

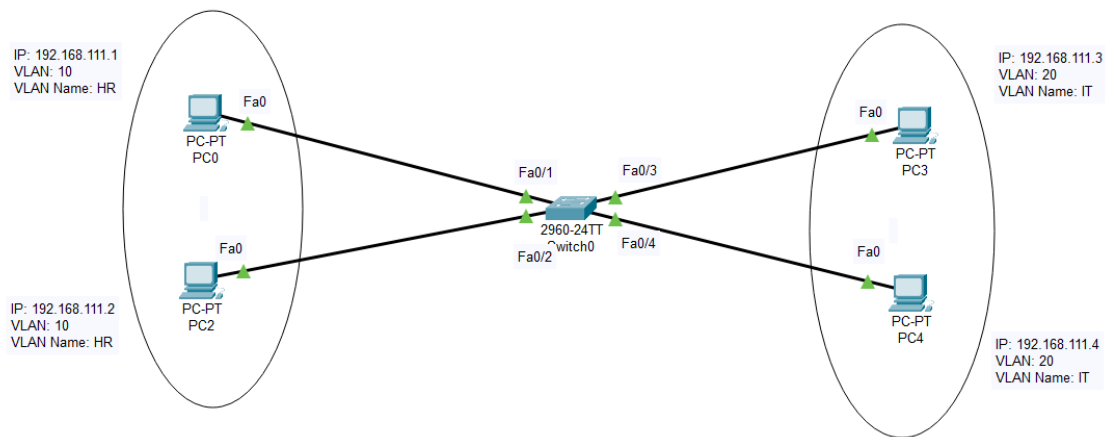
LAB 5

LAB 5.1: UNDERSTANDING, CREATING AND SIMULATING MULTIPLE VLANS IN A SINGLE SWITCH.

OBJECTIVE: To understand and create multiple VLANS in a switch

BACKGROUND: VLAN is a custom network which is created from one or more local area networks in order to limit access to a specified group of users by dividing workstations into different isolated VLAN.

