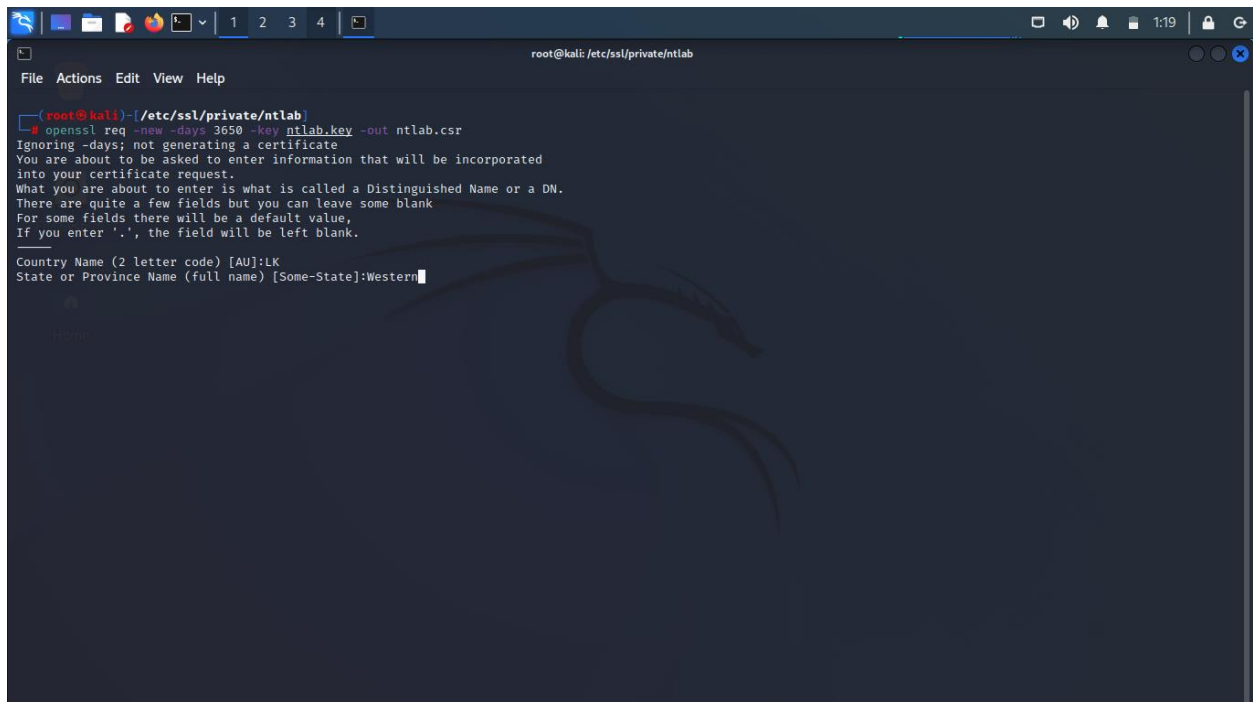
```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help

root@kali:~# openssl req -new -days 3650 -key ntlab.key -out ntlab.csr
Ignoring -days; not generating a certificate
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) [AU]:LK
State or Province Name (full name) [Some-State]:
```

Step 22:

When prompted for the state or province name, type the following command: **Western**

Press **Enter**.

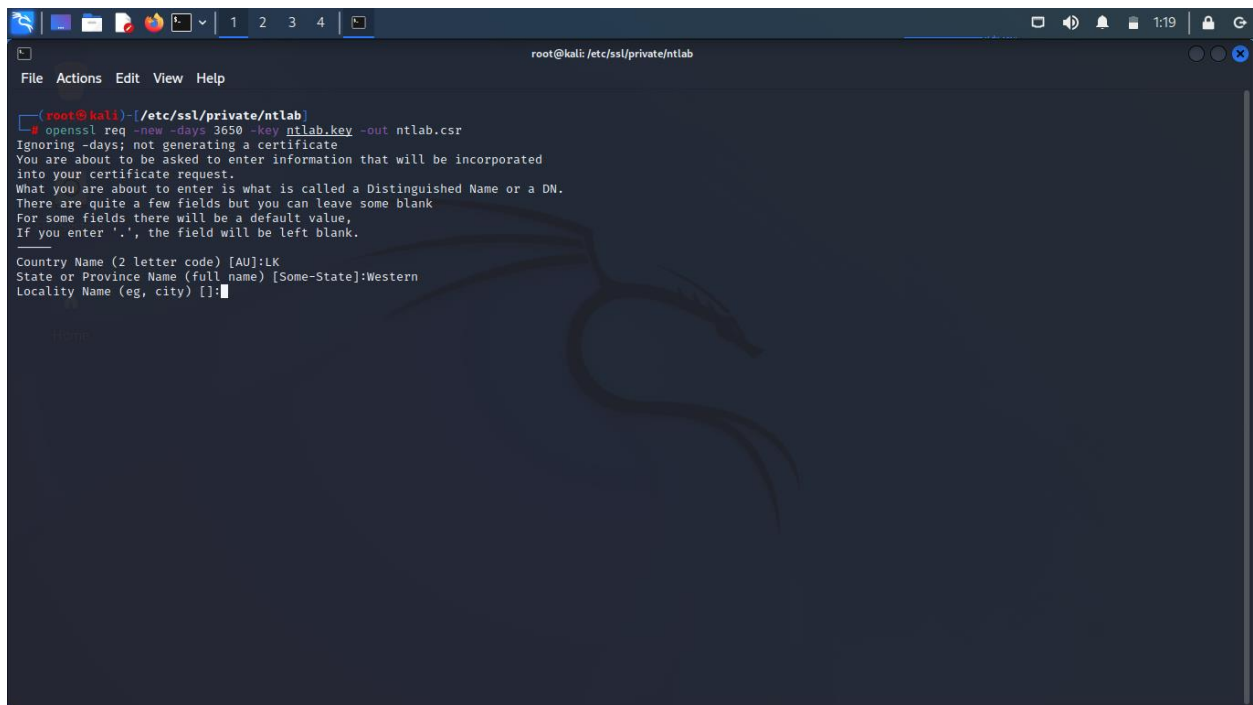


```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help

root@kali:~# openssl req -new -days 3650 -key ntlab.key -out ntlab.csr
Ignoring -days; not generating a certificate
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) [AU]:LK
State or Province Name (full name) [Some-State]:Western
```

Step 23:

You are now prompted for a locality name.

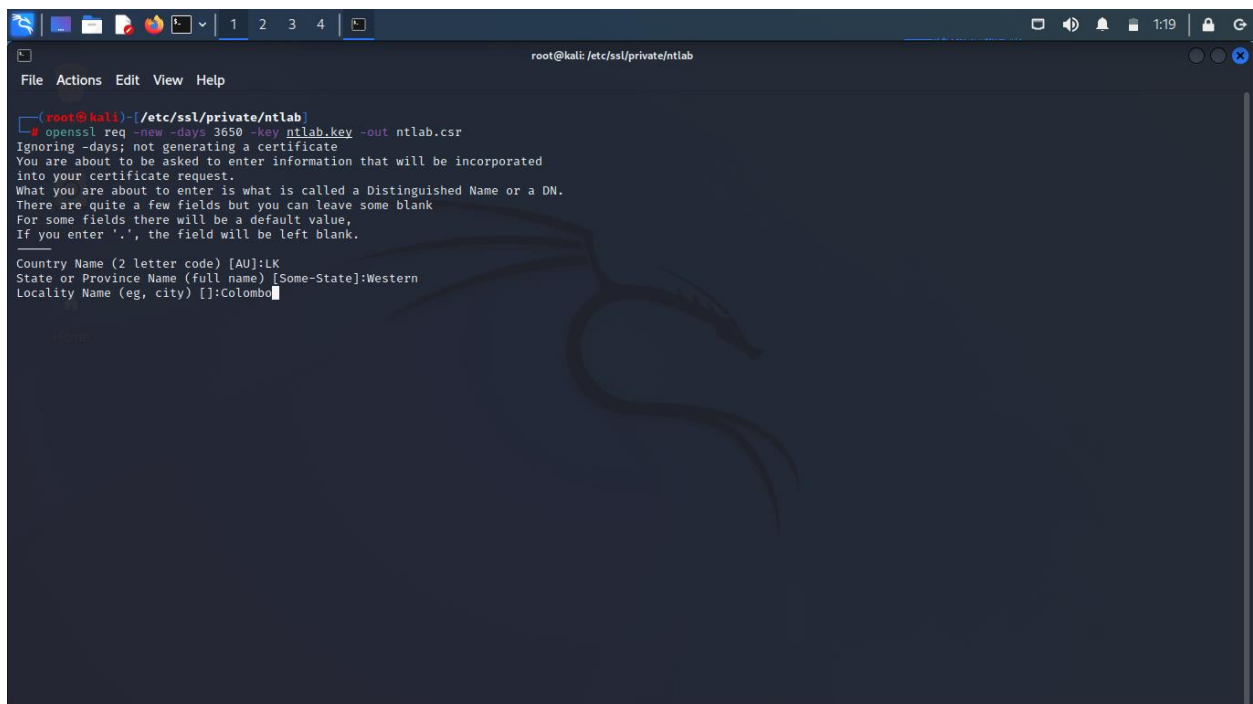


```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help

root@kali)~# openssl req -new -days 3650 -key ntlab.key -out ntlab.csr
Ignoring -days; not generating a certificate
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) [AU]:LK
State or Province Name (full name) [Some-State]:Western
Locality Name (eg, city) []:
```

