



## Composants, Fonctionnement et Configuration d'un Routeur

TP05-Networking L2

Mai 2022

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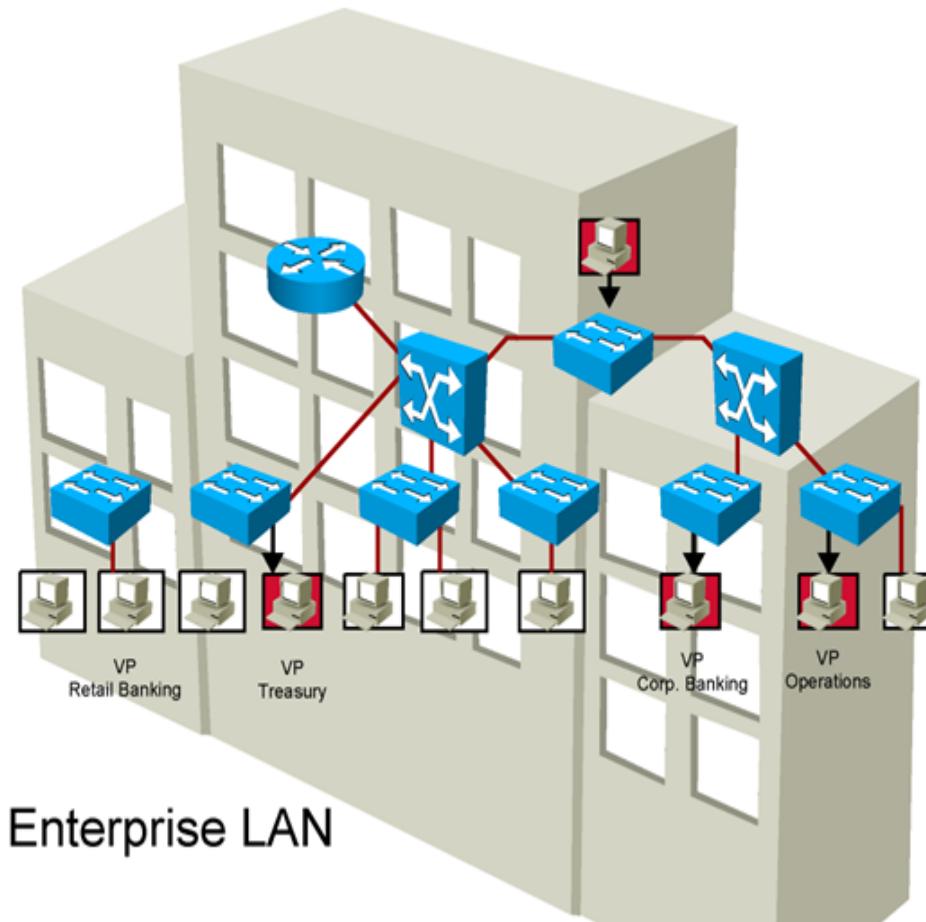
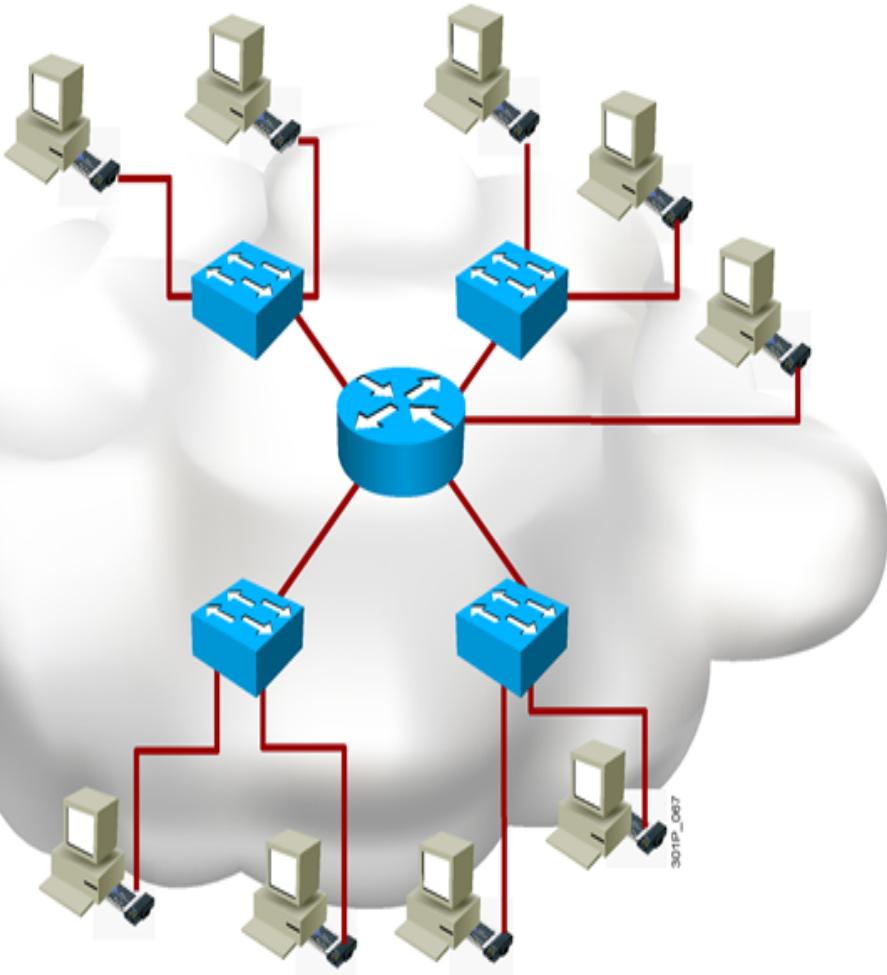
Cisco 2800 Series Router



