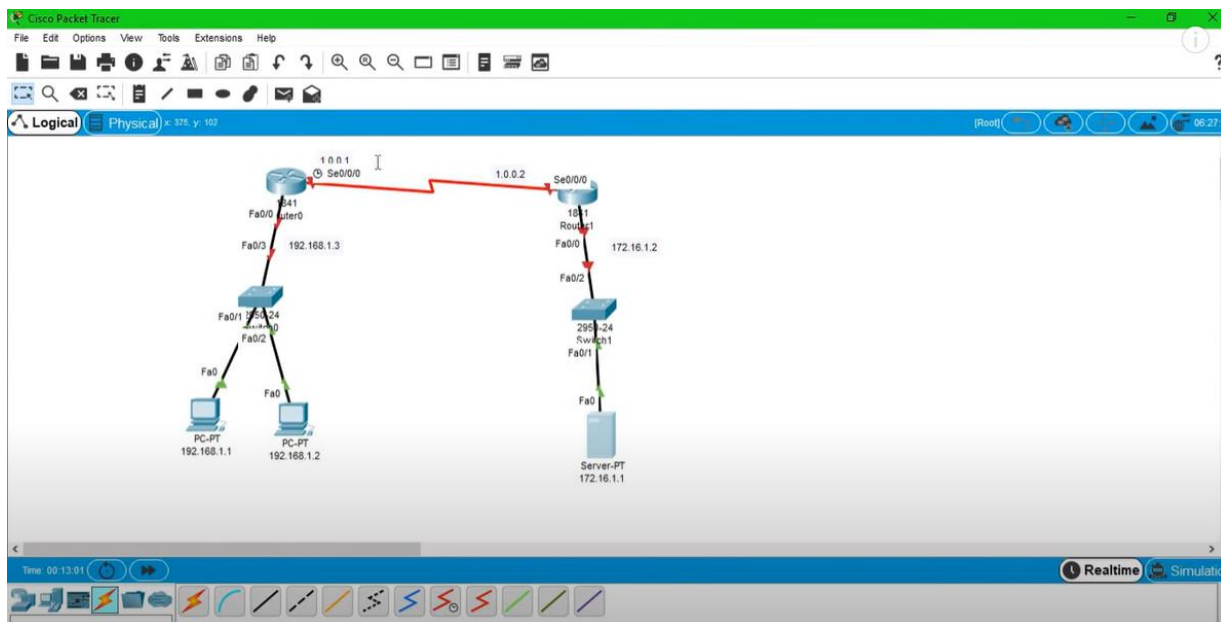


ISM-Lab Challenging Task(Qno. 2)

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Reg.No: 20BCE1989

1. A. Configure a network topology with two routers, two switches, four PCs, a server and configure the static NAT. Submit the necessary screenshot and configuration details in a document.



Router:

```
Router(config)#int fa 0/0
Router(config-if)#ip add 192.168.1.1 255.255.255.0
Router(config-if)#no shut
Router(config-if)#
Router(config-if)#int fa0/1
Router(config-if)#ip add 192.168.2.1 255.255.255.0
Router(config-if)#no shut
```

PC:

```
IP add 192.168.1.10      Subnet mask 255.255.255.0  Default gateway
192.168.1.1
```

Server:

```
IP add 200.0.0.10 Subnet mask 255.255.255.0 Default gateway 200.0.0.1
```