Step 24:

When prompted for the city name, type the following command: **Colombo**

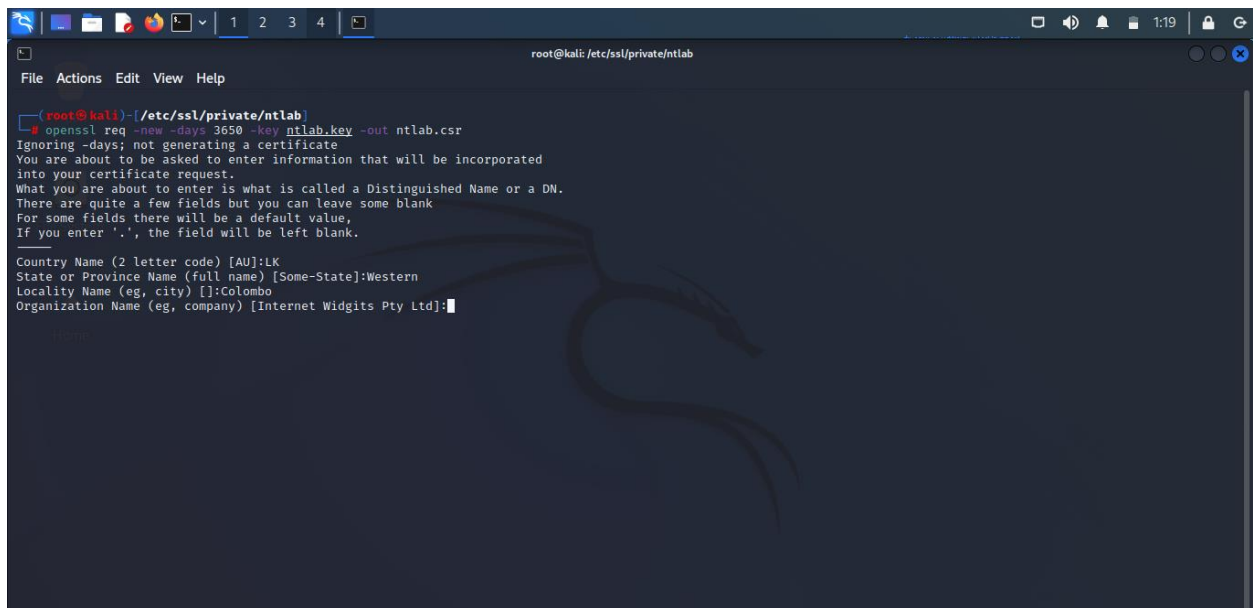


```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help

root@kali)~# openssl req -new -days 3650 -key ntlab.key -out ntlab.csr
Ignoring -days; not generating a certificate
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) [AU]:LK
State or Province Name (full name) [Some-State]:Western
Locality Name (eg, city) []:Colombo
```

Step 25:

You are now prompted for the organization name.

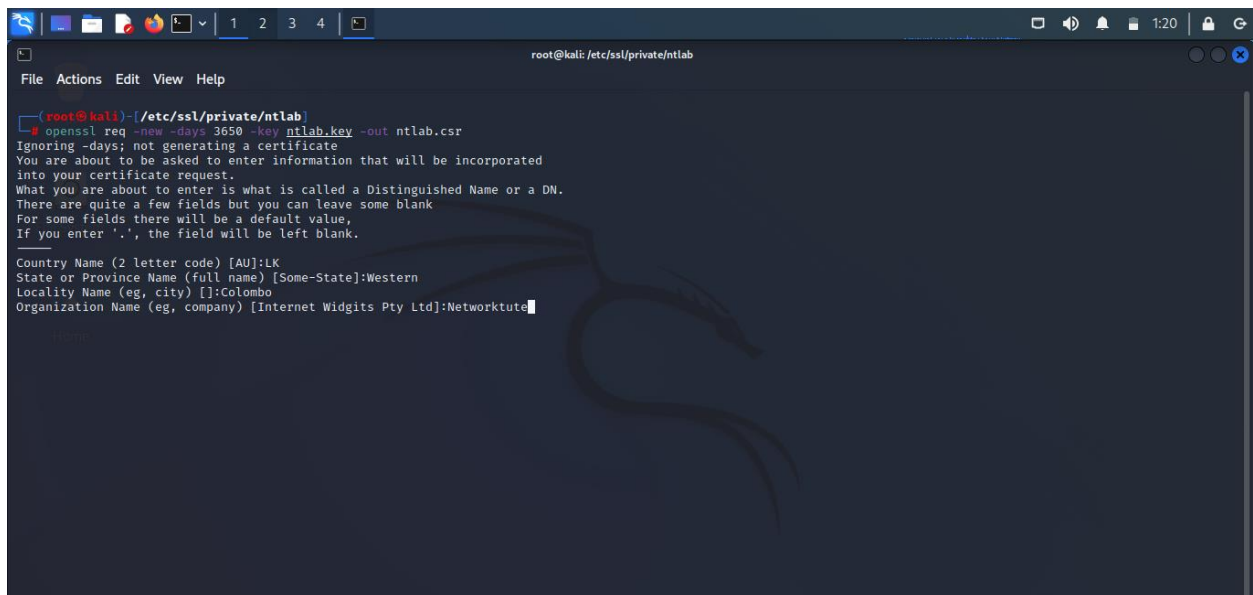
A terminal window titled 'root@kali: /etc/ssl/private/ntlab' showing the execution of the 'openssl req' command. The command is '# openssl req -new -days 3650 -key ntlab.key -out ntlab.csr'. The terminal output shows the command being run, followed by a message 'Ignoring -days; not generating a certificate'. Then, it prompts for information to be incorporated into the certificate request. It asks for a Distinguished Name (DN) and lists fields: Country Name (2 letter code) [AU]:LK, State or Province Name (full name) [Some-State]:Western, Locality Name (eg, city) []:Colombo, and Organization Name (eg, company) [Internet Widgits Pty Ltd]:. The cursor is positioned at the end of the Organization Name field.

```
root@kali: /etc/ssl/private/ntlab
# openssl req -new -days 3650 -key ntlab.key -out ntlab.csr
Ignoring -days; not generating a certificate
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) [AU]:LK
State or Province Name (full name) [Some-State]:Western
Locality Name (eg, city) []:Colombo
Organization Name (eg, company) [Internet Widgits Pty Ltd]:
```

Step 26:

When prompted for the organization name, type the following command: **Networktute**

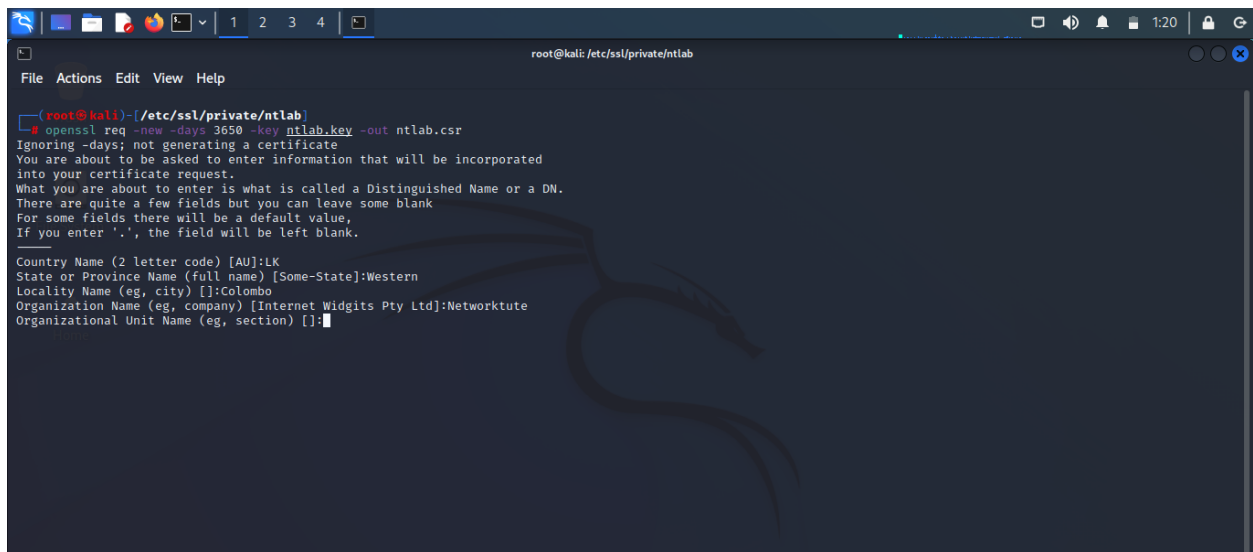
Press **Enter**.

