



Network (2), CCE 463
Fourth Year
Computers and Control Eng. (CCE) Program
Regulation (2019)
Second Semester, 2023/2024

Experiment (9): Securing data with IPSec VPN

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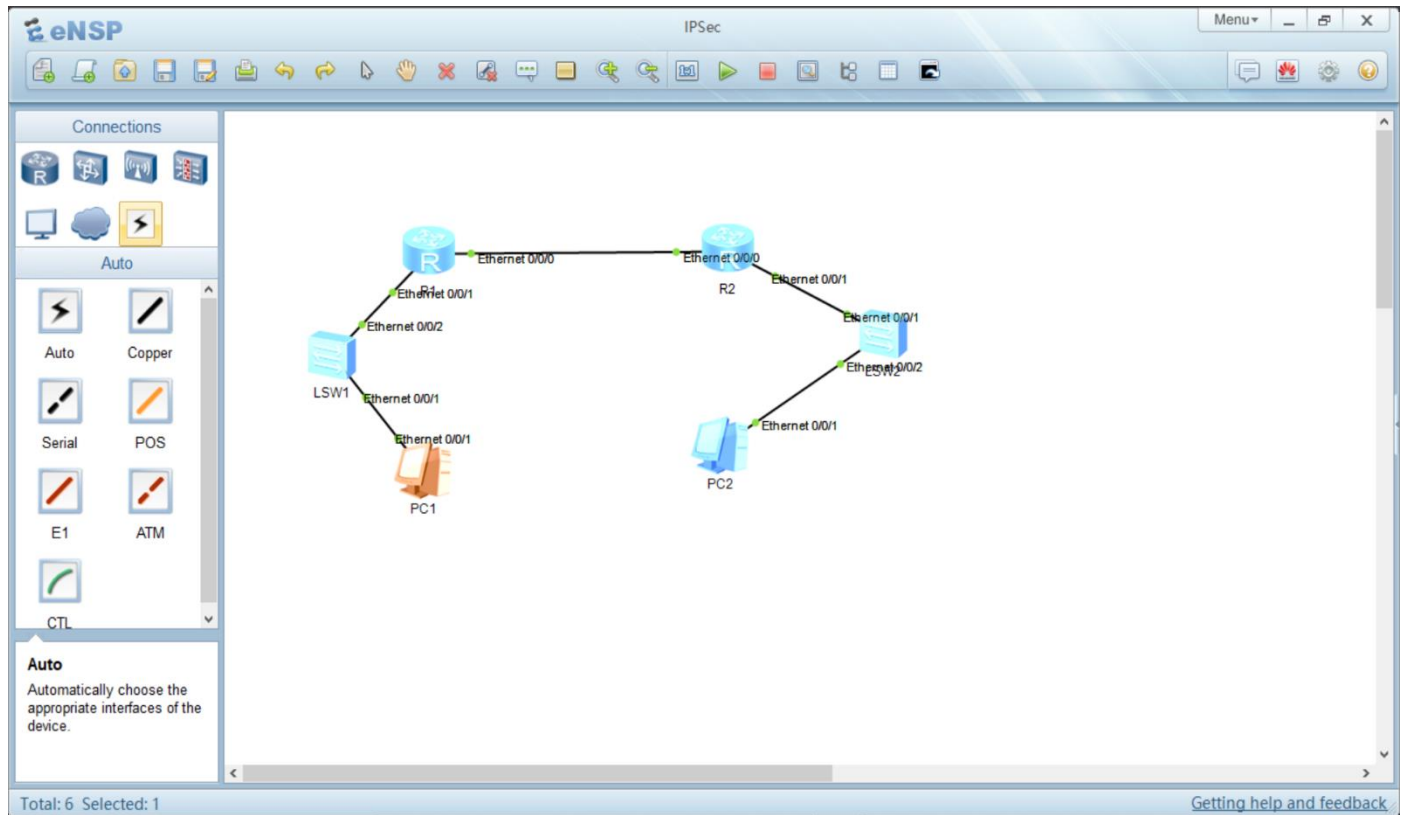
Section Number : 2