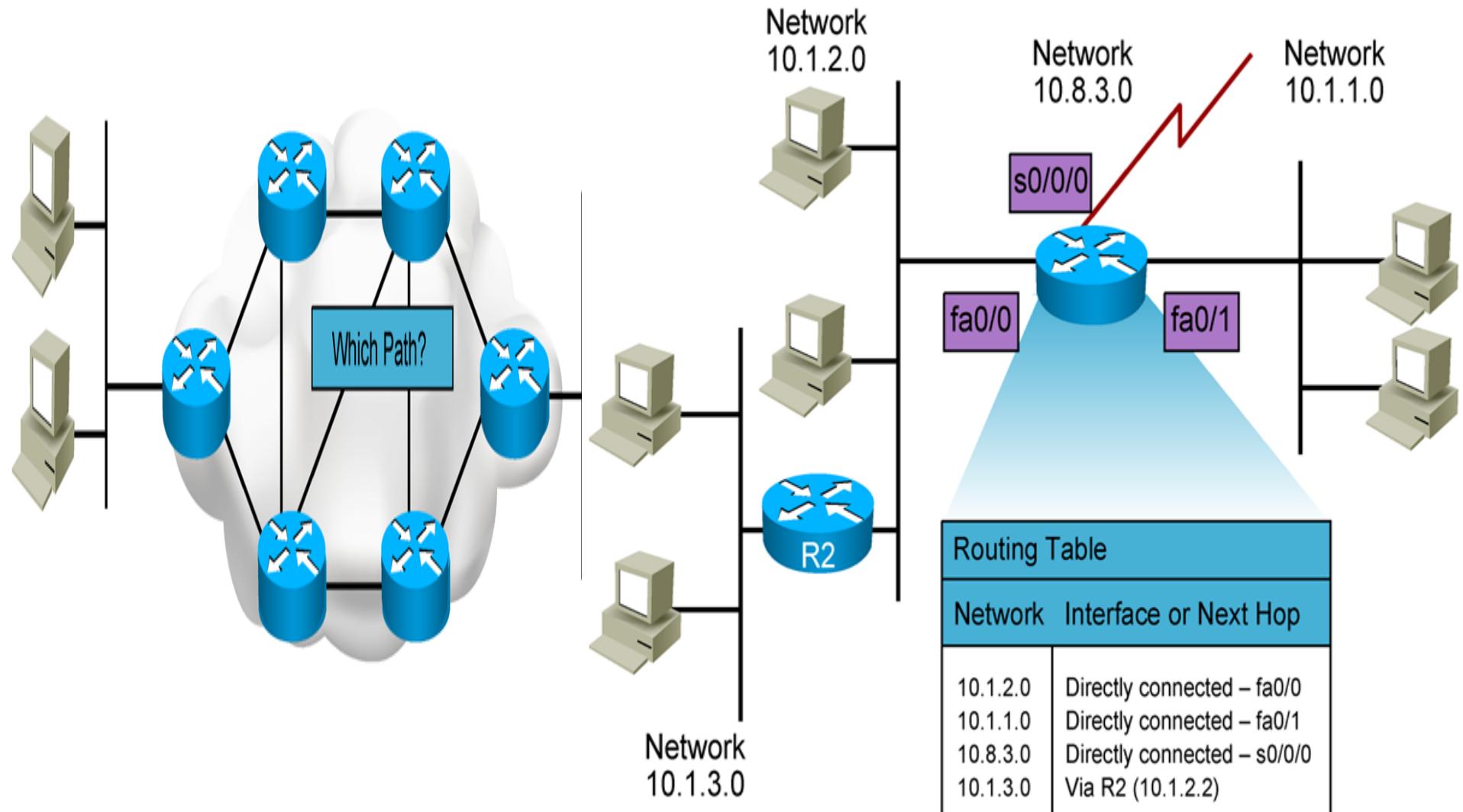
# Plan

- Rôles et Fonctions
- Fonctionnement global
- Composants internes
- Processus de démarrage
- Sources de configuration
- Configuration basique d'un routeur

