

# **Institut Universitaire des Sciences(IUS)**

**FACULTÉ DES SCIENCES ET TECHNOLOGIES (FST)**

## **TROISIÈME ANNÉE**

Rapport de travail du Laboratoire No 8

Cours : Réseaux I

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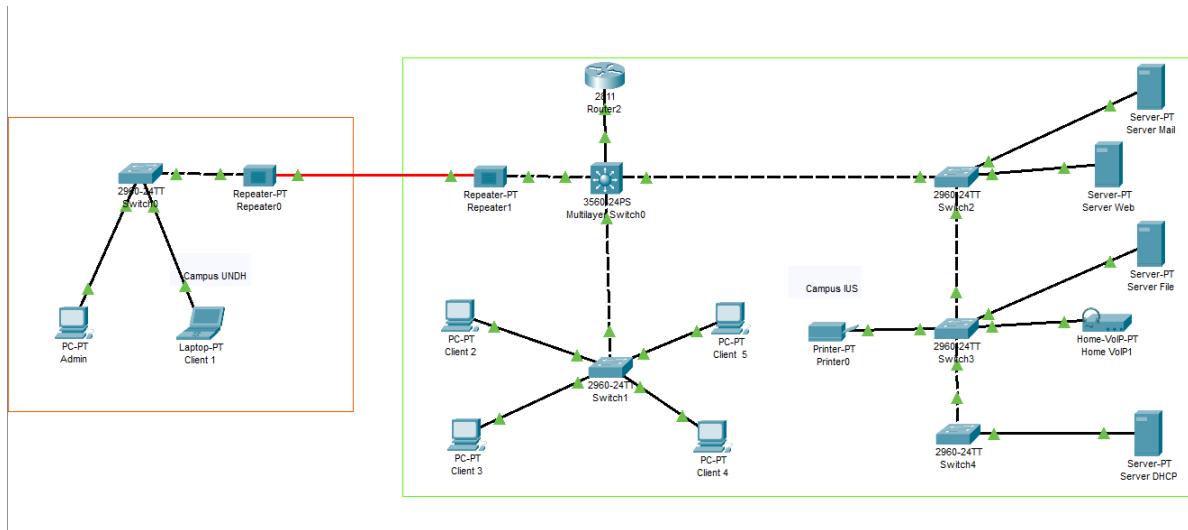
Professeur : Ismaël SAINT AMOUR

**Le 4 janvier 2026**

L'objectif de ce TD est de :