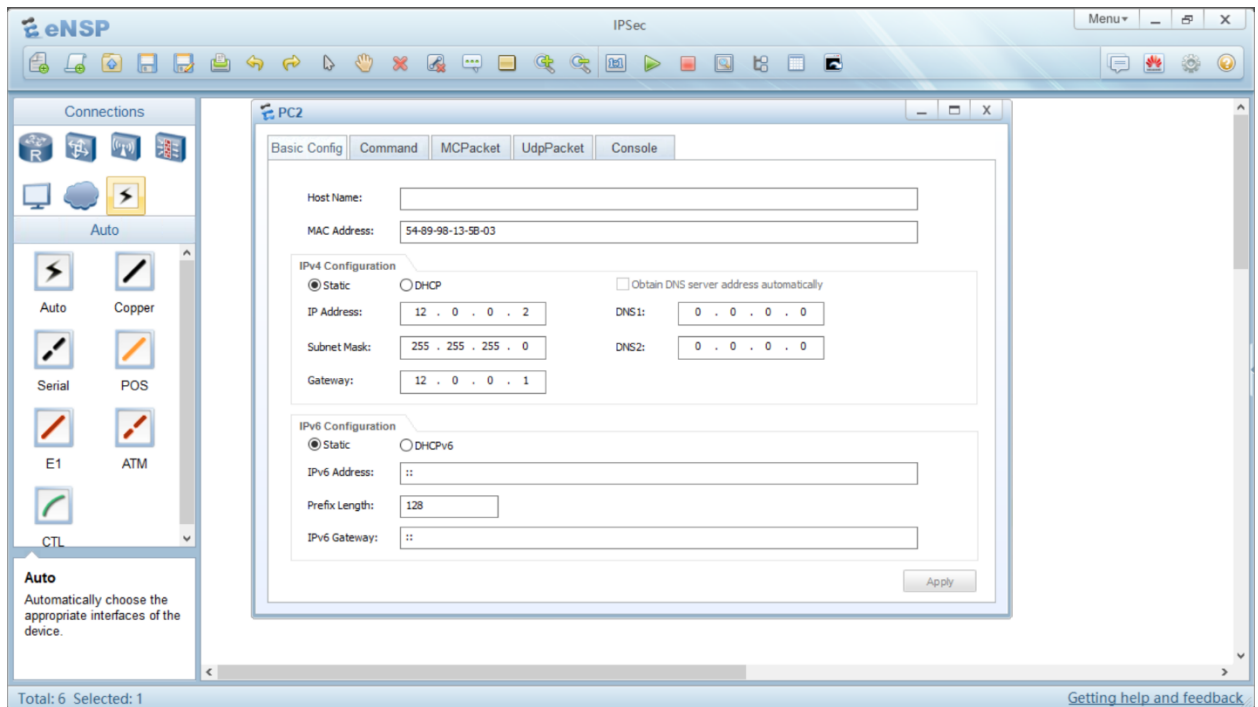
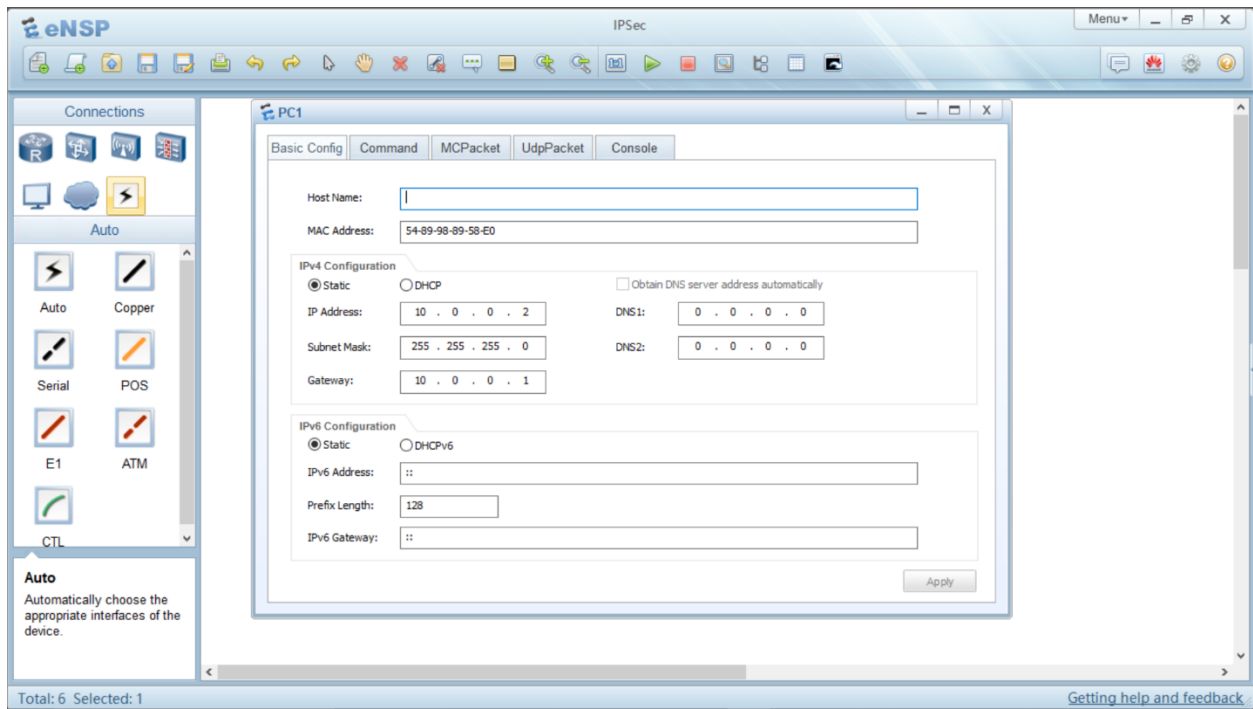
Student Number in the registration statement :32

