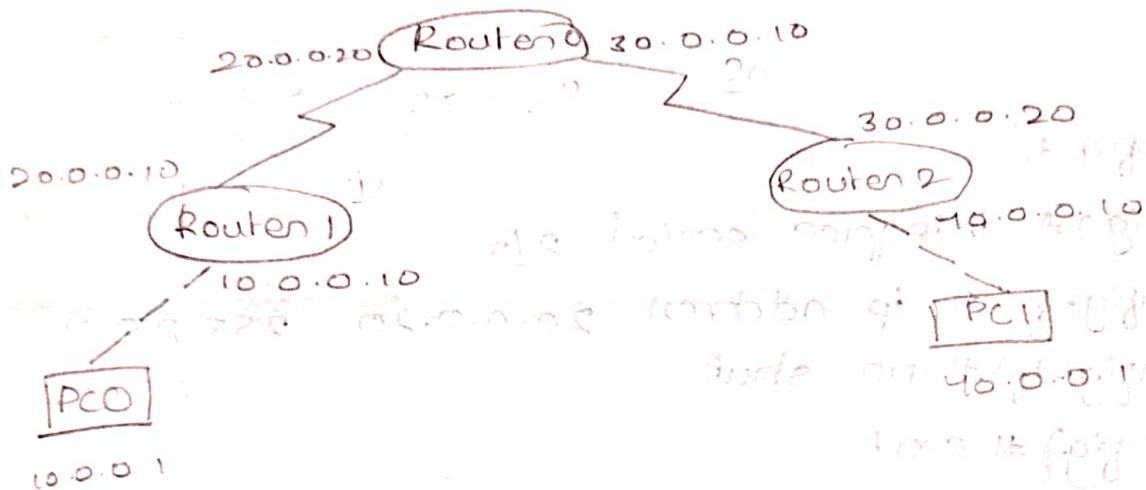


Lab 9

Aim - To demonstrate TTL / life of a packet

Topology:



Procedure

1. Create a 2 PC and 3 router configuration, as shown in the topology
2. Use serial DTE between routers and copper cross over between router and PC.
3. Configure the IP address and gateway of PC and configure all the routers

for router 0

>enable

Router# config +

Router(config)# interface g0/0/0

Router(config-if)# ip address 10.0.0.10 255.0.0.0

Router(config-if)# no shut

Router(config-if)# exit

```
Router(config)# ip route 30.0.0.0 255.0.0.0 20.0.0.20
Router(config)# ip route 40.0.0.0 255.0.0.0 20.0.0.20
Router(config)# exit
```

For router 1

> enable

```
Router# config t
```

```
Router(config)# interface serial 2/0
```

```
Router(config-if)# ip address 20.0.0.20 255.0.0.0
```

```
Router(config-if)# no shut
```

```
Router(config)# exit
```

```
Router(config)# interface serial 3/0
```

```
Router(config-if)# ip address 30.0.0.10 255.0.0.0
```

```
Router(config-if)# no shut
```

```
Router(config-if)# exit
```

```
Router(config)# ip route 10.0.0.0 255.0.0.0 20.0.0.10
```

```
Router(config)# ip route 40.0.0.0 255.0.0.0 30.0.0.20
```

```
Router(config)# exit
```

Similar commands for router 2.

- 4) Select simulation mode, select simple PDU and select source & destination PCs.
- 5) Click on capture button to send PDU, and acknowledgement from PC to router and router to PC.
- 6) Click on PDU during every transfer to see the inbound and outbound PDU details. Observe the difference in TTL.

Result

at PC0

Outbound PDU details: TTL=255

At router0

Inbound PDU details : TTL = 255

Outbound PDU details : TTL = 254

at router1

Inbound PDU details : TTL = 254

Outbound PDU details : TTL = 253

at router2

Inbound PDU details : TTL = 253

Outbound PDU details : TTL = 252

Observation

- The TTL is reduced by 1 in every router
- TTL is a mechanism which limits the number of hops between source and destination
- When TTL becomes 0 it means it can't do another hop

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File Edit Options View Tools Extensions Help

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

Time: 00:10:24.991 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward

Connections

Automatically Choose Connection Type

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)

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PDU Information at Device: Router0

