



Bachelor Cycle

Cisco Networking

PW #3

Summary

- Hardware Overview
- IOS System Cisco
- The MUX
- The IOS prompts
- Helpful commands
- Configuration files
- Configuring a FastEthernet or Serial interface
- Static Routing

Hardware Overview(1/2)

- You will have 6 laboratories
- Each lab contains :
 - Four 1841 routers and one 2801/2811 router
 - Two 2960 switches (24 ports)
- The laboratory 7, called LABA contain :
 - Three 2960 switches (24 ports)

Hardware Overview (2/2)

	Lab1			
	lab1-ro1841-1			mux-1
	lab1-ro1841-2			
	lab1-ro1841-3	Prises Lab		mux-2
	lab1-ro1841-4			
	lab1-ro2801	Prises Rangee 6		Bocal Switch KB Labo Cisco 1
	Lab2	Prises Rangee 5		
	lab2-ro1841-1	Prises Rangee 4		Bocal Switch KB Labo Cisco 2
	lab2-ro1841-2	Prises Rangee 3		
	lab2-ro1841-3	Prises Rangee 2		
	lab2-ro1841-4	Prises Rangee 1		
	lab2-ro2801			
	lab3	Prises Baie SR		lab7
	lab3-ro1841-1			lab7-ro1841-1
	lab3-ro1841-2	lab1 lab2 lab3		lab7-ro1841-2
	lab3-ro1841-3	lab4 lab5 lab6		lab7-ro1841-3
	lab3-ro1841-4	lab7 labA		lab7-ro1841-4
	lab3-ro2801			lab7-ro1841-5
	lab4	Prises brassage Mux		labA
	lab4-ro1841-1			labA-ro1841-1
	lab4-ro1841-2	lab1-sw2960-1		labA-ro1841-2
	lab4-ro1841-3	lab1-sw2960-2		labA-ro1841-3
	lab4-ro1841-4	lab2-sw2960-1		
	lab4-ro2801	lab2-sw2960-2		
	lab5	lab3-sw2960-1		
	lab5-ro1841-1	lab3-sw2960-2		
	lab5-ro1841-2	lab4-sw2960-1		
	lab5-ro1841-3	lab4-sw2960-2		
	lab5-ro1841-4	lab5-sw2960-1		
	lab5-ro2811	lab5-sw2960-2		
	lab6	lab6-sw2960-1		
	lab6-ro1841-1	lab6-sw2960-2		
	lab6-ro1841-2	labA-sw2960-1		
	lab6-ro1841-3	labA-sw2960-2		
	lab6-ro1841-4	labA-sw2960-3		
	lab6-ro2811			

IOS System Cisco (1/2)

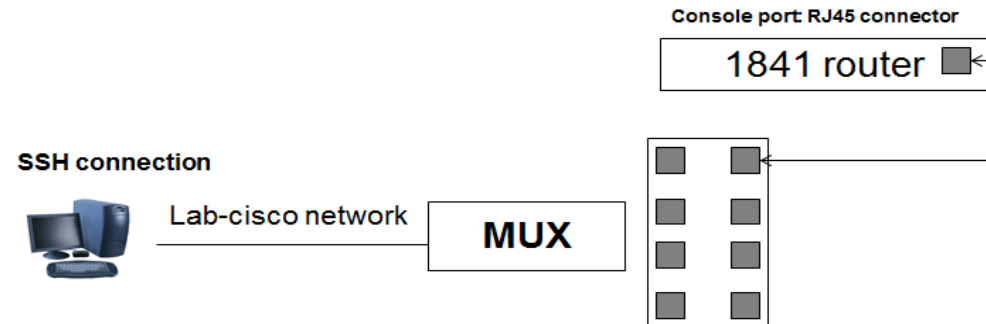
- IOS, for Internetwork Operating System, is a NOS (Network Operating System)
- It runs on Cisco routers and network switches
- It is used to configure, monitor and detect problems
- It works on specific CPU (Motorola 68030, Orion/R4600, and so on.)

IOS System Cisco (2/2)

- Configuring the IOS :
 - Console Port via physical access
 - Auxiliary port for connecting via a modem
 - VTY (virtual TTY) access via Telnet or SSH
 - Web

The MUX (1/2)

- Multiplexer ports
- Provides access to the routers via the network



The MUX (2/2)

- A single connexion port
- SSH address of a router :
 - Ssh `cisco@lab[1-6]-ro[1841-[1-4]]2801|2811.cis.epitech.net`
- SSH address of a switch :
 - Ssh [cisco@lab\[1-6\]-sw2960\[1-2\].cis.epitech.net](ssh:cisco@lab[1-6]-sw2960[1-2].cis.epitech.net)

Note : Alt + Shift + A to properly log out

```
(login@ubuntu)ssh cisco@lab1-ro1841-1.cis.epitech.net
cisco@lab1-ro1841-1's password : cisco
Lab1-ro1841-1>
Lab1-ro1841-1>exit
```