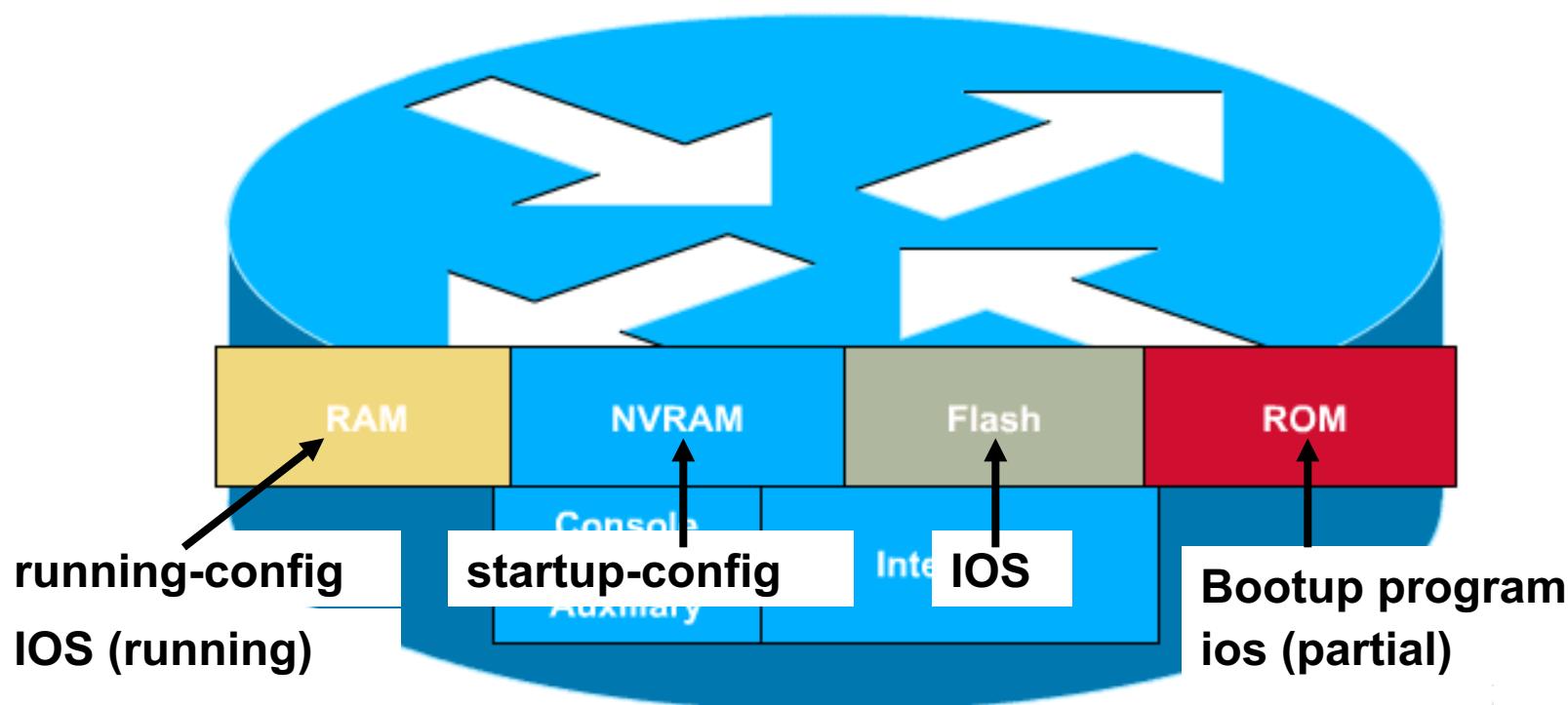
# Router Features



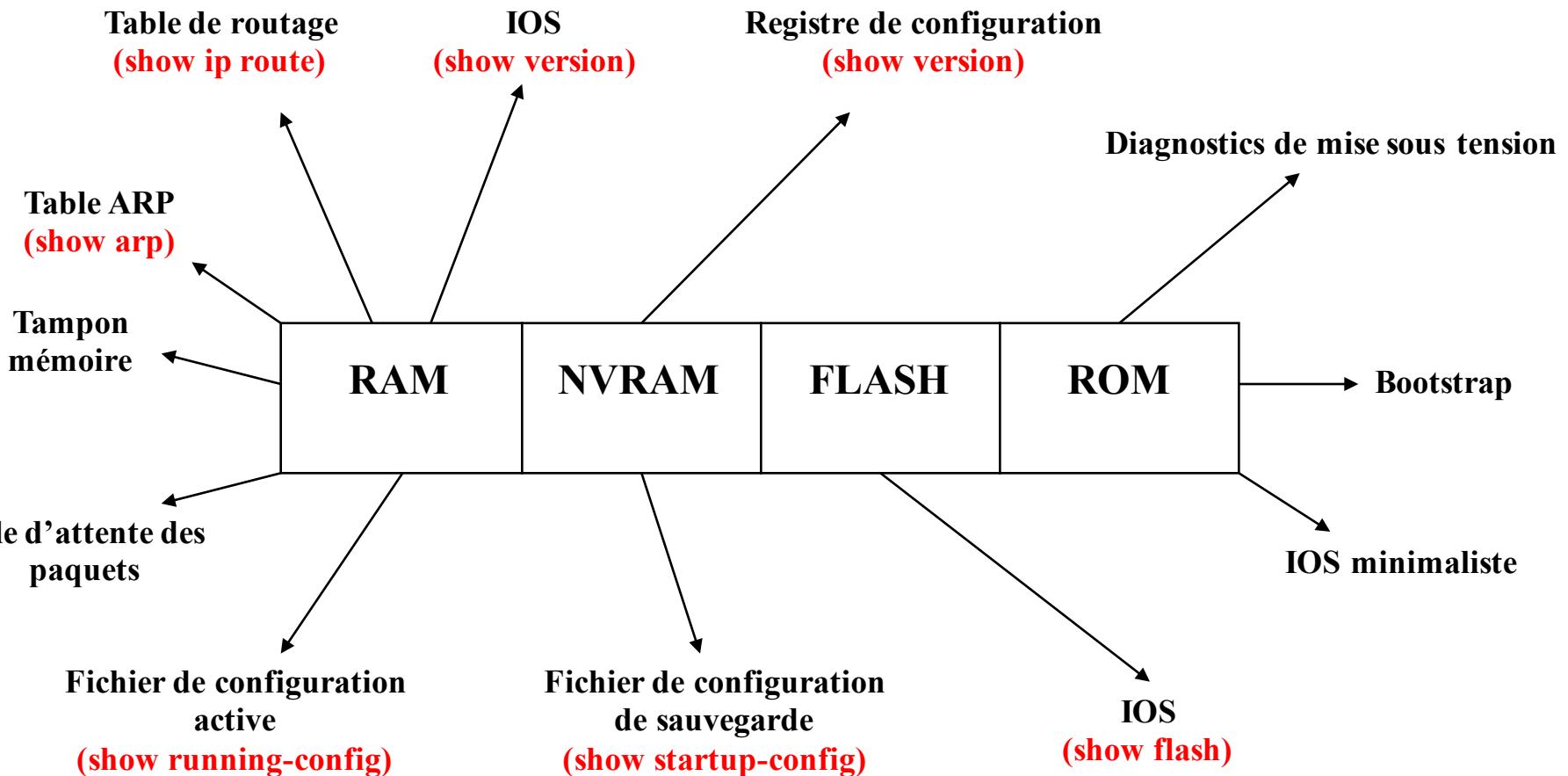
# Features next



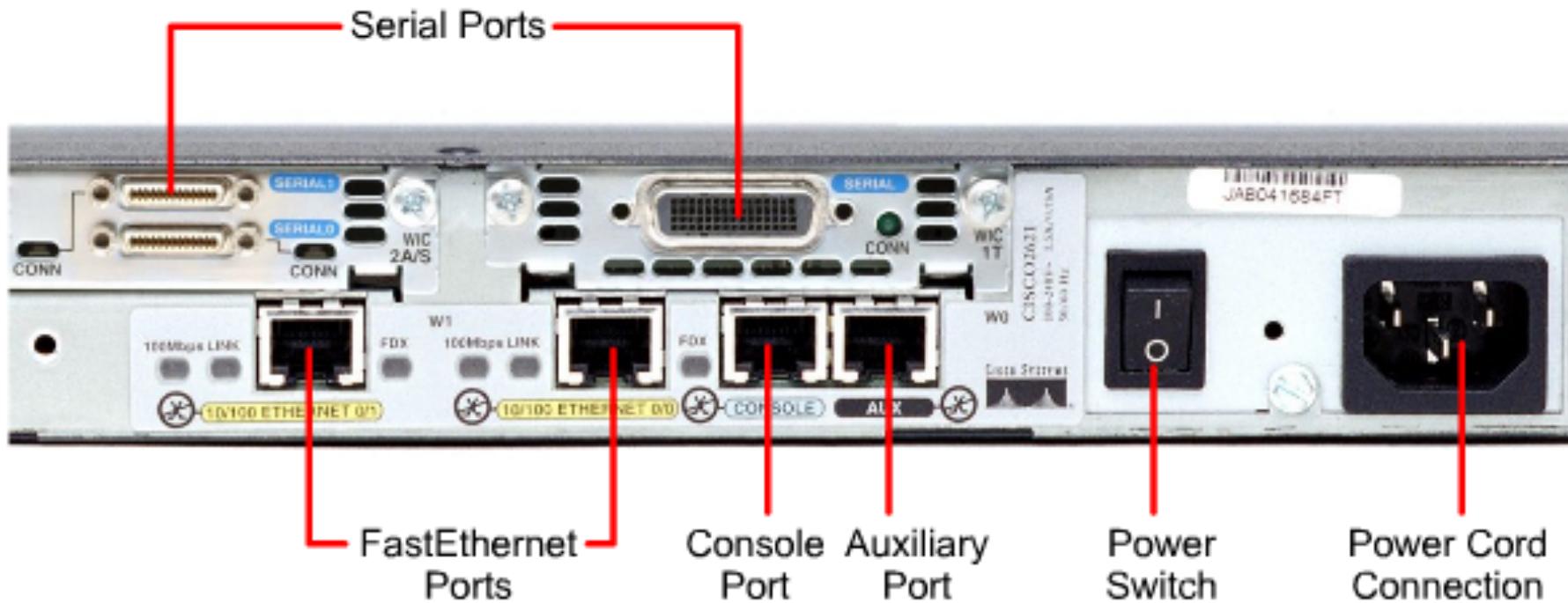
