Composants, Fonctionnement et Configuration d'un Switch

TP-Networking L2

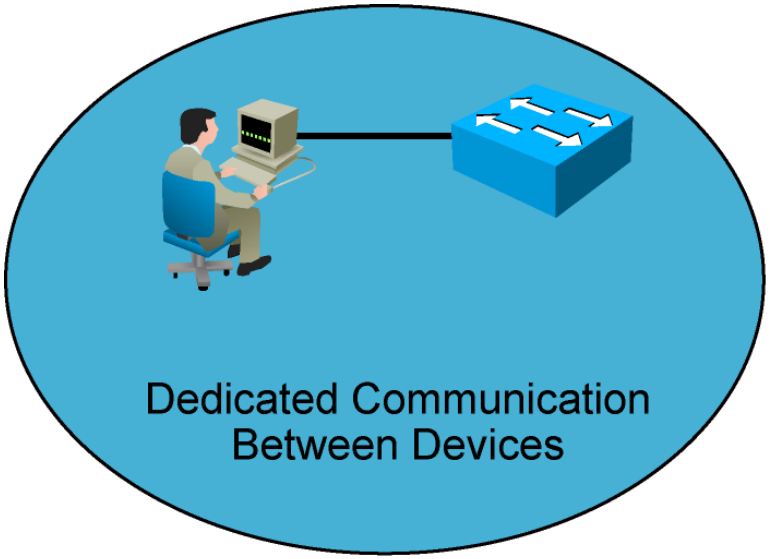
Mars 2022

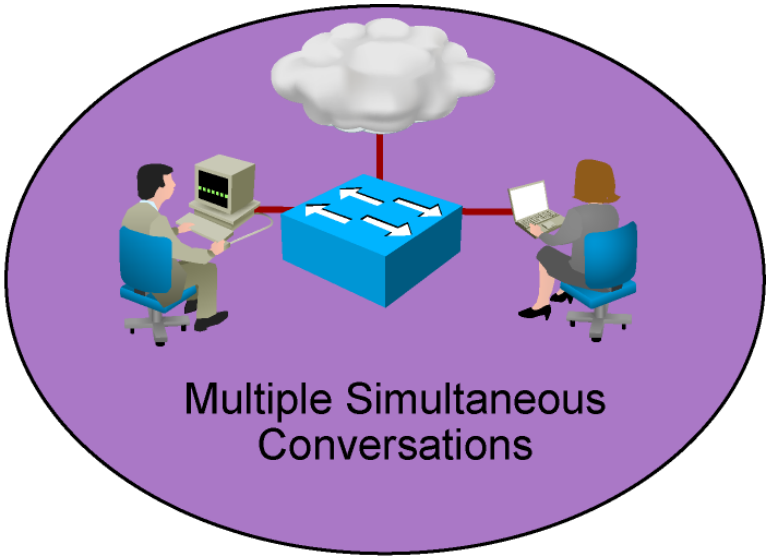
Sr. A. DJENNA

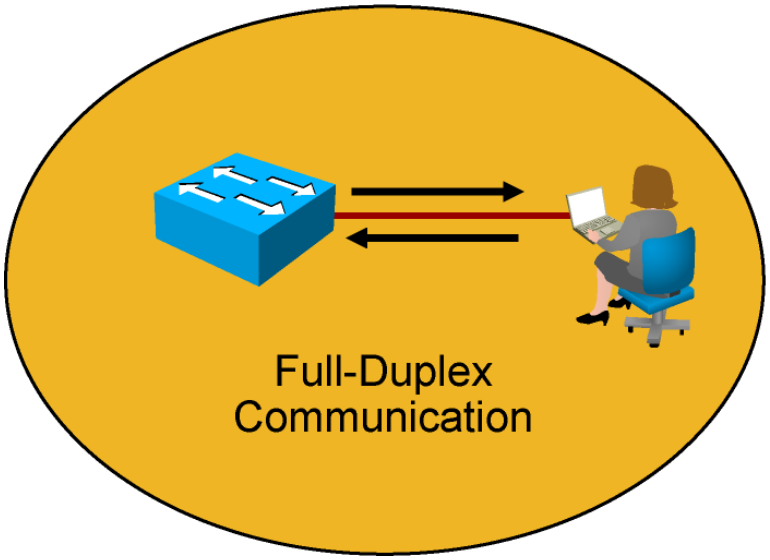
Plan

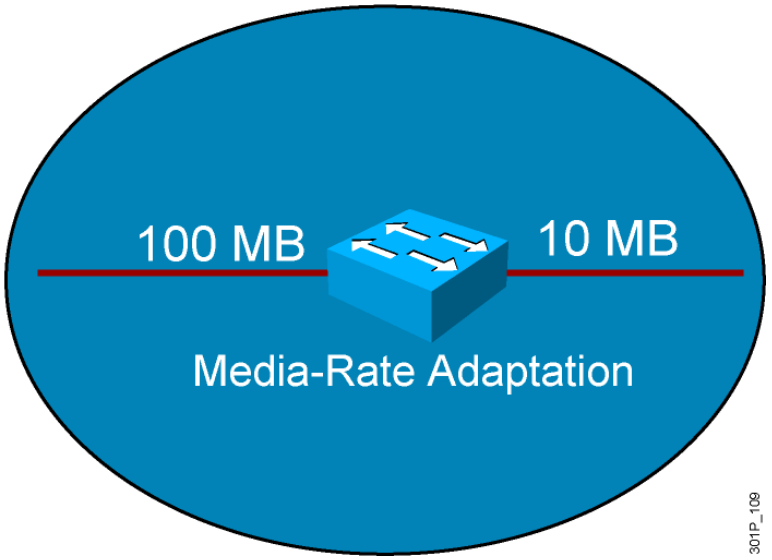
- Rôles et Fonctions
- Fonctionnement global
- Composants internes
- Processus de démarrage
- Sources de configuration
- Configuration niv 1
- Configuration niv 2
- Configuration niv 3

LAN Switch Features









