Count to Infinity, Split Horizon

Complete Course on Computer Networks - Part III

Ravindrababu Ravula • Lesson 9 • Apr 1, 2021

1-04-2021 Classes by Ravindrababu Ravula

Lecture Name	Time
Checking Additional FDs and Equivalence of FDs with Examples | DBMS	6.:00 AM
Count to Infinity and Split Horizon | CN	7:00 AM
Process Management Part-2 Practice Questions | OS	8:05 AM
Process Management Set-3 Practice Questions | OS	5:00PM
OOPS Concepts | Frequently Asked Java Interview Questions	6:00PM
Linux System Calls | L:4 | Google Interview Questions	7:00PM
B.Tech Project in Web Technologies | L:4 | HTML | Web Technologies Course for Engg and UGC-NET	8:00PM


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LEARN FROM TOP EDUCATORS

DHCP – Dynamic Host Configuration Protocol

Every thing is same as BOOTP except that the mapping table need not be static

Application Layer
Transport Layer
Network Layer
Datalink Layer
Physical Layer

Request from Application Layer

Ia =? | 0.0.0.0

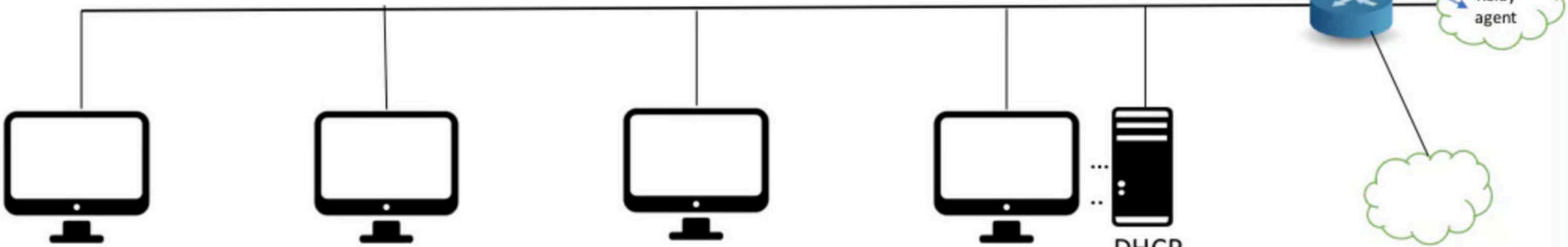
Ia =? | 0.0.0.0 | Ma | FF:FF:FF:FF:FF:FF

192.168.1.2 → private

NAT

Network which does not have a DHCP server has a Relay Agent

Relay agent



DHCP Server

A B C D

PCs without a Hard Disk

MAC	IP
Ma	Ia
Mb	Ib
Mc	Ic

Static

Dynamic

Generally servers will be given permanent IP

All others

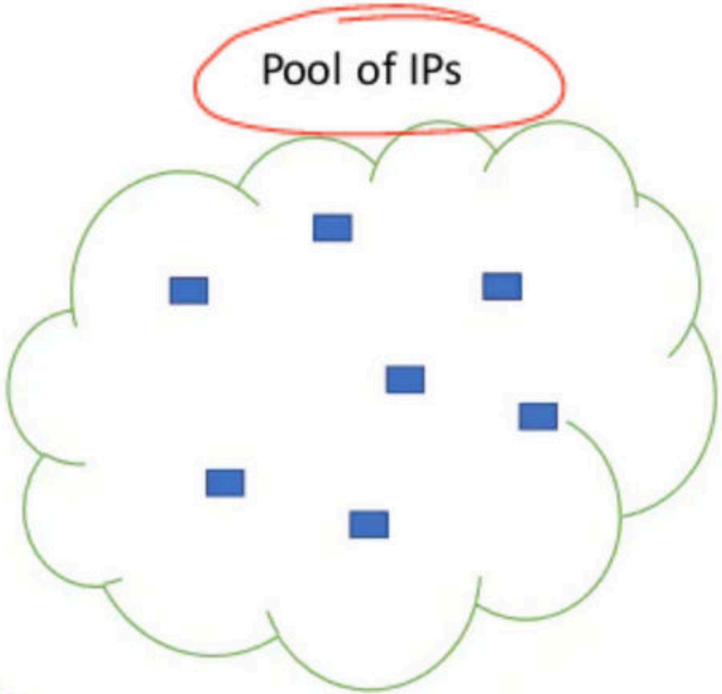
DHCP MAPPING TABLE

Static

MAC	IP
Ma	Ia
Mb	Ib
Mc	Ic
Md	Id
....	...

Dynamic

MAC	IP	Least Time
Ms	Is	10 mins



Picking from the pool of IPs

Note : If renew requests is not sent the IP is pulled and added back to the pool

Advantage and points to remember:

- Only One DHCP server is enough.
- Dynamic Table

Evolution:

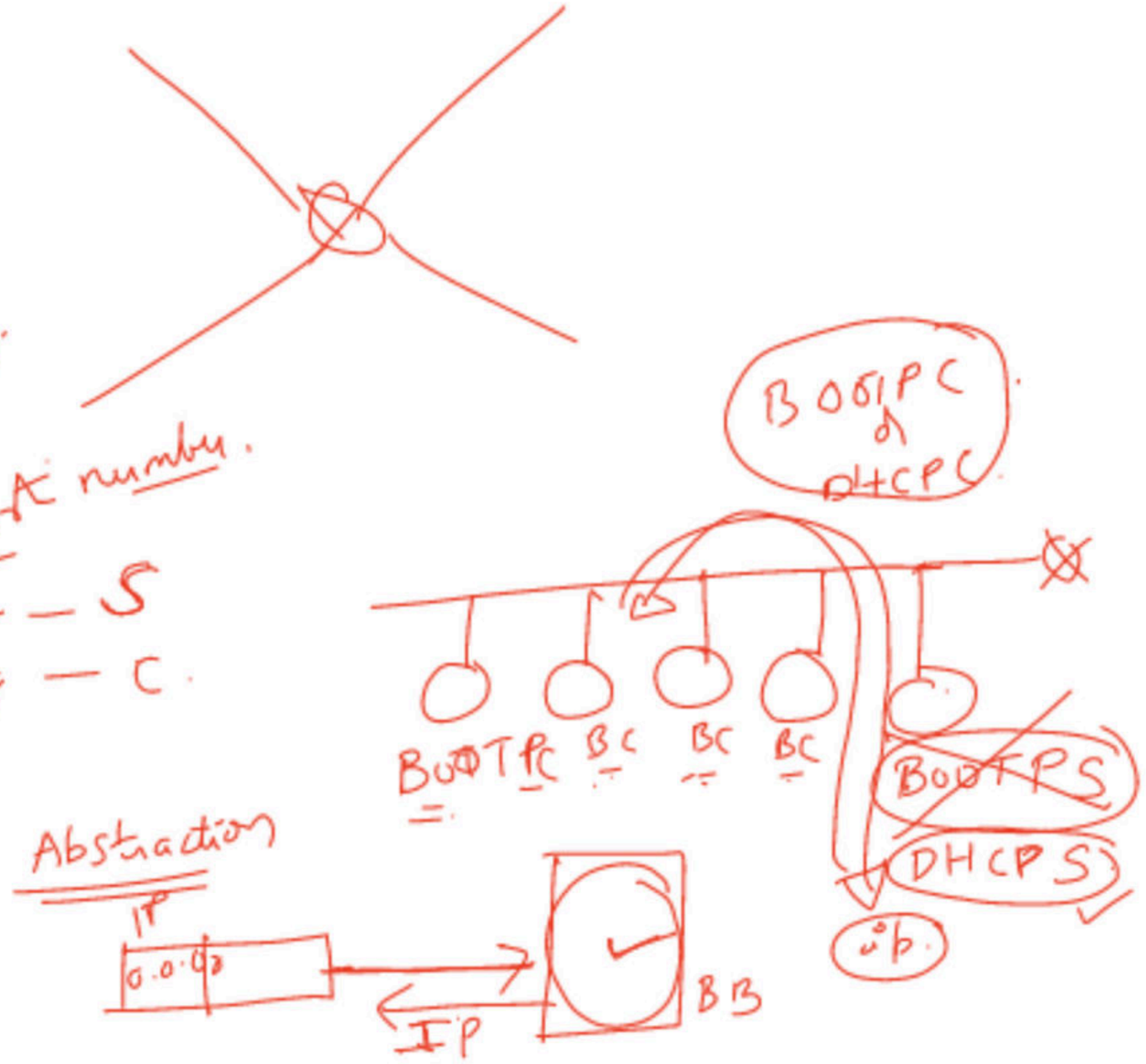
RARP → BOOTP → DHCP

Backward Compatible

Same port → port number.