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

Ethernet II

0		4		8		14		19		31			
PREAMBLE:		101010...1011		DEST MAC:		00E0.F918.C964		SRC MAC:		0001.437D.5A06			
TYPE:		0x800		DATA (VARIABLE LENGTH)						FCS:		0x0	

IP

0		4		8		16		19		31	
IHL:		0x9		DSCP:		0x0		TL:		28	
ID:		0x9 <td colspan="2">0x0<td colspan="2">0x0<td colspan="2">0x0<td colspan="2">0x0</td></td></td></td>		0x0 <td colspan="2">0x0<td colspan="2">0x0<td colspan="2">0x0</td></td></td>		0x0 <td colspan="2">0x0<td colspan="2">0x0</td></td>		0x0 <td colspan="2">0x0</td>		0x0	
TTL:		255 <td colspan="2">PRO:</td> <td colspan="2">0x1<td colspan="2">CHKSUM<td colspan="2">0x0</td></td></td>		PRO:		0x1 <td colspan="2">CHKSUM<td colspan="2">0x0</td></td>		CHKSUM <td colspan="2">0x0</td>		0x0	
SRC IP:						10.0.0.1					
DST IP:						40.0.0.1					
OPT:						0x0		0x0		0x0	
DATA (VARIABLE LENGTH)											

ICMP

0		8		16		31	
TYPE:		0x8		CODE:		0x0	
ID:		0x4 <td colspan="2">CHECKSUM<td colspan="2">0x0</td></td>		CHECKSUM <td colspan="2">0x0</td>		0x0	
SEQ NUMBER:		9 <td colspan="2"></td> <td colspan="2"></td>					

Simulation Panel

Event List

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

Reset Simulation ☒ Constant Delay Captured to: 0.001 s

Play Controls

Back Auto Capture / Play Capture / Forward

Event List Filters - Visible Events

ACL Filter, ARP, BGP, CD, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TFTP, Telnet, UDP, VTP

Edit Filters Show All/None

Simulation

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File Edit Options View Tools Extensions Help

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

Simulation Panel

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

Reset Simulation ☒ Constant Delay Captured to: 0.001 s

Play Controls Back Auto Capture / Play Capture / Forward

Event List Filters - Visible Events
ACL Filter: ARP, BGP, CDG, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG

PDU Information at Device: Router0

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

HDLCL

0	8	16	32	32+bits	48+bits	64+bits
FLG:	ADR:	CONTROL:	DATA: (VARIABLE LENGTH)	FCS:	FLG:	
0111	0xbf	0x0		0x0	0111	
1110					1110	

IP

0	4	8	16	19	31	Bits
IHL:	DSCTP:	TL:				
0x9	0x0	28				
TTL:	PRO:	CHKSUM				
254	0x1					
SRC IP:			40.0.0.1			
DST IP:			40.0.0.1			
OPT:			0x0			
DATA (VARIABLE LENGTH)						

ICMP

0	8	16	31	Bits
TYPE:	CODE:	CHECKSUM		
0x4	0x0			
ID:	SEQ NUMBER:			
0x4	9			

Time: 00:10:24.991 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) Period

In Progress PC0 PC1 ICMP 0.000 N

Snipping Tool

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File Edit Options View Tools Extensions Help

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	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 Filters - Visible Events

ACL Filter, ARP, BGP, CD, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, LACP, NDP, NTP, NETFLOW, NTP, OSPF, OSPFv6, PAgp, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TFTP, Telnet, UDP, VTP

Edit Filters Show All/None

Time: 00:10:24.992 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)
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Automatically Choose Connection Type

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PDU Information at Device: Router1

OSI Model

Inbound PDU Details

Outbound PDU Details

PDU Formats

HDLC

0	8	16	32	32+x	60+x	56+x
FLG: 0111	ADR: 0x8f	CONTROL: 0x0	DATA: (VARIABLE LENGTH)		FC: 0x0	FLG: 0111
1110						

IP

0		4		8		16		16		31		Bits	
4	4	IHL		DSCP: 0x0		TL: 28							
ID: 0x9				0x0				0x0					
TTL: 254				PRO: 0x1				CHKSUM					
SRC IP: 10.0.0.1													
DST IP: 40.0.0.1													
OPT: 0x0				0x0									
DATA (VARIABLE LENGTH)													