A terminal window titled 'root@kali: /etc/ssl/private/ntlab' showing the same 'openssl req' command as in Step 25. The output is identical up to the Organization Name prompt. In this screenshot, the Organization Name field is filled with 'Networktute' and the cursor is at the end of the line.

```
root@kali: /etc/ssl/private/ntlab
# openssl req -new -days 3650 -key ntlab.key -out ntlab.csr
Ignoring -days; not generating a certificate
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) [AU]:LK
State or Province Name (full name) [Some-State]:Western
Locality Name (eg, city) []:Colombo
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Networktute
```

Step 27:

You are now prompted for the organizational unit.



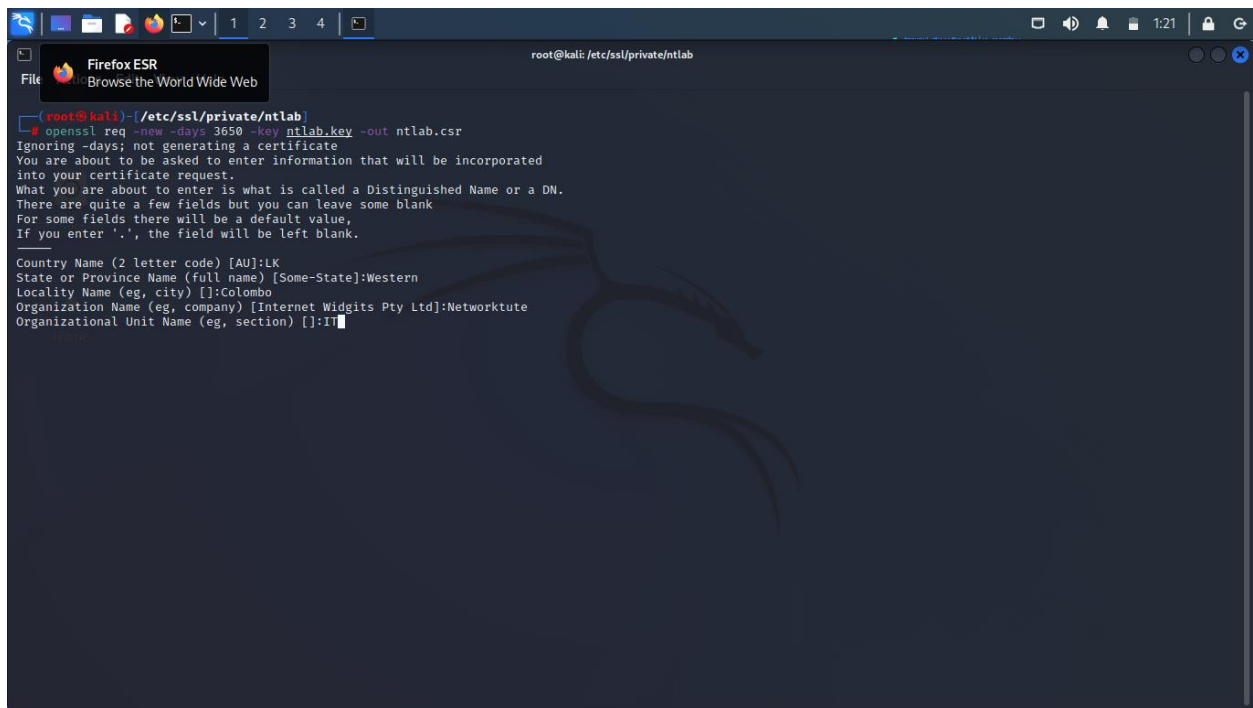
```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help

root@kali)~# openssl req -new -days 3650 -key ntlab.key -out ntlab.csr
Ignoring -days; not generating a certificate
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) [AU]:LK
State or Province Name (full name) [Some-State]:Western
Locality Name (eg, city) []:Colombo
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Networktute
Organizational Unit Name (eg, section) []:
```

Step 28:

When prompted for the organizational unit name, type the following command: ***IT***

Press Enter.

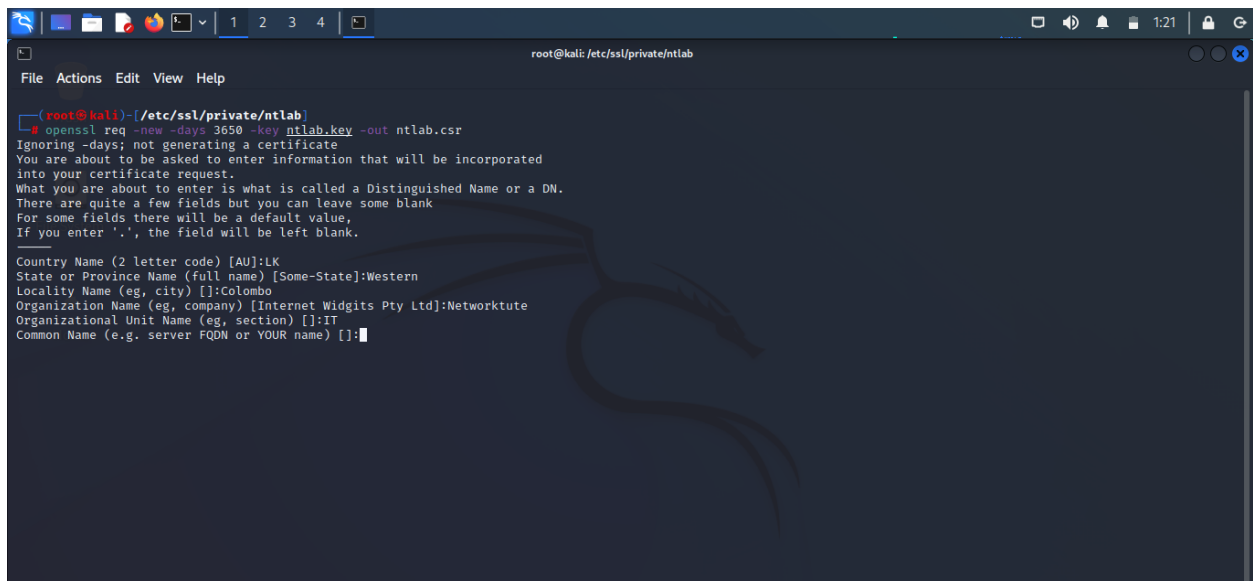


```
root@kali: /etc/ssl/private/ntlab
File Firefox ESR Browse the World Wide Web

root@kali)~# openssl req -new -days 3650 -key ntlab.key -out ntlab.csr
Ignoring -days; not generating a certificate
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) [AU]:LK
State or Province Name (full name) [Some-State]:Western
Locality Name (eg, city) []:Colombo
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Networktute
Organizational Unit Name (eg, section) []:IT
```

Step 29:

You are now prompted for the common name.