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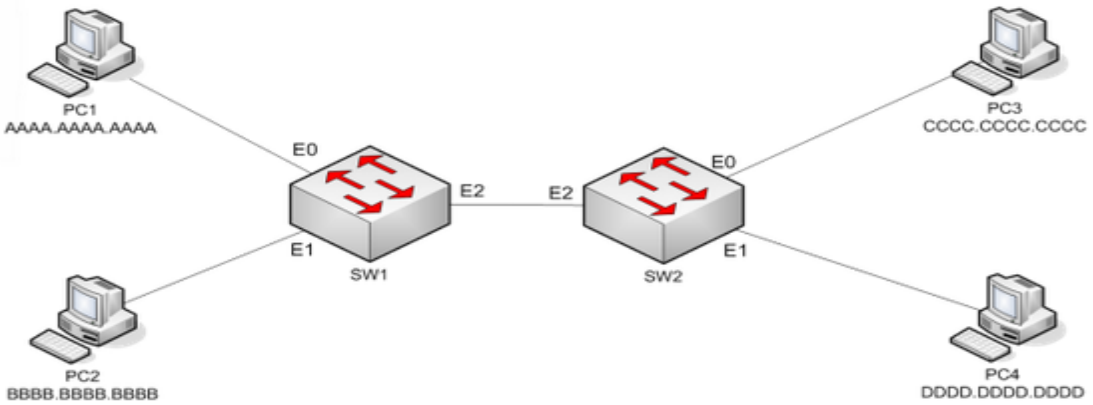
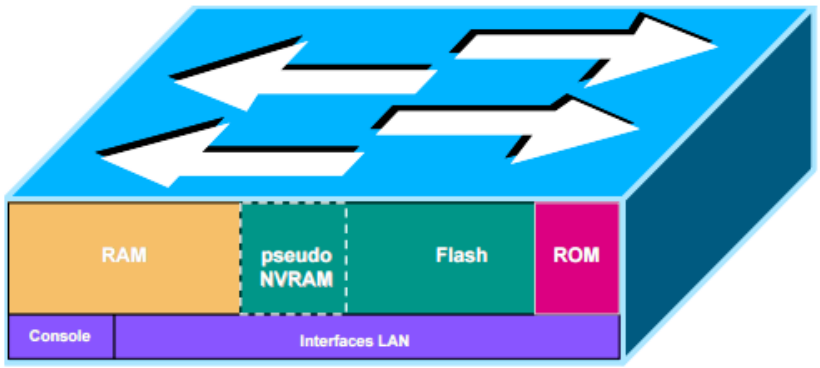
Fonctionnement global



Interface	MAC
E0	
E1	
E2	

Interface	MAC
E0	
E1	
E2	

Composants internes d'un Switch Cisco



RAM
Random Access Memory

- IOS décompressé
- running-config
- cache ARP
- …

La RAM est effacée à chaque redémarrage !

NVRAM
Non-Volatile RAM

- startup-config

La NVRAM est conservée même après un redémarrage ou un arret

- Fichier IOS compressé
- Peut contenir plusieurs IOS
- Peut contenir des fichiers de sauvegarde