67 – S

68 – C

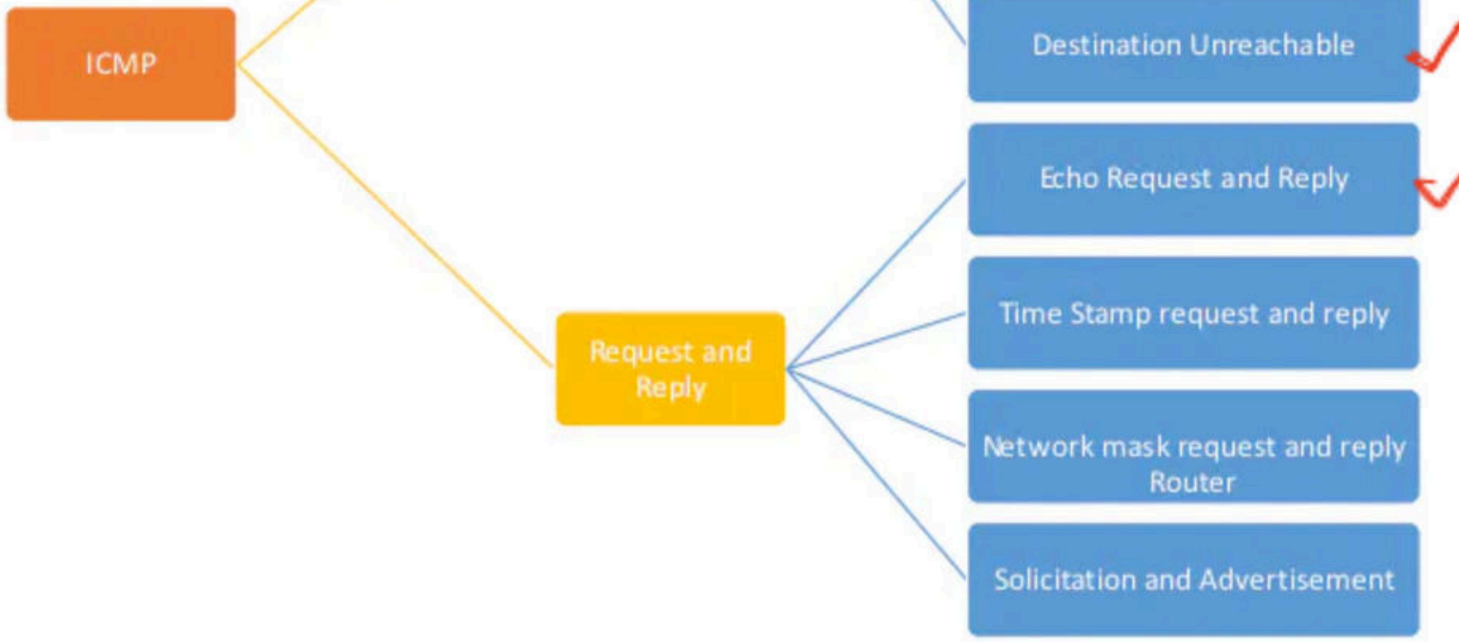


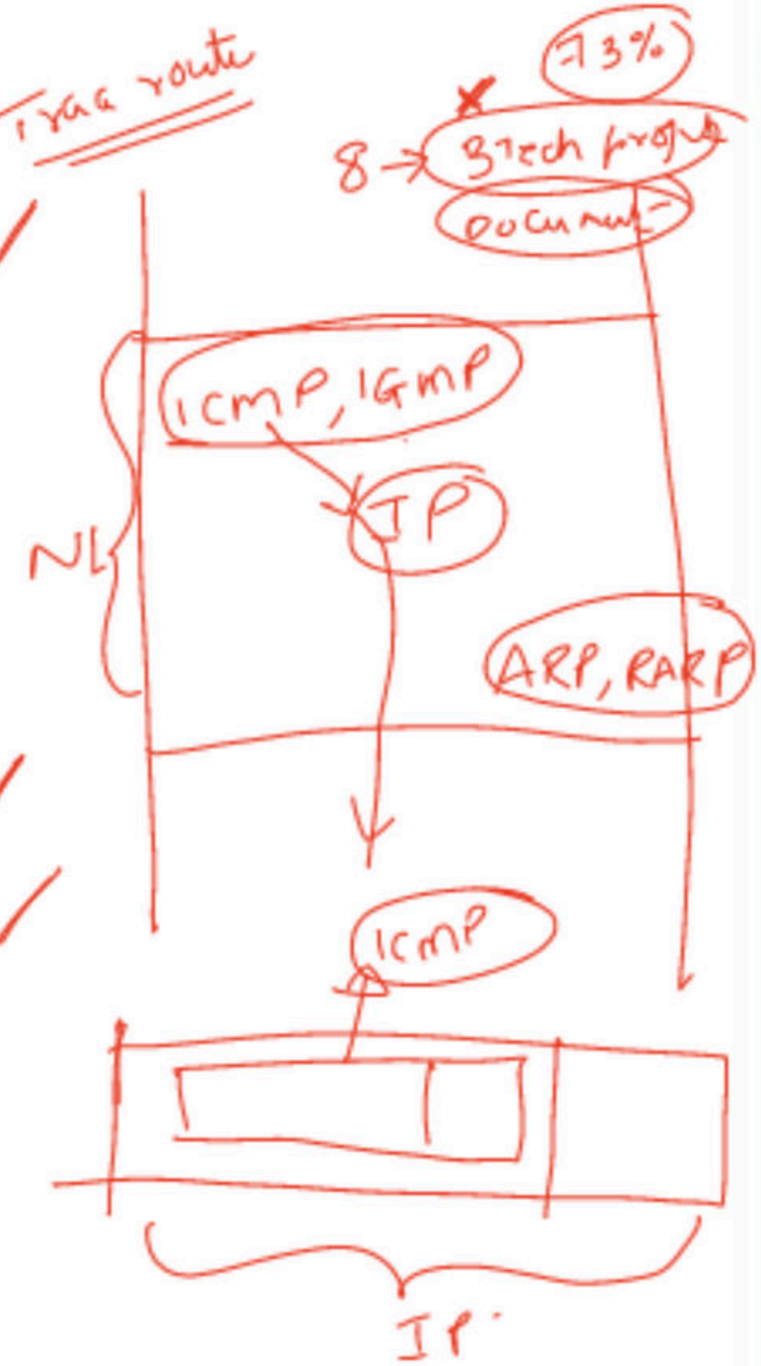
Computer Networks

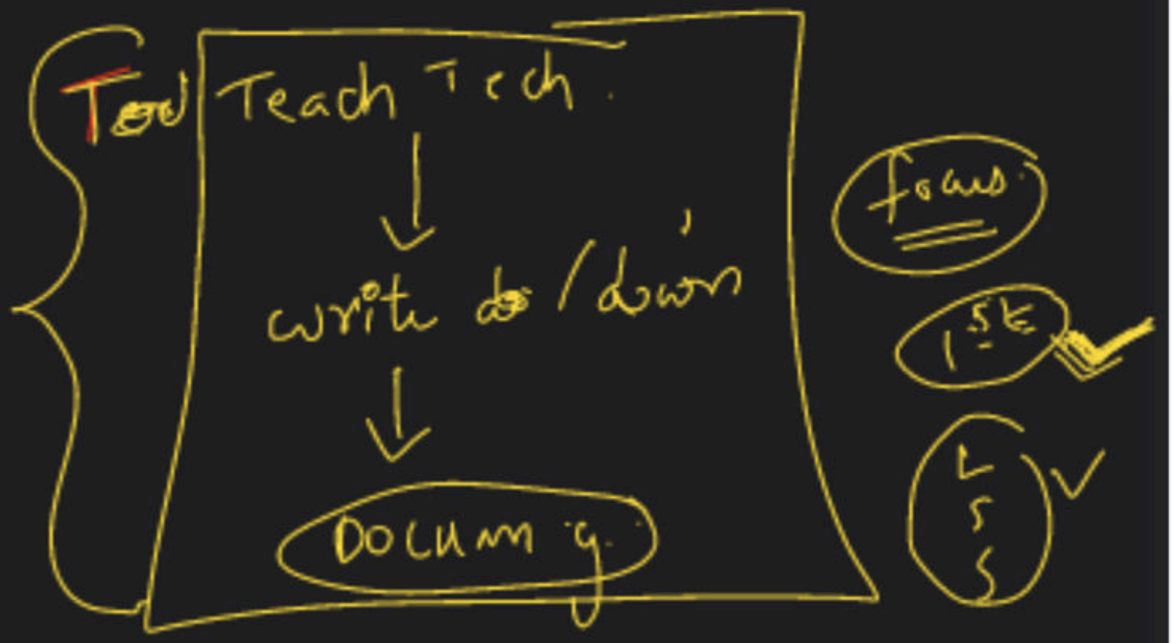
ICMP

Internet Control Message Protocol (ICMP)

The Internet Control Message Protocol (ICMP) is a network layer protocol used by network devices to diagnose network communication issues.

