

# DERSIM BESIKTAS

## TP 6 - Routage

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# 1. Configuration des routeurs R11 et R12

Depuis le routeur **R12** je vais dans l'onglet **CLI** puis je tape la commande **en** pour passer en mode privilégié et je tape la commande **conf t** pour pouvoir configurer le routeur

```
R12# en
R12# conf t
Enter configuration commands, one per line. End with CNTL/Z.
R12(config)#
```

Copy

Paste

Puis je tape la commande **ip route 10.0.11.0 255.255.255.0 10.0.8.11** pour dire que je veux joindre le réseau **10.0.11.0** via la passerelle **10.0.8.11**

```
R12#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R12(config)#ip route 10.0.11.0 255.255.255.0 10.0.8.11
R12(config)#
```

Une fois que le routeur **R12** est configuré je tape les commandes **exit** et **sh run** pour quitter la configuration et afficher la configuration en cours

```
router rip
!
ip classless
ip route 10.0.11.0 255.255.255.0 10.0.8.11
!
ip flow-export version 9
```

En faisant la commande **sh ip route** on peut voir que la configuration qu'on a effectué a bien été pris en compte

```
R12: sh ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

  10.0.0.0/24 is subnetted, 3 subnets
  C    10.0.8.0 is directly connected, FastEthernet0/0
  S    10.0.11.0 [1/0] via 10.0.8.11
  C    10.0.12.0 is directly connected, FastEthernet0/1

R12>
```

Et pour finir avec la commande **copy run start** j'enregistre les modifications

```
R12: copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
R12#
```

Depuis **PC 11** ,je ping le routeur **R12** et ils arrivent à se joindre entre eux

```
C:\> ping 10.0.8.12

Pinging 10.0.8.12 with 32 bytes of data:

Reply from 10.0.8.12: bytes=32 time<1ms TTL=254
Reply from 10.0.8.12: bytes=32 time<1ms TTL=254
Reply from 10.0.8.12: bytes=32 time<1ms TTL=254
Reply from 10.0.8.12: bytes=32 time<1ms TTL=254

Ping statistics for 10.0.8.12:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Lorsque j'essaie de ping le routeur **R12** côté **réseau 12** la machine n'arrive pas à joindre le routeur

```
C:\>ping 10.0.12.1

Pinging 10.0.12.1 with 32 bytes of data:

Reply from 10.0.11.1: Destination host unreachable.
Reply from 10.0.11.1: Destination host unreachable.
Reply from 10.0.11.1: Destination host unreachable.
Reply from 10.0.11.1: Destination host unreachable.

Ping statistics for 10.0.12.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>
```

Pour cela on va devoir configurer le routeur R11

Sur le routeur R11 je vais dans l'onglet CLI et je tape les commandes **en** et **conf t** pour pouvoir le configurer

```
R11>en
R11#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R11(config)#
```

je fais la tape **ip route** pour pouvoir joindre le réseau 10.0.12.0 via la passerelle 10.0.8.12

et je fais **exit** pour quitter le mode de configuration

```
-----
R11(config)# ip route 10.0.12.0 255.255.255.0 10.0.8.12
R11(config)# exit
R11#
%SYS-5-CONFIG_I: Configured from console by console
```

avec la commande **sh ip route** je regarde la configuration actuelle et je vérifie que il y a bien la route que j'ai configurée puis avec la commande **copy run start** j'enregistre la configuration

```
R1 #sh ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

      10.0.0.0/24 is subnetted, 3 subnets
C       10.0.8.0 is directly connected, FastEthernet0/0
C       10.0.11.0 is directly connected, FastEthernet0/1
S       10.0.12.0 [1/0] via 10.0.8.12

R11# copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
R11#
```

Cette-fois quand je refais un ping depuis **PC11** ça marche correctement

```
C:\>ping 10.0.12.1

Pinging 10.0.12.1 with 32 bytes of data:

Reply from 10.0.12.1: bytes=32 time=1ms TTL=254
Reply from 10.0.12.1: bytes=32 time<1ms TTL=254
Reply from 10.0.12.1: bytes=32 time<1ms TTL=254
Reply from 10.0.12.1: bytes=32 time<1ms TTL=254

Ping statistics for 10.0.12.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