TOPOLOGY

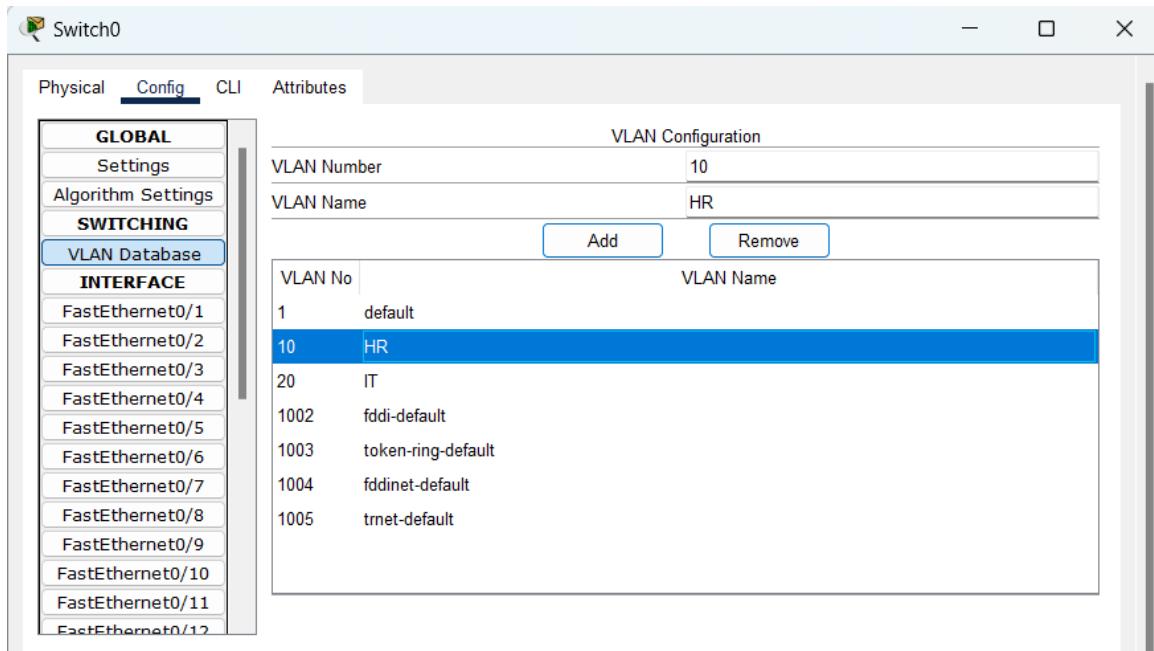


IP ADDRESSING PLAN

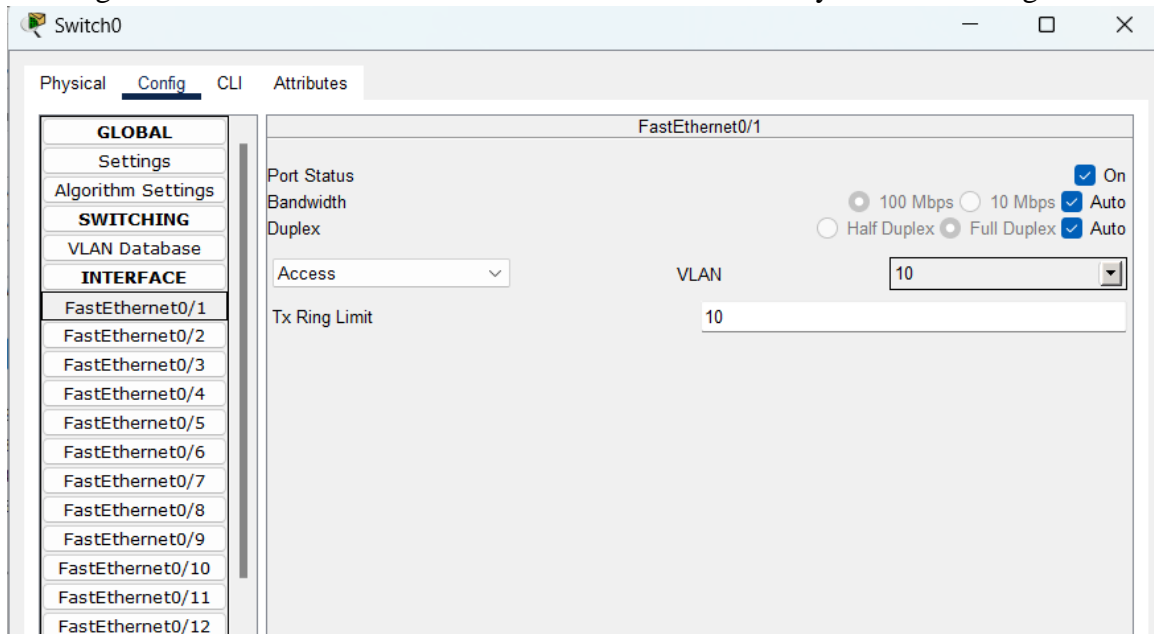
Device	Interface	IP address	Subnetmask	VLAN	Default gateway
PC0	NIC	192.168.101.1	255.255.255.0	10/HR	-
PC1	NIC	192.168.101.2	255.255.255.0	10/HR	-
PC2	NIC	192.168.101.3	255.255.255.0	20/IT	-
PC3	NIC	192.168.101.4	255.255.255.0	20/IT	-

PROCEDURE

1. Create the topology as shown above
2. Assign the IP address to each PC as shown in IP addressing plan
3. Create two VLANs in a switch as



4. Assign the PC connected interface of switch into the VLAN you want to assign



VERIFICATION

1. Ping the PC as

PDU List Window										
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC2	ICMP		0.000	N	0	(edit)	
	Successful	PC3	PC4	ICMP		0.000	N	1	(edit)	
	Failed	PC0	PC4	ICMP		0.000	N	2	(edit)	

PC with in a VLAN gets communicated but PC present in different VLAN can not communicate.

