

## LAB PROGRAM -10

Q) Demonstrate the TTL/ Life of a Packet Topology

**Procedure :**

COMPASS  
Date: 10/8/23

Experiment - 10

Aim: Demonstrate the TTL/ Life of a packet

Topology:

```
graph TD
    R1[Router 1] ---|S0/0/0| R3[Router 3]
    R1 ---|S0/0/0| R5[Router 5]
    R3 ---|S0/0/0| PC0[PC0]
    R5 ---|S0/0/0| PC1[PC1]
```

IP addresses and interfaces shown in the diagram:

- Router 1: S0/0/20 (20.0.0.20), S0/0/10 (30.0.0.10), S0/0/20 (30.0.0.20)
- Router 3: S0/0/10 (10.0.0.10), S0/0/0 (10.0.0.10)
- Router 5: S0/0/10 (30.0.0.10), S0/0/0 (40.0.0.10)
- PC0: 10.0.0.10
- PC1: 40.0.0.1

Procedure:

Step 1: Create a topology as shown above with 2 PC's and 3 routers.

Step 2: Set the IP Address and gateway of both the PC's and Configure the router using static/default/dynamic routing.

Step 3: In simulation mode send a simple PDU from one PC to another. Use the Capture button to capture every transfer.

Step 4: Click on the PDU during every transfer to see the Inbound and outbound PDU details. Observe the difference in TTL within the IP header when it passes through the router.

output:

IP header: (PC 0) (Inbound)

0	4	8	16	19	31 bits
4	INL	DSCP:	TL: 28		
ID: 0x7		0x	0x0		
TTL: (255)	PRO: 0x1		CHKSUM		
SRC IP : 10.0.0.1					
DST IP : 40.0.0.1					
OPT: 0x0				0x0	
DATA (variable length)					

IP header: (Router 0) (outbound)

↳ Inbound IP header for Router 0 will look the same as above

0	4	8	16	19	31 bits
4	INL	DSCP:	TL: 28		
ID: 0x6		0x	0x0		
TTL: 254	PRO: 0x1		CHKSUM		
SRC IP: 10.0.0.1					
DST IP: 40.0.0.1					
OPT: 0x0				0x0	
DATA (variable length)					

→ Similar results are seen for the other 2 routers and PC.

observation:

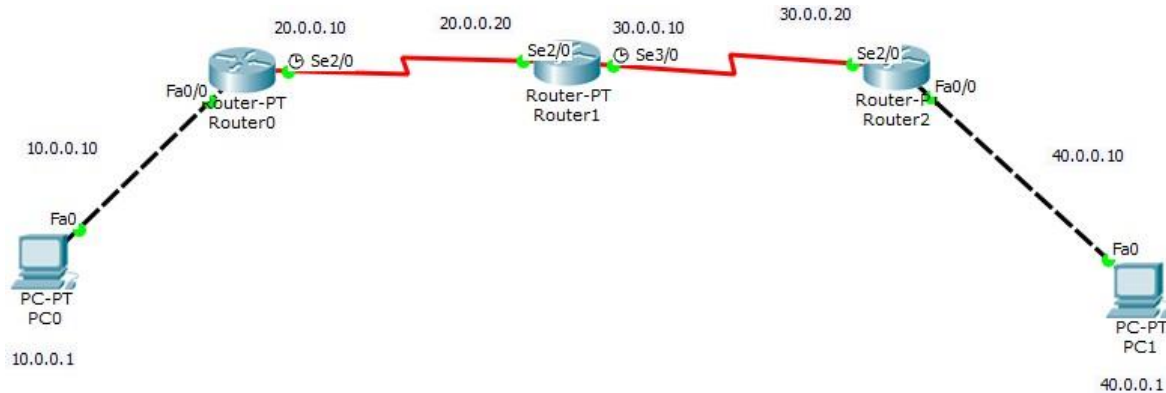
→ TTL: time to live indicates the no of hops the packet can travel before it is discarded by the router to prevent a packet from travelling aimlessly within the network. This field is set by the sender & reduced by 1 by the router it passes through. When the TTL = 0, the router discards the packet and sends ICMP message to source.

## Topology :

### Configurations:

Configure the devices as per static / default / dynamic routing.