La FLASH est conservée même après un redémarrage ou un arret du

FLASH

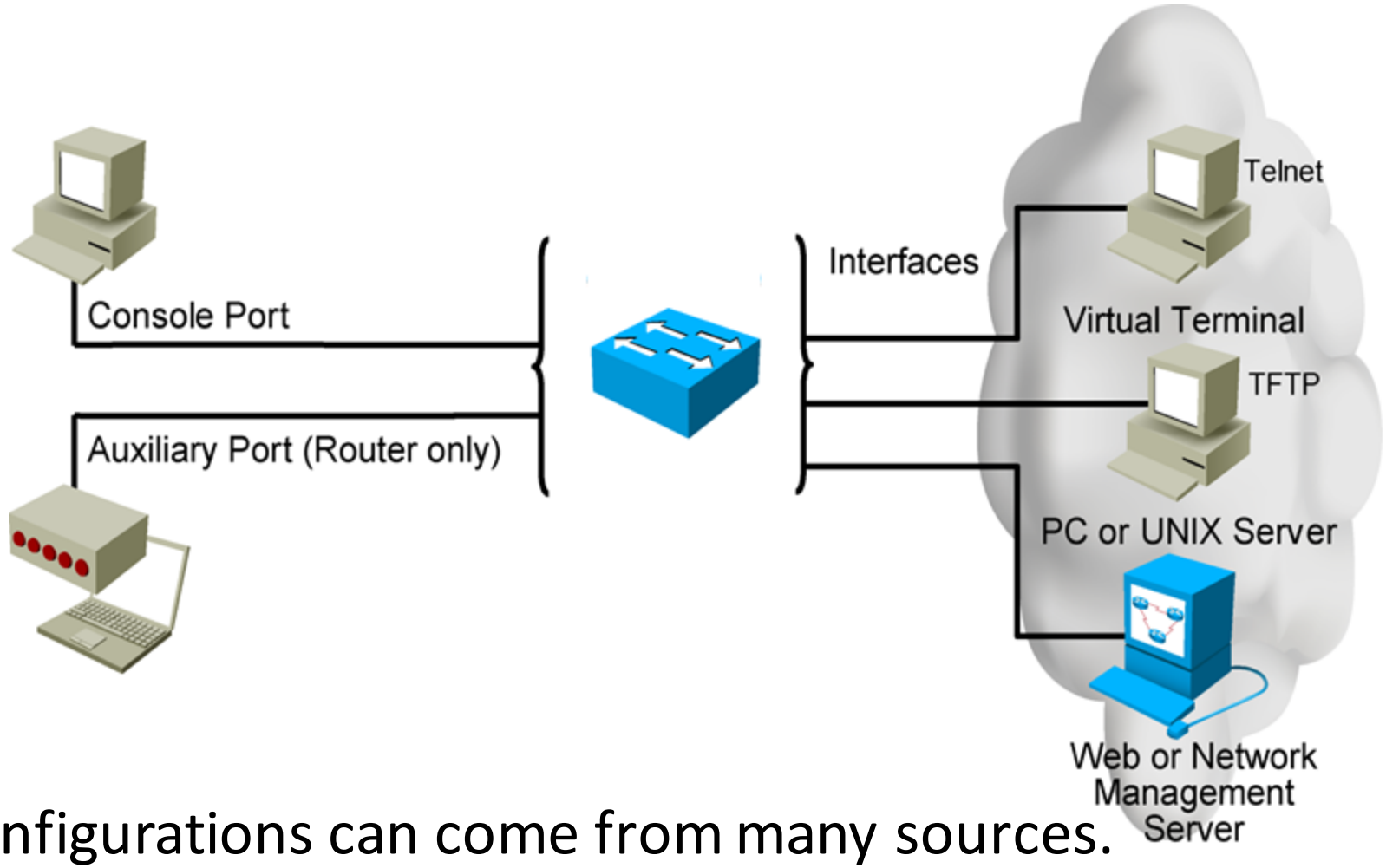
- POST – Power-on self test
- Mini OS pour des commandes basiques (ROMMON)

La ROM est conservée même après un redémarrage ou un arret

ROM
Read Only Memory

1 2 3

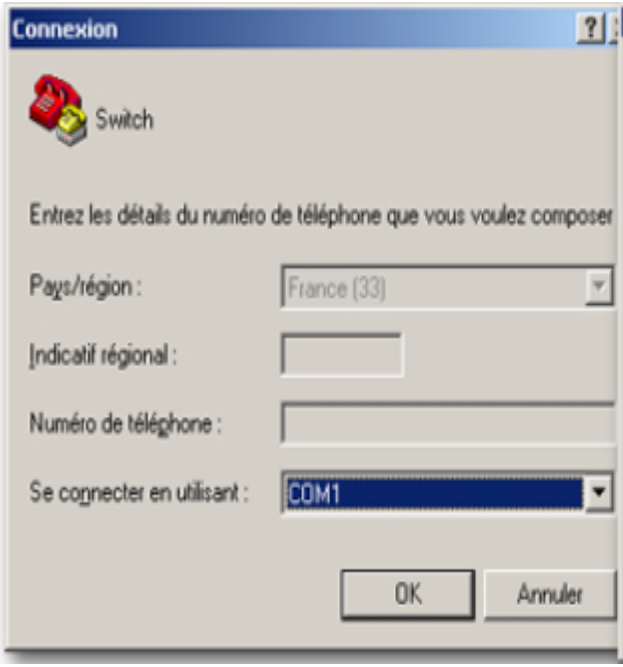
External Switch Configuration Sources

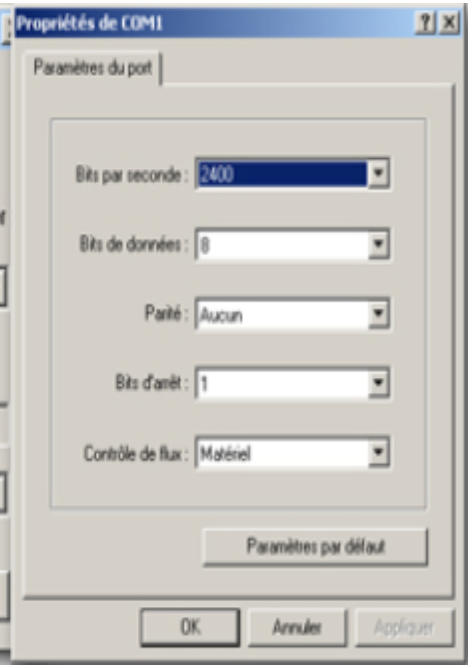


– Configurations can come from many sources.
– Configurations will act in device memory.