2. View the details of VLANs created in switch as

```
Switch#show vlan brief
```

VLAN	Name	Status	Ports
1	default	active	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 Gig0/1, Gig0/2
10	HR	active	Fa0/1, Fa0/2
20	IT	active	Fa0/3, Fa0/4
1002	fddi-default	active	
1003	token-ring-default	active	
1004	fddinet-default	active	
1005	trnet-default	active	

```
Switch#
```

CONCLUSION

In this way we can create multiple VLANs within a LAN (in a Switch) so that broadcast domain can be divided and gets minimized in a LAN.

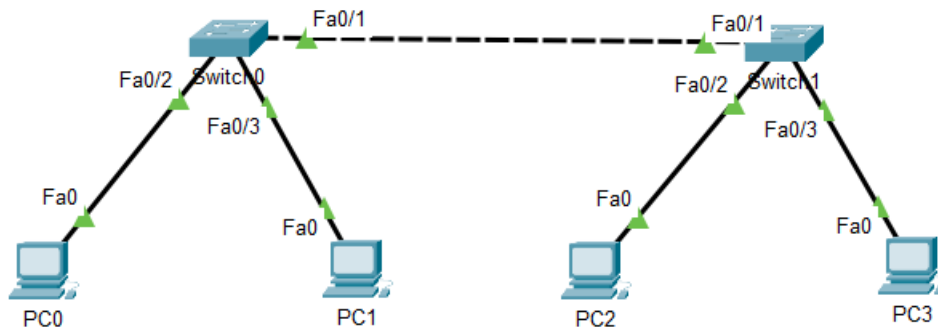
LAB 5.2: UNDERSTANDING, CREATING, AND SIMULATING MULTIPLE VLANS DISTRIBUTED IN MULTIPLE SWITCH AND ROUTING AMONG VLANS

OBJECTIVE: TO understand and create multiple VLANS distributed in multiple switch and routing among them

TOOLS USED: Packet Tracer

BACKGROUND: Virtual Local Area Networks or Virtual LANs (VLANs) are a logical group of computers that appear to be on the same LAN irrespective of the configuration of the underlying physical network. Native VLAN is simply the one VLAN which traverses a Trunk port without a VLAN tag. An Access switch port carries traffic for only one VLAN whereas Trunk port carries traffic for multiple VLANs. When frames traverse a Trunk port, a VLAN tag is added to distinguish which frames belong to which VLANs. Access ports do not require a VLAN tag, since all incoming and outgoing frames belong to a single VLAN.

