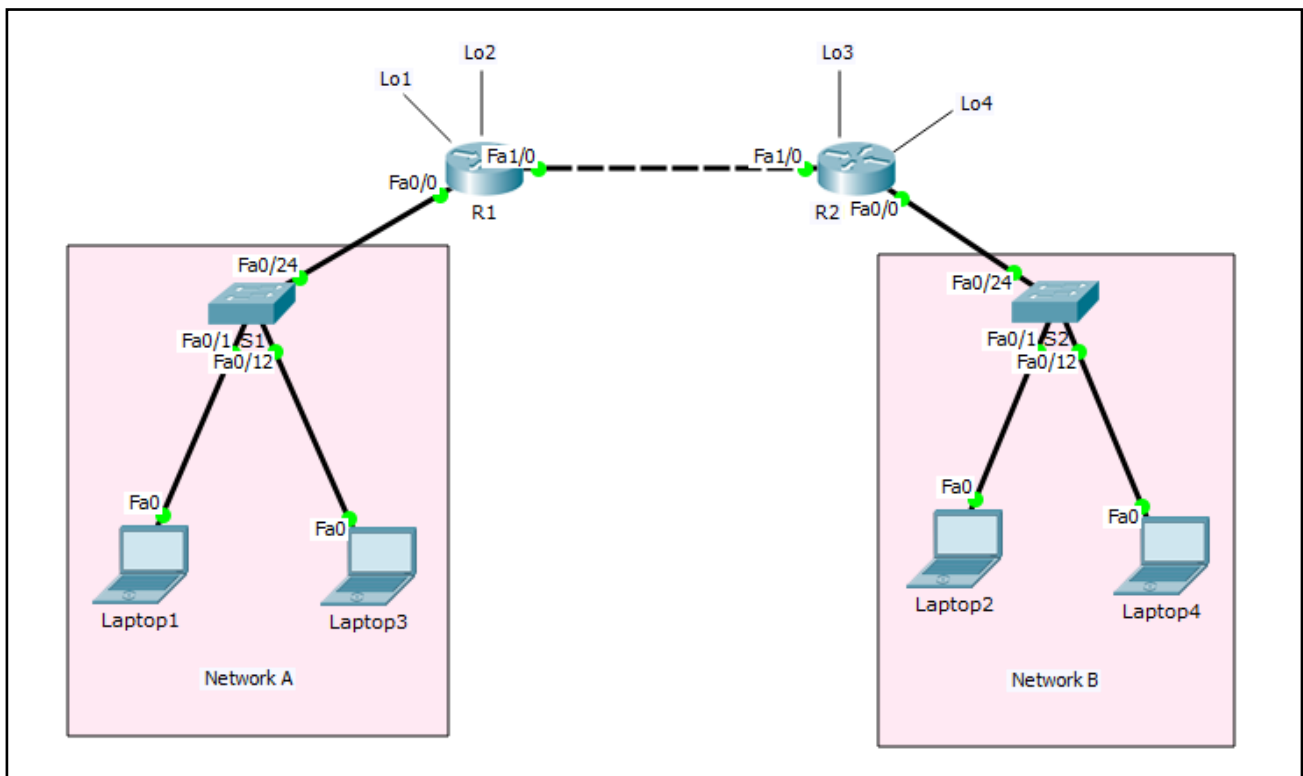


Lab 16. VLAN

Topologi



Tabel Addressing

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	Fa0/0	192.168.1.254	255.255.255.0	N/A
	Fa1/0	12.12.12.1	255.255.255.0	N/A
	Lo1	172.16.1.1	255.255.255.0	N/A
	Lo2	172.16.2.2	255.255.255.0	N/A
R2	Fa0/0	192.168.2.254	255.255.255.0	N/A
	Fa1/0	12.12.12.2	255.255.255.0	N/A
	Lo3	172.16.3.3	255.255.255.0	N/A
	Lo4	172.16.4.4	255.255.255.0	N/A
S1	N/A	VLAN 1	N/A	N/A
S2	N/A	VLAN 1	N/A	N/A
Laptop1	NIC	192.168.1.1	255.255.255.0	192.168.1.254
Laptop3	NIC	192.168.1.3	255.255.255.0	192.168.1.254
Laptop2	NIC	192.168.2.1	255.255.255.0	192.168.2.254
Laptop4	NIC	192.168.2.3	255.255.255.0	192.168.2.254