# Composants internes d'un Routeur Cisco



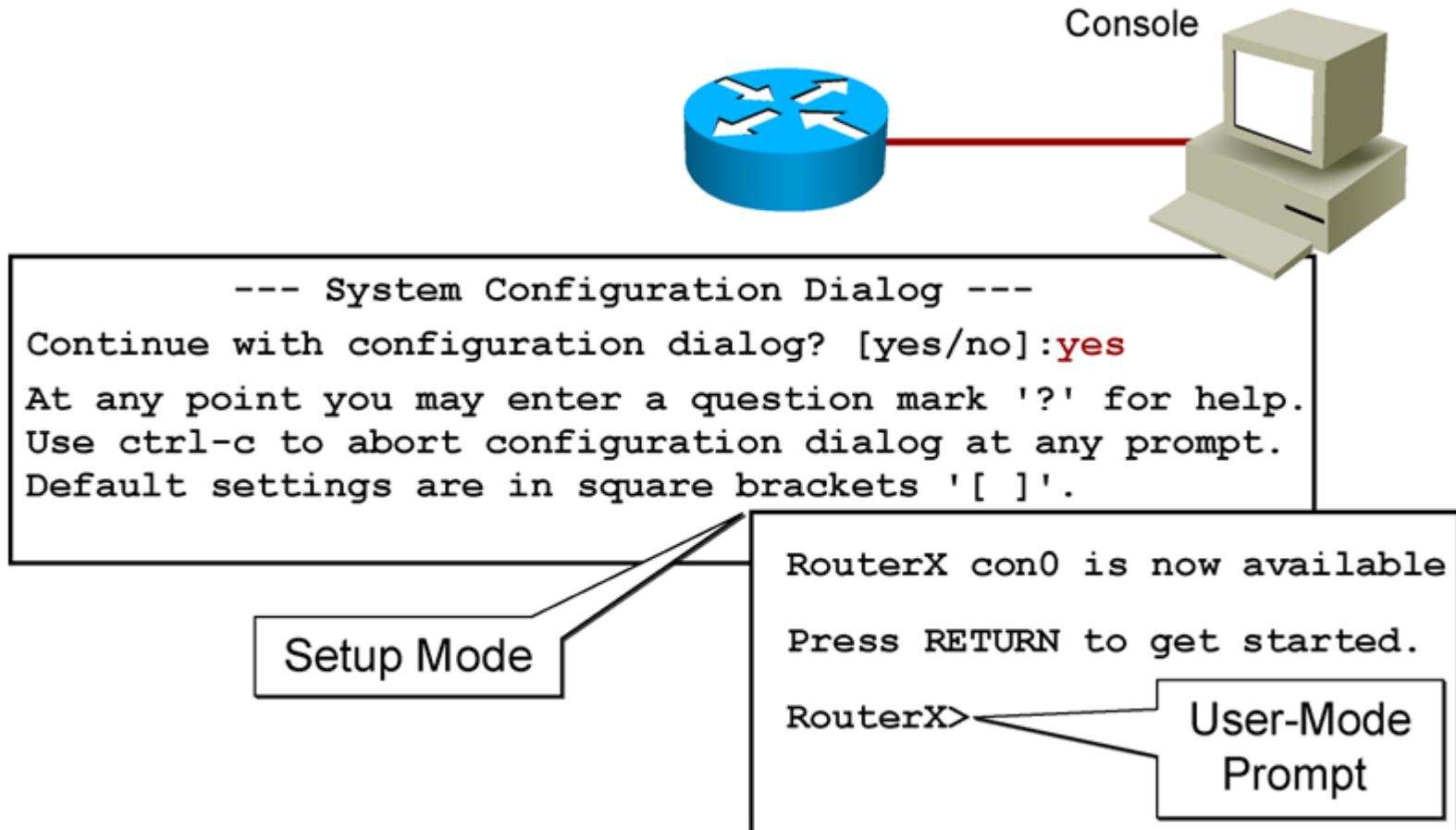
# Composants internes d'un Routeur Cisco