TOPOLOGY

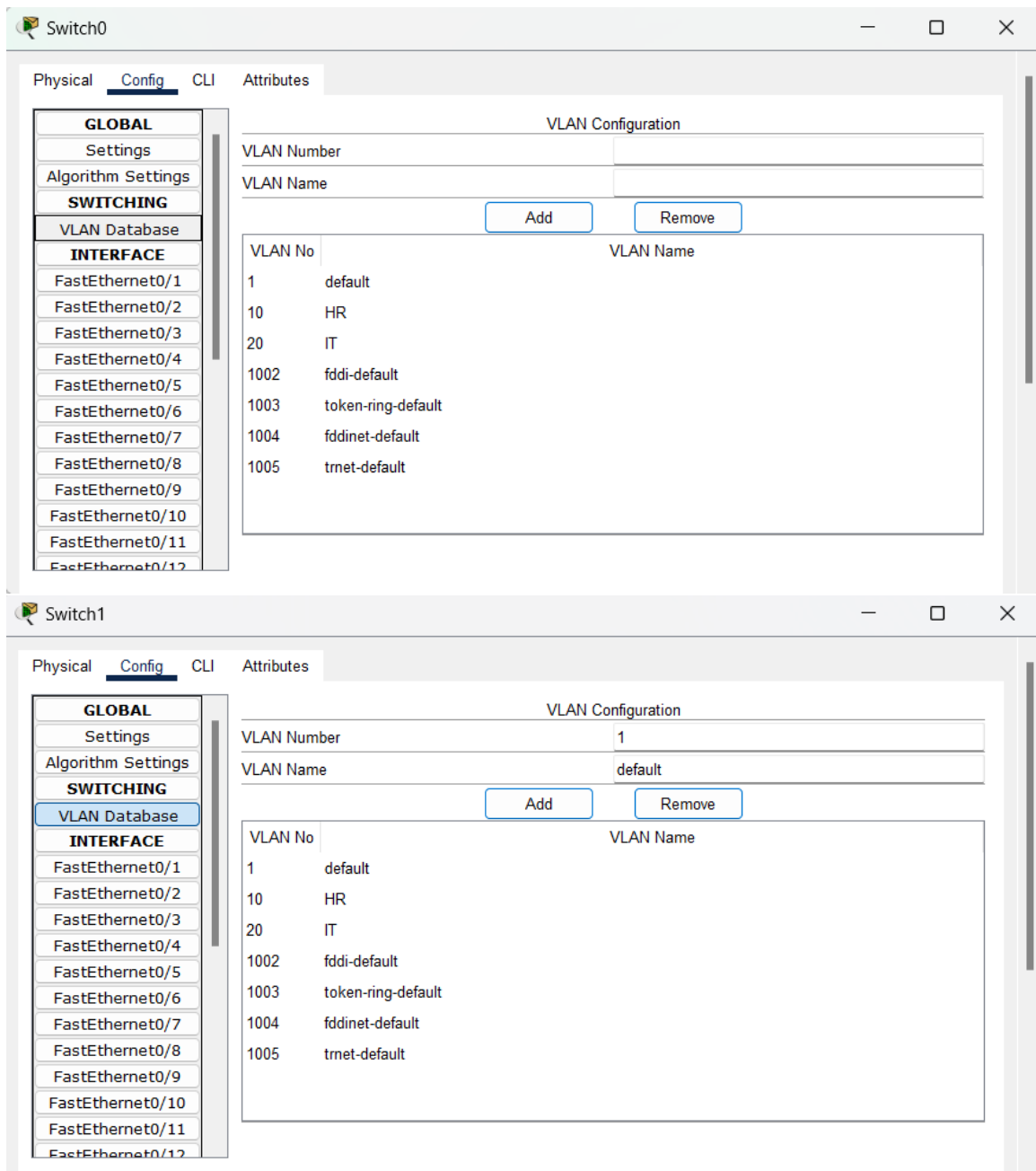


IP ADDRESSING PLAN

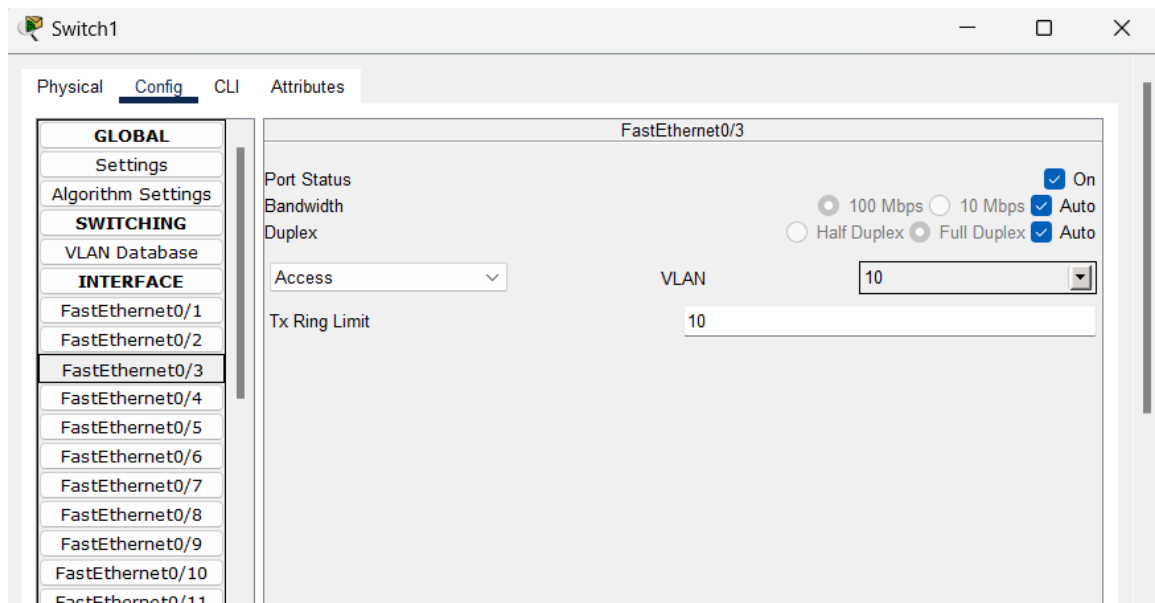
Device	Interface	IP address	Subnet Mask	VLAN	Default gateway
PC0	NIC	192.168.11.1	255.255.255.0	10/HR	-
PC1	NIC	192.168.11.2	255.255.255.0	20/IT	-
PC2	NIC	192.168.11.3	255.255.255.0	20/IT	-
PC3	NIC	192.168.11.4	255.255.255.0	10/HR	-