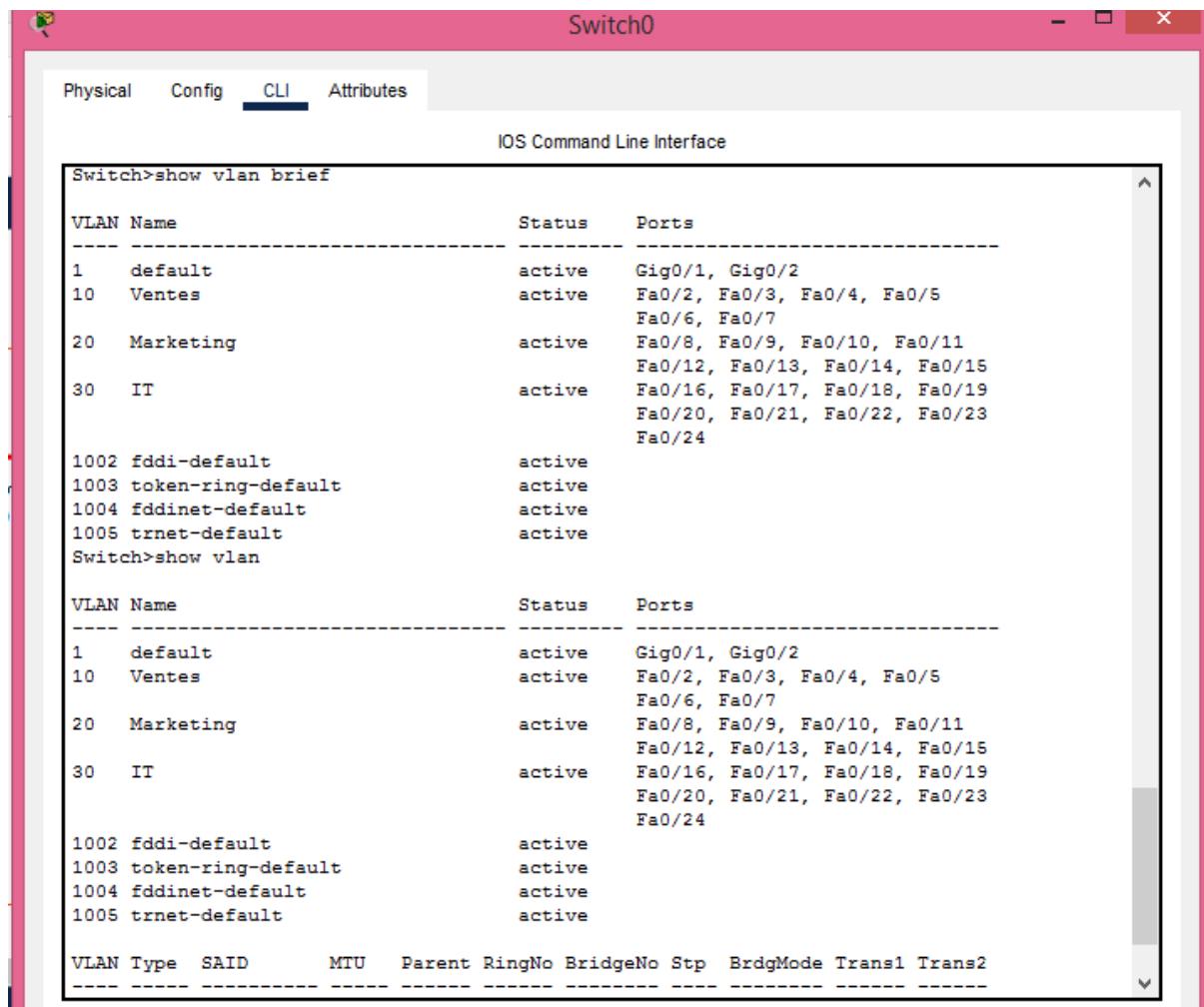
1. Créer et gérer des VLAN sur des switches
2. Comprendre le rôle des VLAN pour segmenter un réseau.
3. Apprendre à créer des VLAN et à affecter des ports aux VLAN correspondants.
4. Configurer le routage inter-VLAN sur un routeur (Router-on-a-Stick)
5. Comprendre comment un routeur peut permettre aux VLAN de communiquer entre eux.
6. Configurer des sous-interfaces avec encapsulation 802.1Q.
7. Configurer les trunks entre switches et vers le routeur
8. Apprendre à utiliser les trunks pour transporter plusieurs VLAN sur une seule liaison physique.
9. Comprendre le concept de VLAN natif et VLAN autorisés sur les trunks.
10. Attribuer des adresses IP et des gateways aux hôtes
11. Configurer les PCs dans différents VLAN avec des IP correctes.
12. Vérifier la communication intra-VLAN (même VLAN) et inter-VLAN (différents VLAN).

1. Reproduisez cette topologie en créant et configurant plusieurs VLAN sur les switchs. Assignez les ports aux VLAN correspondants, puis testez et gérez la connectivité entre eux à l'aide d'un routeur.



## Test de vérifications

Vérification des vlans sur :



The screenshot shows a terminal window titled "Switch0" running the IOS Command Line Interface. The window has tabs for "Physical", "Config", "CLI" (which is selected), and "Attributes". The CLI output displays two "show vlan" commands. The first command, "show vlan brief", lists VLANs 1 through 30 and some default VLANs (1002-1005) with their names, status, and member ports. The second command, "show vlan", provides a more detailed view of the same VLANs, including their type, SAID, MTU, and additional bridge-related parameters.

```
Switch>show vlan brief
VLAN Name          Status    Ports
---- --
1    default        active    Gig0/1, Gig0/2
10   Ventes         active    Fa0/2, Fa0/3, Fa0/4, Fa0/5
                           Fa0/6, Fa0/7
20   Marketing      active    Fa0/8, Fa0/9, Fa0/10, Fa0/11
                           Fa0/12, Fa0/13, Fa0/14, Fa0/15
30   IT             active    Fa0/16, Fa0/17, Fa0/18, Fa0/19
                           Fa0/20, Fa0/21, Fa0/22, Fa0/23
                           Fa0/24
1002 fddi-default  active
1003 token-ring-default  active
1004 fddinet-default  active
1005 trnet-default   active
Switch>show vlan
VLAN Name          Status    Ports
---- --
1    default        active    Gig0/1, Gig0/2
10   Ventes         active    Fa0/2, Fa0/3, Fa0/4, Fa0/5
                           Fa0/6, Fa0/7
20   Marketing      active    Fa0/8, Fa0/9, Fa0/10, Fa0/11
                           Fa0/12, Fa0/13, Fa0/14, Fa0/15
30   IT             active    Fa0/16, Fa0/17, Fa0/18, Fa0/19
                           Fa0/20, Fa0/21, Fa0/22, Fa0/23
                           Fa0/24
1002 fddi-default  active
1003 token-ring-default  active
1004 fddinet-default  active
1005 trnet-default   active
VLAN Type    SAID      MTU    Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- --      --      --      --      --      --      --      --      --      --
```