## 2. Configuration des Routeurs R21 et R22

Maintenant je vais faire la même chose avec **PC 21** et **PC 22** de sorte à ce qu'ils puissent se joindre entre eux

Sur le Routeur **R21**, dans l'onglet **CLI** je fais les commandes **en** pour pouvoir passer en mode privilégié et **conf t** pour pouvoir configurer le routeur. Avec la commande **ip route** j'indique la route dans la table de routage puis je quitte le mode de configuration avec la commande **exit**

```
R21# en
R21# conf t
Enter configuration commands, one per line. End with CNTL/Z.
R21(config)# ip route 10.0.22.0 255.255.255.0 10.0.16.22
R21(config)# exit
R21#
%SYS-5-CONFIG_I: Configured from console by console
```

Ensuite j'enregistre la configuration avec la commande **copy run start**

```
%SYS-5-CONFIG_I: Configured from console
copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
R21#
```

Je fais la même chose pour le routeur **R22**

Je vais dans l'onglet **CLI** puis je tape les commandes **en** pour être en mode privilégié et **conf t** pour entrer dans le mode de configuration. Puis avec la commande **ip route** je tape **ip route 10.0.21.0 255.255.255.0 10.0.16.21** pour indiquer le chemin dans la table de routage

```
R22#en
R22#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R22(config)#ip route 10.0.21.0 255.255.255.0 10.0.16.21
R22(config)#exit
R22#
%SYS-5-CONFIG_I: Configured from console by console
```

---

```
sh ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

 10.0.0.0/24 is subnetted, 3 subnets
C    10.0.16.0 is directly connected, FastEthernet0/0
S    10.0.21.0 [1/0] via 10.0.16.21
C    10.0.22.0 is directly connected, FastEthernet0/1

R22#
```

---

Je sauvegarde la configuration avec la commande **copy run start** pour enregistrer les modifications que j'ai effectuée

```
R22#
R22#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
R22#
```

---

Ping depuis PC 22 vers PC 21

```
C:\> ping 10.0.21.2

Pinging 10.0.21.2 with 32 bytes of data:

Reply from 10.0.21.2: bytes=32 time<1ms TTL=126
Reply from 10.0.21.2: bytes=32 time<1ms TTL=126
Reply from 10.0.21.2: bytes=32 time=2ms TTL=126
Reply from 10.0.21.2: bytes=32 time<1ms TTL=126

Ping statistics for 10.0.21.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\>
```

Ping depuis PC 21 vers PC 22

```
C:\> ping 10.0.22.2

Pinging 10.0.22.2 with 32 bytes of data:

Reply from 10.0.22.2: bytes=32 time<1ms TTL=126
Reply from 10.0.22.2: bytes=32 time<1ms TTL=126
Reply from 10.0.22.2: bytes=32 time<1ms TTL=126
Reply from 10.0.22.2: bytes=32 time=1ms TTL=126

Ping statistics for 10.0.22.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

### 3. Configuration de tout les routeurs pour la connectivité générale

Connexion entre toutes les machines :

J'ai fait les mêmes procédures de sortes à ce que que tout les PC puissent se joindre entre elles

#### Routeur R11 :

```
R11#sh ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

  10.0.0.0/24 is subnetted, 5 subnets
C       10.0.8.0 is directly connected, FastEthernet0/0
C       10.0.11.0 is directly connected, FastEthernet0/1
S       10.0.12.0 [1/0] via 10.0.8.12
S       10.0.21.0 [1/0] via 10.0.8.8
S       10.0.22.0 [1/0] via 10.0.8.8

R11#
```

## Routeur R12 :

```
R12#sh ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/24 is subnetted, 5 subnets
C       10.0.8.0 is directly connected, FastEthernet0/0
S       10.0.11.0 [1/0] via 10.0.8.11
C       10.0.12.0 is directly connected, FastEthernet0/1
S       10.0.21.0 [1/0] via 10.0.8.8
S       10.0.22.0 [1/0] via 10.0.8.8

R12#
```

## Routeur R8 :

```
R8#sh ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/24 is subnetted, 7 subnets
C       10.0.1.0 is directly connected, FastEthernet0/0
C       10.0.2.0 is directly connected, Serial0/0/0
C       10.0.8.0 is directly connected, FastEthernet0/1
S       10.0.11.0 [1/0] via 10.0.8.11
S       10.0.12.0 [1/0] via 10.0.8.12
S       10.0.21.0 [1/0] via 10.0.2.16
S       10.0.22.0 [1/0] via 10.0.2.16