PROCEDURE

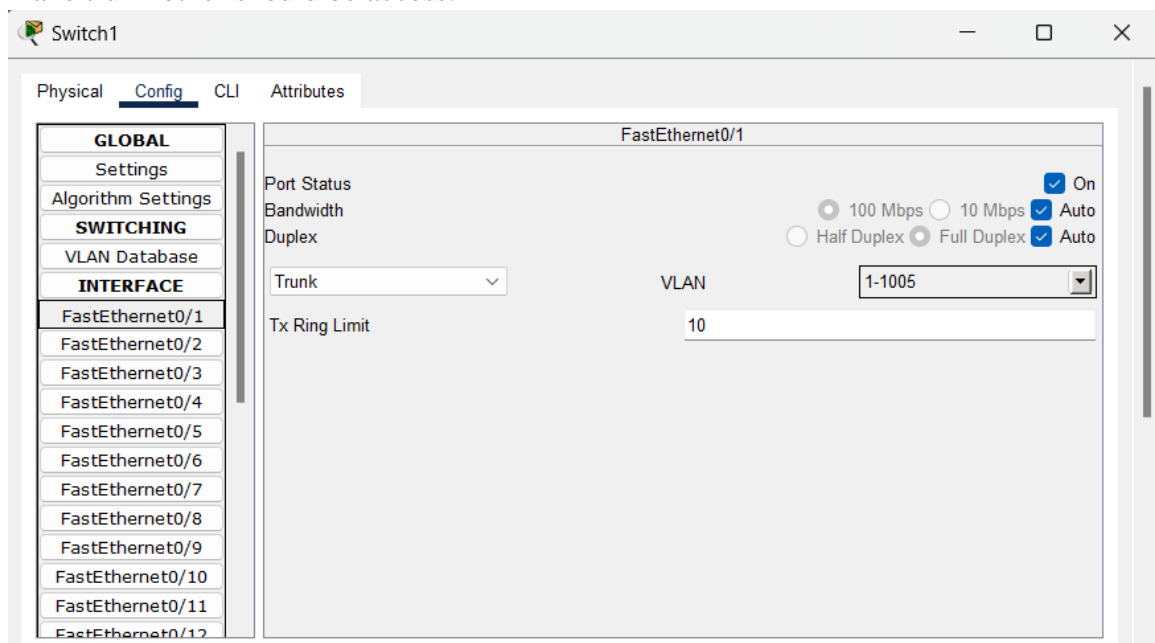
1. Create the topology as shown above
2. Assign the IP address to each PC as shown in IP addressing plan
3. Create two VLANs in each switch as



4. Assign the PC connected interface of switch into the VLAN you want to assign



Similarly, for other interfaces in switch 0 and go to into switch1 and assign interface to each VLAN as shown above. During assignment fa 0/1 interface in each switch must make trunk other should be access.