Tujuan

- Setting VLAN

Konsep Dasar

VLAN

- Membagi single broadcast domain menjadi beberapa broadcast domain
- Security layer 2
- Secara default semua port switch masuk VLAN 1
- VLAN 1 dikenal juga sebagai Administrative VLAN atau Management VLAN
- VLAN bisa dibuat dari nomor 2 – 1001
- VLAN hanya bisa dikonfigurasi pada Manageable Switch saja
- 2 tipe VLAN :
 - Static VLAN
 - Dynamic VLAN
- VLAN meningkatkan security network
- VLAN meningkatkan jumlah broadcast domain dan menurunkan size broadcast domain

Static VLAN

- Static VLAN berdasarkan port
- Dilakukan secara manual untuk assign port ke VLAN
- Disebut juga sebagai Port-Based VLAN
- Satu port hanya bisa untuk satu VLAN

Dua cara membuat VLAN :

1. Membuat VLAN di config mode

```
Switch (config)# vlan <no>
Switch (config-vlan)# name <name>
Switch (config-vlan)# exit
```

Assign port di VLAN

```
Switch (config)# interface <interface type> <interface no.>
Switch (config-if)# switchport mode access
Switch (config-if)# switchport access vlan <no>
```

2. Membuat VLAN menggunakan command database

```
Switch (config)# vlan database
Switch (config-vlan)# vlan <vlan id> name <vlan name>
Switch (config-vlan)# exit
```

Assign port di VLAN

```
Switch (config)# interface <interface type> <interface no.>
Switch (config-if)# switchport mode access
Switch (config-if)# switchport access vlan <no>
```

Verifikasi VLAN

```
Switch # show vlan
```

Dynamic VLAN

- Berdasarkan MAC address PC
- Switch secara otomatis assign port ke VLAN
- Masing-masing port bisa menjadi lebih dari satu member VLAN
- Untuk konfigurasi VLAN dibutuhkan software VMPS (VLAN Membership Policy Server)

Konfigurasi

Login console ke S1 atau S2 untuk mempraktikkan **Lab 16-VLAN**.

Sebelum implelementasi VLAN di S1 maupun S2, Laptop1 dan Laptop3 masih bisa saling Ping, begitu juga Laptop2 dan Laptop4 karena masih dalam satu VLAN yang sama yaitu VLAN 1.

Tes Ping Laptop1 ke Laptop3

```
Laptop1>ipconfig
```

```
FastEthernet0 Connection:(default port)
```

```
Link-local IPv6 Address.....: FE80::201:43FF:FE3A:AEC2
```

```
IP Address.....: 192.168.1.1
```

```
Subnet Mask.....: 255.255.255.0
```

```
Default Gateway.....: 192.168.1.254
```

```
Laptop3>ipconfig
```

```
FastEthernet0 Connection:(default port)
```

```
Link-local IPv6 Address.....: FE80::2D0:97FF:FE5C:503B
```

```
IP Address.....: 192.168.1.3
```

```
Subnet Mask.....: 255.255.255.0
```

```
Default Gateway.....: 192.168.1.254
```

```
Laptop1>ping 192.168.1.3
```

```
Pinging 192.168.1.3 with 32 bytes of data:
```

```
Reply from 192.168.1.3: bytes=32 time=1ms TTL=128
```

```
Reply from 192.168.1.3: bytes=32 time=0ms TTL=128
```

```
Reply from 192.168.1.3: bytes=32 time=0ms TTL=128
```

```
Reply from 192.168.1.3: bytes=32 time=0ms TTL=128
```

```
Ping statistics for 192.168.1.3:
```

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Tes Ping Laptop2 ke Laptop4

```
Laptop2>ipconfig
```

```
FastEthernet0 Connection:(default port)
```

```
Link-local IPv6 Address.....: FE80::260:2FFF:FE42:A6D3
```

```
IP Address.....: 192.168.2.1
```

```
Subnet Mask.....: 255.255.255.0
```

```
Default Gateway.....: 192.168.2.254
```

```
Laptop4>ipconfig
```

```
FastEthernet0 Connection:(default port)
```

```
Link-local IPv6 Address.....: FE80::20A:F3FF:FE4B:1E76
```

```
IP Address.....: 192.168.2.3
```

```
Subnet Mask.....: 255.255.255.0
```

```
Default Gateway.....: 192.168.2.254
```

```
Laptop2>ping 192.168.2.3
```

```
Pinging 192.168.2.3 with 32 bytes of data:
```

```
Reply from 192.168.2.3: bytes=32 time=63ms TTL=128
```

```
Reply from 192.168.2.3: bytes=32 time=8ms TTL=128
```

```
Reply from 192.168.2.3: bytes=32 time=0ms TTL=128
```

```
Reply from 192.168.2.3: bytes=32 time=0ms TTL=128
```

```
Ping statistics for 192.168.2.3:
```