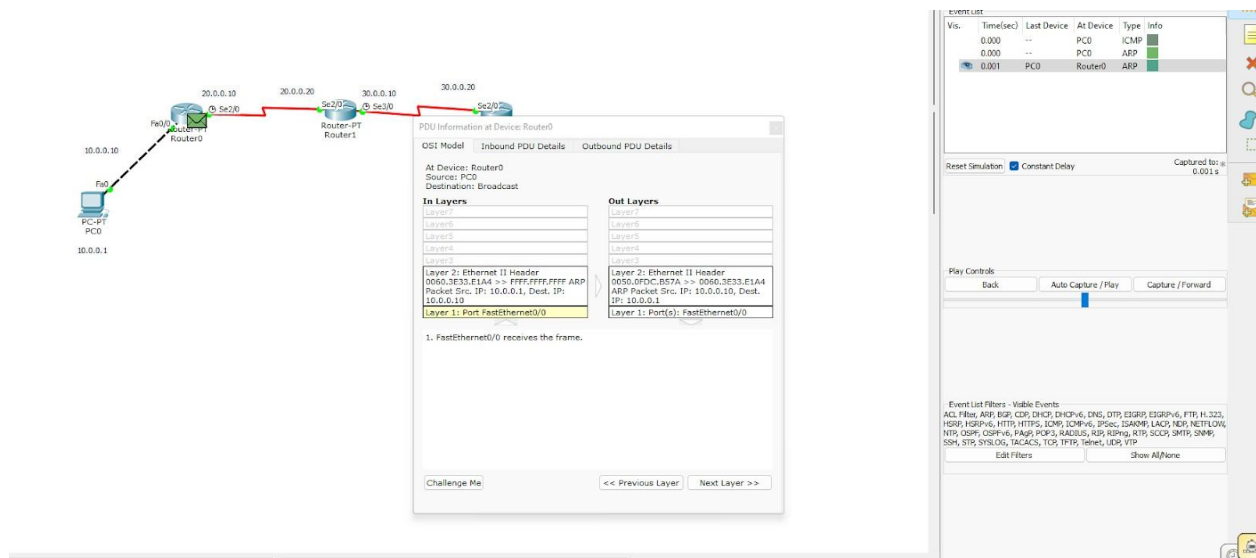
( Below has been done using static routing )



## Output :

### PDU Details :

Simple PDU sent from PC0 to PC1 in simulation mode.





Cisco Packet Tracer Student - C:\Users\Admin\Downloads\Lab 3CN.pkt

File Edit Options View Tools Simulation Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Router0: 20.0.0.10, 20.0.0.20, 30.0.0.10, 30.0.0.20  
Router1: 20.0.0.20, 30.0.0.10, 30.0.0.20  
PC0: 10.0.0.10, 10.0.0.1

PDU Information at Device: Router1

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

HLEN		LEN		TYPE		CHECKSUM		DATA (VARIABLE LENGTH)		FCS		FLEN	
0	8	16	32	32	16	16	16	32	16	16	16	16	
FLG:	ADR:	CONTR:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	
0111	0x0f	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	
1110													

IP

HLEN		LEN		TYPE		CHECKSUM		DATA (VARIABLE LENGTH)		FCS		FLEN	
0	8	16	32	32	16	16	16	32	16	16	16	16	
FLG:	ADR:	CONTR:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	
0111	0x0f	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	
1110													

ICMP

HLEN		LEN		TYPE		CHECKSUM		DATA (VARIABLE LENGTH)		FCS		FLEN	
0	8	16	32	32	16	16	16	32	16	16	16	16	
FLG:	ADR:	CONTR:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	
0111	0x0f	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	
1110													

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type	Info
0.000	--	PC0	Router0	ICMP	
0.001	PC0	Router0	ICMP		
0.002	Router0	Router1	ICMP		

Reset Simulation Constant Delay Captured to: 0.002 s

Play Controls

Back Auto Capture / Play Capture / Forward

Event List Simulation

Time: 00:01:06.511 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward

Scenario 0

New Delete

Toggle PDU List Window

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

In Progress PC0 PC1 ICMP 0.000 N 0 (edit) (delete)

Cisco Packet Tracer Student - C:\Users\Admin\Downloads\Lab 3CN.pkt

File Edit Options View Tools Simulation Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Router0: 20.0.0.10, 20.0.0.20, 30.0.0.10, 30.0.0.20  
Router1: 20.0.0.20, 30.0.0.10, 30.0.0.20  
PC0: 10.0.0.10, 10.0.0.1

PDU Information at Device: Router1

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

HLEN		LEN		TYPE		CHECKSUM		DATA (VARIABLE LENGTH)		FCS		FLEN	
0	8	16	32	32	16	16	16	32	16	16	16	16	
FLG:	ADR:	CONTR:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	
0111	0x0f	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	
1110													