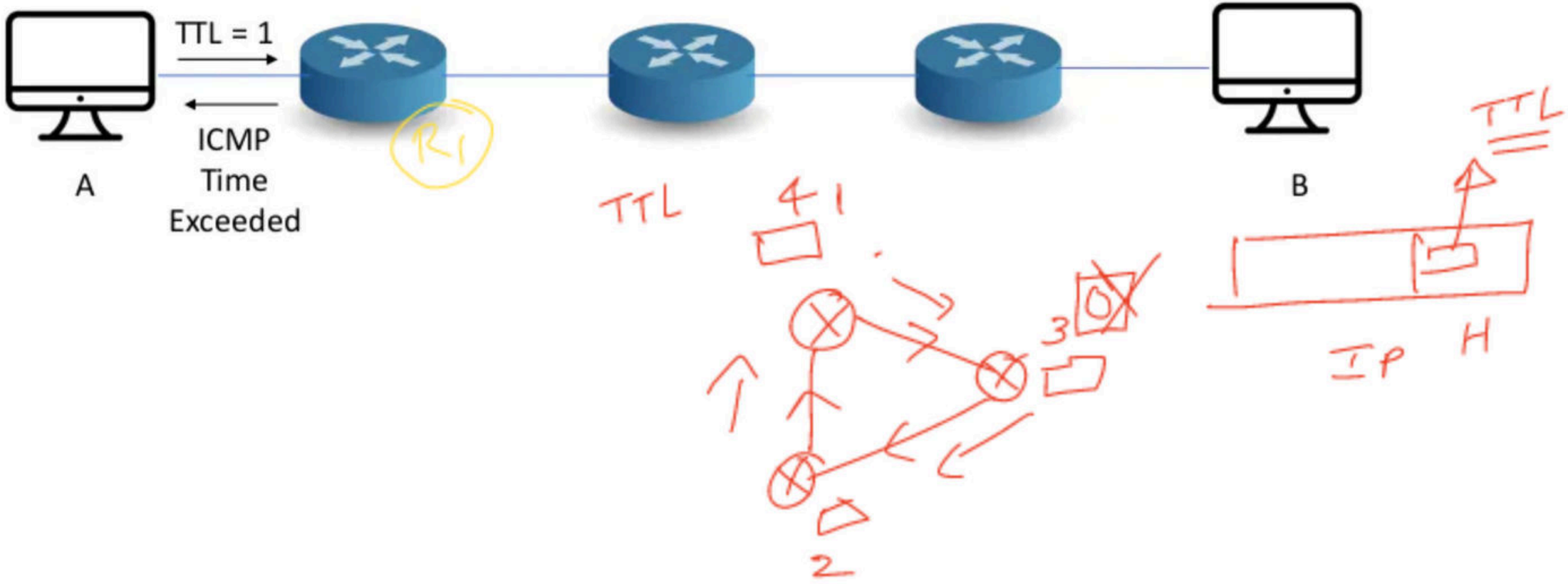


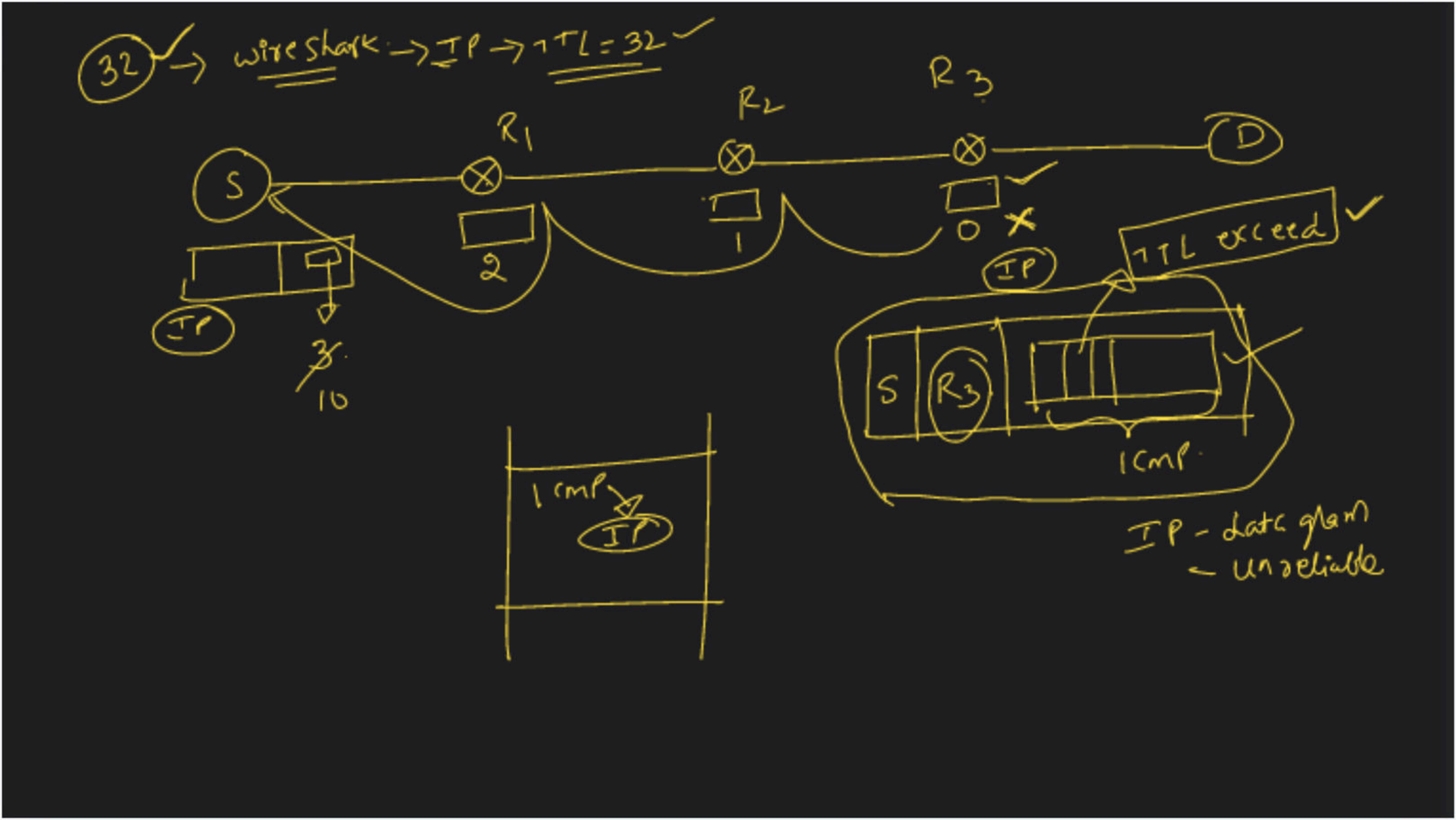



Tool
Teach Tech
write do / down
Docum g.
focus
1 5 E
L
S
S

TTL Exceed

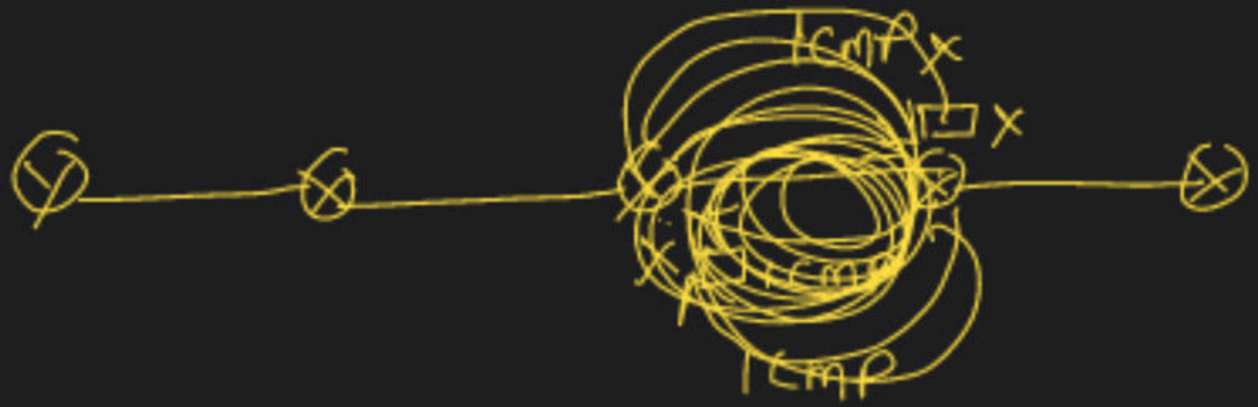
To avoid infinite loop.