# Router Ports



# Configuration d'un Routeur



Unconfigured vs. Configured Router

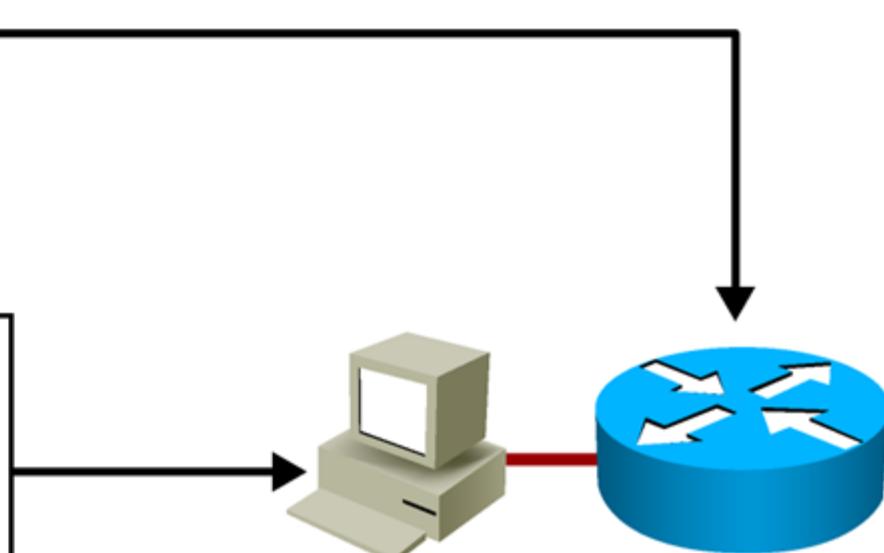
# Configuration d'un Routeur

## Router Name

```
Router(config) #hostname RouterX  
RouterX(config) #
```

## Message-of-the-Day Banner

```
RouterX(config) #banner motd #  
Enter TEXT message. End with  
the character #. You have  
entered a secured system.  
Authorized access only! #
```



# Cisco IOS User Interface Functions

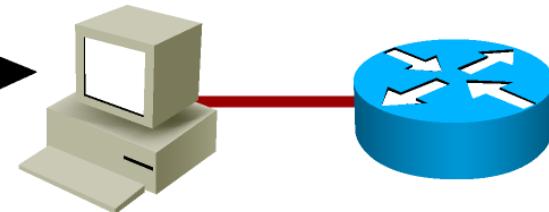
```
RouterX#configure terminal
RouterX(config)#interface serial 0
RouterX(config-if)#no shutdown
%LINK-3-UPDOWN:  Interface Serial0, changed state to up
%LINEPROTO-5-UPDOWN: Line Protocol on Interface Serial0, changed state to up
```

```
RouterX#show interface serial s0/0/0
Serial0/0 is up, line protocol is up
Hardware is PowerQUICC Serial
Internet address is 10.140.4.2/24
MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec, rely 255/255, load 1/255
Encapsulation HDLC, loopback not set, keepalive set (10 sec)
Last input 00:00:09, output 00:00:04, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0 (size/max/drops); Total output drops: 0
Queueing strategy: weighted fair
Output queue: 0/1000/64/0 (size/max total/threshold/drops)
    Conversations 0/1/256 (active/max active/max total)
    Reserved Conversations 0/0 (allocated/max allocated)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
(output omitted)
```

# Configuring a Router Password

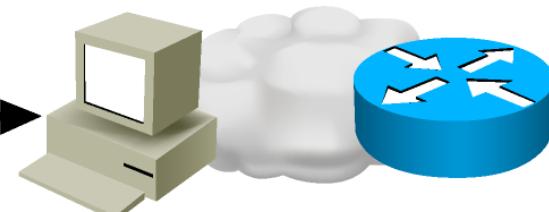
## Console Password

```
RouterX(config)#line console 0  
RouterX(config-line)#login  
RouterX(config-line)#password cisco
```



## Virtual Terminal Password

```
RouterX(config)#line vty 0 4  
RouterX(config-line)#login  
RouterX(config-line)#password sanjose
```



## Enable Password

```
RouterX(config)#enable password cisco
```



## Secret Password

```
RouterX(config)#enable secret sanfran
```

## Service Password-Encryption Commands

```
RouterX(config)#service password encryption  
RouterX(config)#no service password-encryption
```

# Configuring Interfaces

Router

```
Router(config)#interface fastethernet0/1
Router(config-if)#ip address 183.8.126.2 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#exit

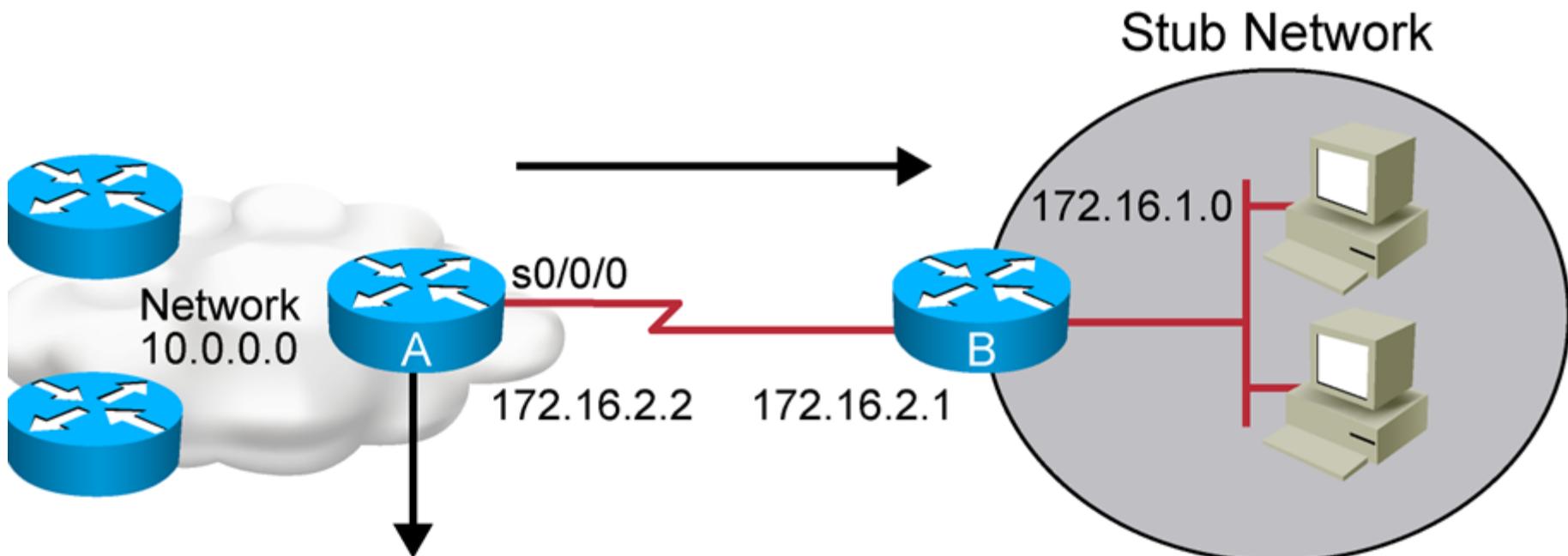
Router(config)#interface serial 0
Router(config-if)#ip address 172.16.10.1 255.255.0.0
Router(config-if)#clock rate 64000      (only if DCE)
Router(config-if)#no shutdown
```