IP

HLEN		LEN		TYPE		CHECKSUM		DATA (VARIABLE LENGTH)		FCS		FLEN	
0	8	16	32	32	16	16	16	32	16	16	16	16	
FLG:	ADR:	CONTR:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	
0111	0x0f	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	
1110													

ICMP

HLEN		LEN		TYPE		CHECKSUM		DATA (VARIABLE LENGTH)		FCS		FLEN	
0	8	16	32	32	16	16	16	32	16	16	16	16	
FLG:	ADR:	CONTR:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	DATA:	
0111	0x0f	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0	
1110													

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type	Info
0.000	--	PC0	Router0	ICMP	
0.001	PC0	Router0	ICMP		
0.002	Router0	Router1	ICMP		

Reset Simulation Constant Delay Captured to: 0.002 s

Play Controls

Back Auto Capture / Play Capture / Forward

Event List Simulation

Time: 00:01:06.511 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward

Scenario 0

New Delete

Toggle PDU List Window

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

In Progress PC0 PC1 ICMP 0.000 N 0 (edit) (delete)

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type	Info
0.000	--	PC0	PC0	ICMP	
0.001	PC0	Router0	Router0	ICMP	
0.002	Router0	Router1	Router1	ICMP	
0.003	Router1	Router2	Router2	ICMP	

Reset Simulation ☒ Constant Delay Captured to: 0.003 s

Play Controls: Back Auto Capture / Play Capture / Forward

Event List Filters - Table Events

ACL, ARP, ARP, RST, DNS, DHCP, DHCPv6, DNS, OSPF, EIGRP, EIGRPv6, FTP, H.323, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, LACP, NTP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, PAgPv6, RADIUS, RST, SSH, STP, STPv6, SNMP, SSH, STP, STPv6, TACACS, TFTP, Telnet, UDP, VTP

Edit Filters Show AllNone

Time: 00:01:05.512 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward

Scenario 0

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
<input checked="" type="radio"/>	In Progress	PC0	PC1	ICMP		0.000	N	0	(edit)	(delete)

New Delete

Toggle PDU List Window

PDU Information at Device: Router2

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

HDLCL

0	8	16	32	32+8	64+16	64+16
FLG:	ADR:	CONTRL:	DATA: (VARIABLE LENGTH)	PCS:	PLG:	
0111	0x0f	0x0		0x0	0111	0111

IP

0	4	8	16	16	32	32+8
4	THL	DSCTP: 0x0		TL: 20		
	ID: 0x2	0x0	0x0			
	TTL: 255	PRO: 0x1		CHKSUM		
	SRC IP: 10.0.0.1					
	DST IP: 40.0.0.1					
	OPT: 0x0		0x0			

ICMP

0	8	16	32	32+8
TYPE: 0x0	CODE: 0x0	CHECKSUM		
ID: 0x0		SEQ NUMBER: 2		

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type	Info
0.000	--	PC0	PC0	ICMP	
0.001	PC0	Router0	Router0	ICMP	
0.002	Router0	Router1	Router1	ICMP	
0.003	Router1	Router2	Router2	ICMP	
0.004	Router2	PC1	PC1	ICMP	

Constant Delay Captured to: 0.003 s

Auto Capture / Play Capture / Forward

Event List Filters - Table Events

ACL, DHCP, DHCPv6, DNS, OSPF, EIGRP, EIGRPv6, FTP, H.323, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, LACP, NTP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, PAgPv6, RADIUS, RST, SSH, STP, STPv6, SNMP, TACACS, TFTP, Telnet, UDP, VTP

Show AllNone

Time: 00:01:05.514 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward

Scenario 0

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
<input checked="" type="radio"/>	In Progress	PC0	PC1	ICMP		0.000	N	0	(edit)	(delete)

New Delete

Toggle PDU List Window

PDU Information at Device: Router2

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

HDLCL

0	8	16	32	32+8	64+16	64+16
FLG:	ADR:	CONTRL:	DATA: (VARIABLE LENGTH)	PCS:	PLG:	
0111	0x0f	0x0		0x0	0111	0111

IP

0	4	8	16	16	32	32+8
4	THL	DSCTP: 0x0		TL: 20		
	ID: 0x1	0x0	0x0			
	TTL: 127	PRO: 0x1		CHKSUM		
	SRC IP: 40.0.0.1					
	DST IP: 10.0.0.1					
	OPT: 0x0		0x0			

ICMP

0	8	16	32	32+8
TYPE: 0x0	CODE: 0x0	CHECKSUM		
ID: 0x0		SEQ NUMBER: 2		