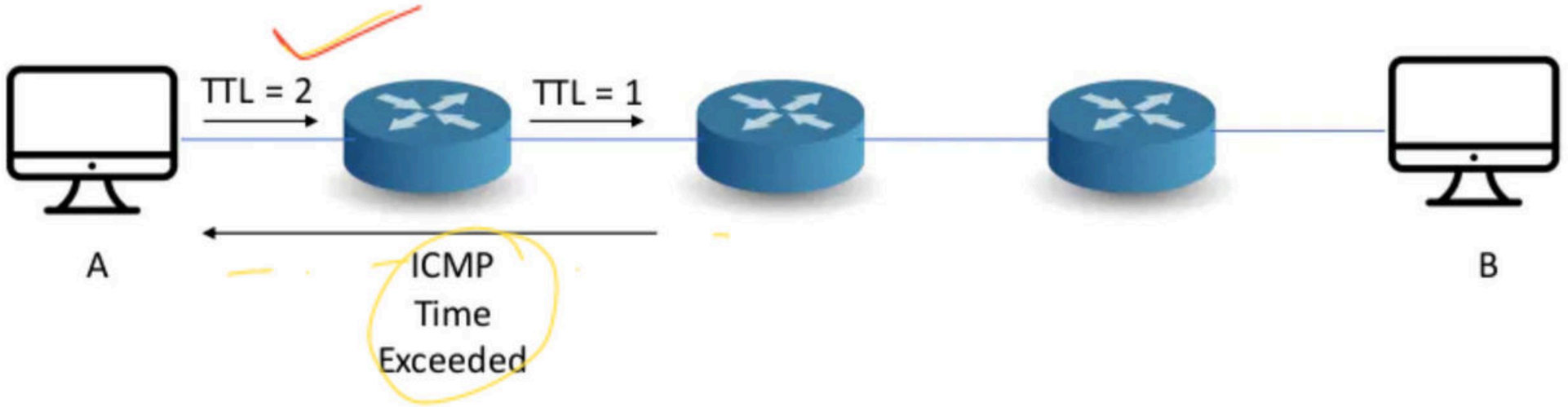

32 → wireshark → IP → TTL = 32
R1
R2
R3
S
D
2
1
0
IP
3
10
TTL exceed
IP
S
R3
ICMP
ICMP
IP
IP - datagram
- unreliable