Dr/ Mohamed Abdelhamid

Eng/Menna Samy

Program Setup (eNSP)





Router 1 Configuration

```

R1
The device is running!

<Huawei>sys
Enter system view, return user view with Ctrl+Z.
[Huawei]int
[Huawei]interface eth0/0/1
[Huawei-Ethernet0/0/1]ip address 10.0.0.1 24
[Huawei-Ethernet0/0/1]
Apr 27 2024 22:31:19-08:00 Huawei %%01IFNET/4/LINK_STATE(1)[0]:The line protocol
IP on the interface Ethernet0/0/1 has entered the UP state.
Apr 27 2024 22:31:22-08:00 Huawei DS/4/DATASYNC_CFGCHANGE:OID 1.3.6.1.4.1.2011.5
.25.191.3.1 configurations have been changed. The current change number is 1, th
e change loop count is 0, and the maximum number of records is 4095.
[Huawei-Ethernet0/0/1]in
[Huawei-Ethernet0/0/1]interface eth0/0/0
[Huawei-Ethernet0/0/0]ip address 11.0.0.1 24
[Huawei-Ethernet0/0/0]
Apr 27 2024 22:31:55-08:00 Huawei %%01IFNET/4/LINK_STATE(1)[1]:The line protocol
IP on the interface Ethernet0/0/0 has entered the UP state.
Apr 27 2024 22:32:02-08:00 Huawei DS/4/DATASYNC_CFGCHANGE:OID 1.3.6.1.4.1.2011.5
.25.191.3.1 configurations have been changed. The current change number is 2, th
e change loop count is 0, and the maximum number of records is 4095.
[Huawei-Ethernet0/0/0]q
[Huawei]show ip route
^
Error: Unrecognized command found at '^' position.
[Huawei]ip route
^
Error: Incomplete command found at '^' position.
[Huawei]ip route-static 12.0.0.0 24 11.0.0.2
[Huawei]
Apr 27 2024 22:35:12-08:00 Huawei DS/4/DATASYNC_CFGCHANGE:OID 1.3.6.1.4.1.2011.5
.25.191.3.1 configurations have been changed. The current change number is 3, th
e change loop count is 0, and the maximum number of records is 4095.
[Huawei]q
<Huawei>show ip route
^
Error: Unrecognized command found at '^' position.
<Huawei>show ip
^
Error: Unrecognized command found at '^' position.
<Huawei>sys
Enter system view, return user view with Ctrl+Z.