# Cisco SDM Main Window Layout and Navigation

The screenshot shows the Cisco SDM main window with the title "Cisco Router and Security Device Manager (SDM): 10.44.44.3". The window is divided into several sections:

- Tasks Panel (Left):** A vertical sidebar with icons and labels for: Interfaces and Connections, Firewall and ACL, VPN, Security Audit, Routing, NAT, Intrusion Prevention, Quality of Service, and Additional Tasks.
- Header Bar:** Includes File, Edit, View, Tools, Help menus, and Home, Configure, Monitor, Refresh, Save, Search, and Help buttons. The Cisco Systems logo is also present.
- About Your Router Section:** Displays the host name "RouterX". It includes a Cisco 2811 icon, hardware details (Model Type: Cisco 2811, Available / Total Memory(MB): 158/256 MB, Total Flash Capacity: 61 MB), software details (IOS Version: 12.4(12), SDM Version: 2.3.1), and feature availability status for IP, Firewall, VPN, IPS, and NAC.
- Configuration Overview Section:** A large central area showing various network configurations:
  - Interfaces and Connections:** Total Supported LAN: 1, Configured LAN Interface: 1, DHCP Server: Not Configured. Status: Up (1), Down (3).
  - Firewall Policies:** Status: Inactive. Options: Trusted (0), Untrusted (0), DMZ (0).
  - VPN:** IPSec (Site-to-Site): 0, Xauth Login Required: 0, No. of DMVPN Clients: 0. Status: Up (0).
  - Routing:** No. of Static Route: 0, Dynamic Routing Protocols: RIP.
  - Intrusion Prevention:** Active Signatures: 0, No. of IPS-enabled Interfaces: 0, SDF Version: 0.
- Footer:** Shows the date and time: 21:32:51 UTC Thu Apr 12 2007.

# Static Route Example



```
RouterX(config)# ip route 172.16.1.0 255.255.255.0 172.16.2.1
```

or

```
Router(config)#ip route 172.16.1.0 255.255.255.0 s0/0/0
```

# RIP Configuration

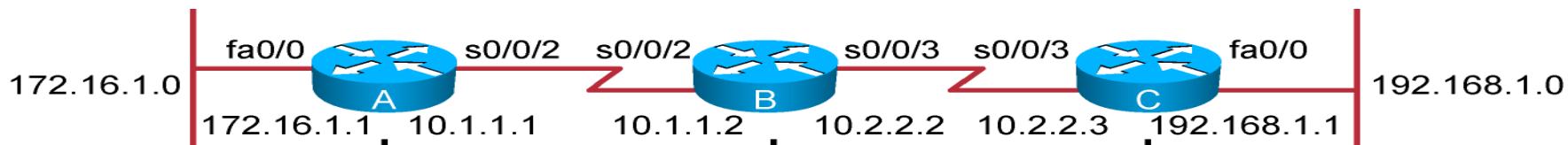
```
RouterX(config) # router rip
```

- Starts the RIP routing process

```
RouterX(config-router) # version 2
```

- Enables RIP version 2

```
RouterX(config-router) # network network-number
```



```
router rip  
version 2  
network 172.16.0.0  
network 10.0.0.0
```

```
router rip  
version 2  
network 192.168.1.0  
network 10.0.0.0
```

```
router rip  
version 2  
network 10.0.0.0
```

# Routing Table

```
RouterX# show 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  
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, \* - candidate default  
U - per-user static route

Gateway of last resort is 0.0.0.0 to network 0.0.0.0

10.0.0.0/8 is subnetted, 1 subnets  
C 10.1.1.0 is directly connected, Serial0/0/0  
S\* 0.0.0.0/0 is directly connected, Serial0

# Routing Table next

```
RouterA# show 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, \* - candidate default

U - per-user static route, o - ODR

T - traffic engineered route

Gateway of last resort is not set

172.16.0.0/24 is subnetted, 1 subnets

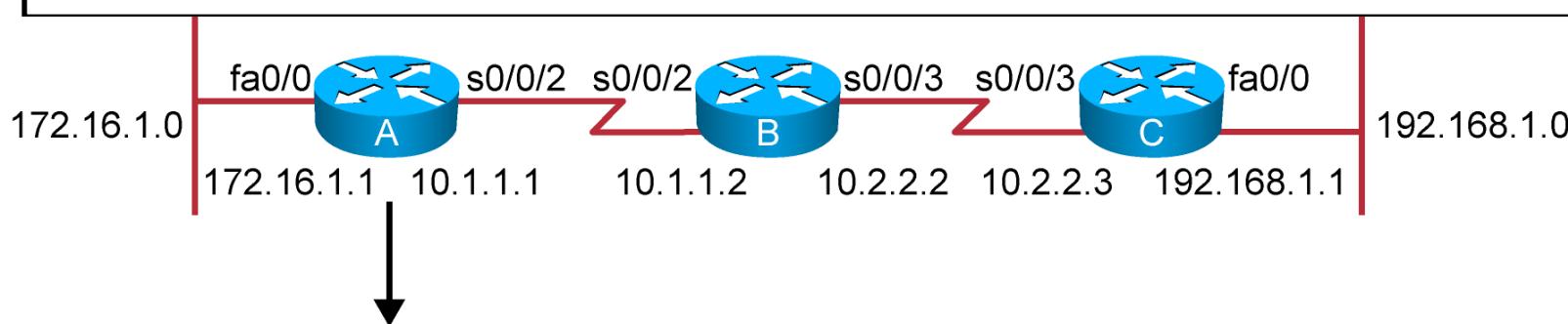
C 172.16.1.0 is directly connected, fastethernet0/0