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
Minimum = 0ms, Maximum = 63ms, Average = 17ms
```

Tabel VLAN

Switch	VLAN	VLAN NAME	Interface	Network VLAN
S1	VLAN 10	IT	Fa0/1-Fa0/12	192.168.10.0/24
	VLAN 20	Admin	Fa0/13-Fa0/24	192.168.20.0/24
	Interface VLAN10			192.168.10.10
S2	VLAN 10	IT	Fa0/1-Fa0/12	192.168.10.0/24
	VLAN 20	Admin	Fa0/13-Fa0/24	192.168.20.0/24
	Interface VLAN10			192.168.10.10

Setting VLAN di S1 dan S2 sesuai dengan tabel VLAN diatas dan setting IP address untuk interface VLAN 10 agar S1 atau S2 dapat diremote melalui telnet.

Setting VLAN di S1

Tampilkan VLAN default di S1

```
S1#show vlan
```

```
VLAN Name Status Ports
```

```
-----  
1 default active Fa0/1, Fa0/2, Fa0/3, Fa0/4  
Fa0/5, Fa0/6, Fa0/7, Fa0/8  
Fa0/9, Fa0/10, Fa0/11, Fa0/12  
Fa0/13, Fa0/14, Fa0/15, Fa0/16  
Fa0/17, Fa0/18, Fa0/19, Fa0/20  
Fa0/21, Fa0/22, Fa0/23, Fa0/24  
1002 fddi-default act/unsup  
1003 token-ring-default act/unsup  
1004 fddinet-default act/unsup  
1005 trnet-default act/unsup
```

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

```
-----  
1 enet 100001 1500 - - - - - 0 0  
1002 fddi 101002 1500 - - - - - 0 0  
1003 tr 101003 1500 - - - - - 0 0  
1004 fdnet 101004 1500 - - - ieee - 0 0  
1005 trnet 101005 1500 - - - ibm - 0 0
```

```
Remote SPAN VLANs
```

```
Primary Secondary Type Ports
```

```
S1#
```

Command membuat VLAN di S1

```
S1(config)#  
S1(config)#vlan 10  
S1(config-vlan)#name IT  
S1(config-vlan)#vlan 20  
S1(config-vlan)#name Admin  
S1(config-vlan)#  
S1(config-vlan)#interface range fa0/1-12  
S1(config-if-range)#switchport mode access  
S1(config-if-range)#switchport access vlan 10  
S1(config-if-range)#  
S1(config-if-range)#interface range fa0/13-24  
S1(config-if-range)#switchport mode access
```

```
S1(config-if-range)#switchport access vlan 20
S1(config-if-range)#
S1(config-if-range)#end
```

Command setting IP address interface VLAN 10 di S1

```
S1(config)#
S1(config)#interface vlan 10
S1(config-if)#ip address 192.168.10.10 255.255.255.0
S1(config-if)#no shutdown
S1(config-if)#
S1(config-if)#ip default-gateway 192.168.10.254
S1(config)#
```

Note : ulangi langkah yang sama diatas untuk membuat VLAN dan Interface VLAN di S2

Verifikasi

Tampilkan show vlan brief setelah disetting VLAN di S1

```
S1#show vlan brief

VLAN Name Status Ports
-----
1 default active
10 IT active Fa0/1, Fa0/2, Fa0/3, Fa0/4
Fa0/5, Fa0/6, Fa0/7, Fa0/8
Fa0/9, Fa0/10, Fa0/11, Fa0/12
20 Admin active Fa0/13, Fa0/14, Fa0/15, 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
S1#
```

Tampilkan show vlan brief setelah disetting VLAN di S2

```
S2#show vlan brief

VLAN Name Status Ports
-----
1 default active
10 IT active Fa0/1, Fa0/2, Fa0/3, Fa0/4
Fa0/5, Fa0/6, Fa0/7, Fa0/8
Fa0/9, Fa0/10, Fa0/11, Fa0/12
20 Admin active Fa0/13, Fa0/14, Fa0/15, 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
S2#
```

Dari hasil output `show vlan brief` diatas, kita telah berhasil membuat VLAN 10 dan VLAN 20 di S1 dan S2. Dengan status Active pada masing-masing VLAN dan interface VLAN sudah sesuai dengan tabel VLAN yang diberikan.

Tampilkan `show ip interface brief` di S1