```

```

R1
Error: Unrecognized command found at '^' position.
<Huawei>sys
Enter system view, return user view with Ctrl+Z.
[Huawei]acl number 3001
[Huawei-acl-adv-3001]
Apr 27 2024 22:36:32-08:00 Huawei DS/4/DATASYNC_CFGCHANGE:OID 1.3.6.1.4.1.2011.5
.25.191.3.1 configurations have been changed. The current change number is 4, th
e change loop count is 0, and the maximum number of records is 4095.
[Huawei-acl-adv-3001]rule 5 permit source 10.0.0.0 0.0.0.255 destination 12.0.0.
0 0.0.0.255
^
Error: Wrong parameter found at '^' position.
[Huawei-acl-adv-3001]rule 5 permit ip source 10.0.0.0 0.0.0.255 destination 12.0
.0.0 0.0.0.255
^
Error: Unrecognized command found at '^' position.
[Huawei-acl-adv-3001]ru
[Huawei-acl-adv-3001]rule 5 per
[Huawei-acl-adv-3001]rule 5 permit ip sou
[Huawei-acl-adv-3001]rule 5 permit ip source 10.0.0.0 0.0.0.255 destination 12.0
.0.0 0.0.0.255
[Huawei-acl-adv-3001]
Apr 27 2024 22:41:02-08:00 Huawei DS/4/DATASYNC_CFGCHANGE:OID 1.3.6.1.4.1.2011.5
.25.191.3.1 configurations have been changed. The current change number is 5, th
e change loop count is 0, and the maximum number of records is 4095.
[Huawei-acl-adv-3001]q
[Huawei]ipsec prop
[Huawei]ipsec proposal tran1
[Huawei-ipsec-proposal-tran1]esp autg
[Huawei-ipsec-proposal-tran1]esp auth
[Huawei-ipsec-proposal-tran1]esp authentication-algorithm SHA1
[Huawei-ipsec-proposal-tran1]esp encr
[Huawei-ipsec-proposal-tran1]esp encryption-algorithm AES
^
Error: Ambiguous command found at '^' position.
[Huawei-ipsec-proposal-tran1]esp encryption-algorithm DES
[Huawei-ipsec-proposal-tran1]q
[Huawei]ipsec policy pl 10
Error: This IPSec policy/sequence combination is new, please indicate the mode t
o finish creating it.
[Huawei]ipsec policy pl 10 manual
[Huawei-ipsec-policy-manual-pl-10]sec
[Huawei-ipsec-policy-manual-pl-10]security acl 3001
[Huawei-ipsec-policy-manual-pl-10]prop