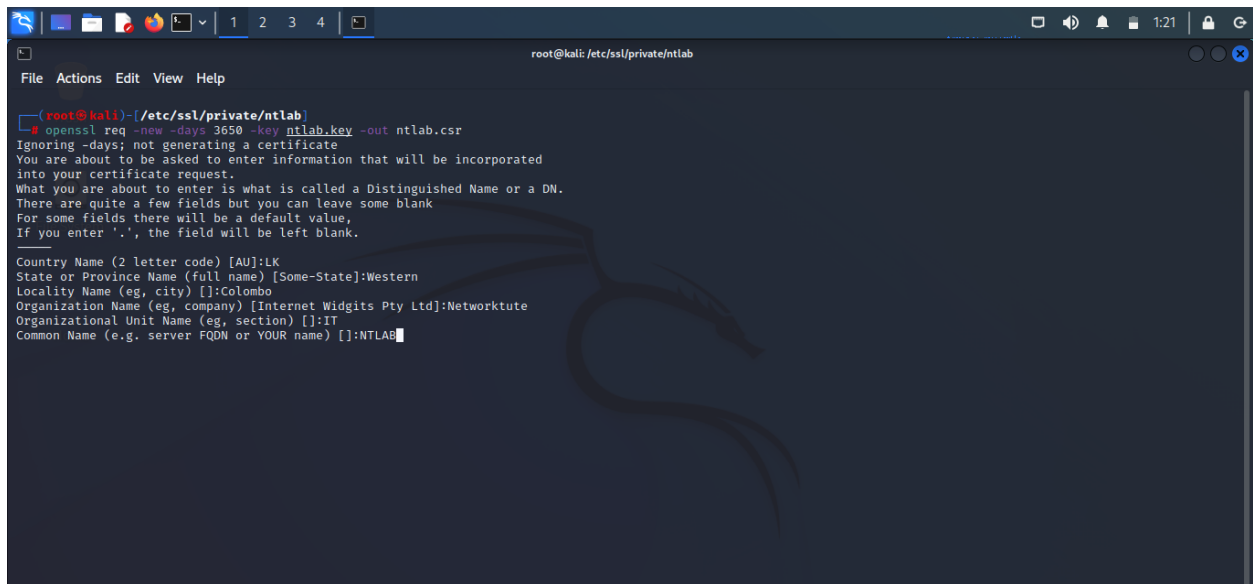
```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help

root@kali)~# /etc/ssl/private/ntlab
root@kali)~# openssl req -new -days 3650 -key ntlab.key -out ntlab.csr
Ignoring -days; not generating a certificate
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) [AU]:LK
State or Province Name (full name) [Some-State]:Western
Locality Name (eg, city) []:Colombo
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Networktute
Organizational Unit Name (eg, section) []:IT
Common Name (e.g. server FQDN or YOUR name) []:
```

Step 30:

When prompted for the common name, type the following command: **NTLAB**

Press **Enter**.

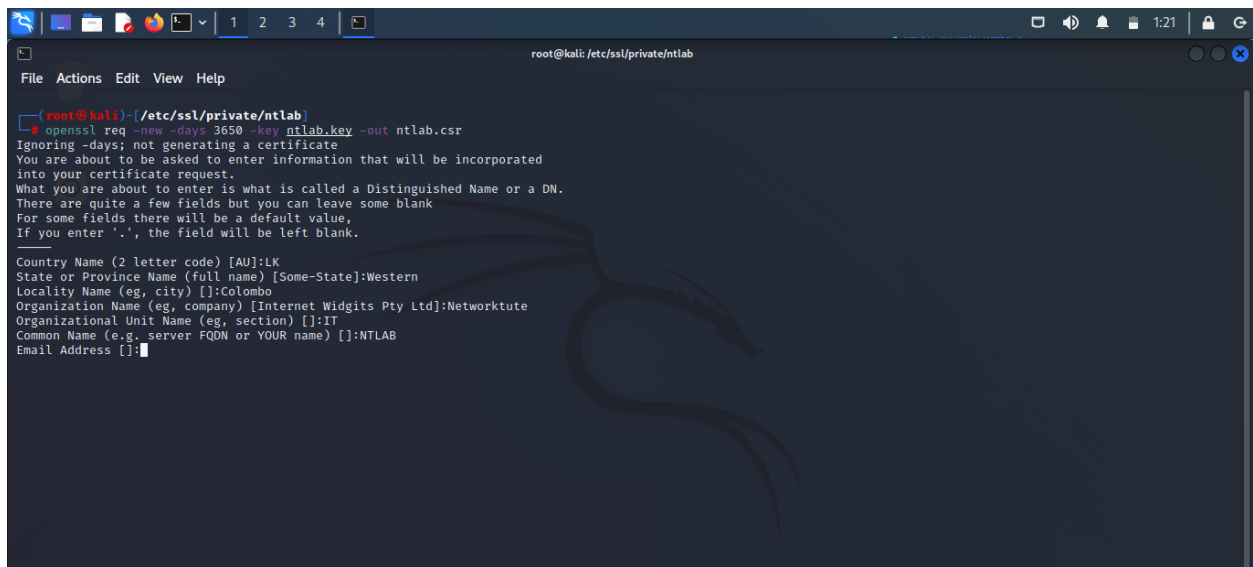


```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help

root@kali)~# /etc/ssl/private/ntlab
root@kali)~# openssl req -new -days 3650 -key ntlab.key -out ntlab.csr
Ignoring -days; not generating a certificate
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) [AU]:LK
State or Province Name (full name) [Some-State]:Western
Locality Name (eg, city) []:Colombo
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Networktute
Organizational Unit Name (eg, section) []:IT
Common Name (e.g. server FQDN or YOUR name) []:NTLAB
```


Step 31:

You are now prompted for the Email address.



```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help

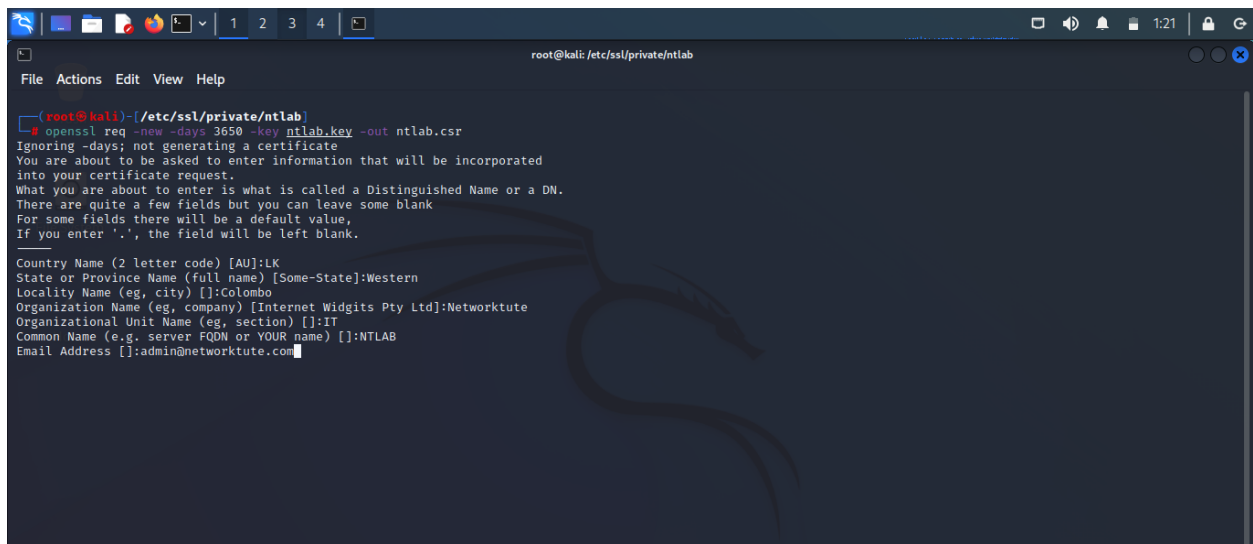
root@kali)~# openssl req -new -days 3650 -key ntlab.key -out ntlab.csr
Ignoring -days; not generating a certificate
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There 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) [AU]:LK
State or Province Name (full name) [Some-State]:Western
Locality Name (eg, city) []:Colombo
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Networktute
Organizational Unit Name (eg, section) []:IT
Common Name (e.g. server FQDN or YOUR name) []:NTLAB
Email Address []:
```

Step 32:

When prompted for the Email address, type the following command:

admin@networktute.com

Press **Enter**.