R8#
```

## Routeur R16 :

```
R16# sh ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/24 is subnetted, 7 subnets
C       10.0.1.0 is directly connected, FastEthernet0/0
C       10.0.2.0 is directly connected, Serial0/0/0
S       10.0.11.0 [1/0] via 10.0.2.8
S       10.0.12.0 [1/0] via 10.0.2.8
C       10.0.16.0 is directly connected, FastEthernet0/1
S       10.0.21.0 [1/0] via 10.0.16.21
S       10.0.22.0 [1/0] via 10.0.16.22

R16#
```

---

## Routeur 21 :

```
R21# sh ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/24 is subnetted, 5 subnets
S       10.0.11.0 [1/0] via 10.0.16.16
S       10.0.12.0 [1/0] via 10.0.16.16
C       10.0.16.0 is directly connected, FastEthernet0/0
C       10.0.21.0 is directly connected, FastEthernet0/1
S       10.0.22.0 [1/0] via 10.0.16.22

R21#
```

---

## Routeur 22 :

```
R22#sh ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/24 is subnetted, 5 subnets
S       10.0.11.0 [1/0] via 10.0.16.16
S       10.0.12.0 [1/0] via 10.0.16.16
C       10.0.16.0 is directly connected, FastEthernet0/0
S       10.0.21.0 [1/0] via 10.0.16.21
C       10.0.22.0 is directly connected, FastEthernet0/1