```

```

R1
[Huawei-ipsec-proposal-tran1]esp encryption-algorithm AES
Error:Ambiguous command found at '^' position.
[Huawei-ipsec-proposal-tran1]esp encryption-algorithm DES
[Huawei-ipsec-proposal-tran1]q
[Huawei]ipsec policy pl 10
Error: This IPSec policy/sequence combination is new, please indicate the mode t
o finish creating it.
[Huawei]ipsec policy pl 10 manual
[Huawei-ipsec-policy-manual-pl-10]sec
[Huawei-ipsec-policy-manual-pl-10]security acl 3001
[Huawei-ipsec-policy-manual-pl-10]prop
[Huawei-ipsec-policy-manual-pl-10]proposal tran1
[Huawei-ipsec-policy-manual-pl-10]tun
[Huawei-ipsec-policy-manual-pl-10]tunnel remote 11.0.0.2
[Huawei-ipsec-policy-manual-pl-10]tunn
[Huawei-ipsec-policy-manual-pl-10]tunnel local 11.0.0.2
Error: Tunnel Local and Remote address cannot be same.
[Huawei-ipsec-policy-manual-pl-10]tunnel local 11.0.0.1
[Huawei-ipsec-policy-manual-pl-10]sa spi out
[Huawei-ipsec-policy-manual-pl-10]sa spi outbound esp 54321
[Huawei-ipsec-policy-manual-pl-10]sa spi inb
[Huawei-ipsec-policy-manual-pl-10]sa spi inbound es
[Huawei-ipsec-policy-manual-pl-10]sa spi inbound esp 12345
[Huawei-ipsec-policy-manual-pl-10]sa string-key out
[Huawei-ipsec-policy-manual-pl-10]sa string-key outbound esp simple huawei
[Huawei-ipsec-policy-manual-pl-10]sa string-key inbound esp simple huawei
[Huawei-ipsec-policy-manual-pl-10]q
[Huawei]inter
[Huawei]interface eth0/0/0
[Huawei-Ethernet0/0/0]ipsec policy pl
[Huawei-Ethernet0/0/0] User interface con0 is available

Please Press ENTER.

<Huawei>sys
Enter system view, return user view with Ctrl+Z.
[Huawei]display ip routing-table
Route Flags: R - relay, D - download to fib
-----
Routing Tables: Public
  Destinations : 7          Routes : 7

```

```

R1
[Huawei-ipsec-policy-manual-pl-10]ipsec-proposal tran1
[Huawei-ipsec-policy-manual-pl-10]tun
[Huawei-ipsec-policy-manual-pl-10]tunnel remote 11.0.0.2
[Huawei-ipsec-policy-manual-pl-10]tunn
[Huawei-ipsec-policy-manual-pl-10]tunnel local 11.0.0.2
Error: Tunnel Local and Remote address cannot be same.
[Huawei-ipsec-policy-manual-pl-10]tunnel local 11.0.0.1
[Huawei-ipsec-policy-manual-pl-10]sa spi out
[Huawei-ipsec-policy-manual-pl-10]sa spi outbound esp 54321
[Huawei-ipsec-policy-manual-pl-10]sa spi inb
[Huawei-ipsec-policy-manual-pl-10]sa spi inbound es
[Huawei-ipsec-policy-manual-pl-10]sa spi inbound esp 12345
[Huawei-ipsec-policy-manual-pl-10]sa string-key out
[Huawei-ipsec-policy-manual-pl-10]sa string-key outbound esp simple huawei
[Huawei-ipsec-policy-manual-pl-10]sa string-key inbound esp simple huawei
[Huawei-ipsec-policy-manual-pl-10]q
[Huawei]inter
[Huawei]interface eth0/0/0
[Huawei-Ethernet0/0/0]ipsec policy pl
[Huawei-Ethernet0/0/0] User interface con0 is available

Please Press ENTER.

<Huawei>sys
Enter system view, return user view with Ctrl+Z.
[Huawei]display ip routing-table
Route Flags: R - relay, D - download to fib
-----
Routing Tables: Public
  Destinations : 7          Routes : 7

Destination/Mask    Proto Pre  Cost   Flags NextHop         Interface
-----
10.0.0.0/24        Direct 0    0      D    10.0.0.1       Ethernet0/0/1
10.0.0.1/32        Direct 0    0      D    127.0.0.1       Ethernet0/0/1
11.0.0.0/24        Direct 0    0      D    11.0.0.1       Ethernet0/0/0
11.0.0.1/32        Direct 0    0      D    127.0.0.1       Ethernet0/0/0
12.0.0.0/24        Static 60   0      RD   11.0.0.2       Ethernet0/0/0
127.0.0.0/8        Direct 0    0      D    127.0.0.1       InLoopBack0
127.0.0.1/32       Direct 0    0      D    127.0.0.1       InLoopBack0

[Huawei]