ICMP

0		8		16		31		Bits	
TYPE: 0x8		CODE: 0x0		CHECKSUM					
ID: 0x4		SEQ NUMBER: 9							

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File Edit Options View Tools Extensions Help

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	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 Filters - Visible Events

ACL Filter: ARP, BGP, CD, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG

PDU Information at Device: Router1

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

HDLC

0	8	16	32	32+x	60+x	56+x
FLG:	ADR:	CONTROL:	DATA: (VARIABLE LENGTH)	FC:	FLG:	
0111	0x8f	0x0		0x0	0111	1110

IP

0	4	8	16	19	31	Bits
4	0x9	DSCP: 0x0	0x0	TL: 28	0x0	
ID:	0x9	0x0	0x0	0x0		
TTL: 253	PRO: 0x1	CHKSUM				
SRC IP: 10.0.0.1						
DST IP: 40.0.0.1						
OPT: 0x0						0x0
DATA (VARIABLE LENGTH)						

ICMP

0	8	16	31	Bits
TYPE: 0x8	CODE: 0x0	CHECKSUM		
ID: 0x4	SEQ NUMBER: 9			

Time: 00:10:24.992 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward

Connections

Automatically Choose Connection Type

Scenario 0

New Delete

Toggle PDU List Window

Fire Last Status Source Destination Type Color Time(sec) Period

In Progress PC0 PC1 ICMP 0.000 N

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

PDU Information at Device: Router2

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

HDLC

0	8	16	32	32+ms	48+ms	56+ms
FLG:	ADR:	CONTROL:	DATA: (VARIABLE LENGTH)	FCS:	FLG:	
0111	0x8f	0x0		0x0	0111	
1110					1110	

IP

0	4	8	16	19	31	Bits
IHL:	DSCP:	0x0	TL:	28		
4	0xb	0x0	0x0			
TTL:	PRO:	0x1	CHKSUM			
253						
SRC IP:	10.0.0.1					
DST IP:	40.0.0.1					
OPT:	0x0		0x0			
DATA: (VARIABLE LENGTH)						

ICMP

0	8	16	31	Bits
TYPE:	CODE:	CHECKSUM		
0x8	0x0			
ID:	0x6	SEQ NUMBER:	11	

Simulation Panel

Event List

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

Reset Simulation ☒ Constant Delay Captured to: 0.003 s

Play Controls

Back Auto Capture / Play Capture / Forward

Event List Filters - Visible Events

ACL Filter: ARP, BGP, CD, DHCP, ICMPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgp, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TFTP, Telnet, UDP, VTP

Edit Filters Show All/None

Time: 00:10:44.965 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)
-------------	-----	-----	------	--	-------	---	---	--------	----------

Connections

Automatically Choose Connection Type

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

Time: 00:10:44.965 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward

Connections

Automatically Choose Connection Type

Scenario 0 New Delete Toggle PDU List Window

Fire Last Status Source Destination Type Color Time(sec) Period

In Progress PC0 PC1 ICMP 0.000 N

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PDU Information at Device: Router2

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

Ethernet II

0		4		8		14		19		31			
PREAMBLE:		101010...1011		DEST MAC:		0060.7009.07DB		SRC MAC:		0001.9790.548D			
TYPE:		0x800		DATA (VARIABLE LENGTH)						FCS:		0x0	

IP

0		4		8		16		19		31	
IHL:		0x0		DSCP:		0x0		TL:		28	
ID:		0xb		0x0		0x0		0x0		0x0	
TTL:		252		PRO:		0x1		CHKSUM		0x0	
SRC IP:						10.0.0.1					
DST IP:						40.0.0.1					
OPT:						0x0		0x0		0x0	
DATA (VARIABLE LENGTH)											

ICMP

0		8		16		31	
TYPE:		0x8		CODE:		0x0	
ID:				0xb			
CHECKSUM				SEQ NUMBER:			
0x0				11			

Simulation Panel

Event List

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

Reset Simulation ☒ Constant Delay Captured to: 0.003 s

Play Controls: Back Auto Capture / Play Capture / Forward

Event List Filters - Visible Events

ACL Filter, ARP, BGP, CD, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG

Snipping Tool

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