Switch1

Physical Config CLI Attributes

IOS Command Line Interface

```
SW-R2>show vlan brief

VLAN Name          Status      Ports
---- -----
1    default        active     Gig0/1, Gig0/2
10   Ventes         active     Fa0/2, Fa0/3, Fa0/4, Fa0/5
                           Fa0/6, Fa0/7
20   Marketing      active     Fa0/8, Fa0/9, Fa0/10, Fa0/11
                           Fa0/12, Fa0/13, Fa0/14, Fa0/15
30   IT              active     Fa0/16, Fa0/17, Fa0/18, Fa0/19
                           Fa0/20, Fa0/21, Fa0/22, Fa0/23
                           Fa0/24

1002 fddi-default  active
1003 token-ring-default  active
1004 fddinet-default  active
1005 trnet-default   active

SW-R2>show vlan

VLAN Name          Status      Ports
---- -----
1    default        active     Gig0/1, Gig0/2
10   Ventes         active     Fa0/2, Fa0/3, Fa0/4, Fa0/5
                           Fa0/6, Fa0/7
20   Marketing      active     Fa0/8, Fa0/9, Fa0/10, Fa0/11
                           Fa0/12, Fa0/13, Fa0/14, Fa0/15
30   IT              active     Fa0/16, Fa0/17, Fa0/18, Fa0/19
                           Fa0/20, Fa0/21, Fa0/22, Fa0/23
                           Fa0/24

1002 fddi-default  active
1003 token-ring-default  active
1004 fddinet-default  active
1005 trnet-default   active

VLAN Type   SAID      MTU      Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
```

Switch3

Physical Config **CLI** Attributes

IOS Command Line Interface

```
SW-R2>show vlan brief

VLAN Name          Status      Ports
---- ----
1    default        active     Gig0/1, Gig0/2
10   Ventes         active     Fa0/2, Fa0/3, Fa0/4, Fa0/5
                               Fa0/6, Fa0/7
20   Marketing       active     Fa0/8, Fa0/9, Fa0/10, Fa0/11
                               Fa0/12, Fa0/13, Fa0/14, Fa0/15
30   IT              active     Fa0/16, Fa0/17, Fa0/18, Fa0/19
                               Fa0/20, Fa0/21, Fa0/22, Fa0/23
                               Fa0/24
1002 fddi-default  active
1003 token-ring-default  active
1004 fddinet-default  active
1005 trnet-default   active

SW-R2>show vlan

VLAN Name          Status      Ports
---- ----
1    default        active     Gig0/1, Gig0/2
10   Ventes         active     Fa0/2, Fa0/3, Fa0/4, Fa0/5
                               Fa0/6, Fa0/7
20   Marketing       active     Fa0/8, Fa0/9, Fa0/10, Fa0/11
                               Fa0/12, Fa0/13, Fa0/14, Fa0/15
30   IT              active     Fa0/16, Fa0/17, Fa0/18, Fa0/19
                               Fa0/20, Fa0/21, Fa0/22, Fa0/23
                               Fa0/24
1002 fddi-default  active
1003 token-ring-default  active
1004 fddinet-default  active
1005 trnet-default   active

VLAN Type   SAID      MTU      Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
```

Vérification des trunks :

Switch0

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Switch>show interface trunk
Port      Mode       Encapsulation  Status      Native vlan
Fa0/1    on        802.1q         trunking    1