IP → lost → ICMP

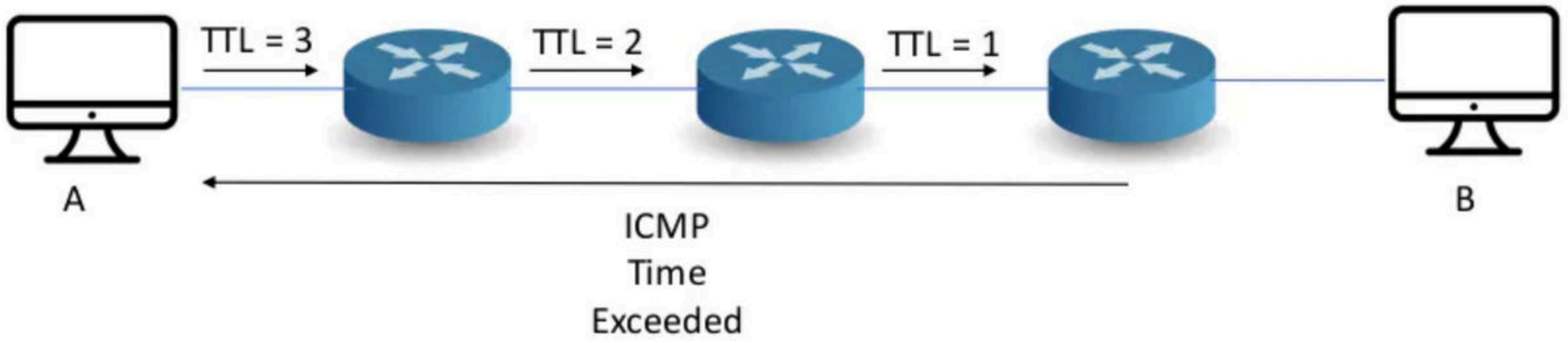
ICMP → lost → XICMP



TTL Exceed

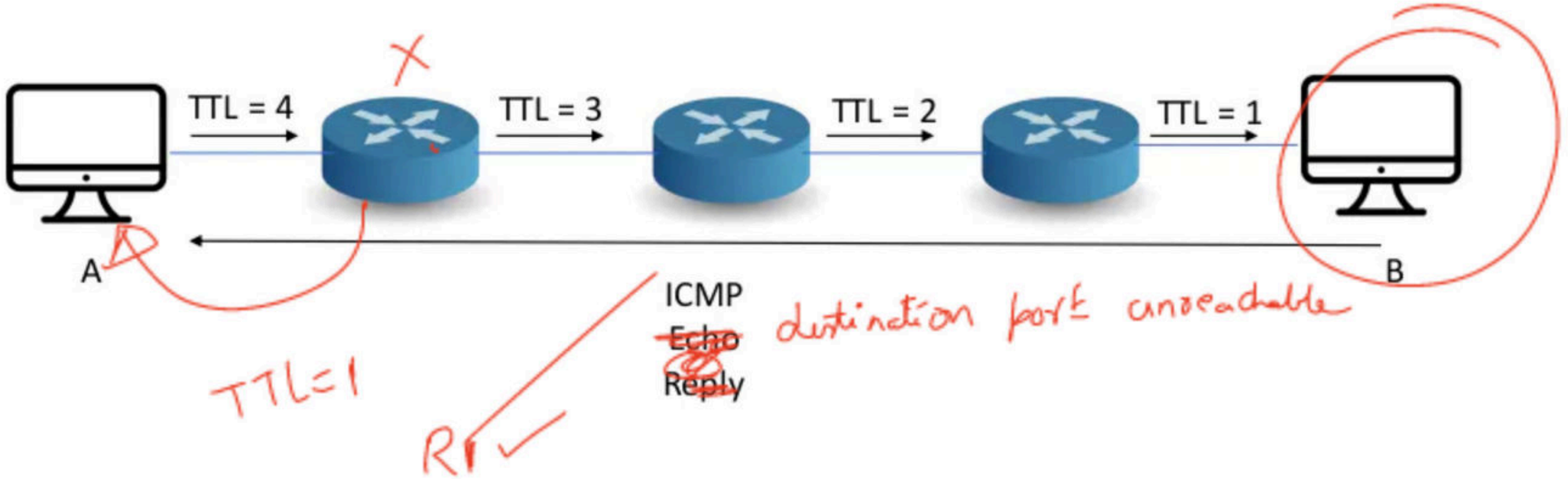


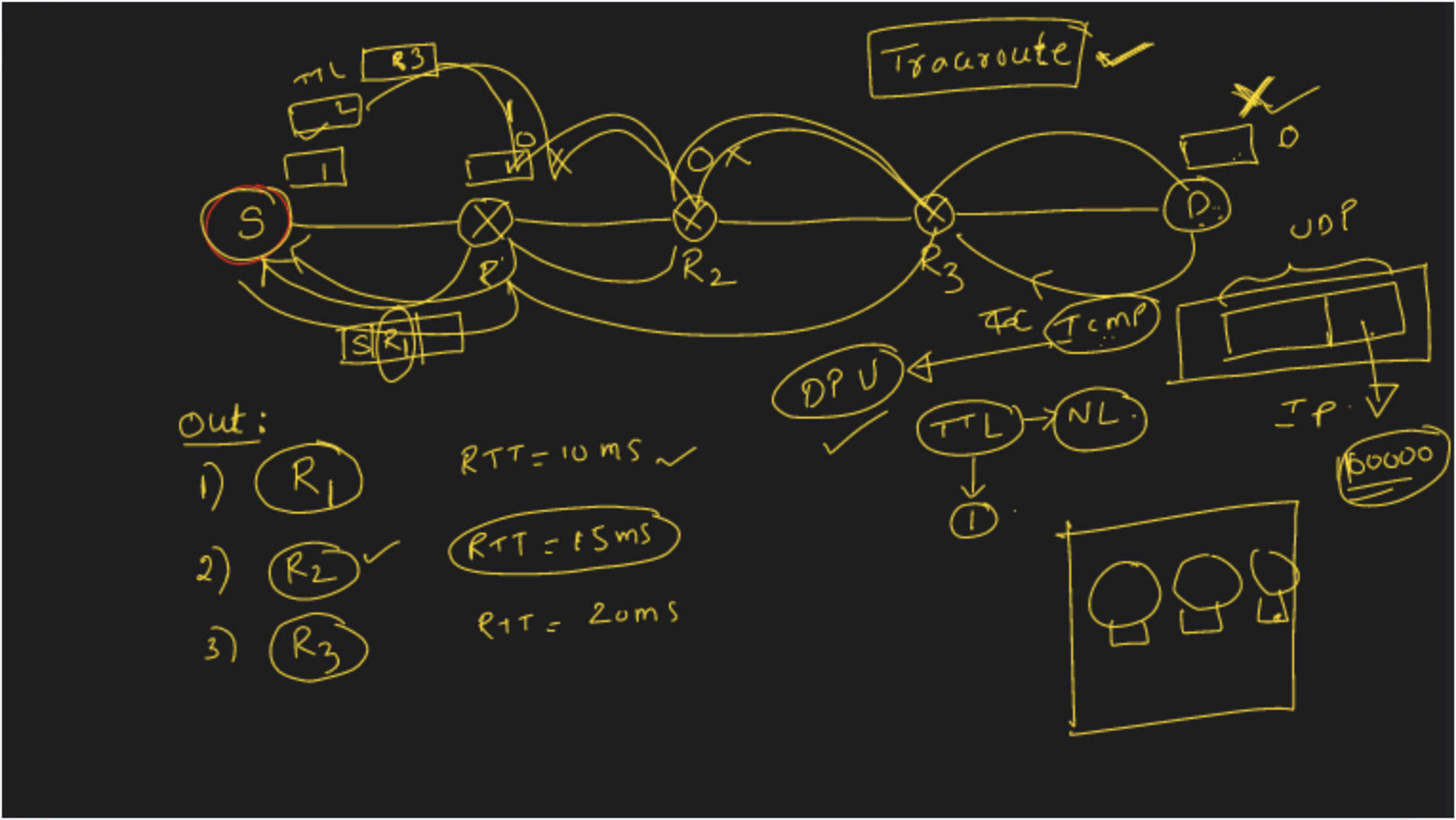
TTL Exceed



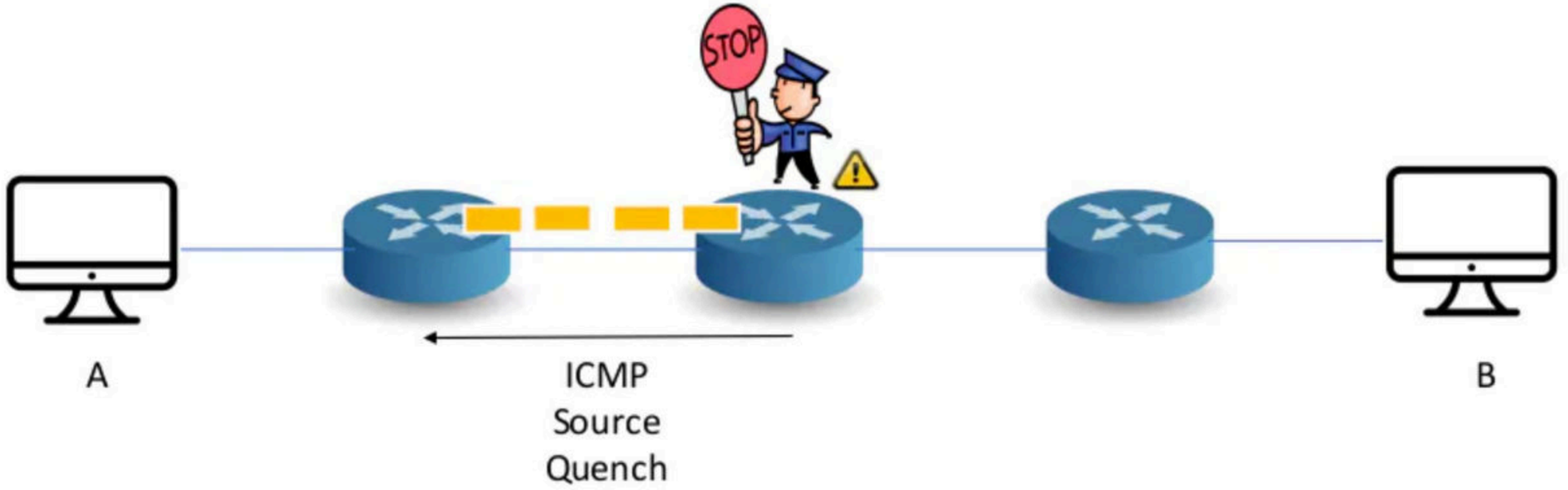
TTL Exceed

Ping

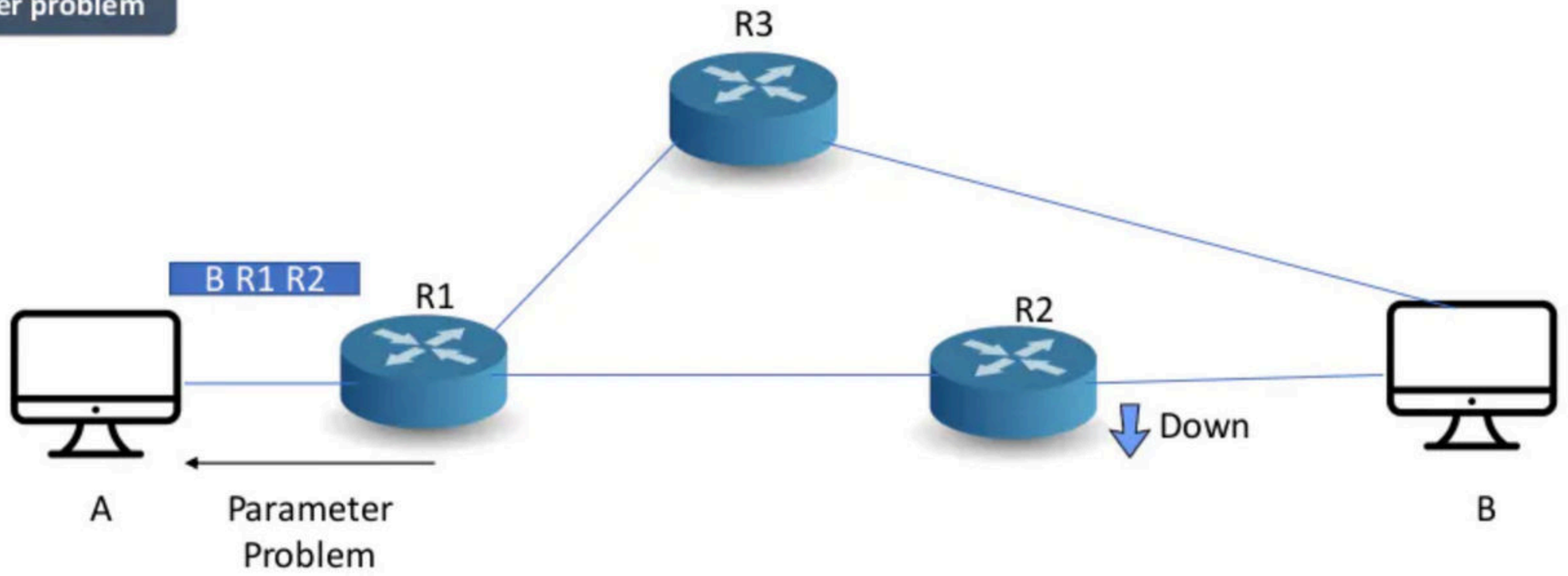



Traceroute
TTL
R3
2
1
S
R1
R2
R3
D
UDP
TTL
ICMP
DPU
TTL
NL
IP
50000
Out:
1) R1
2) R2
3) R3
RTT = 10 ms
RTT = 15ms
RTT = 20ms