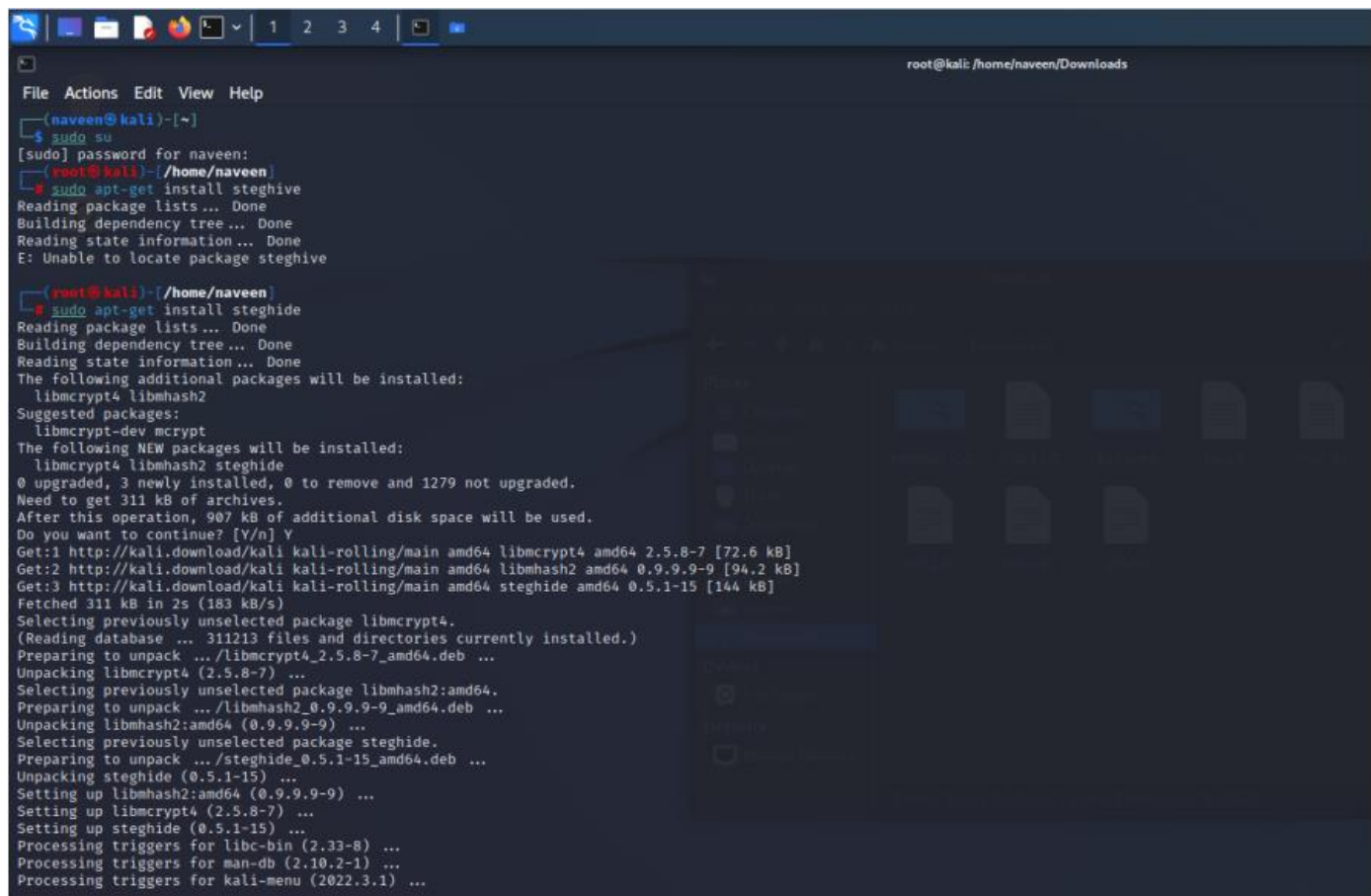
NAT configuration:

```
Router(config)#ip nat inside source static 192.168.1.10  
155.21.21.10
```

```
Router(config)#int fa0/0  
Router(config-if)#ip nat inside  
Router(config-if)#  
Router(config-if)#int fa0/1  
Router(config-if)#ip nat outside
```

b. Madhu has a file that contains the five students' details such as Registration Number, Name, five subject marks (s1, s2, s3, s4, s5) and total. Demonstrate how he can hide and retrieve this file in an image file. Encrypt the file before hiding. [File Name: MARKS]

1. Install steghive tool.



```
(naveen@kali)-[~]
└─$ sudo su
[sudo] password for naveen:
(root@kali)-[/home/naveen]
└─$ sudo apt-get install steghide
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
E: Unable to locate package steghide

(root@kali)-[/home/naveen]
└─$ sudo apt-get install steghide
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libmhash2 libmhash2:amd64
Suggested packages:
  libmhash-dev mhash
The following NEW packages will be installed:
  libmhash2 libmhash2:amd64 steghide
0 upgraded, 3 newly installed, 0 to remove and 1279 not upgraded.
Need to get 311 kB of archives.
After this operation, 907 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://kali.download/kali kali-rolling/main amd64 libmhash2 amd64 0.9.9.9-9 [94.2 kB]
Get:2 http://kali.download/kali kali-rolling/main amd64 libmhash2:amd64 0.9.9.9-9 [94.2 kB]
Get:3 http://kali.download/kali kali-rolling/main amd64 steghide amd64 0.5.1-15 [144 kB]
Fetched 311 kB in 2s (183 kB/s)
Selecting previously unselected package libmhash2.
(Reading database ... 311213 files and directories currently installed.)
Preparing to unpack .../libmhash2_0.9.9.9-9_amd64.deb ...
Unpacking libmhash2:amd64 (0.9.9.9-9) ...
Selecting previously unselected package libmhash2:amd64.
Preparing to unpack .../libmhash2_0.9.9.9-9_amd64.deb ...
Unpacking libmhash2:amd64 (0.9.9.9-9) ...
Selecting previously unselected package steghide.
Preparing to unpack .../steghide_0.5.1-15_amd64.deb ...
Unpacking steghide (0.5.1-15) ...
Setting up libmhash2:amd64 (0.9.9.9-9) ...
Setting up libmhash2 (2.5.8-7) ...
Setting up steghide (0.5.1-15) ...
Processing triggers for libc-bin (2.33-8) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for kali-menu (2022.3.1) ...
```