10.0.0.0/24 is subnetted, 2 subnets

R 10.2.2.0 [120/1] via 10.1.1.2, 00:00:07, Serial0/0/2

C 10.1.1.0 is directly connected, Serial0/0/2

R 192.168.1.0/24 [120/2] via 10.1.1.2, 00:00:07, Serial0/0/2



# OSPF Configuration

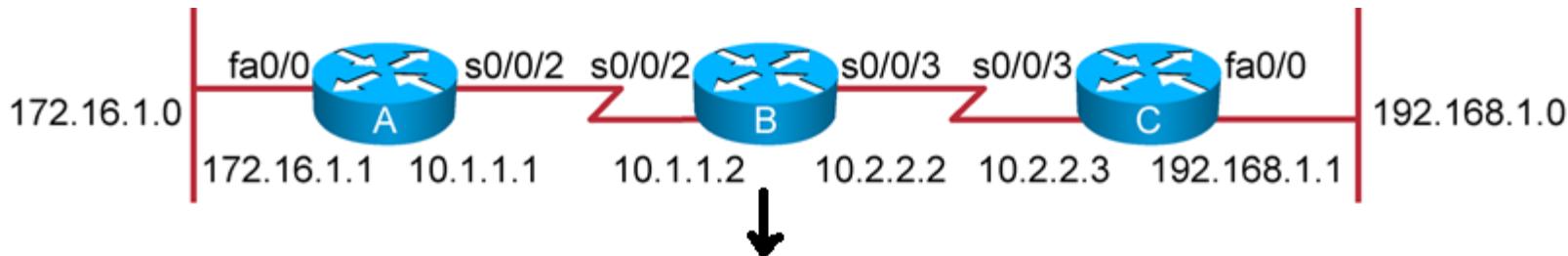
---

```
RouterX(config) # router ospf process-id
```

- Defines OSPF as the routing protocol

```
RouterX(config-router) # network address wildcard-mask area area-id
```

- Assigns network to a specific OSPF area



```
RouterX(config) # router ospf 100
```

```
RouterX(config-router) # network 10.1.1.2 0.0.0.0 area 0
```

*or*      # *network 10.1.1.0 0.0.0.255 area 0*

```
RouterX(config-router) # network 10.2.2.2 0.0.0.0 area 0
```

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# Verifying the OSPF Configuration

---

```
RouterX # show ip protocols
```

- Verifies that OSPF is configured

```
RouterX # show ip route
```

- Displays all the routes learned by the router

```
RouterX # show ip ospf
```

- Displays the OSPF router ID, timers, and statistics

```
RouterX # show ip ospf interface
```

- Displays the area ID and adjacency information

```
RouterX # show ip ospf neighbor
```

- Displays the OSPF neighbor information on a per-interface basis

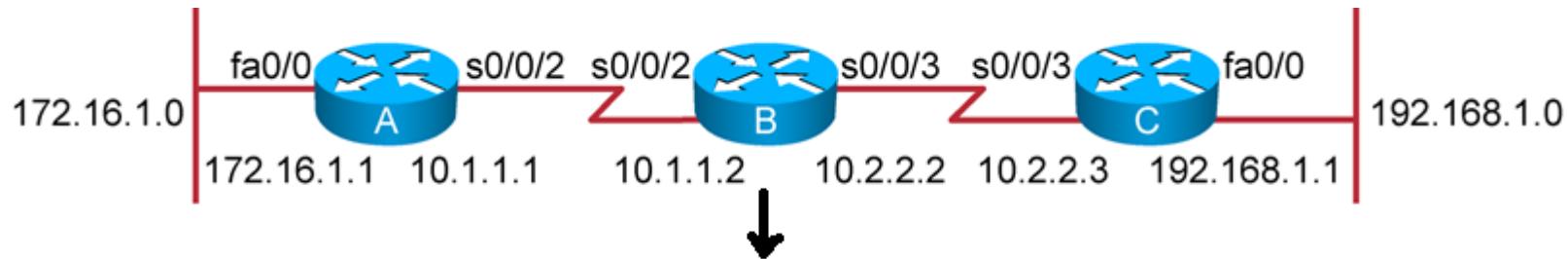
```
RouterX # debug ip ospf events
```

# EIGRP Configuration

---

```
RouterX(config) # router eigrp autonomous-system
```

```
RouterX(config-router) # network network-number
```



```
RouterX(config) # router eigrp 222
```

```
RouterX(config-router) # network 10.0.0.0
```

# Verifying the EIGRP Configuration

---

```
RouterX # show ip route eigrp
```

```
RouterX # show ip protocols
```

```
RouterX # show ip eigrp interfaces
```