Configuration d'un Switch

- Connexion au Switch
- Configuration de l'HyperTerminal





Configuration d'un Switch

- Affichage du processus d'amorçage

```
Copyright (c) 1986-2006 by Cisco Systems, Inc.
Compiled Fri 28-Jul-06 04:33 by yenanh
Image text-base: 0x00003000, data-base: 0x00AA2F34
flashfs[1]: 602 files, 19 directories
flashfs[1]: 0 orphaned files, 0 orphaned directories
flashfs[1]: Total bytes: 32514048
flashfs[1]: Bytes used: 7715328
flashfs[1]: Bytes available: 24798720
flashfs[1]: flashfs fsck took 1 seconds.
flashfs[1]: Initialization complete....done Initializing
flashfs.

POST: CPU MIC register Tests : Begin
POST: CPU MIC register Tests : End, Status Passed

POST: PortASIC Memory Tests : Begin
POST: PortASIC Memory Tests : End, Status Passed

POST: CPU MIC PortASIC interface Loopback Tests : Begin
POST: CPU MIC PortASIC interface Loopback Tests : End, Status
```

Configuration d'un Switch

- Signification

```
Cisco Internetwork Operating System Software
IOS (tm) C2950 Software (C2950-I6Q4L2-M), Version 12.1(22)EA4, REL
fc1)
Copyright (c) 1986-2005 by cisco Systems, Inc.
Compiled Wed 18-May-05 22:31 by jharirba
Image text-base: 0x80010000, data-base: 0x80562000

ROM: Bootstrap program is is C2950 boot loader
Switch uptime is 2 hours, 4 minutes, 49 seconds
System returned to ROM by power-on

Cisco WS-C2950-24 (RC32300) processor (revision C0) with 21039K by

Processor board ID FHK0610Z0WC
Last reset from system-reset
Running Standard Image
24 FastEthernet/IEEE 802.3 interface(s)
63488K bytes of flash-simulated non-volatile configuration memory.
Base ethernet MAC Address: 00D0.BCE9.5909
Motherboard assembly number: 73-5781-09
Power supply part number: 34-0965-01
Motherboard serial number: FOC061004SZ
Power supply serial number: DAB0609127D
Model revision number: C0
Motherboard revision number: A0
Model number: WS-C2950-24
System serial number: FHK0610Z0WC
Configuration register is 0xF
```

IOS Version number

Type of memory

Type of interface

Device model number

Device serial number

How device will boot setting

Cisco IOS User Interface Functions

- There are two main EXEC modes for entering commands.