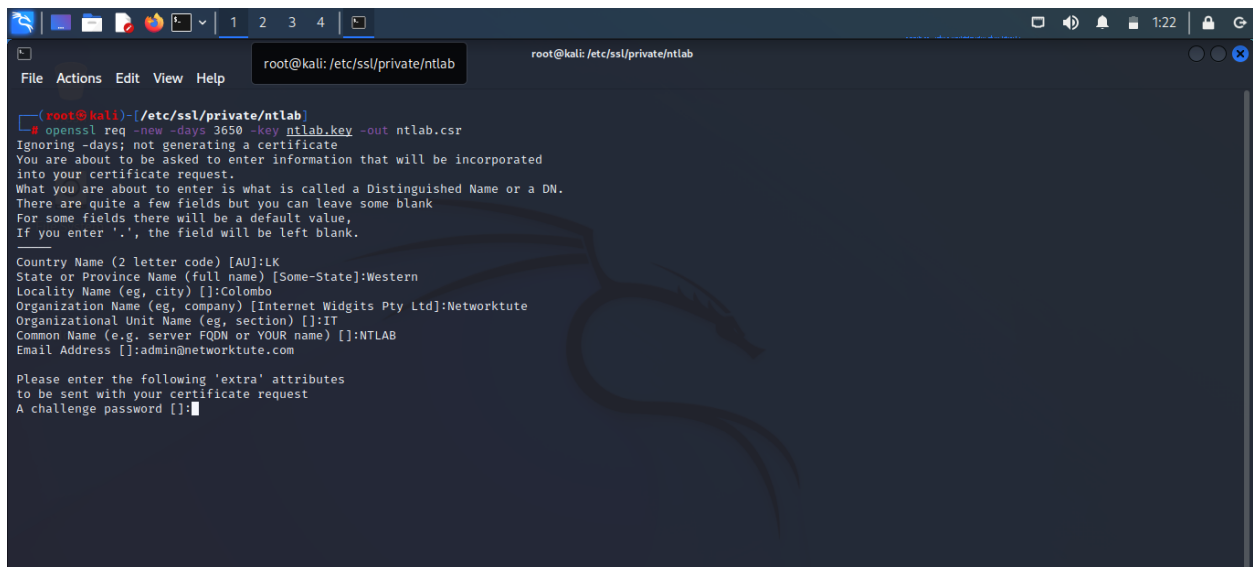


```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help

root@kali)~# openssl req -new -days 3650 -key ntlab.key -out ntlab.csr
Ignoring -days; not generating a certificate
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) [AU]:LK
State or Province Name (full name) [Some-State]:Western
Locality Name (eg, city) []:Colombo
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Networktute
Organizational Unit Name (eg, section) []:IT
Common Name (e.g. server FQDN or YOUR name) []:NTLAB
Email Address []:admin@networktute.com
```

Step 33:

You are now prompted for a challenge password.



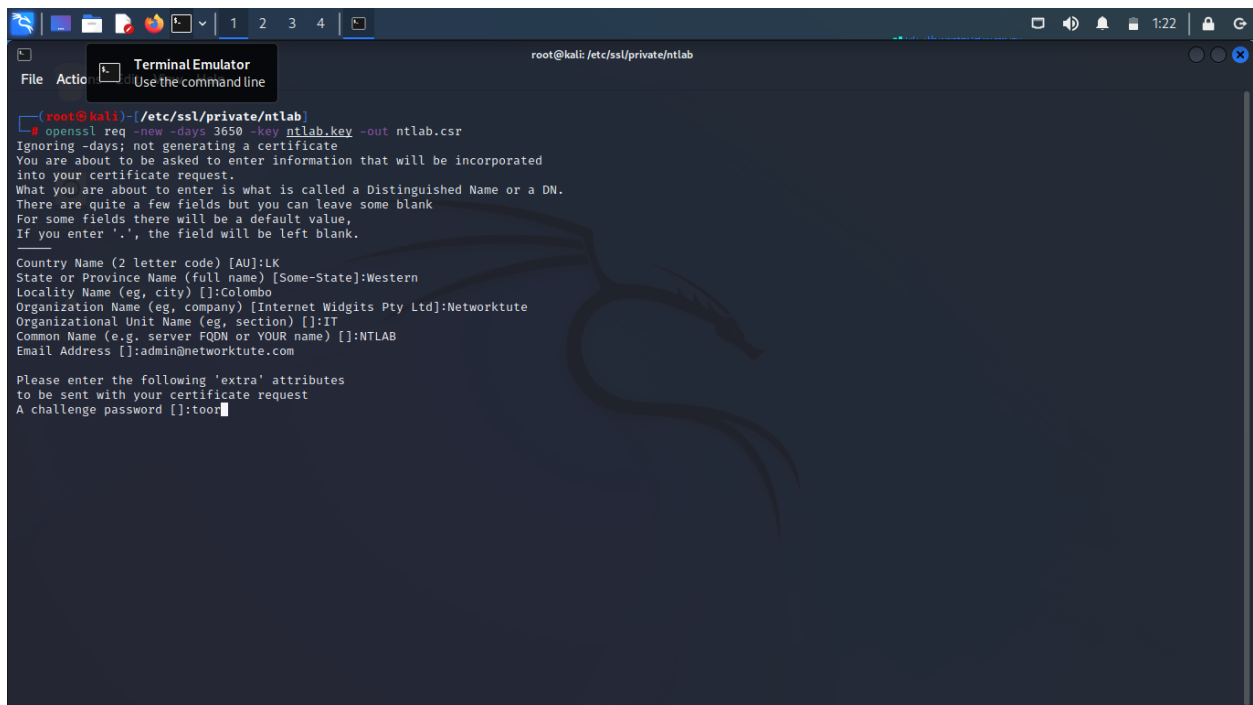
```
root@kali: /etc/ssl/private/ntlab
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help
root@kali)~# openssl req -new -days 3650 -key ntlab.key -out ntlab.csr
Ignoring -days; not generating a certificate
You are about to be asked to enter information that will be incorporated
into your certificate 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) [AU]:LK
State or Province Name (full name) [Some-State]:Western
Locality Name (eg, city) []:Colombo
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Networktute
Organizational Unit Name (eg, section) []:IT
Common Name (e.g. server FQDN or YOUR name) []:NTLAB
Email Address []:admin@networktute.com

Please enter the following 'extra' attributes
to be sent with your certificate request
A challenge password []:
```

Step 34:

When prompted for the challenge password, type the following command: **toor**

Press Enter.

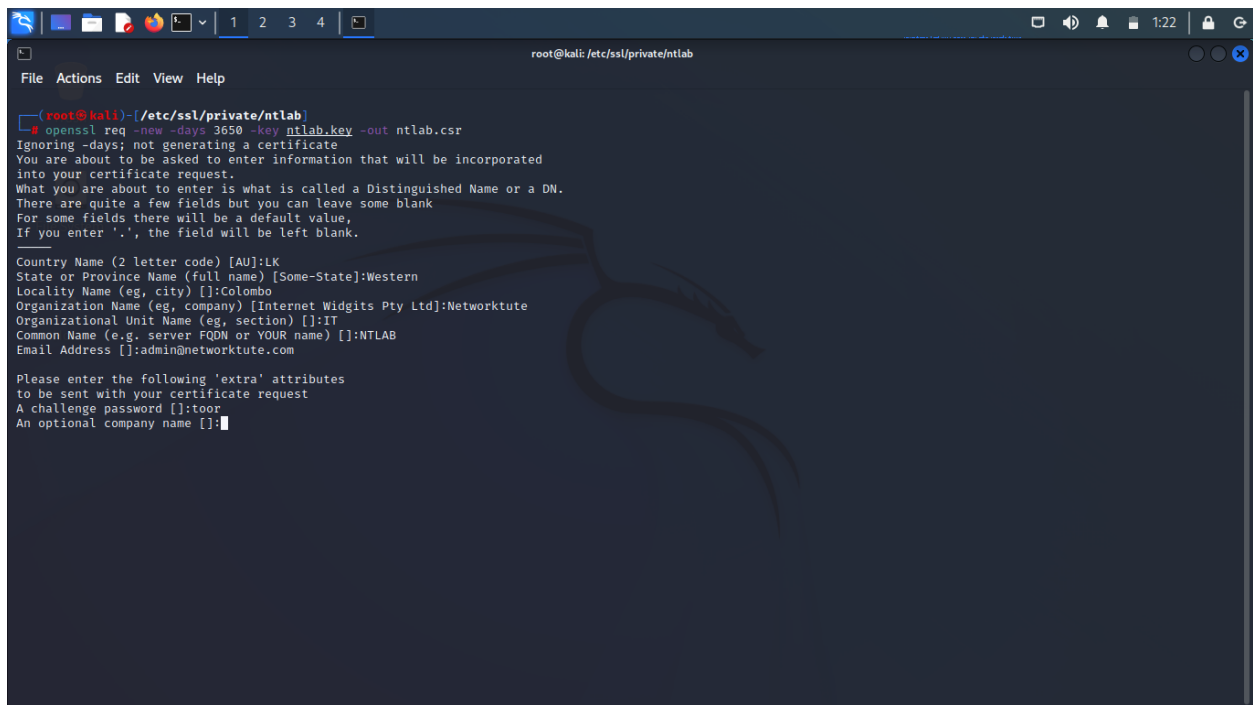


```
root@kali: /etc/ssl/private/ntlab
root@kali: /etc/ssl/private/ntlab
File Action Terminal Emulator Use the command line
root@kali)~# openssl req -new -days 3650 -key ntlab.key -out ntlab.csr
Ignoring -days; not generating a certificate
You are about to be asked to enter information that will be incorporated
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) [AU]:LK
State or Province Name (full name) [Some-State]:Western
Locality Name (eg, city) []:Colombo
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Networktute
Organizational Unit Name (eg, section) []:IT
Common Name (e.g. server FQDN or YOUR name) []:NTLAB
Email Address []:admin@networktute.com

Please enter the following 'extra' attributes
to be sent with your certificate request
A challenge password []:toor
```

Step 35:

You are now prompted for an optional company name.