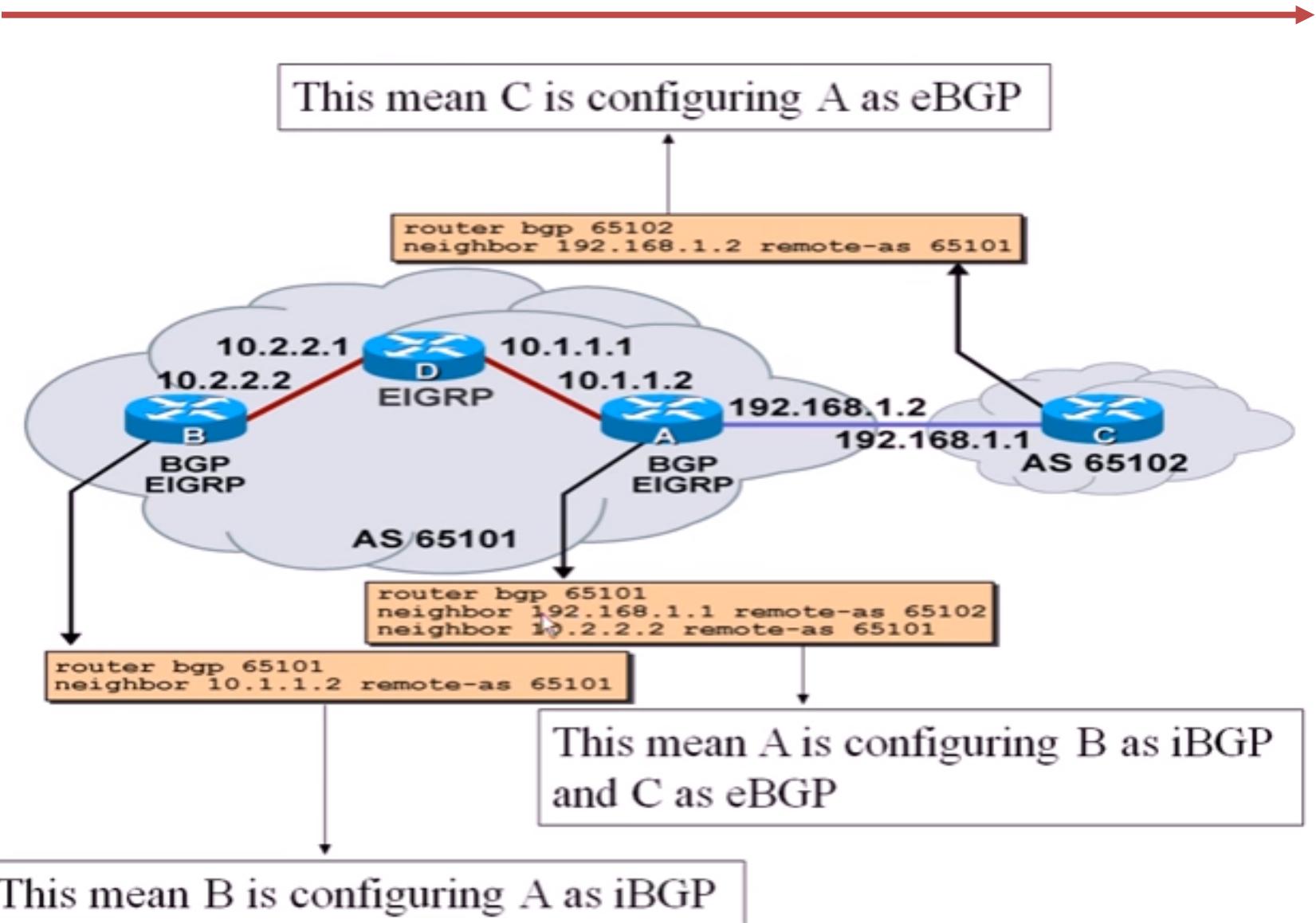
```
RouterX # show ip eigrp neighbors [detail]
```

```
RouterX # show ip eigrp topology [all-links]
```

```
RouterX # show ip eigrp traffic
```

```
RouterX # debug ip eigrp
```

# BGP Config



# BGP Config

```
Fred#show ip bgp summary
BGP table version is 8, main routing table version 8
4 network entries (8/12 paths) using 832 bytes of memory
5 BGP path attribute entries using 576 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
2 received paths for inbound soft reconfiguration
```

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
1.1.0.1	4	213	80	81	8	0	0	01:15:51	2
1.1.0.3	4	387	79	81	0	0	0	00:00:15	Active
1.2.0.1	4	213	82	82	0	0	0	02:15:23	Idle

```
as123#show ip bgp
BGP table version is 16, local router ID is 1.2.3.4
Status codes: s suppressed, h history, * valid, > best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete
```

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 1.0.0.0	0.0.0.0	0		32768	i
* 21.0.0.0	3.4.5.6	0			37 21i
*>	2.3.4.5	0		0	21i
*> 37.0.0.0	3.4.5.6	0		0	37i
*	2.3.4.5			0	21 37 i

```
Router#debug ip bgp updates
1:36:43: BGP: 2.3.4.5 send UPDATE 192.168.0.0
255.255.240.0, next 2.3.4.6, metric 0, path 123
1:36:43: BGP: 2.3.4.5 send UPDATE 192.168.16.0
255.255.255.0, next 2.3.4.6, metric 0, path 123
```

```
RouterA# debug ip bgp events
BGP events debugging is on
BGP : 172.16.1.2 passive open
BGP : 172.16.1.2 went from idle to connect
BGP : 172.16.1.2 open rcvd, version 4
BGP : 172.16.1.2 went from connect to open sent
BGP : 172.16.1.2 sending open, version 4
BGP : 172.16.1.2 went from open sent to open confirm
BGP : Scanning routing tables
BGP : 172.16.1.2 went from open confirm to established
```

```
Fred#show ip bgp neighbor 1.2.0.1
BGP neighbor is 1.2.0.1, remote AS 213, external link
Index 3, Offset 0, Mask 0x8
BGP version 4, remote router ID 10.1.1.1
BGP state = Established, table version = 11, up for 01:23:05
Last read 00:00:05, hold time is 180, keepalive interval is 60
seconds
Minimum time between advertisement runs is 30 seconds
Received 92 messages, 0 notifications, 0 in queue
Sent 92 messages, 0 notifications, 0 in queue
Connections established 1; dropped 0
Last reset never
No. of prefix received 2
```

# Statuts des interfaces et autres show

```
RouterA# show ip interface brief
```

```
RouterA# show interfaces
```

```
RouterA# show interface summary
```

```
RouterA# show interface detailed management
```

```
RouterA# show port number
```

```
RouterA# show port summary
```

# Thank you very much for your attention

*Ce n'est pas la fin,  
Ce n'est même pas le commencement de  
la fin,  
Mais plutôt, la fin du commencement...*