First Mode

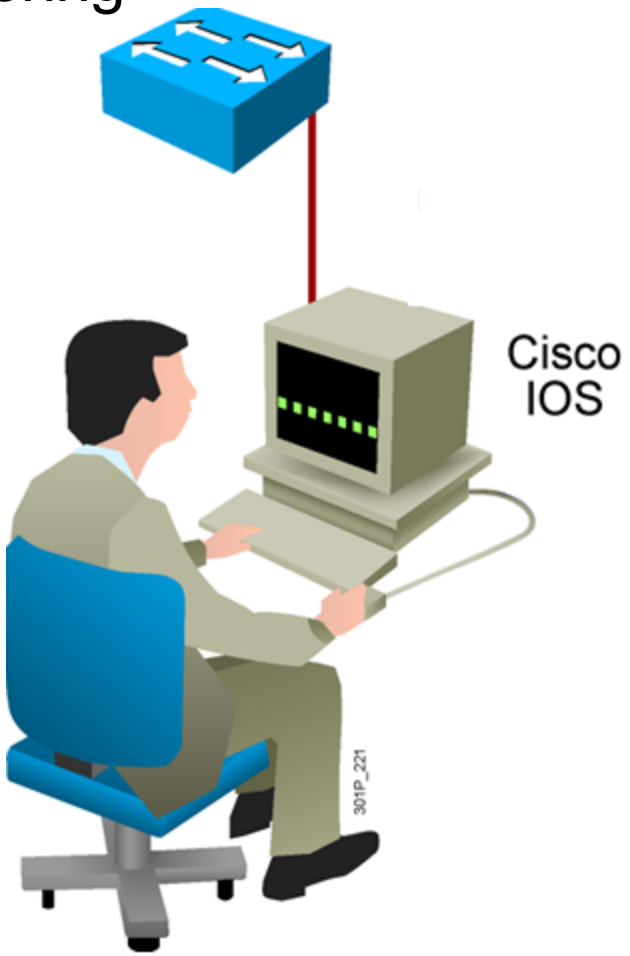
User Mode

- Limited examination of switch or router
- Command prompt: hostname>

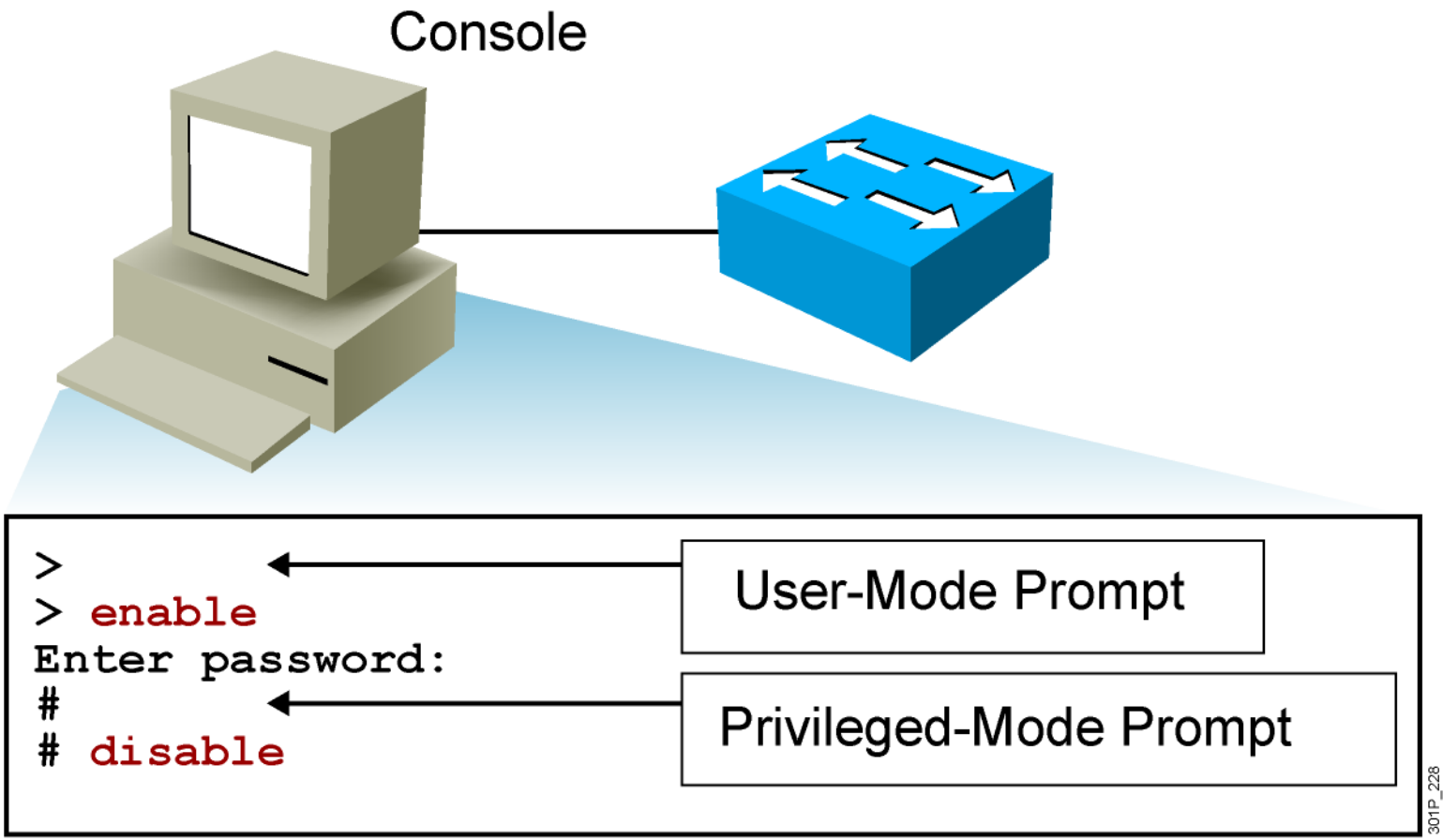
Second Mode (and Most Commonly Used)