```

Router 2 Configuration

```
R2
The device is running!

<Huawei>sys
Enter system view, return user view with Ctrl+Z.
[Huawei]inter
[Huawei]interface eth
[Huawei]interface Ethernet0/0/0
[Huawei-Ethernet0/0/0]ip address 11.0.0.2 24
[Huawei-Ethernet0/0/0]
Apr 27 2024 22:32:40-08:00 Huawei %%01IFNET/4/LINK_STATE(1)[0]:The line protocol
IP on the interface Ethernet0/0/0 has entered the UP state.
Apr 27 2024 22:32:42-08:00 Huawei DS/4/DATASYNC_CFGCHANGE:OID 1.3.6.1.4.1.2011.5
.25.191.3.1 configurations have been changed. The current change number is 1, th
e change loop count is 0, and the maximum number of records is 4095.
[Huawei-Ethernet0/0/0]inte
[Huawei-Ethernet0/0/0]interfa
[Huawei-Ethernet0/0/0]interface eth0/0/1
[Huawei-Ethernet0/0/1]ip address 12.0.0.1 24
[Huawei-Ethernet0/0/1]
Apr 27 2024 22:33:17-08:00 Huawei %%01IFNET/4/LINK_STATE(1)[1]:The line protocol
IP on the interface Ethernet0/0/1 has entered the UP state.
Apr 27 2024 22:33:22-08:00 Huawei DS/4/DATASYNC_CFGCHANGE:OID 1.3.6.1.4.1.2011.5
.25.191.3.1 configurations have been changed. The current change number is 2, th
e change loop count is 0, and the maximum number of records is 4095.
[Huawei-Ethernet0/0/1]

User interface con0 is available

Please Press ENTER.

<Huawei>sys
Enter system view, return user view with Ctrl+Z.
[Huawei]ip static-rou
[Huawei]ip static-route 10.0.0.0 24 11.0.0.1
^
Error: Unrecognized command found at '^' position.
[Huawei]ip route-static 10.0.0.0 24 11.0.0.1
[Huawei]
Apr 27 2024 23:24:48-08:00 Huawei DS/4/DATASYNC_CFGCHANGE:OID 1.3.6.1.4.1.2011.5
.25.191.3.1 configurations have been changed. The current change number is 3, th
e change loop count is 0, and the maximum number of records is 4095.
```

```
R2
.25.191.3.1 configurations have been changed. The current change number is 4, th
e change loop count is 0, and the maximum number of records is 4095.
[Huawei-acl-adv-3002]rul
[Huawei-acl-adv-3002]rule 5 per
[Huawei-acl-adv-3002]rule 5 permit ip source 12.0.0.0 0.0.0.255 destination 10.0
.0.0 0.0.0.255
[Huawei-acl-adv-3002]
Apr 27 2024 23:26:58-08:00 Huawei DS/4/DATASYNC_CFGCHANGE:OID 1.3.6.1.4.1.2011.5
.25.191.3.1 configurations have been changed. The current change number is 5, th
e change loop count is 0, and the maximum number of records is 4095.
[Huawei-acl-adv-3002]q
[Huawei]ipsec prop
[Huawei]ipsec proposal tran2 manual
^
Error:Too many parameters found at '^' position.
[Huawei]ipsec proposal tran2
[Huawei-ipsec-proposal-tran2]esp aut
[Huawei-ipsec-proposal-tran2]esp authentication-algorithm SHA!
^
Error: Unrecognized command found at '^' position.
[Huawei-ipsec-proposal-tran2]esp authentication-algorithm SHA1
[Huawei-ipsec-proposal-tran2]esp encr
[Huawei-ipsec-proposal-tran2]esp encryption-algorithm DES
[Huawei-ipsec-proposal-tran2]q
[Huawei]ipsec policy p2 11 manual
[Huawei-ipsec-policy-manual-p2-11]secu
[Huawei-ipsec-policy-manual-p2-11]security acl 3002
[Huawei-ipsec-policy-manual-p2-11]prop
[Huawei-ipsec-policy-manual-p2-11]proposal tran2
[Huawei-ipsec-policy-manual-p2-11]tunn
[Huawei-ipsec-policy-manual-p2-11]tunnel remo
[Huawei-ipsec-policy-manual-p2-11]tunnel remote 11.0.0.1
[Huawei-ipsec-policy-manual-p2-11]tunnel loc
[Huawei-ipsec-policy-manual-p2-11]tunnel local 11.0.0.2
[Huawei-ipsec-policy-manual-p2-11]sa spi out
[Huawei-ipsec-policy-manual-p2-11]sa spi outbound esp 12345
[Huawei-ipsec-policy-manual-p2-11]sa spi inbound esp 54321
[Huawei-ipsec-policy-manual-p2-11]sa string-ke
[Huawei-ipsec-policy-manual-p2-11]sa string-key out
[Huawei-ipsec-policy-manual-p2-11]sa string-key outbound sim
[Huawei-ipsec-policy-manual-p2-11]sa string-key outbound simple huawei
^
Error: Unrecognized command found at '^' position.
```