VERIFICATION

Ping the PC as

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC3	ICMP		0.000	N	0	(edit)	
	Successful	PC1	PC2	ICMP		0.000	N	1	(edit)	
	Failed	PC0	PC2	ICMP		0.000	N	2	(edit)	

PC present in Same VLAN gets communicated irrespective of their location and connection switch however, PC present in different VLAN cannot communicate.

View the details of VLANs created in switch as

In switch 0,

```
Switch#show vlan brief
```

VLAN	Name	Status	Ports
1	default	active	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, Gig0/1, Gig0/2
10	HR	active	Fa0/2
20	IT	active	Fa0/3
1002	fddi-default	active	
1003	token-ring-default	active	
1004	fddinet-default	active	
1005	trnet-default	active	

```
Switch#
```

In switch 1,

```
Switch>show vlan brief
```

VLAN	Name	Status	Ports
1	default	active	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, Gig0/1, Gig0/2
10	HR	active	Fa0/3
20	IT	active	Fa0/2
1002	fddi-default	active	
1003	token-ring-default	active	
1004	fddinet-default	active	
1005	trnet-default	active	

```
Switch>
```

CONCLUSION

In this way we can create multiple VLANs distributed in multiple switches so that broadcast domain can be distributed in multiple locations.

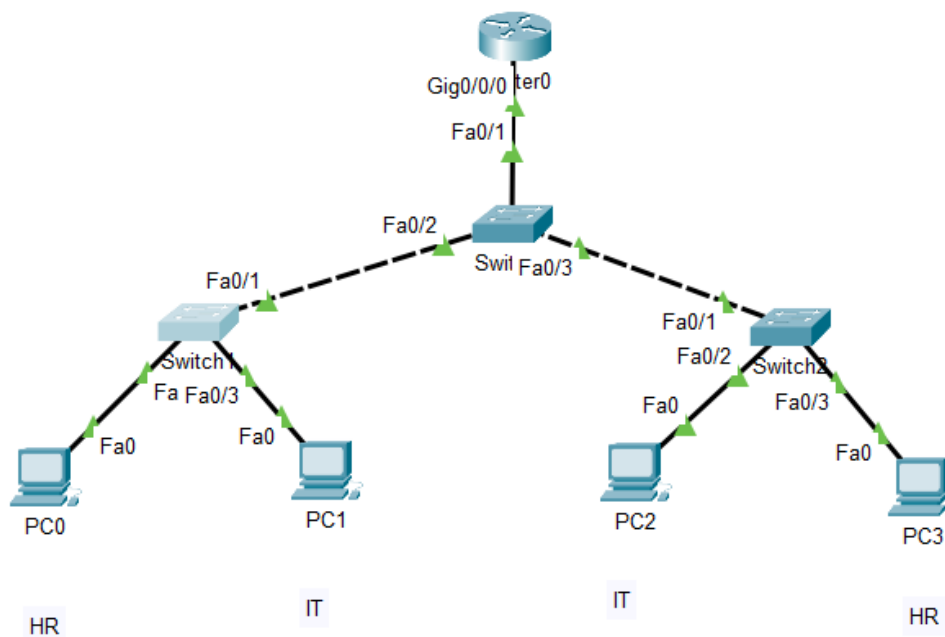
LAB 5.3: UNDERSTANDING, CREATING AND SIMULATING MULTIPLE VLANS DISTRIBUTED IN MULTIPLE SWITCH AND ROUTING AMONG VLANS

OBJECTIVE: To understand and create multiple VLANs distributed in multiple switch and routing among them

TOOLS USED: PACKET TRACER

BACKGROUND: Virtual LANs (VLANs) are networks segments on a switched LAN. Inter-VLAN routing refers to the movement of packets across the network between hosts in different network segments. VLANs make it easier for one to segment a network, which improves the performance of the network and makes it more flexible, since they are logical connections. VLANs act as separate subnet on the network. To move packets from one VLAN to another and enable communications among hosts, the VLAN network should be configured.