Privileged (aka Enabled) Mode

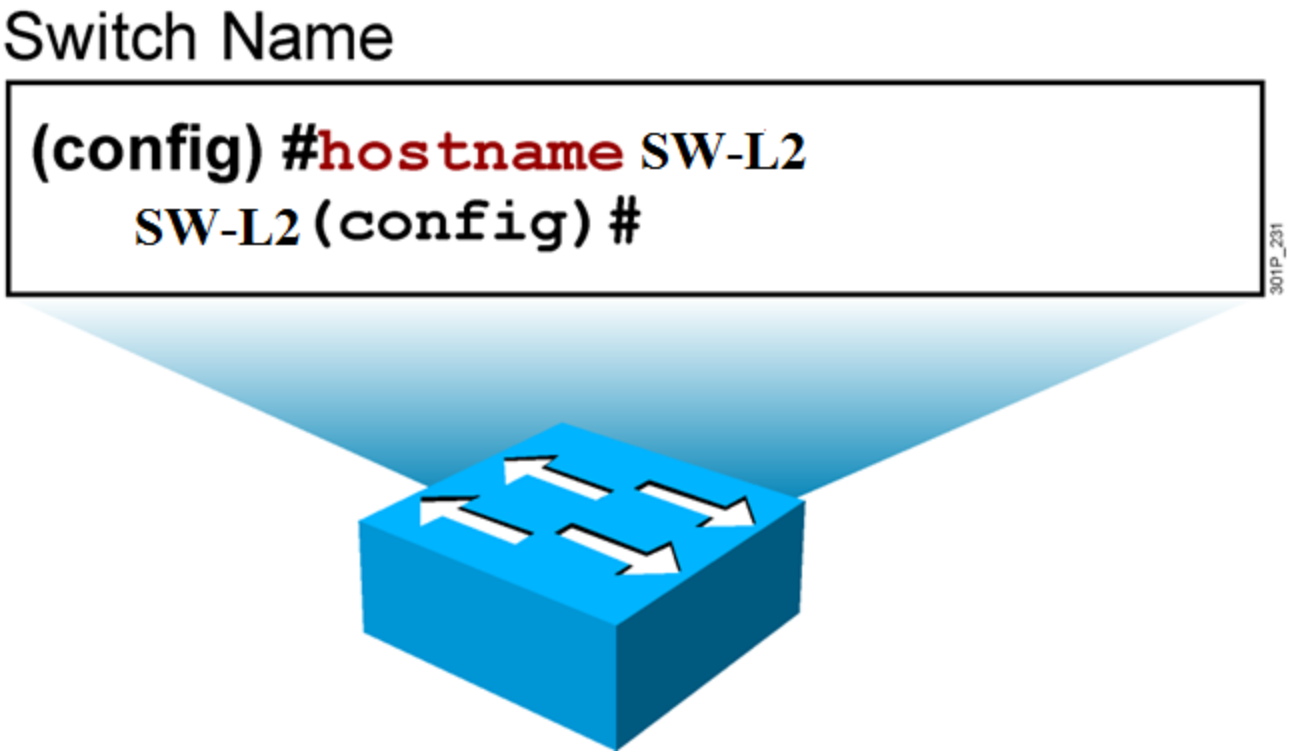
- Detailed examination of switch or router
- Enables configuration and debugging
- Prerequisite for other configuration modes
- Command prompt: hostname#



Logging In to the Switch and Entering the Privileged EXEC Mode



Configuring Switch Identification



Saving Configurations

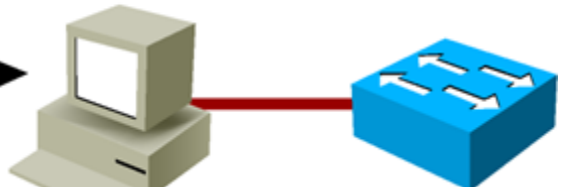
```
SwitchX
SwitchX copy running-config startup-config
Destination filename [startup-config]?
Building configuration…

SwitchX
```

Copies the current configuration to NVRAM

Configuring a Switch Password

Console Password

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



Virtual Terminal Password

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

Enable Password

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

Secret Password

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

- `enable secret mot_de_passe`
  - Le mot de passe est stocké de manière cryptée
- `enable password mot_de_passe`
  - Le mot de passe est stocké en clair