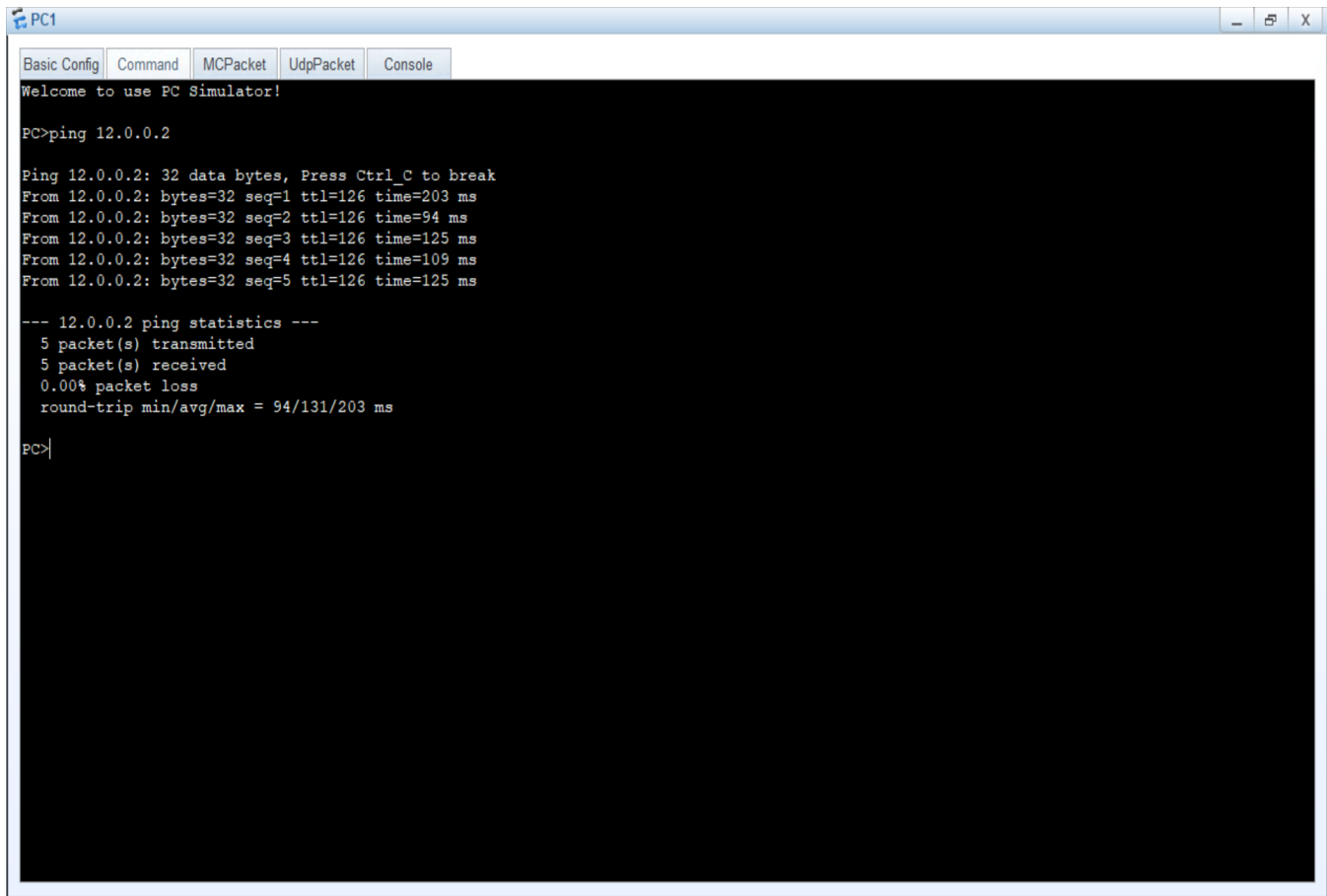
```
R2
[Huawei-ipsec-policy-manual-p2-11] tunnel remote 11.0.0.1
[Huawei-ipsec-policy-manual-p2-11] tunnel loc
[Huawei-ipsec-policy-manual-p2-11] tunnel local 11.0.0.2
[Huawei-ipsec-policy-manual-p2-11] sa spi out
[Huawei-ipsec-policy-manual-p2-11] sa spi outbound esp 12345
[Huawei-ipsec-policy-manual-p2-11] sa spi inbound esp 54321
[Huawei-ipsec-policy-manual-p2-11] sa string-ke
[Huawei-ipsec-policy-manual-p2-11] sa string-key out
[Huawei-ipsec-policy-manual-p2-11] sa string-key outbound sim
[Huawei-ipsec-policy-manual-p2-11] sa string-key outbound simple huawei
^
Error: Unrecognized command found at '^' position.
[Huawei-ipsec-policy-manual-p2-11] sa string-key outbound esp simple huawei
[Huawei-ipsec-policy-manual-p2-11] sa string-key inbound esp simple huawei
[Huawei-ipsec-policy-manual-p2-11] q
[Huawei] interface eth0/0/0
[Huawei-Ethernet0/0/0] ipsec policy p2
[Huawei-Ethernet0/0/0] q
[Huawei] show ip routing-table
^
Error: Unrecognized command found at '^' position.
[Huawei] display ip routing-table
Route Flags: R - relay, D - download to fib
-----
Routing Tables: Public
Destinations : 7      Routes : 7

Destination/Mask    Proto    Pre    Cost    Flags NextHop         Interface
-----
10.0.0.0/24        Static   60     0        RD  11.0.0.1       Ethernet0/0/0