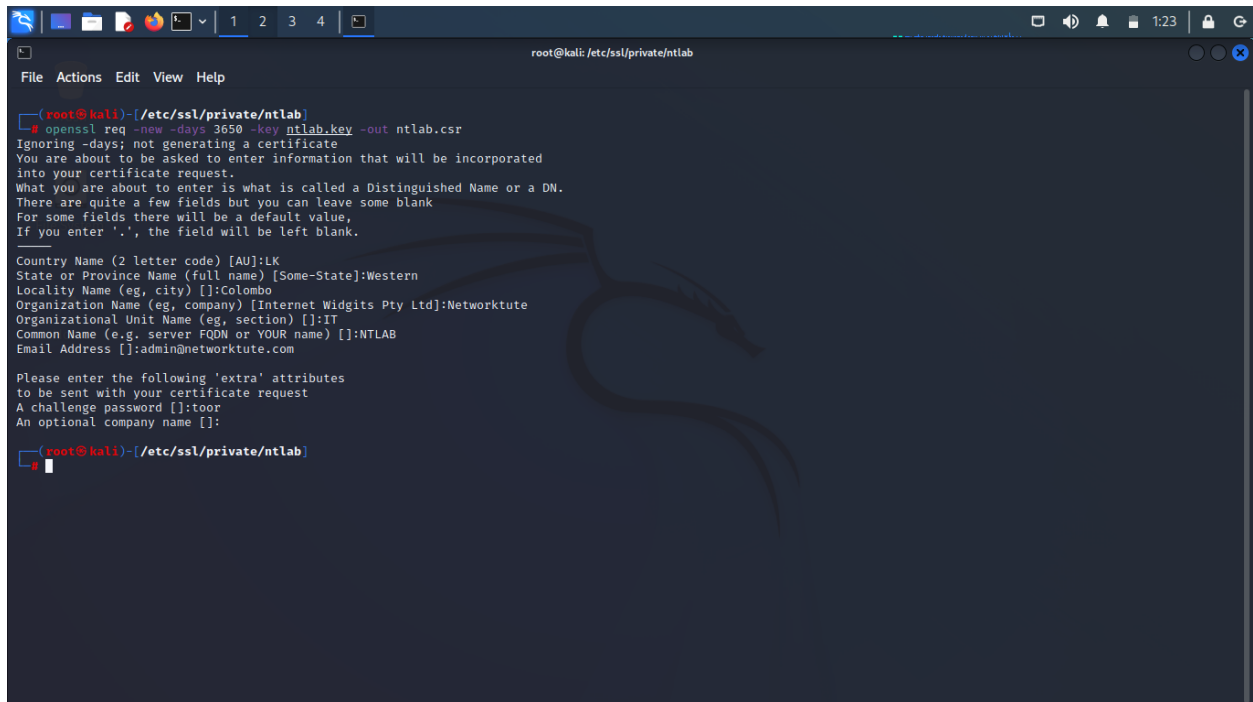
```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help

root@kali)~[/etc/ssl/private/ntlab]
# openssl req -new -days 3650 -key ntlab.key -out ntlab.csr
Ignoring -days; not generating a certificate
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) [AU]:LK
State or Province Name (full name) [Some-State]:Western
Locality Name (eg, city) []:Colombo
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Networktute
Organizational Unit Name (eg, section) []:IT
Common Name (e.g. server FQDN or YOUR name) []:NTLAB
Email Address []:admin@networktute.com

Please enter the following 'extra' attributes
to be sent with your certificate request
A challenge password []:toor
An optional company name []:
```

Step 36:

When prompted for an optional company name, press **Enter**. The CSR file is now generated



```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help

root@kali)~[/etc/ssl/private/ntlab]
# openssl req -new -days 3650 -key ntlab.key -out ntlab.csr
Ignoring -days; not generating a certificate
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) [AU]:LK
State or Province Name (full name) [Some-State]:Western
Locality Name (eg, city) []:Colombo
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Networktute
Organizational Unit Name (eg, section) []:IT
Common Name (e.g. server FQDN or YOUR name) []:NTLAB
Email Address []:admin@networktute.com

Please enter the following 'extra' attributes
to be sent with your certificate request
A challenge password []:toor
An optional company name []:
#
```

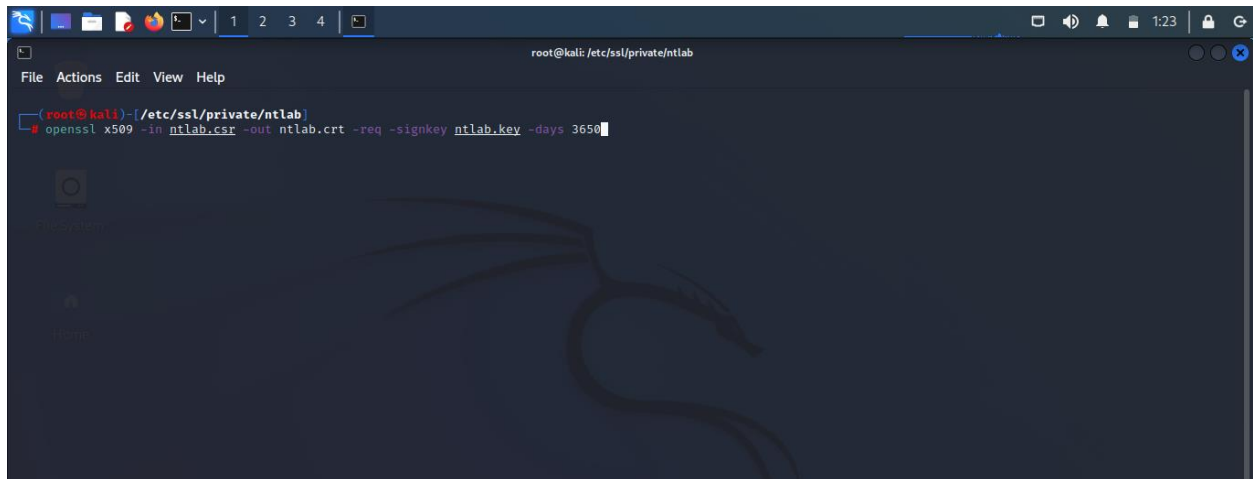
Step 37:

Clear the screen by entering the following command: *clear*

You will now generate the certificate file from the CSR and the private key files. Type the following command:

```
openssl x509 -in ntlab.csr -out ntlab.crt -req -signkey ntlab.key -days 3650
```

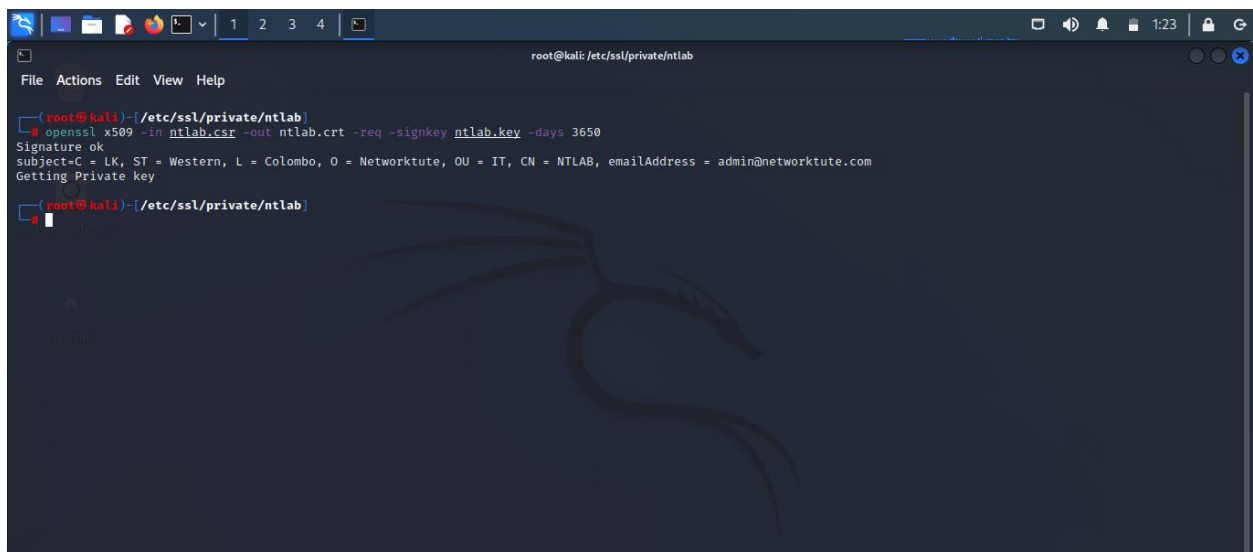
Press **Enter**.