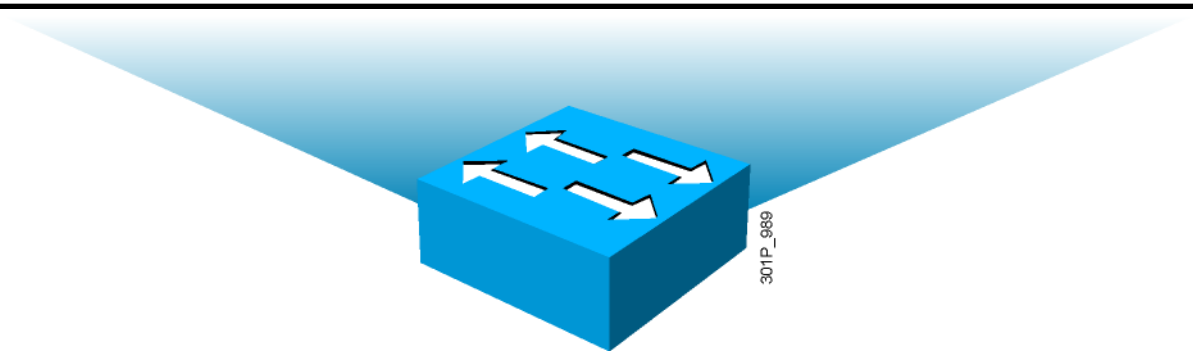
Service Password-Encryption Commands

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

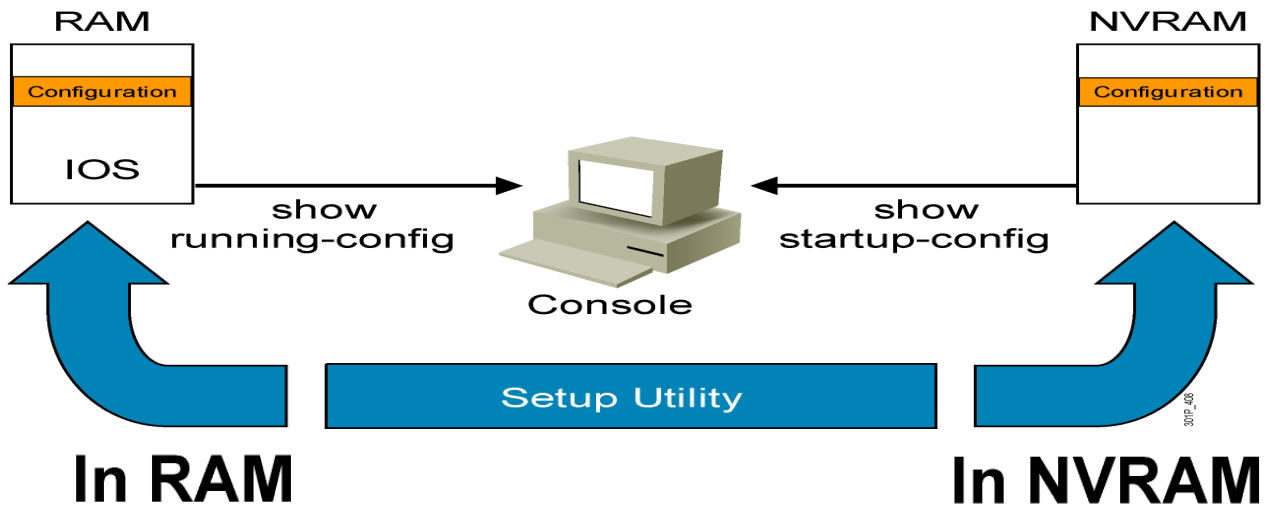
Configuring the Login Banner

– Defines and enables a customized banner to be displayed before the username and password login prompts.

```
SwitchX(config)# banner motd " Access for authorized users only. Please enter your
username and password. "
```



Viewing the Configuration




```
SwitchX#show running-config
Building configuration...??
Current configuration:?
!?
version 12.0
!
 -- More --
```

```
SwitchX#show startup-config
Using 1359 out of 32762 bytes
!
version 12.0
!
 -- More --
```

Displays the current and saved configuration

Configuring the Switch

Configuration modes:

- Global configuration mode
  - `SwitchX#configure terminal`
  - `SwitchX(config)#`
- Interface configuration mode
  - `SwitchX(config)#interface fa0/1`
  - `SwitchX(config-if)#`

Setting Duplex and Speed Options

Cisco Catalyst 2960 Series

```
SwitchX(config)#interface fa0/1
SwitchX(config-if)#duplex {auto | full | half}
```

Cisco Catalyst 2960 Series

```
SwitchX(config)#interface fa0/1
SwitchX(config-if)#speed {10 | 100 | 1000 | auto}
```

Configuring the Switch IP Address

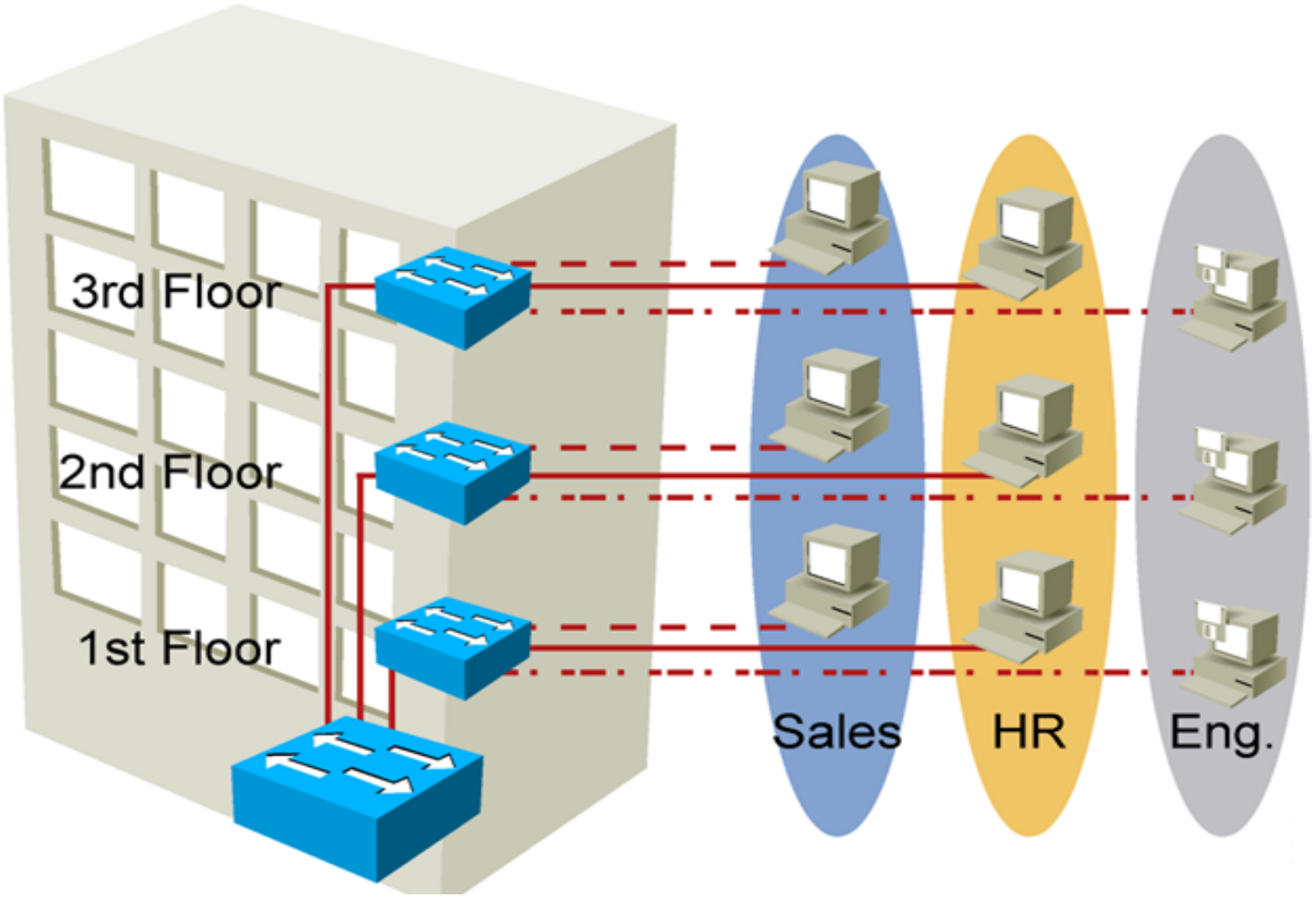
```
SwitchX(config)#interface vlan 1
SwitchX(config-if)#ip address {ip address} {mask}
```