The IOS prompts (1/2)

- User mode (Reading only)

```
Lab1-ro1841-1>
```

- Privileged mode (Reading and Writing)

```
Lab1-ro1841-1#>
```

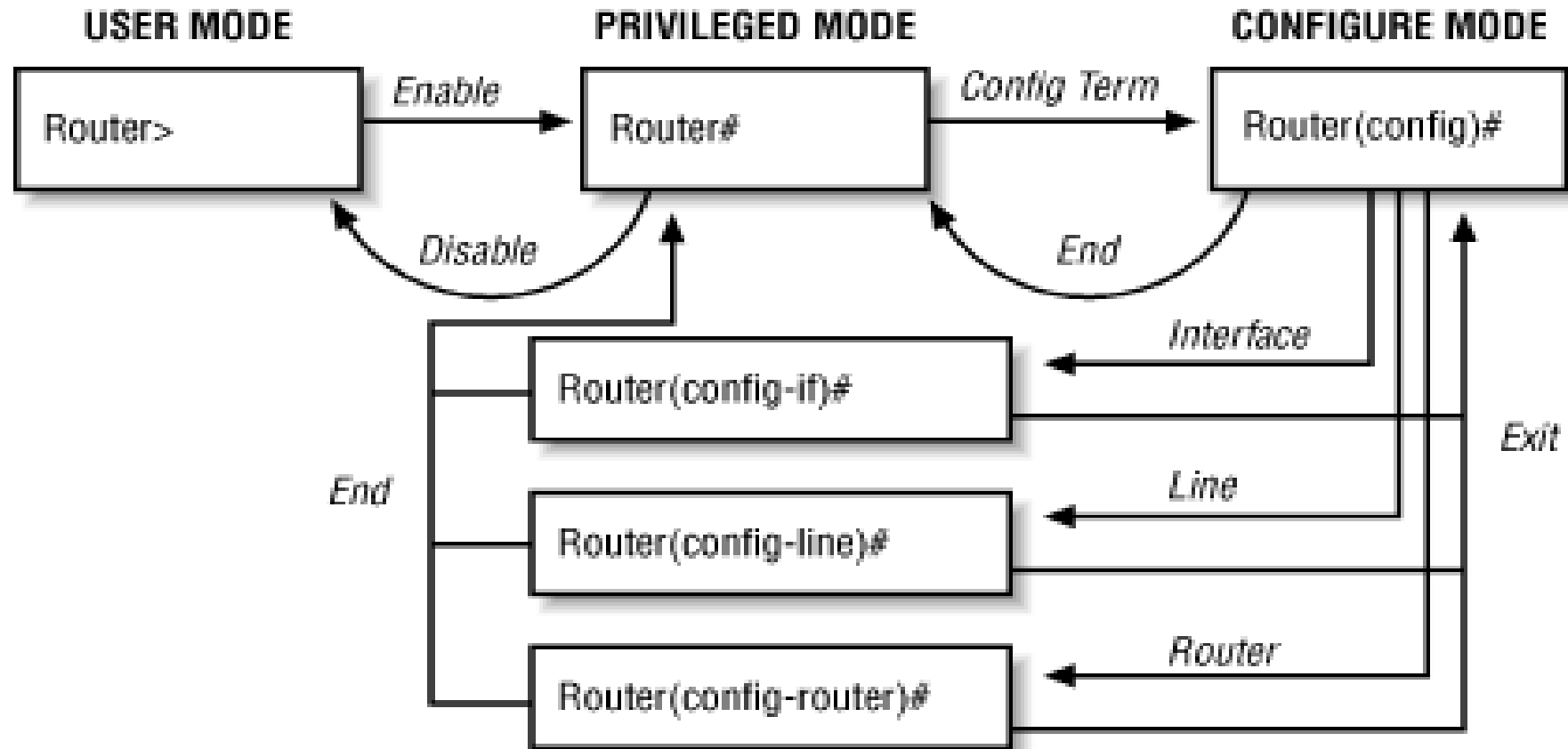
- Configure mode

```
Lab1-ro1841-1(config)#>
```

- Interface configure mode

```
Lab1-ro1841-1(config-if)#>
```

The IOS prompts (2/2)



Helpful Commands

- ? : help
- Enable (en) : enter privileged mode
- Configure terminal (conf t) : entre configure mode
- No : opposite of ...
- Show ? : show all commands
- Reload : reboot the router
- TAB : auto completion
- Enable secret : change the password of privileged mode

Configuration Files

- 2 files :
 - Startup-config (NVRAM)
 - Running-config (RAM)
- Save modifications

```
Lab1-ro1841-1#>copy running-config startup-config
```