2. Enter help command to get all possible steghide commands

```

root@kali:~/home/naveen# steghide --help
steghide version 0.5.1

the first argument must be one of the following:
embed, --embed          embed data
extract, --extract      extract data
info, --info            display information about a cover- or stego-file
info <filename>        display information about <filename>
encinfo, --encinfo      display a list of supported encryption algorithms
version, --version       display version information
license, --license       display steghide's license
help, --help            display this usage information

embedding options:
-ef, --embedfile        select file to be embedded
-ef <filename>          embed the file <filename>
-cf, --coverfile        select cover-file
-cf <filename>          embed into the file <filename>
-p, --passphrase        specify passphrase
-p <passphrase>         use <passphrase> to embed data
-sf, --stegofile        select stego file
-sf <filename>          write result to <filename> instead of cover-file
-e, --encryption        select encryption parameters
-e <a>[<m>][<m>[<a>]]    specify an encryption algorithm and/or mode
-e none                 do not encrypt data before embedding
-z, --compress          compress data before embedding (default)
-z <cl>                 using level <cl> (1 best speed...9 best compression)
-Z, --dontcompress     do not compress data before embedding
-K, --nochecksum        do not embed crc32 checksum of embedded data
-N, --dontembedname     do not embed the name of the original file
-f, --force             overwrite existing files
-q, --quiet             suppress information messages
-v, --verbose           display detailed information

extracting options:
-sf, --stegofile        select stego file
-sf <filename>          extract data from <filename>
-p, --passphrase        specify passphrase
-p <passphrase>         use <passphrase> to extract data
-xf, --extractfile      select file name for extracted data
-xf <filename>          write the extracted data to <filename>
-f, --force             overwrite existing files
-q, --quiet             suppress information messages
-v, --verbose           display detailed information

options for the info command:
-p, --passphrase        specify passphrase
-p <passphrase>         use <passphrase> to get info about embedded data

To embed emb.txt in cvr.jpg: steghide embed -cf cvr.jpg -ef emb.txt

```

3. Create text file marks.txt and embed the text file into kali.jpeg image and store the stego file as emarks.jpg.

```
KaliLinux2022.3 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

root@kali: /home/naveen

GNU nano 6.3 marks.txt *
Student 1:
Registration number:20BCE1989
Name: Naveen
subject marks:
s1:80
s2:90
s3:80
s4:70
s5:90

Student 2:
Registration number:20BLC1078
Name: Pugal
subject marks:
s1:70
s2:90
s3:80
s4:80
s5:80

Student 3:
Registration number:20BLC1022
Name: Murli
subject marks:
s1:90
s2:80
s3:90
s4:80
s5:80

Student 4:
Registration number:20BLC1234
Name: Melvin
subject marks:
s1:70
s2:80
s3:80
s4:80
s5:70

Student 5:
Registration number:20BLC2467
Name: Aadithya
subject marks:
s1:70
s2:90
s3:70
s4:80

Help Exit Write Out Read File Where Is Replace Cut Paste Execute Justify Location Go To Line Undo Redo Set Mark Copy To Bracket Where Was Previous Next Back Forward Prev Word Next Word Home End
```

```
(root@kali)-[/home/naveen]
# nano marks.txt

(root@kali)-[/home/naveen]
# cd Downloads

(root@kali)-[/home/naveen/Downloads]
# steghide embed -cf kali.jpeg -ef marks.txt -sf emarks.jpg
Enter passphrase:
Re-Enter passphrase:
embedding "marks.txt" in "kali.jpeg" ... done
writing stego file "emarks.jpg" ... done
```