Example:

```
SwitchX(config)#interface vlan 1
SwitchX(config-if)#ip address 10.5.5.11 255.255.255.0
SwitchX(config-if)#no shutdown
```

Dans le cas d'un switch, **il n'y a pas de traitement de paquet niveau 3** (disons **pas de routage**). Pourtant, on a besoin d'attribuer une adresse IP à ce dernier pour pouvoir l'administrer : c'est ce qu'on appelle **l'IP de management**. On spécifie l'IP d'administration du switch en configurant l'IP de l'interface du **vlan d'administration** (qui est par défaut le vlan 1)

VLAN



Configuring the Switch Default Gateway


```
SwitchX(config)#ip default-gateway {ip address}
```

Example:

```
SwitchX(config)#ip default-gateway 172.20.137.1
```

Securing Unused Ports

- Unsecured ports can create a security hole.
- A switch plugged into an unused port will be added to the network.
- Secure unused ports by disabling interfaces (ports).

```
SwitchX(config-int)# shutdown
```

- To disable an interface, use the shutdown command in interface configuration mode.
- To restart a disabled interface, use the no form of this command.

Showing Switch Initial Startup Status

```
SwitchX#show version
```

- Displays the configuration of the system hardware, software version, names and sources of configuration files, and boot images

```
SwitchX#show running-config
```

- Displays the current active configuration file of the switch

```
SwitchX#show interfaces
```

- Displays statistics for all interfaces configured on the switch

Switch show version Command

```
Switch#show version

Cisco IOS Software, C2960 Software (C2960-LANBASEK9-M), Version 12.2(25)SEE2, RELEASE
SOFTWARE (fc1)
Copyright (c) 1986-2006 by Cisco Systems, Inc.
Compiled Fri 28-Jul-06 11:57 by yenanh
Image text-base: 0x00003000, data-base: 0x00BB7944

ROM: Bootstrap program is C2960 boot loader
BOOTLDR: C2960 Boot Loader (C2960-HBOOT-M) Version 12.2(25r)SEE1, RELEASE SOFTWARE (fc1)

Switch uptime is 24 minutes

System returned to ROM by power-on
System image file is "flash:c2960-lanbasek9-mz.122-25.SEE2/c2960-lanbasek9-mz.122-
25.SEE2.bin"
cisco WS-C2960-24TT-L (PowerPC405) processor (revision B0) with 61440K/4088K bytes of
memory.


Processor board ID FOC1052W3XC
Last reset from power-on
1 Virtual Ethernet interface
24 FastEthernet interfaces
2 Gigabit Ethernet interfaces
The password-recovery mechanism is enabled.

! Text omitted
```

Switch show interfaces Command

```
SwitchX#show interfaces FastEthernet0/2
FastEthernet0/2 is up, line protocol is up (connected)
  Hardware is Fast Ethernet, address is 0008.a445.ce82 (bia 0008.a445.ce82)
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Half-duplex, 10Mb/s
  input flow-control is unsupported output flow-control is unsupported
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 4w6d, output 00:00:01, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     182979 packets input, 16802150 bytes, 0 no buffer
     Received 49954 broadcasts (0 multicast)
     0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 8 ignored
     0 watchdog, 20115 multicast, 0 pause input
     0 input packets with dribble condition detected
     3747473 packets output, 353656347 bytes, 0 underruns
  --More--
```

Managing the MAC Address Table

Catalyst 2960 Series

```
SwitchX#show mac-address-table
          Mac Address Table
-------------------------------------------
Vlan    Mac Address       Type        Ports
----    -----------       --------    -----
 All    0008.a445.9b40    STATIC      CPU
 All    0100.0ccc.cccc    STATIC      CPU
 All    0100.0ccc.cccd    STATIC      CPU
 All    0100.0cdd.dddd    STATIC      CPU
   1    0008.e3e8.0440    DYNAMIC     Fa0/2
Total Mac Addresses for this criterion: 5
SwitchX#
```