A terminal window titled 'root@kali: /etc/ssl/private/ntlab' with a menu bar (File, Actions, Edit, View, Help). The terminal shows the command 'openssl x509 -in ntlab.csr -out ntlab.crt -req -signkey ntlab.key -days 3650' being entered. The background features a Kali Linux dragon logo.

```
root@kali: /etc/ssl/private/ntlab
root@kali)~# openssl x509 -in ntlab.csr -out ntlab.crt -req -signkey ntlab.key -days 3650
```

Step 38:

The certificate file is now generated.

A terminal window titled 'root@kali: /etc/ssl/private/ntlab' with a menu bar (File, Actions, Edit, View, Help). The terminal shows the output of the previous command: 'Signature ok', 'subject=C = LK, ST = Western, L = Colombo, O = Networktute, OU = IT, CN = NTLAB, emailAddress = admin@networktute.com', and 'Getting Private key'. The background features a Kali Linux dragon logo.

```
root@kali: /etc/ssl/private/ntlab
root@kali)~# openssl x509 -in ntlab.csr -out ntlab.crt -req -signkey ntlab.key -days 3650
Signature ok
subject=C = LK, ST = Western, L = Colombo, O = Networktute, OU = IT, CN = NTLAB, emailAddress = admin@networktute.com
Getting Private key
root@kali)~#
```

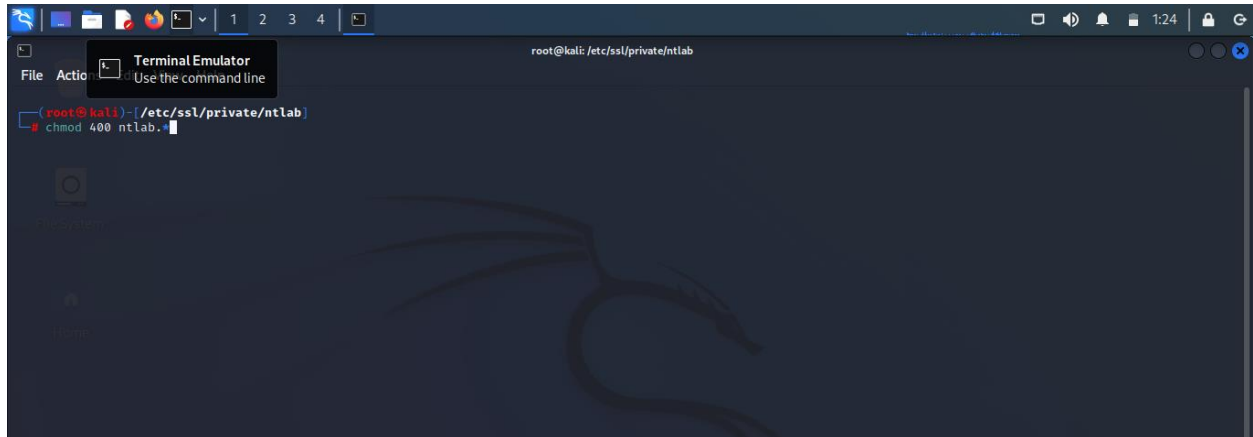
Step 39:

Clear the screen by entering the following command: *clear*

You will use the `chmod` command to ensure that these files are not accessible to other users. You will set the read permission for the root user. Type the following command:

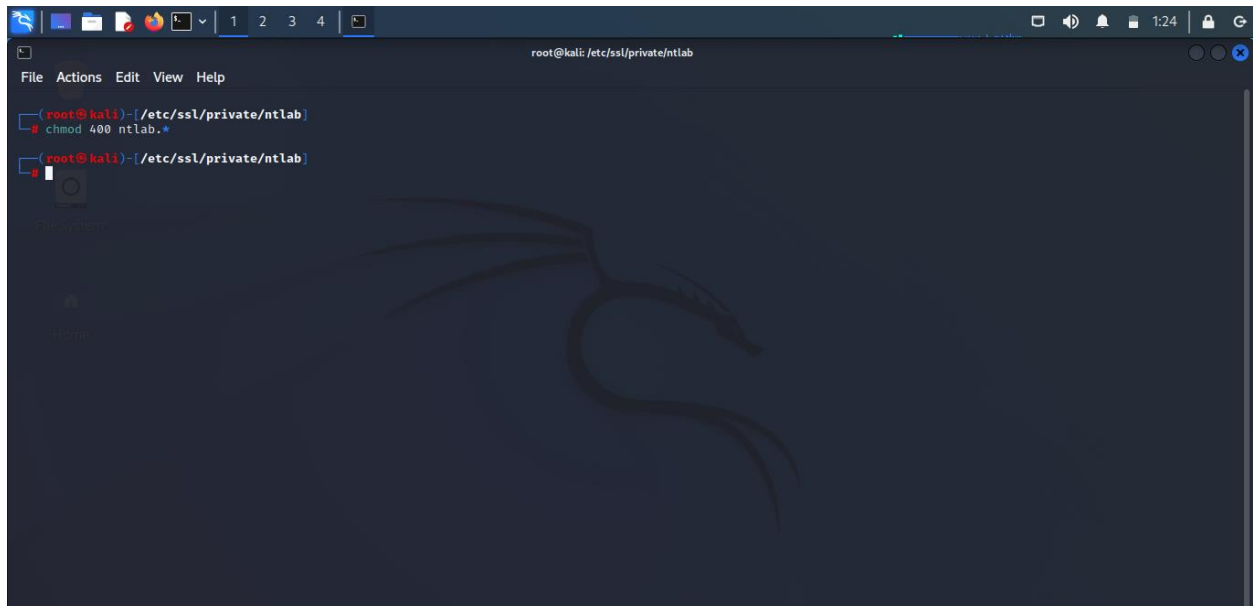
```
chmod 400 ntlab.*
```

Press **Enter**.

A screenshot of a Kali Linux terminal window titled "Terminal Emulator". The window shows the prompt "root@kali: /etc/ssl/private/ntlab". The command "chmod 400 ntlab.*" has been entered and is currently being typed, with the cursor at the end of the command. The terminal background features a faint Kali Linux dragon logo. The top of the window has a menu bar with "File" and "Actions" visible, and a status bar at the bottom showing the time as 1:24.

Step 40:

Notice that you have changed the permissions for multiple files at once.

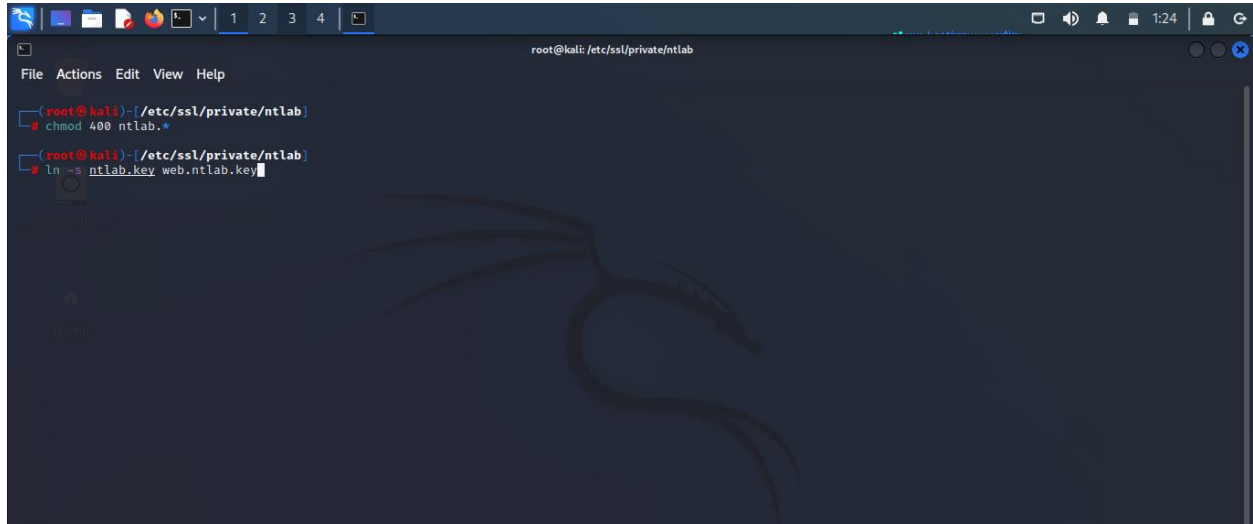
A screenshot of the same Kali Linux terminal window. The command "chmod 400 ntlab.*" has been executed, and the prompt has moved to the next line. The terminal background still shows the faint Kali Linux dragon logo. The top of the window has a menu bar with "File", "Actions", "Edit", "View", and "Help" visible, and a status bar at the bottom showing the time as 1:24.