```
S1#show ip interface brief
Interface IP-Address OK? Method Status Protocol
FastEthernet0/1 unassigned YES manual up up
...
FastEthernet0/24 unassigned YES manual up up
Vlan1 unassigned YES manual administratively down down
Vlan10 192.168.10.10 YES manual up up
S1#
```

Tampilkan `show ip interface brief` di S2

```
S2#show ip interface brief
Interface IP-Address OK? Method Status Protocol
FastEthernet0/1 unassigned YES manual up up
...
FastEthernet0/24 unassigned YES manual up up
Vlan1 unassigned YES manual administratively down down
Vlan10 192.168.10.10 YES manual up up
S2#
```

Dari hasil output diatas, interface VLAN 10 telah berhasil disetting IP address. Langkah selanjutnya meremote S1 dari Laptop1. Setting IP Laptop1 terlebih dahulu agar sesuai dengan network VLAN 10. IP address Laptop1 = 192.168.10.1/24. Diasumsikan switch telah disetting basic switch configuration misalnya hostname, enable secret, telnet, dll, lihat solution **Lab 15-Basic Switch Configuration**.

```
Laptop1>ipconfig

FastEthernet0 Connection:(default port)

Link-local IPv6 Address.....: FE80::201:43FF:FE3A:AEC2
IP Address.....: 192.168.10.1
Subnet Mask.....: 255.255.255.0
Default Gateway.....: 192.168.10.254
```

Tes Ping dari Laptop1 ke S1

```
Laptop1>ping 192.168.10.10

Pinging 192.168.10.10 with 32 bytes of data:

Reply from 192.168.10.10: bytes=32 time=1ms TTL=255
Reply from 192.168.10.10: bytes=32 time=0ms TTL=255
Reply from 192.168.10.10: bytes=32 time=0ms TTL=255
Reply from 192.168.10.10: bytes=32 time=0ms TTL=255

Ping statistics for 192.168.10.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Telnet dari Laptop1 ke S1

```
Laptop1>telnet 192.168.10.10
Trying 192.168.10.10 ...Open

User Access Verification

Password:
S1>enable
Password:
S1#
```

Note: ulangi langkah yang sama diatas untuk tes Ping dari Laptop2 ke S2 dan akses telnet ke S2

Setelah selesai disetting VLAN, maka Laptop1 dan Laptop3 di S1, Laptop2 dan Laptop4 di S2 tidak bisa melakukan Ping karena beda VLAN. Oleh karena itu untuk mengkoneksikan VLAN yang berbeda membutuhkan device layer 3 yaitu router dan L3 switch.

- Laptop1 & Laptop2 menjadi member VLAN10
- Laptop3 & Laptop4 menjadi member VLAN 20

Tabel Addressing setelah VLAN disetting

Device	Interface	IP Address	Subnet Mask	Default Gateway
Laptop1	NIC	192.168.10.1	255.255.255.0	192.168.10.254
Laptop3	NIC	192.168.20.1	255.255.255.0	192.168.20.254
Laptop2	NIC	192.168.10.2	255.255.255.0	192.168.10.254
Laptop4	NIC	192.168.20.2	255.255.255.0	192.168.20.254

Dari tabel diatas ada yang memiliki network address yang sama, hal ini tidak menjadi masalah karena VLAN terletak beda lokasi yang satu di Network A dan lainnya di Network B. Dan VLAN ini tidak dikoneksikan menggunakan routing protocol sehingga tidak menyebabkan overlap network.

Tes Ping dari Laptop1 ke Laptop3 setelah disetting VLAN di S1

```
Laptop1>ping 192.168.20.1
```

```
Pinging 192.168.20.1 with 32 bytes of data:
```

```
Request timed out.
```

```
Request timed out.
```

```
Request timed out.
```

```
Request timed out.
```

```
Ping statistics for 192.168.20.1:
```

```
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Tes Ping gagal dari Laptop1 ke Laptop3 karena beda VLAN dan belum terdapat gateway diantara masing-masing VLAN. Untuk mengatasi hal ini maka diperlukan InterVLAN menggunakan interface physical router atau sub-interface router (Router-on-Stick).

Review

1. Command apa yang digunakan untuk menghapus VLAN di switch?
2. Hapus VLAN 1 di S1 maupun S2? Bagaimana hasilnya, berhasil atau tidak? Jelaskan?
3. Ubah interface router Fa0/0 R1 dan R2 menjadi 192.168.10.254, kemudian lakukan tes Ping dari S1 dan S2? Bagaimana hasilnya? Jelaskan?