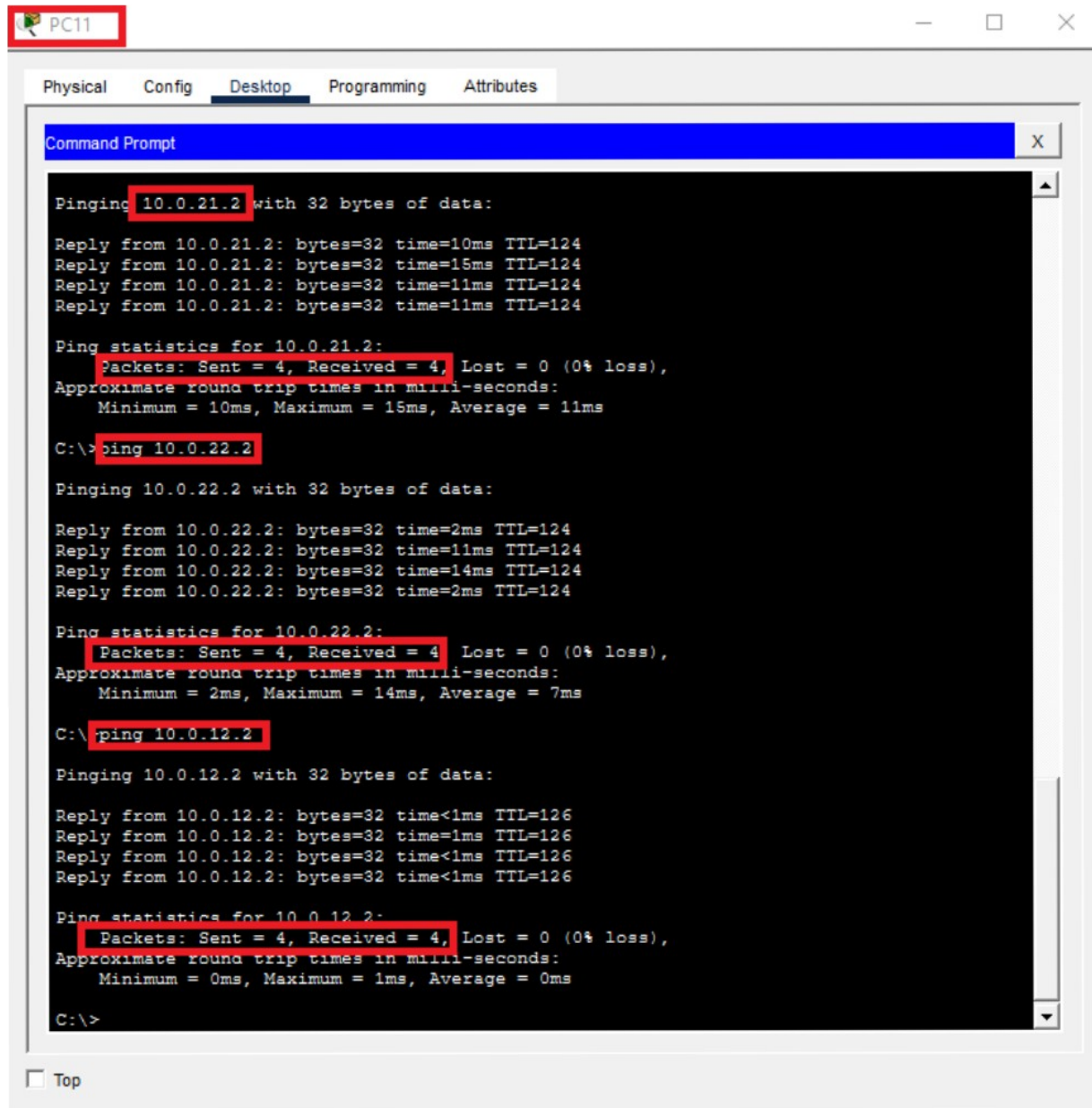
R22#
```

---

## 4. Test entre tous les PC

Ping entre toutes les machines :

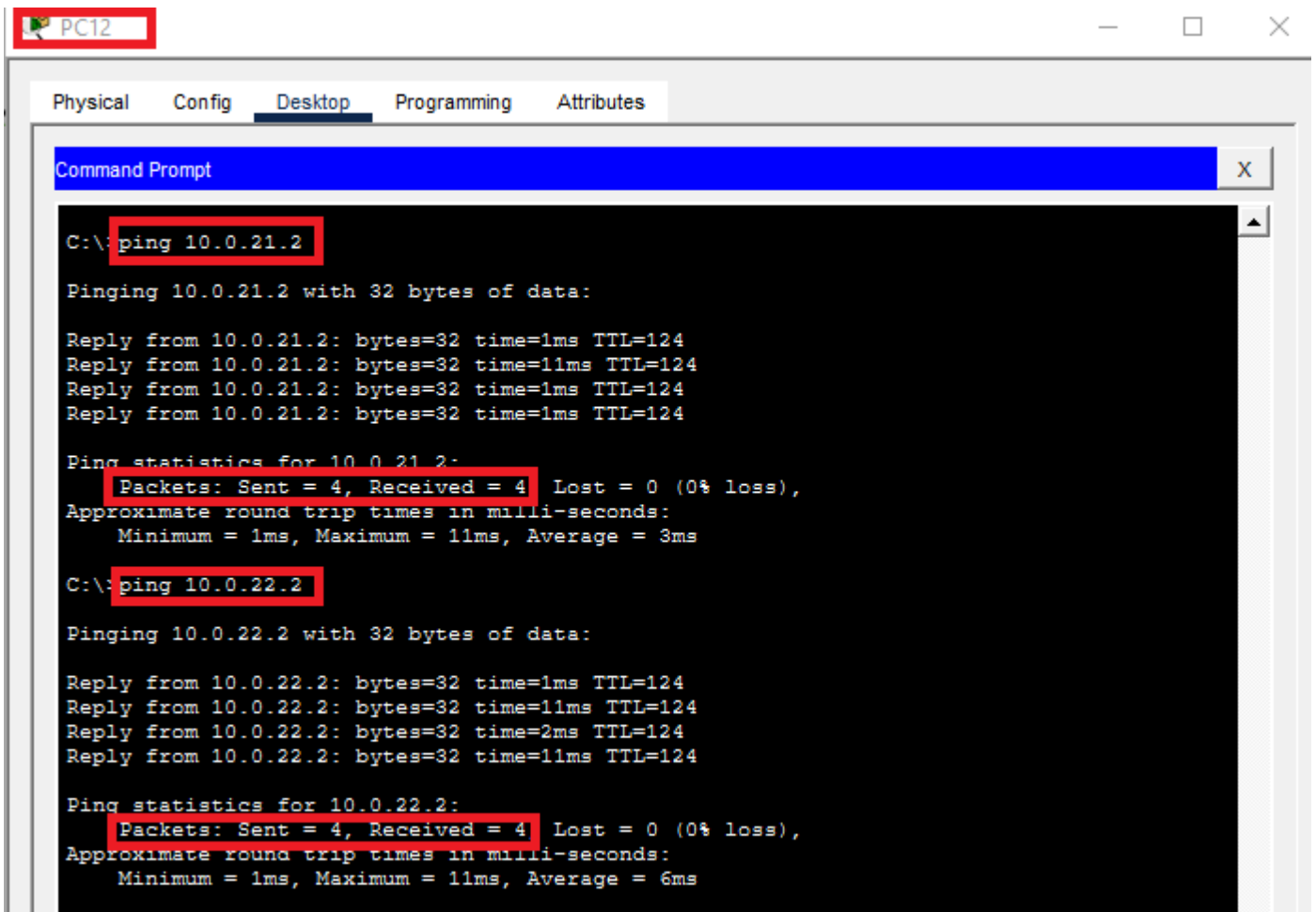
PC 11 :



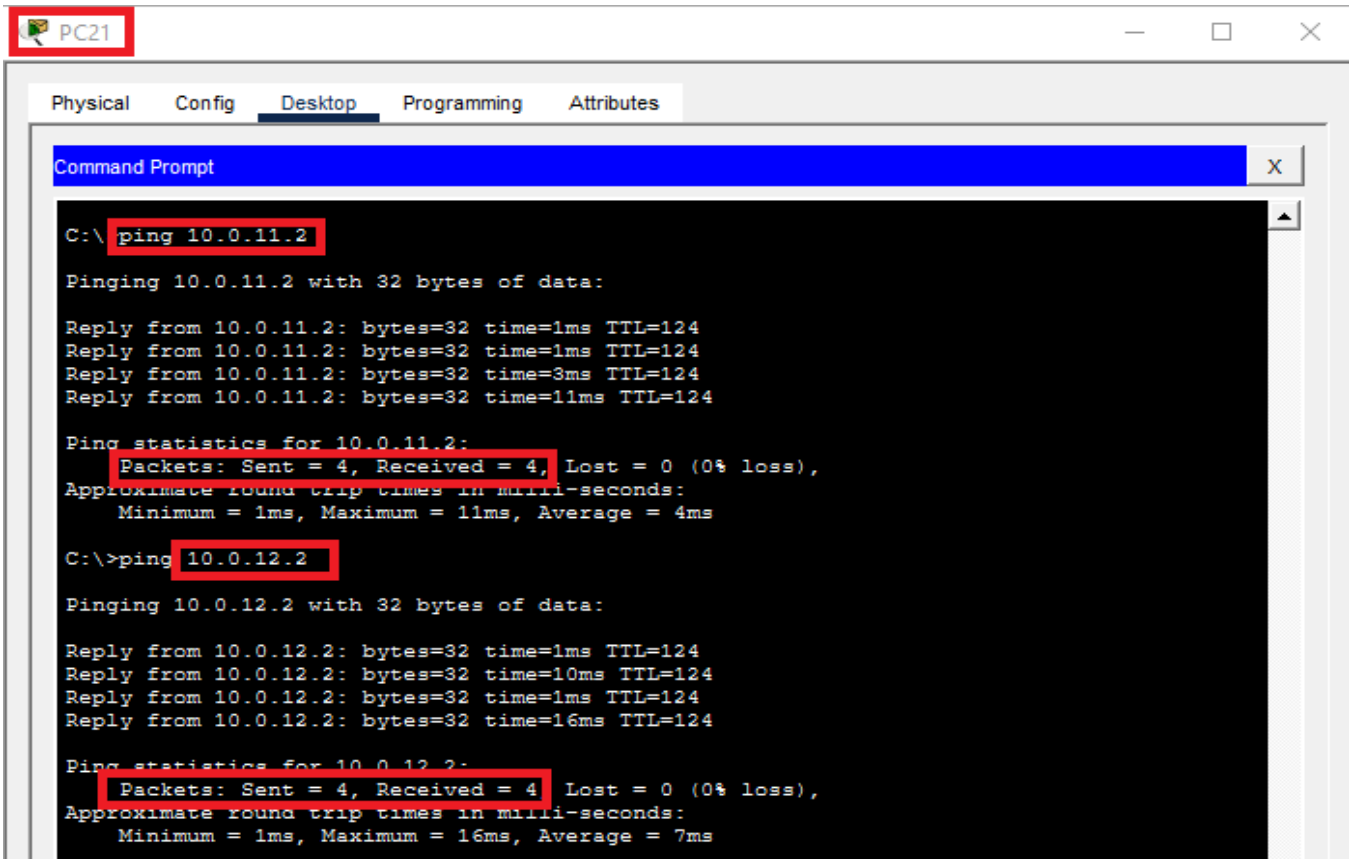
The screenshot shows a Windows desktop environment for PC11. A Command Prompt window is open, displaying the results of three ping tests. The first test is for 10.0.21.2, the second for 10.0.22.2, and the third for 10.0.12.2. Each test shows four successful replies with 32 bytes of data and a 0% loss rate. The statistics for each test are as follows:

```
Pinging 10.0.21.2 with 32 bytes of data:
Reply from 10.0.21.2: bytes=32 time=10ms TTL=124
Reply from 10.0.21.2: bytes=32 time=15ms TTL=124
Reply from 10.0.21.2: bytes=32 time=11ms TTL=124
Reply from 10.0.21.2: bytes=32 time=11ms TTL=124
Ping statistics for 10.0.21.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 10ms, Maximum = 15ms, Average = 11ms
C:\> ping 10.0.22.2
Pinging 10.0.22.2 with 32 bytes of data:
Reply from 10.0.22.2: bytes=32 time=2ms TTL=124
Reply from 10.0.22.2: bytes=32 time=11ms TTL=124
Reply from 10.0.22.2: bytes=32 time=14ms TTL=124
Reply from 10.0.22.2: bytes=32 time=2ms TTL=124
Ping statistics for 10.0.22.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 14ms, Average = 7ms
C:\> ping 10.0.12.2
Pinging 10.0.12.2 with 32 bytes of data:
Reply from 10.0.12.2: bytes=32 time<1ms TTL=126
Reply from 10.0.12.2: bytes=32 time=1ms TTL=126
Reply from 10.0.12.2: bytes=32 time<1ms TTL=126
Reply from 10.0.12.2: bytes=32 time<1ms TTL=126
Ping statistics for 10.0.12.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>
```

PC 12 :



## PC 21 :



The screenshot shows a PC21 desktop environment with a Command Prompt window open. The window title is "Command Prompt" and it has a blue header bar. The desktop background is black. The Command Prompt shows the following output:

```
C:\>ping 10.0.11.2

Pinging 10.0.11.2 with 32 bytes of data:

Reply from 10.0.11.2: bytes=32 time=1ms TTL=124
Reply from 10.0.11.2: bytes=32 time=1ms TTL=124
Reply from 10.0.11.2: bytes=32 time=3ms TTL=124
Reply from 10.0.11.2: bytes=32 time=11ms TTL=124

Ping statistics for 10.0.11.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 11ms, Average = 4ms

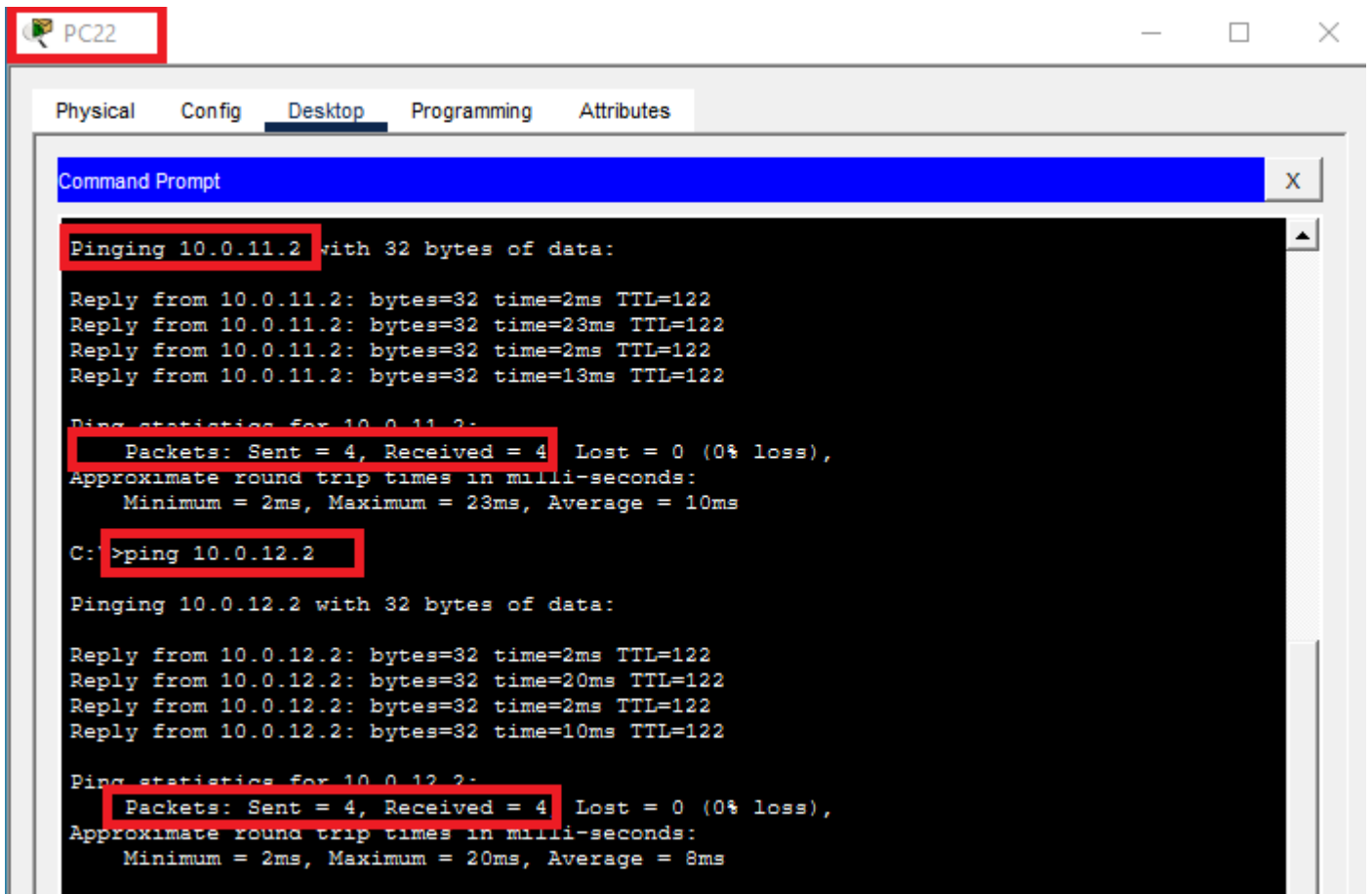
C:\>ping 10.0.12.2

Pinging 10.0.12.2 with 32 bytes of data:

Reply from 10.0.12.2: bytes=32 time=1ms TTL=124
Reply from 10.0.12.2: bytes=32 time=10ms TTL=124
Reply from 10.0.12.2: bytes=32 time=1ms TTL=124
Reply from 10.0.12.2: bytes=32 time=16ms TTL=124

Ping statistics for 10.0.12.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 16ms, Average = 7ms
```

PC 22 :



The screenshot shows a virtual desktop environment for PC22. The desktop has tabs for Physical, Config, Desktop (selected), Programming, and Attributes. A Command Prompt window is open, displaying the following text:

```
Command Prompt
Pinging 10.0.11.2 with 32 bytes of data:
Reply from 10.0.11.2: bytes=32 time=2ms TTL=122
Reply from 10.0.11.2: bytes=32 time=23ms TTL=122
Reply from 10.0.11.2: bytes=32 time=2ms TTL=122
Reply from 10.0.11.2: bytes=32 time=13ms TTL=122

Ping statistics for 10.0.11.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 23ms, Average = 10ms

C: >ping 10.0.12.2

Pinging 10.0.12.2 with 32 bytes of data:
Reply from 10.0.12.2: bytes=32 time=2ms TTL=122
Reply from 10.0.12.2: bytes=32 time=20ms TTL=122
Reply from 10.0.12.2: bytes=32 time=2ms TTL=122
Reply from 10.0.12.2: bytes=32 time=10ms TTL=122

Ping statistics for 10.0.12.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 20ms, Average = 8ms
```