TOPOLOGY



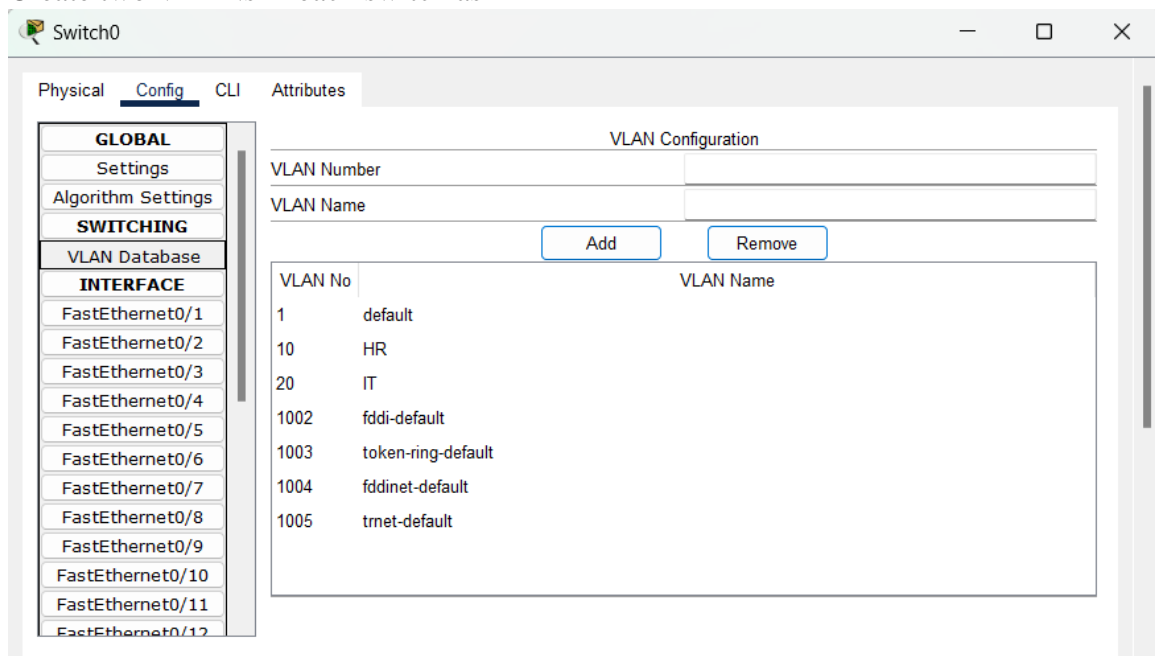
IP ADDRESSING PLAN

Device	Interface	IP address	Subnet Mask	VLAN	Default gateway
PC0	NIC	192.168.10.2	255.255.255.0	10/HR	192.168.10.1
PC1	NIC	192.168.10.2	255.255.255.0	20/IT	192.168.20.1
PC2	NIC	192.168.20.3	255.255.255.0	20/IT	192.168.20.1

PC3	NIC	192.168.20.3	255.255.255.0	10/HR	192.168.10.1
Router	GigabitEthernet 0/0/0.10	192.168.10.1	255.255.255.0	-	-
Router	GigabitEthernet 0/0/0.20	192.168.20.1	255.255.255.0		

PROCEDURE

1. Create the topology as shown above
2. Assign the IP address to each PC as shown in IP addressing plan
3. Create two VLANs in each switch as



Do the same for switch 1 and switch 2 also.

And run the following additional command in switch 0 and switch 1

```
Switch>enable
```

```
Switch#config terminal
```

```
Switch(config)#vtp mode client
```

4. Perform the following configurations in router

```
Router>enable
```

```
Router#configure terminal
```

```
Router(config-if)#interface GigabitEthernet0/0/0.10
```

```
Router (config-subif)#encapsulation dot1Q 10
```