Port      Vlans allowed on trunk
Fa0/1    1-1005

Port      Vlans allowed and active in management domain
Fa0/1    1,10,20,30

Port      Vlans in spanning tree forwarding state and not pruned
Fa0/1    1,10,20,30
```

Switch1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
SW-R2>show interface trunk
Port      Mode       Encapsulation  Status      Native vlan
Fa0/1    on        802.1q         trunking    1

Port      Vlans allowed on trunk
Fa0/1    1-1005

Port      Vlans allowed and active in management domain
Fa0/1    1,10,20,30

Port      Vlans in spanning tree forwarding state and not pruned
Fa0/1    1,10,20,30
```

Switch3

Physical Config **CLI** Attributes

IOS Command Line Interface

```
SW-R2>show interface trunk
Port      Mode       Encapsulation  Status      Native vlan
Fa0/1    on        802.1q         trunking    1

Port      Vlans allowed on trunk
Fa0/1    1-1005

Port      Vlans allowed and active in management domain
Fa0/1    1,10,20,30

Port      Vlans in spanning tree forwarding state and not pruned
Fa0/1    1,10,20,30
```

## Vérification VTP :

Switch0

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Switch>show vtp status
VTP Version capable      : 1 to 2
VTP version running     : 1
VTP Domain Name          : ius.com
VTP Pruning Mode         : Disabled
VTP Traps Generation    : Disabled
Device ID                : 0001.C9A3.B300
Configuration last modified by 0.0.0.0 at 3-1-93 00:00:00

Feature VLAN :
-----
VTP Operating Mode       : Client
Maximum VLANs supported locally : 255
Number of existing VLANs   : 8
Configuration Revision    : 13
MD5 digest               : 0xAF 0x4B 0xCE 0x65 0xEE 0x9C 0xE7 0x4A
                           0xCC 0x25 0xD2 0x51 0xD7 0xF8 0x08 0x74
```

Switch1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
SW-R2>show vtp status
VTP Version capable      : 1 to 2
VTP version running     : 1
VTP Domain Name          : ius.com
VTP Pruning Mode         : Disabled
VTP Traps Generation    : Disabled
Device ID                : 0050.0FB7.A600
Configuration last modified by 0.0.0.0 at 3-1-93 00:00:00

Feature VLAN :
-----
VTP Operating Mode       : Client
Maximum VLANs supported locally : 255
Number of existing VLANs   : 8
Configuration Revision    : 13
MD5 digest               : 0xAF 0x4B 0xCE 0x65 0xEE 0x9C 0xE7 0x4A
                           0xCC 0x25 0xD2 0x51 0xD7 0xF8 0x08 0x74
```

Switch3

Physical Config CLI Attributes

IOS Command Line Interface

```
SW-R2>show vtp status
VTP Version capable      : 1 to 2
VTP version running      : 1
VTP Domain Name          : ius.com
VTP Pruning Mode         : Disabled
VTP Traps Generation     : Disabled
Device ID                : 0002.4ABC.3200
Configuration last modified by 0.0.0.0 at 3-1-93 00:13:29

Feature VLAN :
-----
VTP Operating Mode       : Client
Maximum VLANs supported locally : 255
Number of existing VLANs   : 8
Configuration Revision    : 0
MD5 digest               : 0x6B 0x43 0xE6 0x23 0xB2 0xC6 0xD2 0x0B
                           0x5C 0x0F 0x11 0x3A 0xE7 0xF3 0x5D 0xE9
```

## Vérification STP :

Switch0

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Switch>show spanning-tree summary
Switch is in pvst mode
Root bridge for: default IT
Extended system ID      is enabled
Portfast Default        is disabled
PortFast BPDU Guard Default is disabled
Portfast BPDU Filter Default is disabled
Loopguard Default       is disabled
EtherChannel misconfig guard is disabled
UplinkFast              is disabled
BackboneFast             is disabled
Configured Pathcost method used is short

Name          Blocking Listening Learning Forwarding STP Active
-----
VLAN0001      0          0          0          1          1
VLAN0010      0          0          0          3          3
VLAN0020      0          0          0          1          1
VLAN0030      0          0          0          1          1

-----
4 vlans          0          0          0          6          6
```

Switch1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
4 vlans          0          0          0          8          8

SW-R2>show spanning-tree summary
Switch is in pvst mode
Root bridge for:
Extended system ID      is enabled
Portfast Default        is disabled
PortFast BPDU Guard Default is disabled
Portfast BPDU Filter Default is disabled
Loopguard Default       is disabled
EtherChannel misconfig guard is disabled
UplinkFast              is disabled
BackboneFast             is disabled
Configured Pathcost method used is short

Name          Blocking Listening Learning Forwarding STP Active
-----
VLAN0001      0          0          0          1          1
VLAN0010      0          0          0          1          1
VLAN0020      0          0          0          5          5
VLAN0030      0          0          0          1          1

-----
4 vlans          0          0          0          8          8
```