11.0.0.0/24        Direct   0       0         D  11.0.0.2       Ethernet0/0/0
11.0.0.2/32        Direct   0       0         D  127.0.0.1      Ethernet0/0/0
12.0.0.0/24        Direct   0       0         D  12.0.0.1       Ethernet0/0/1
12.0.0.1/32        Direct   0       0         D  127.0.0.1      Ethernet0/0/1
127.0.0.0/8        Direct   0       0         D  127.0.0.1      InLoopBack0
127.0.0.1/32       Direct   0       0         D  127.0.0.1      InLoopBack0

[Huawei] User interface con0 is available

Please Press ENTER.
```

Simulation Results



The image shows a window titled "PC1" with a menu bar containing "Basic Config", "Command", "MCPacket", "UdpPacket", and "Console". The "Command" tab is active, displaying a terminal window. The terminal text is as follows:

```
Welcome to use PC Simulator!

PC>ping 12.0.0.2

Ping 12.0.0.2: 32 data bytes, Press Ctrl_C to break
From 12.0.0.2: bytes=32 seq=1 ttl=126 time=203 ms
From 12.0.0.2: bytes=32 seq=2 ttl=126 time=94 ms
From 12.0.0.2: bytes=32 seq=3 ttl=126 time=125 ms
From 12.0.0.2: bytes=32 seq=4 ttl=126 time=109 ms
From 12.0.0.2: bytes=32 seq=5 ttl=126 time=125 ms

--- 12.0.0.2 ping statistics ---
    5 packet(s) transmitted
    5 packet(s) received
    0.00% packet loss
    round-trip min/avg/max = 94/131/203 ms

PC>|
```