Step 41:

You will now create the symbolic links for the .csr and .crt files. Type the following command to create the symbolic link for the **ntlab.key**:

```
ln -s ntlab.key web.ntlab.key
```

Press **Enter**.

A terminal window titled 'root@kali: /etc/ssl/private/ntlab' showing the execution of two commands. The first command is 'chmod 400 ntlab.' and the second is 'ln -s ntlab.key web.ntlab.key'. The terminal has a dark blue background with a faint dragon logo. The window's title bar includes standard Linux window controls and a system tray with icons for network, volume, and time (1:24).

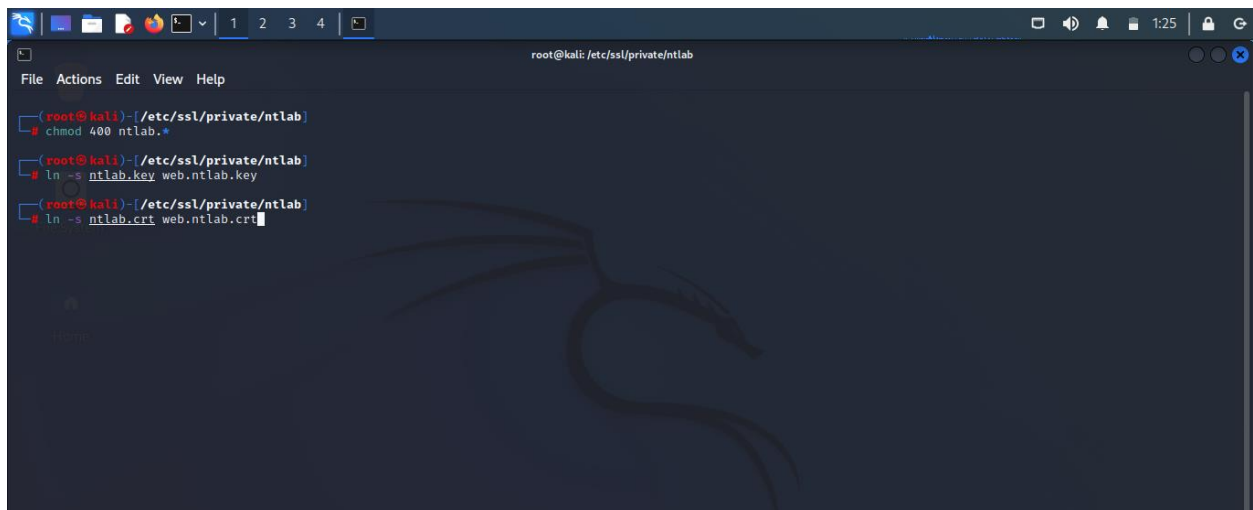
```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help
(root@kali)-/etc/ssl/private/ntlab
# chmod 400 ntlab.
(root@kali)-/etc/ssl/private/ntlab
# ln -s ntlab.key web.ntlab.key
```

Step 42:

To create the symbolic link for the **ntlab.crt** file, type the following command:

```
ln -s ntlab.crt web.ntlab.crt
```

Press **Enter**.

A terminal window titled 'root@kali: /etc/ssl/private/ntlab' showing the execution of three commands. The first two are 'chmod 400 ntlab.' and 'ln -s ntlab.key web.ntlab.key'. The third command is 'ln -s ntlab.crt web.ntlab.crt'. The terminal has a dark blue background with a faint dragon logo. The window's title bar includes standard Linux window controls and a system tray with icons for network, volume, and time (1:25).

```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help
(root@kali)-/etc/ssl/private/ntlab
# chmod 400 ntlab.
(root@kali)-/etc/ssl/private/ntlab
# ln -s ntlab.key web.ntlab.key
(root@kali)-/etc/ssl/private/ntlab
# ln -s ntlab.crt web.ntlab.crt
```

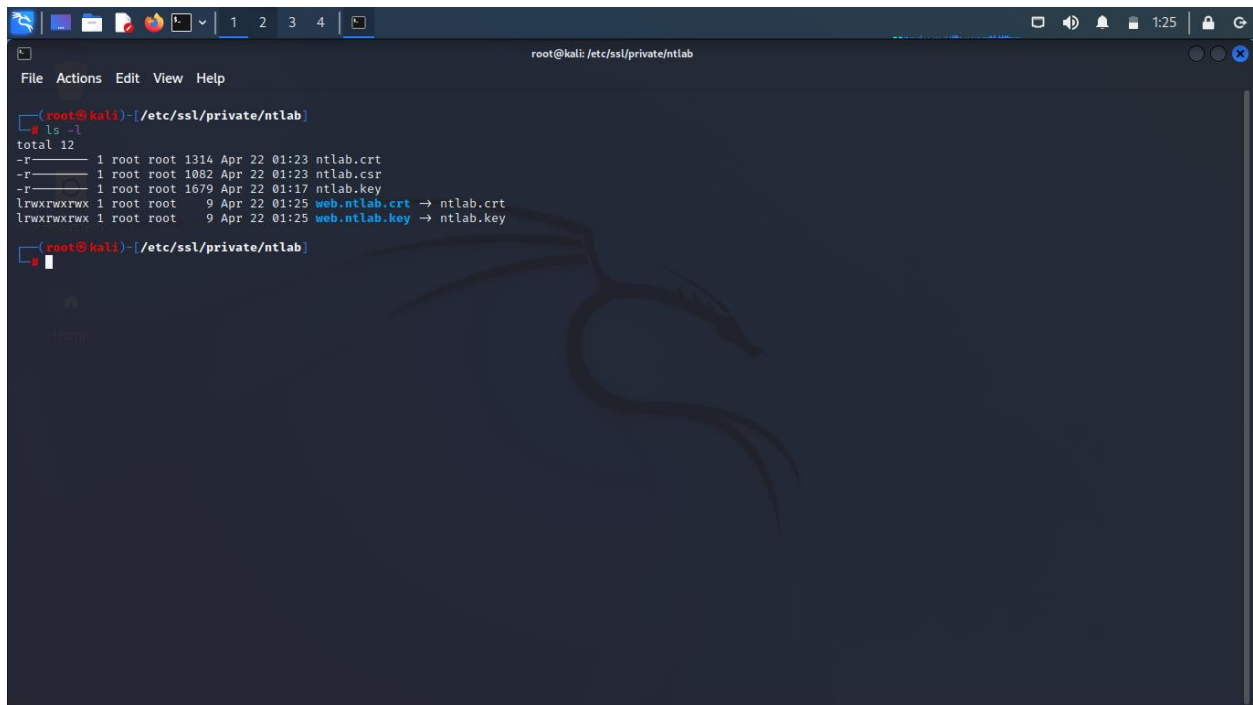
Step 43:

Clear the screen by entering the following command: *clear*

You can list the files in the **/ntlab** directory. Type the following command: *ls -l*

Press **Enter**.

Note: After creating the certificate, you can integrate it into the Web server, such as an Apache Web Server.



```
root@kali: /etc/ssl/private/ntlab
File Actions Edit View Help

root@kali: /etc/ssl/private/ntlab
# ls -l
total 12
-rw-rw-rw- 1 root root 1314 Apr 22 01:23 ntlab.crt
-rw-rw-rw- 1 root root 1082 Apr 22 01:23 ntlab.csr
-rw-rw-rw- 1 root root 1679 Apr 22 01:17 ntlab.key
lrwxrwxrwx 1 root root   9 Apr 22 01:25 web.ntlab.crt -> ntlab.crt
lrwxrwxrwx 1 root root   9 Apr 22 01:25 web.ntlab.key -> ntlab.key

root@kali: /etc/ssl/private/ntlab
#
```