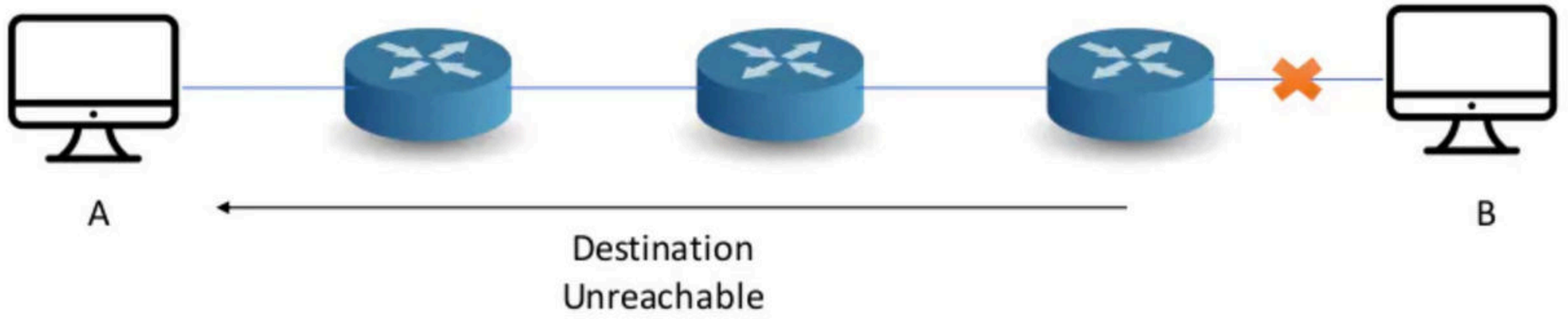
Source quench



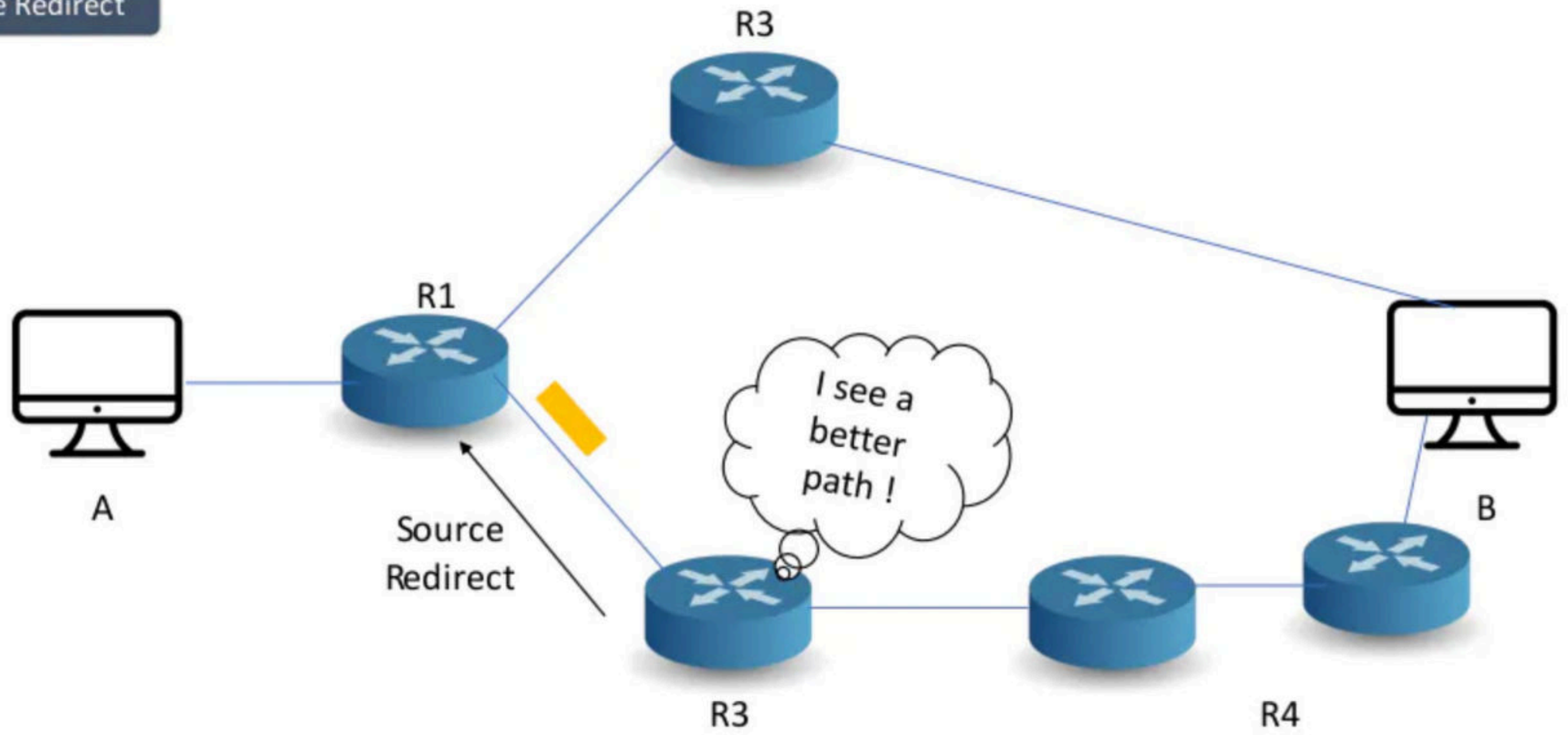
Parameter problem



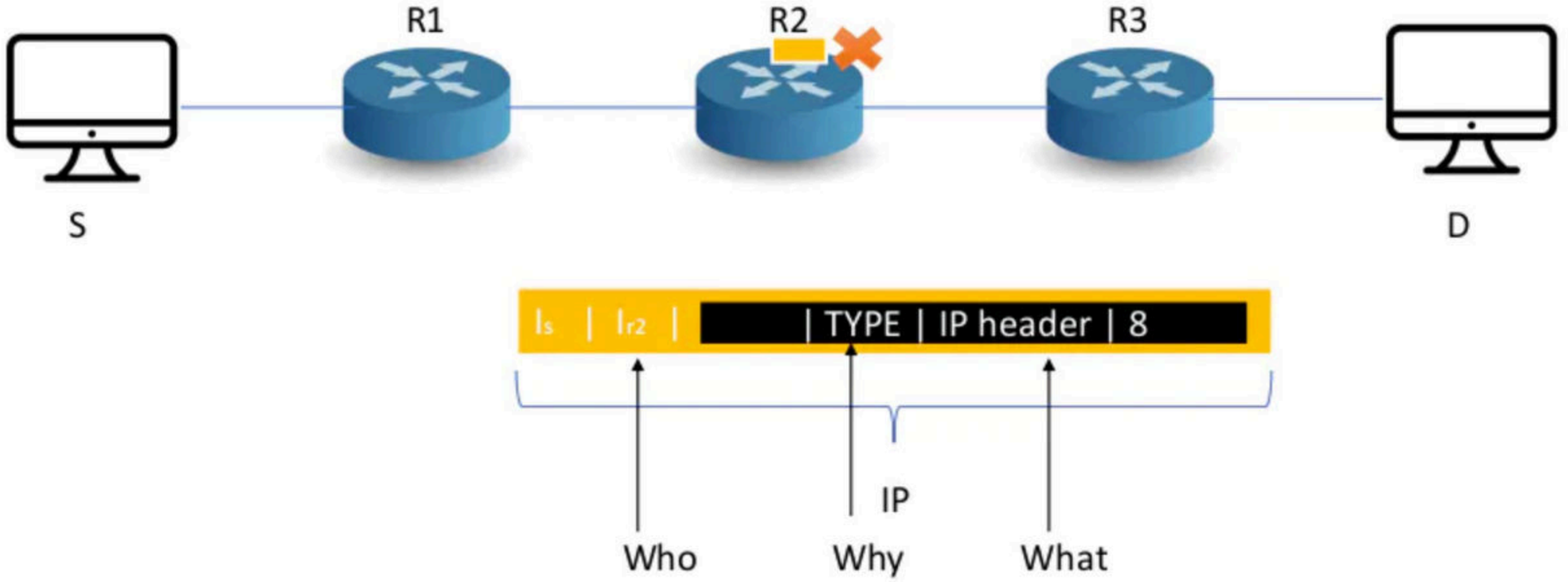
Destination unreachable



Source Redirect



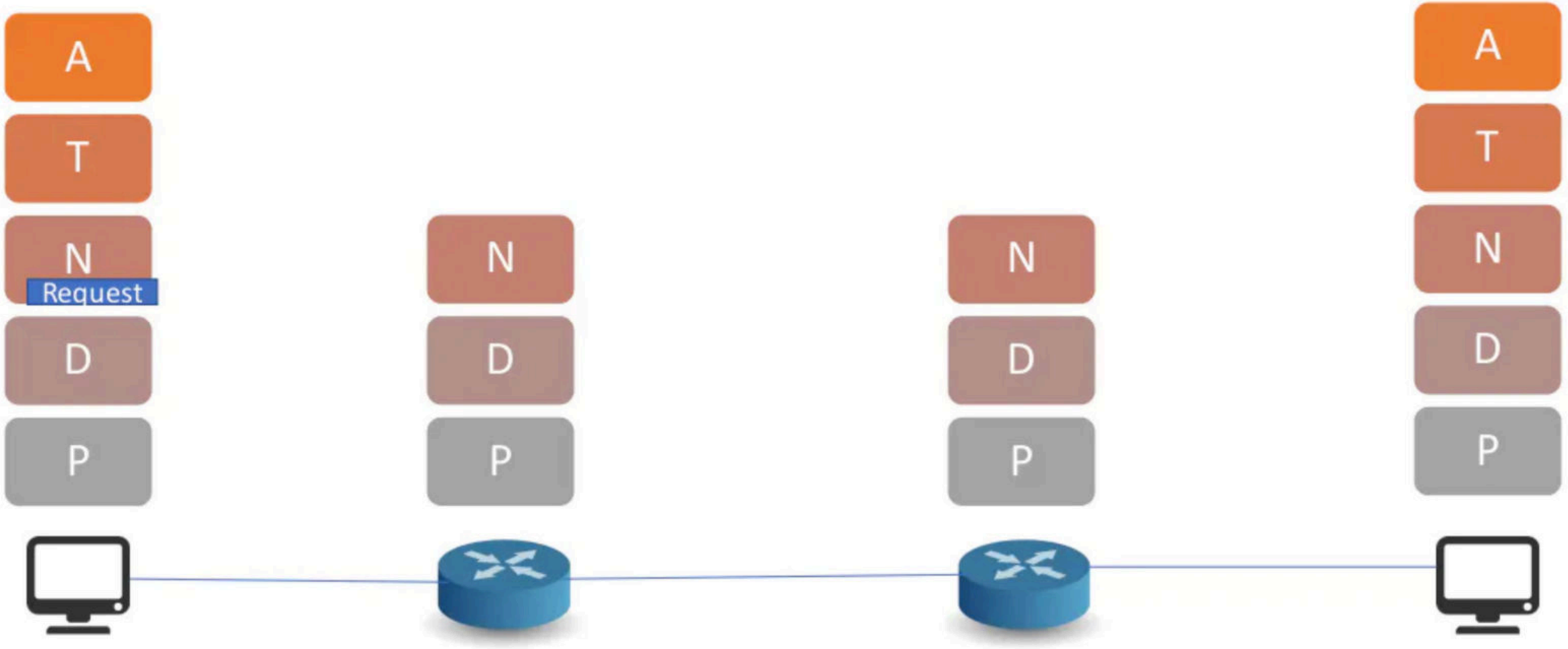
These are things that sender should know:
Who discarded ?
Why it got discarded ?
What packet did you discard?