- Delete configuration

```
Lab1-ro1841-1#>erase startup-config
```

FastEthernet Interface

- From configure mode
- Interface FastEthernet [number]

```
Lab1-ro1841-1(config)#>interface FastEthernet 0/0  
Lab1-ro1841-1(config-if)#>ip address [ip_address] [netmask]  
Lab1-ro1841-1(config-if)#>no shutdown  
Lab1-ro1841-1(config-if)#>exit
```

Note : Don't forget the « no shutdown » command to activate the interface

Serial Interface (1/2)

- A serial connexion uses a DCE/DTE cable
 - DCE (Data Communication Equipment), clock frequency
 - DTE (Data Terminal Equipment)
- Uses HDLC encapsulation as default
- The « clock rate » command modifies the clock frequency

```
Lab1-ro1841-1(config)#>interface Serial 0/0/0
Lab1-ro1841-1(config-if)#>ip address [ip_address] [netmask]
Lab1-ro1841-1(config-if)#>encapsulation hdlc
Lab1-ro1841-1(config-if)#>clock rate 128000
Lab1-ro1841-1(config-if)#>no shutdown
Lab1-ro1841-1(config-if)#>exit
```


Serial Interface (2/2)

- The « show controllers » command lets you know on which side of the cable is the clock

```
Lab1-ro1841-1#>show controllers Serial 0/0/0  
Interface Serial 0/0/0  
Hardware is PowerQUICC MPC860  
DTE V.35 TX and RX clocks detested  
[...]
```

Checking an Interface

- The « show interface » command allows you to view the status of an interface

```
Lab1-ro1841-1#>show interface Serial 0/0/0  
Serial 0/0/0 is up, line protocol is up
```

- An interface is « administratively down » due to a configuration problem.
- Line protocol is « down » due to a cable problem or hardware.
- The « show ip interface brief » command provides access to a simple plan of all interfaces

VTY

- Allows several TELNET connexion
- You must be directly connected (not via MUX)
- 5 VTY by router, 16 VTY by switch

```
Lab1-sw2960-1#>configure terminal
Lab1-sw2960-1(config)#>line vty 0 15
Lab1-sw2960-1(config-line)#>password cisco
Lab1-sw2960-1(config-line)#>login
Lab1-sw2960-1(config-line)#>exit
```

Static Routing (1/3)

- To enable IP routing

```
Lab1-ro1841-1(config)#>ip routing
```

- To add a static route

- ip route [net_addr] [netmask] [ip_addr | interface]

```
Lab1-ro1841-1(config)#>ip route 192.168.1.0 255.255.255.0 Serial 0/0/0
```

```
Lab1-ro1841-1(config)#>ip route 192.168.1.0 255.255.255.0 192.168.2.1
```

Static Routing(2/3)

- To add a static route

```
Lab1-ro1841-1(config)#>ip route 0.0.0.0 0.0.0.0 192.168.2.1
```

- To display the configured routes

```
Lab1-ro1841-1(config)#>show ip route
```

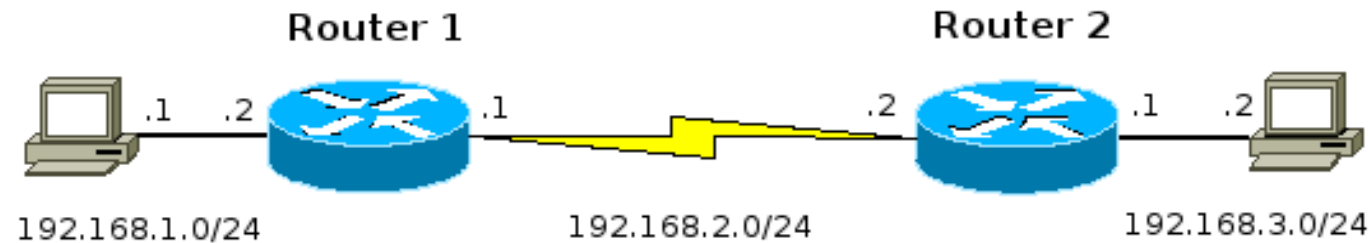
```
-----  
Gateway of last resort is not set
```

```
C      192.168.1.0 is directly connected, Serial 0/0/0
```

```
S      172.16.0.0 [1/2] via 192.168.1.1, Serial 0/0/0
```

```
R      10.0.0.0/8 via 192.168.1.1, 00:00:23, Serial 0/0/1
```

Static Routing (3/3)



```
Router1#>show ip route
```

```
C      192.168.2.0 is directly connected, Serial 0/0/0
C      192.168.1.0 is directly connect, FastEthernet 0/0
S      192.168.3.0 [1/1] via 192.168.2.2, Serial 0/0/0
```

```
Router2#>show ip route
```

```
C      192.168.2.0 is directly connected, Serial 0/0/0
C      192.168.3.0 is directly connect, FastEthernet 0/0
S      192.168.1.0 [1/1] via 192.168.2.1, Serial 0/0/0
```


Practical Work

- You must implement the following architecture using the IP addresses of your choice
- Your four routers must be able to communicate between them.