Switch3

Physical Config CLI Attributes

IOS Command Line Interface

```
SW-R2>show spanning-tree summary
Switch is in pvst mode
Root bridge for: Marketing IT
Extended system ID      is enabled
Portfast Default        is disabled
PortFast BPDU Guard Default  is disabled
Portfast BPDU Filter Default is disabled
Loopguard Default       is disabled
EtherChannel misconfig guard is disabled
UplinkFast              is disabled
BackboneFast             is disabled
Configured Pathcost method used is short

Name          Blocking Listening Learning Forwarding STP Active
-----
VLAN0001      0          0          0          1          1
VLAN0010      0          0          0          2          2
VLAN0020      0          0          0          1          1
VLAN0030      0          0          0          4          4
-----
4 vlans       0          0          0          8          8
```

Test de connexion des postes de travail sur :

Vlan 10 :

Admin

Physical Config Desktop Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.10.3

Pinging 192.168.10.3 with 32 bytes of data:
Reply from 192.168.10.3: bytes=32 time=58ms TTL=128
Reply from 192.168.10.3: bytes=32 time=16ms TTL=128
Reply from 192.168.10.3: bytes=32 time<1ms TTL=128
Reply from 192.168.10.3: bytes=32 time=15ms TTL=128

Ping statistics for 192.168.10.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 58ms, Average = 22ms

C:\>ping 192.168.10.2

Pinging 192.168.10.2 with 32 bytes of data:
Reply from 192.168.10.2: bytes=32 time=75ms TTL=128
Reply from 192.168.10.2: bytes=32 time=3ms TTL=128
Reply from 192.168.10.2: bytes=32 time=2ms TTL=128
Reply from 192.168.10.2: bytes=32 time=29ms TTL=128

Ping statistics for 192.168.10.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 75ms, Average = 27ms
```

Vlan 20 :

The screenshot shows a Cisco Packet Tracer interface with a window titled "Client 2". Inside the window, there is a "Command Prompt" window. The command prompt displays two sets of ping results. The first set is for IP address 192.168.20.2, showing four successful replies with times ranging from <1ms to 6ms. The second set is for IP address 192.168.20.4, also showing four successful replies with times ranging from <1ms to 1ms. Both sets include statistics at the end.

```
C:\>ping 192.168.20.2

Pinging 192.168.20.2 with 32 bytes of data:

Reply from 192.168.20.2: bytes=32 time<1ms TTL=128
Reply from 192.168.20.2: bytes=32 time<1ms TTL=128
Reply from 192.168.20.2: bytes=32 time=6ms TTL=128
Reply from 192.168.20.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.20.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 6ms, Average = 1ms

C:\>ping 192.168.20.4

Pinging 192.168.20.4 with 32 bytes of data:

Reply from 192.168.20.4: bytes=32 time<1ms TTL=128
Reply from 192.168.20.4: bytes=32 time<1ms TTL=128
Reply from 192.168.20.4: bytes=32 time=1ms TTL=128
Reply from 192.168.20.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.20.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Vlan 30 :

The screenshot shows a Cisco Packet Tracer interface with a window titled "Server Web". Inside the window, there is a "Command Prompt" window. The command prompt displays ping results for IP address 192.168.30.2. The results show four replies with times ranging from <1ms to 15ms. Statistics at the end indicate 0% loss with an average of 6ms.

```
Cisco Packet Tracer SERVER Command Line 1.0
C:\>ping 192.168.30.2

Pinging 192.168.30.2 with 32 bytes of data:

Reply from 192.168.30.2: bytes=32 time<1ms TTL=128
Reply from 192.168.30.2: bytes=32 time=11ms TTL=128
Reply from 192.168.30.2: bytes=32 time=15ms TTL=128
Reply from 192.168.30.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.30.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 15ms, Average = 6ms

C:\>
```

## **Conclusion**

Avec ce laboratoire j'ai appris à créer des VLAN, affecter des ports, configurer des liaisons trunks pour transporter plusieurs VLAN, et assurer le routage inter-VLAN grâce à un routeur.