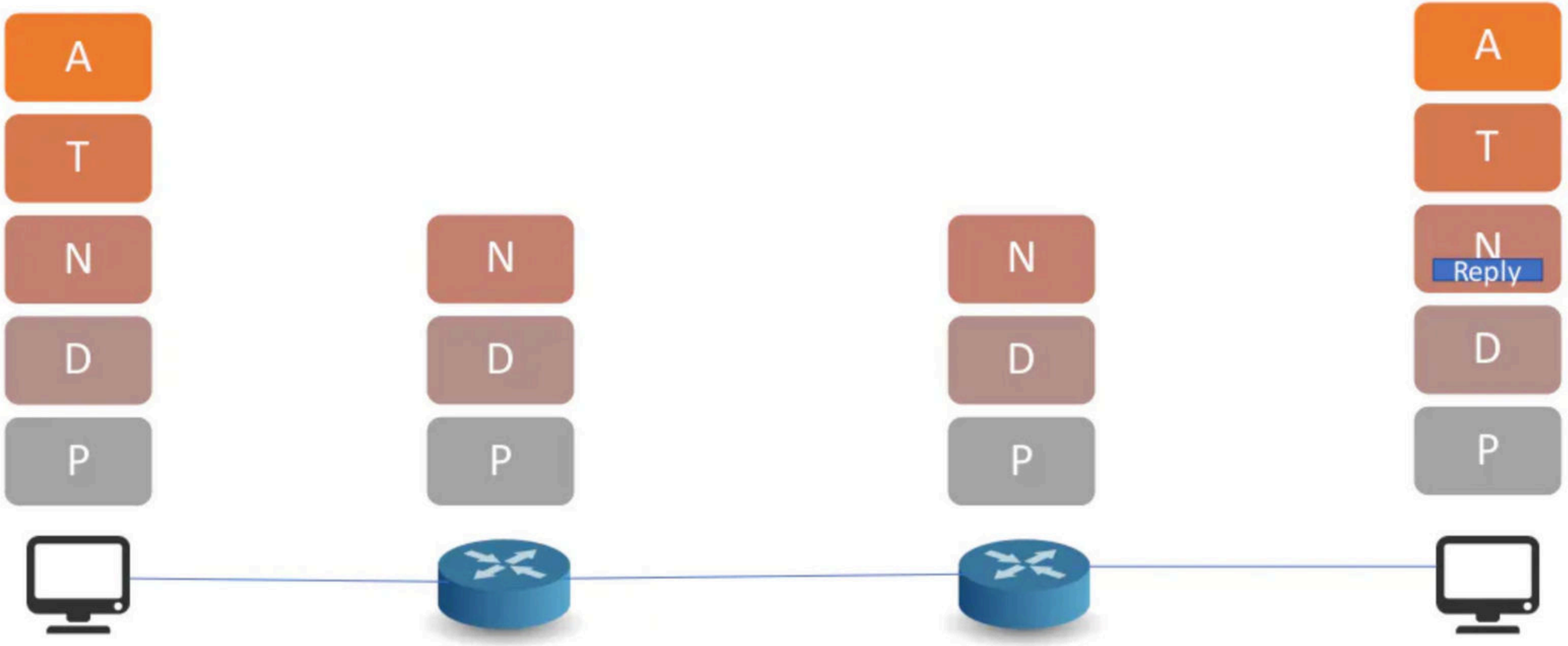
Computer Networks

ICMP Part 2

Echo Request and Reply



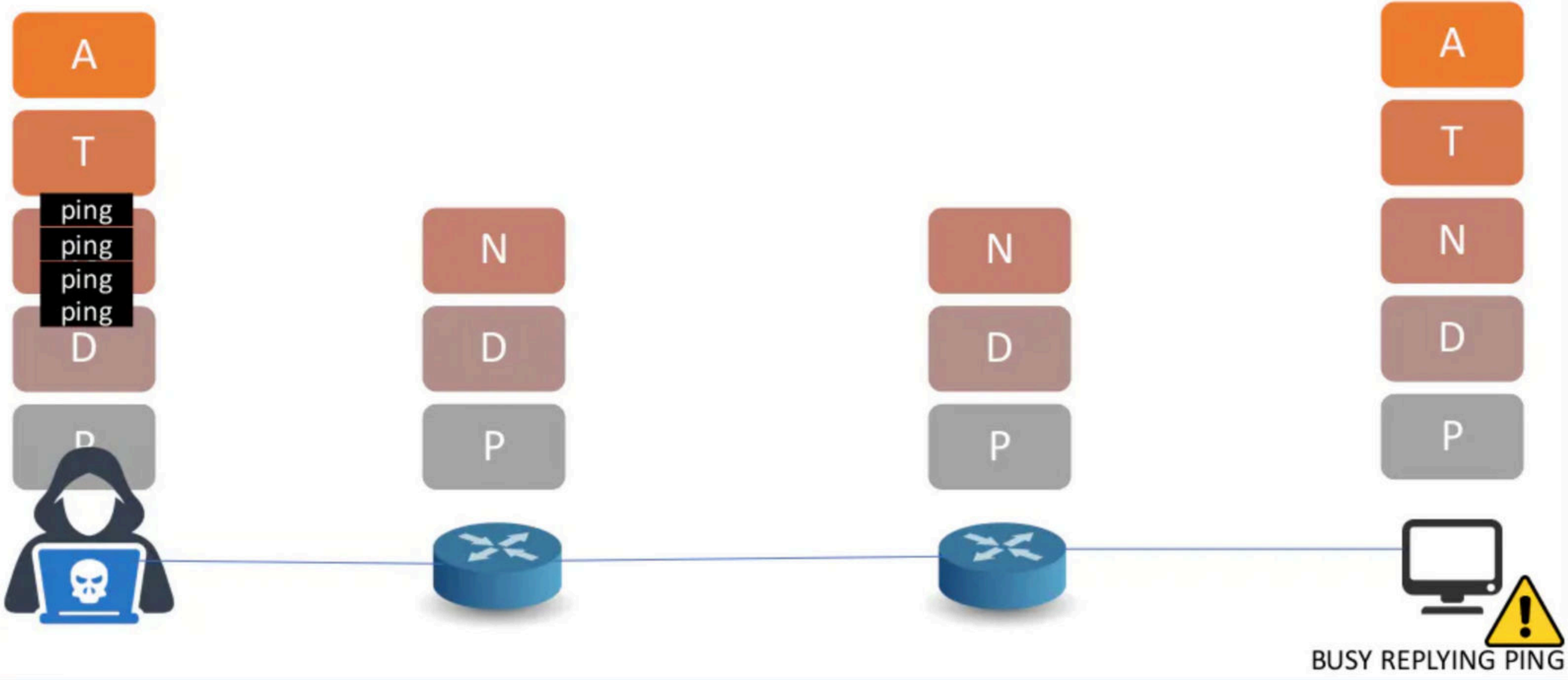
Echo Request and Reply



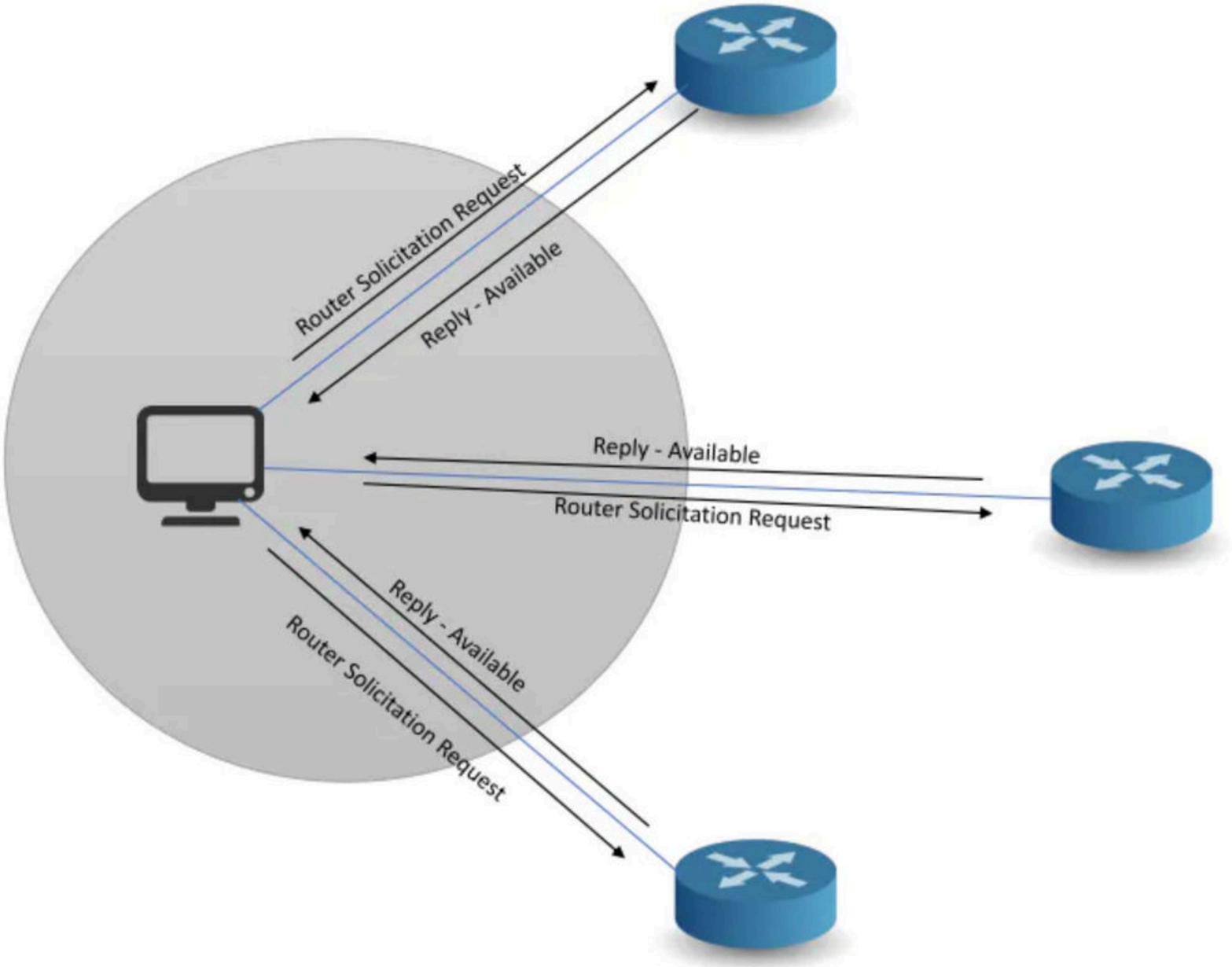
Echo Request and Reply

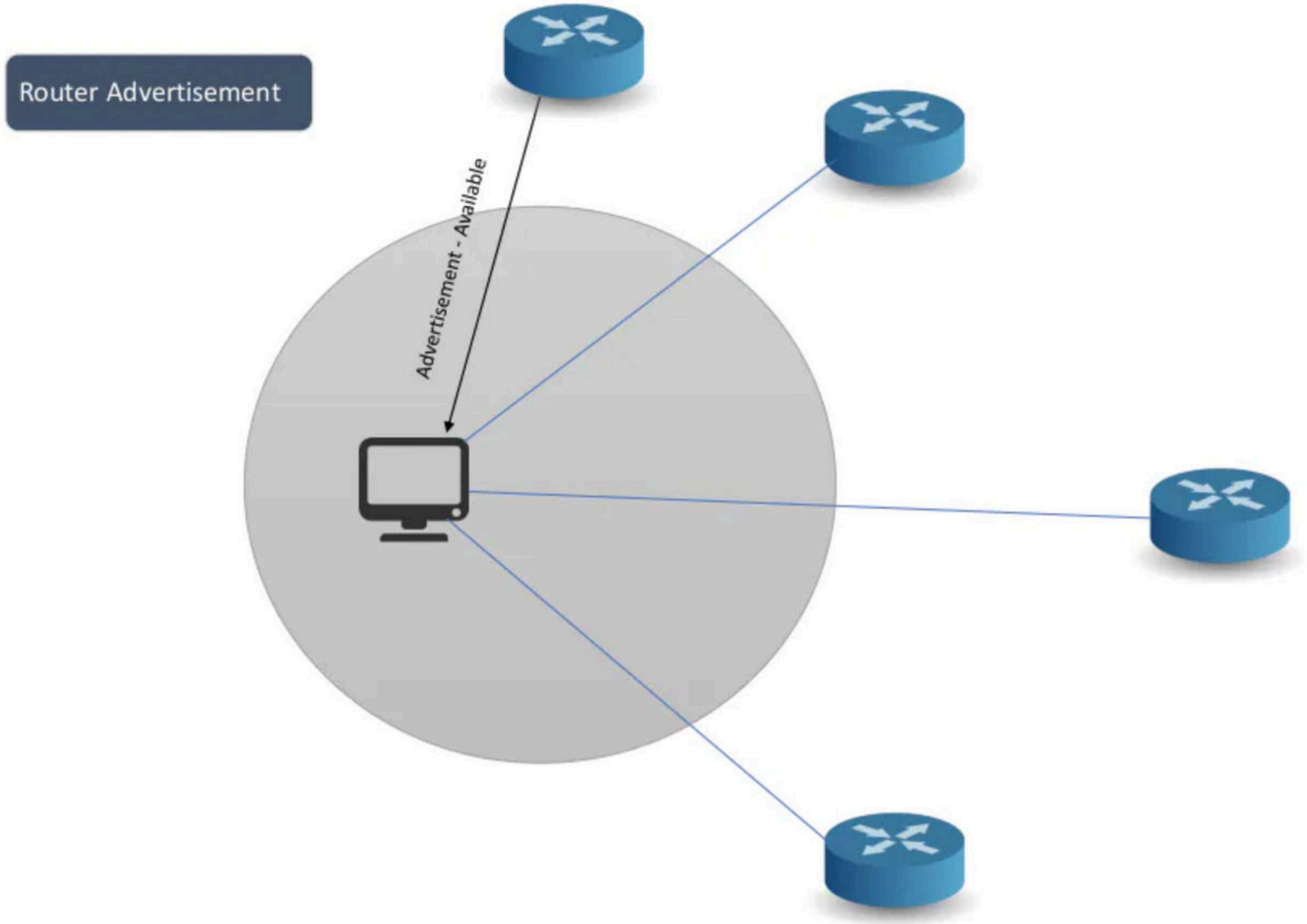
Attack possible
DENIAL OF SERVICE

PING is the Packet InterNet Grope

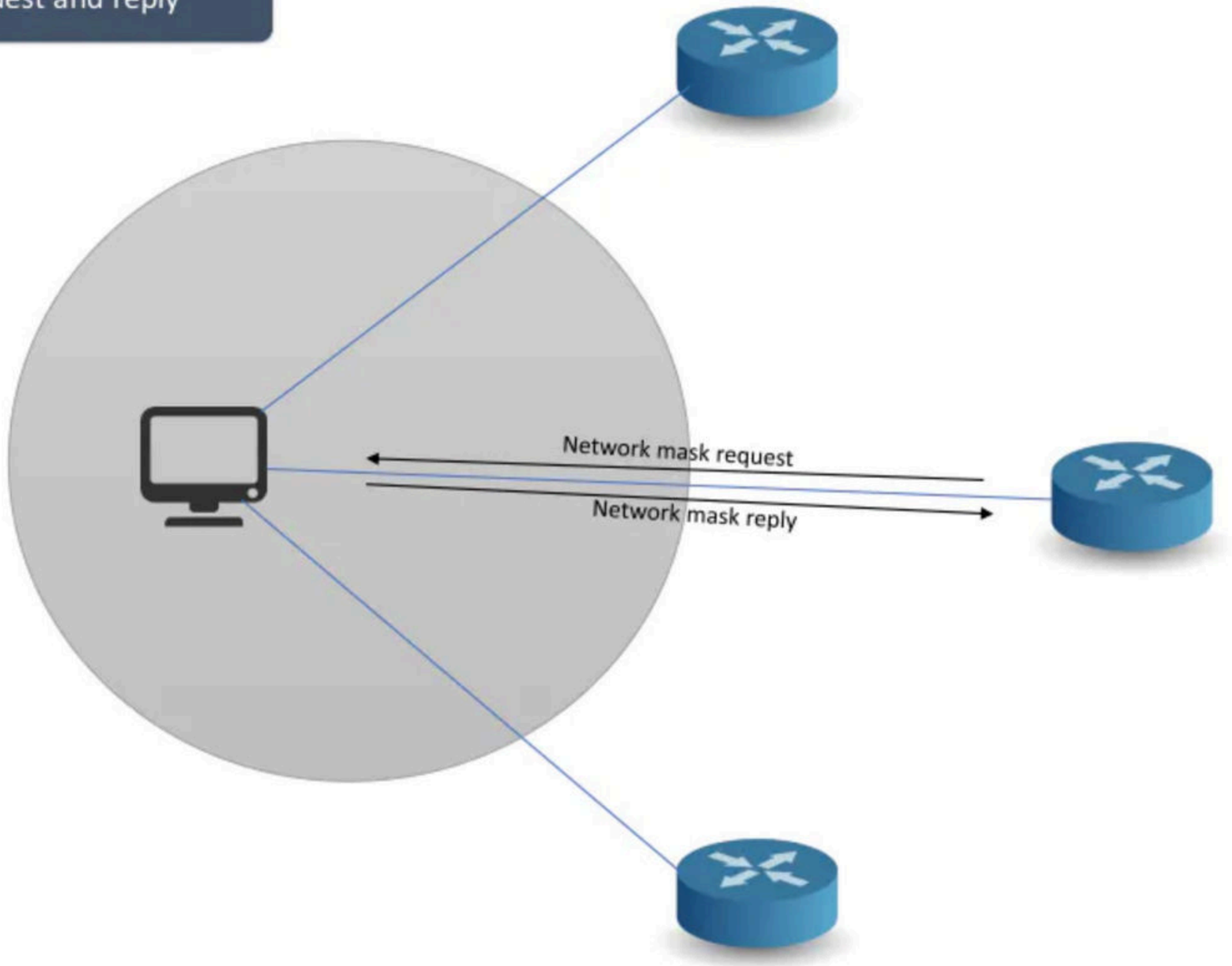


Router Solicitation




Router Advertisement
Advertisement - Available

Network mask request and reply



Timestamp request and reply

- ICMP Timestamp Request and Timestamp Reply messages are used by network routers to synchronize their system clocks for time and date.
- When a router needs to synchronize its system time, it sends an ICMP Timestamp Request message to the other router.
- Once the ICMP Timestamp Request message is received by the other router, it will respond back with an ICMP Timestamp Reply message.
- Timestamp Reply message contains other router's date and time.
- ICMP Timestamp Request and Timestamp Reply messages are not used much these days, because there an entire protocol itself is dedicated for network device time synchronization.