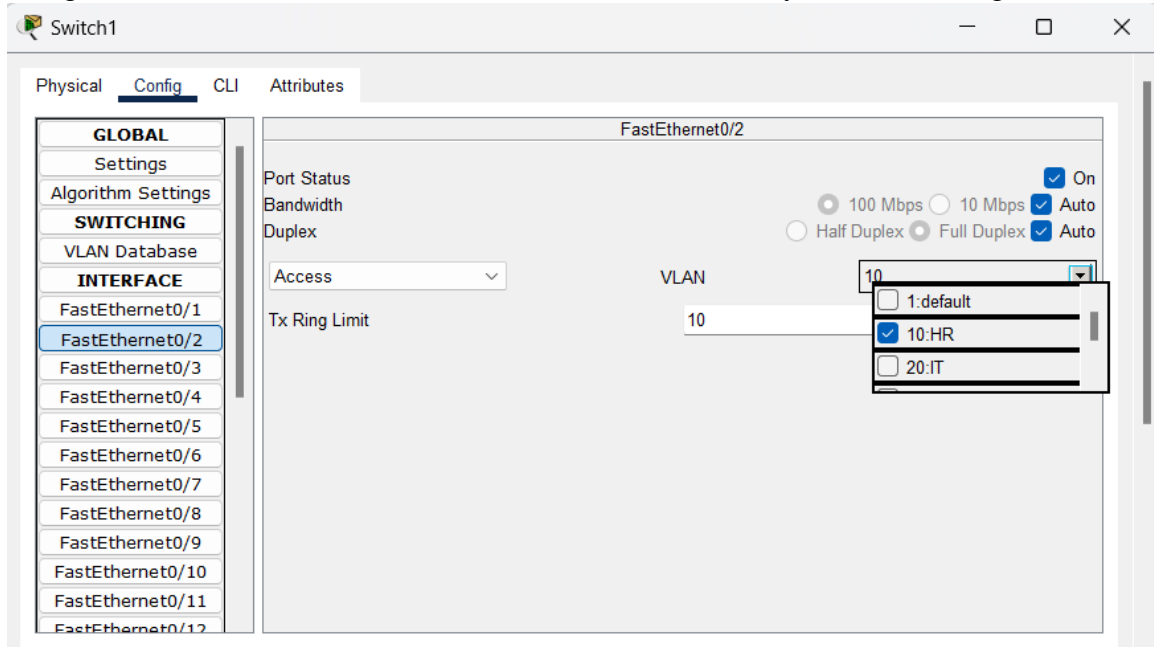
```
Router(config-subif)#ip address 192.168.10.1 255.255.255.0
```

```

Router(config-subif)#exit
Router(config)#interface GigabitEthernet 0/0/0.20
Router(config-subif)#encapsulation dot1Q 20
Router(config-subif)#ip address 192.168.20.1 255.255.255.0
Router(config-subif)#exit

```

5. Assign the PC connected interface of switch into the VLAN you want to assign



Similarly, for other interfaces in switch 0 and go to into switch1 and assign interface to each VLAN as shown above. During assignment fa 0/1 interface in switch 1 and switch 2 must make trunk other should be access. Similarly, all the interfaces 1 to 3 in switch 0 must be trunk.

VERIFICATION

- Ping the PC as

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC3	ICMP		0.000	N	0	(edit)	
	Successful	PC1	PC2	ICMP		0.000	N	1	(edit)	
	Successful	PC0	PC0	ICMP		0.000	N	2	(edit)	

- View the details of VLANs created in switch as
In switch 0,

```
Switch#show vlan brief
```

VLAN Name	Status	Ports
1 default	active	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, Gig0/1, Gig0/2
10 HR	active	
20 IT	active	
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

```
Switch#
```

In switch 1,

```
Switch#show vlan brief
```

VLAN Name	Status	Ports
1 default	active	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, Gig0/1, Gig0/2
10 HR	active	Fa0/2
20 IT	active	Fa0/3
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

```
Switch#
```

In switch 2,

```
Switch#show vlan brief
```

VLAN Name	Status	Ports
1 default	active	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, Gig0/1, Gig0/2
10 HR	active	Fa0/3
20 IT	active	Fa0/2
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

```
Switch#
```

CONCLUSION

In this way we can create multiple VLANs distributed in multiple switches and also perform the inter-VLAN routing in order to make communication possible among VLANs