4. Encrypt the marks.txt file using openssl tool and store the file as out.txt, and embed it into kali.jpeg image and store it as emarks.jpg.

```
(root@kali)-[/home/naveen/Downloads]
# openssl enc -aes-256-cbc -base64 -in marks.txt -out out.txt
enter AES-256-CBC encryption password:
Verifying - enter AES-256-CBC encryption password:
** WARNING : deprecated key derivation used.
Using -iter or -pbkdf2 would be better.

(root@kali)-[/home/naveen/Downloads]
# steghide embed -cf kali.jpeg -ef out.txt -sf emarks.jpg
Enter passphrase:
Re-Enter passphrase:
steghide: the passphrases do not match.

(root@kali)-[/home/naveen/Downloads]
# steghide embed -cf kali.jpeg -ef out.txt -sf emarks.jpg
Enter passphrase:
Re-Enter passphrase:
embedding "out.txt" in "kali.jpeg" ... done
the file "emarks.jpg" does already exist. overwrite ? (y/n) y
writing stego file "emarks.jpg" ... done
```

5. Extract the original encrypted text file from emarks.jpg.

```
(root@kali)-[/home/naveen/Downloads]
# steghide extract -sf emarks.jpg -xf mrks.txt
Enter passphrase:
steghide: could not extract any data with that passphrase!

(root@kali)-[/home/naveen/Downloads]
# steghide extract -sf emarks.jpg -xf mrks.txt
Enter passphrase:
wrote extracted data to "mrks.txt".
```

6. Decrypt the original encrypted file using openssl and read the contents in the file.

```
(root@kali) ~ - [~/home/naveen/Downloads]
# cat mrks.txt
U2FsdGVkX1+rrm7CAEqQkncu+9csAv3V2ndZyaLF5qhZfVUkWWXmmHdtMLvbf2ET
E+vf7+utEfrPvCTm+DXt+n4KnDqTPnRQUL0YUwaZeD1i0Jhp7Wg6LUa3yaZ/R8Z
XGCSJf7rBN5aA/u5Bj57oWjD0p0WVpIb/B1TU+yI7B7g6DtnIN4gs9n06jBWSrK9
9y5RmQcZcBQUMZILjAgp7w2DssCLgiE69I1oDp8Pye2HDgA0EQHd+ybhWz43+7M
kW/SsDlSPnw7PSw/hk2Jf1LYKadhXLQ4FTBxy9g/0AAqcVDBPCKIvAWEofyXFnLE
0Y7X9f1VbKuk6u7koQBs/uRRKBtR+kAJT/u7XZkRqCwbIBLWVhBT969d6+ToqfJ
wlc6aqlb7n7Dr10z5l6rqSDc6ua60VY1XJtVzfHHup51c+FTCubU80bBUGEPKJI
XpYcrxBcbU6UPTACDv38mXmZLVg3ZheQKeqLGYfik4q975fd1Y0hZmlrC/h5di+j
uEYNqVsusM9R4lqQsWlvU9o9KIAggy5s2i6cb0oexo6aLRjLUfomQ80uANJc42mA
epIQujF2BjAa0oAIVtQBunaFb/80zhwJymmSZ5DdIfairpLfYkKbQzzaapm0xm6p
z7YzJLPMEgzTkQMN9gMn+hKj5d7wYrtLHVMBJ1m0x4UKTmt9s/mIdAlyJD+4QShj

(root@kali) ~ - [~/home/naveen/Downloads]
# openssl enc -aes-256-cbc -d -base64 -in mrks.txt -out out2.txt
enter AES-256-CBC decryption password:
** WARNING : deprecated key derivation used.
Using -iter or -pbkdf2 would be better.

(root@kali) ~ - [~/home/naveen/Downloads]
# cat out2.txt
Student 1:
Registration number:20BCE1989
Name: Naveen
subject marks:
s1:80
s2:90
s3:80
s4:70
s5:90

Student 2:
Registration number:20BLC1078
Name: Pugal
subject marks:
s1:70
s2:90
s3:80
s4:80
s5:80

Student 3:
Registration number:20BLC1022
Name: Murli
subject marks:
s1:90
s2:80
s3:90
s4:80
s5:80

Student 4:
Registration number:20BLC1234
Name: Melvin
subject marks:
s1:70
s2:60
s3:80
s4:80
s5:70

Student 5:
Registration number:20BLC2467
Name: Aadithya
subject marks:
s1:70
s2:90
s3:70
s4:80
s5:80
```