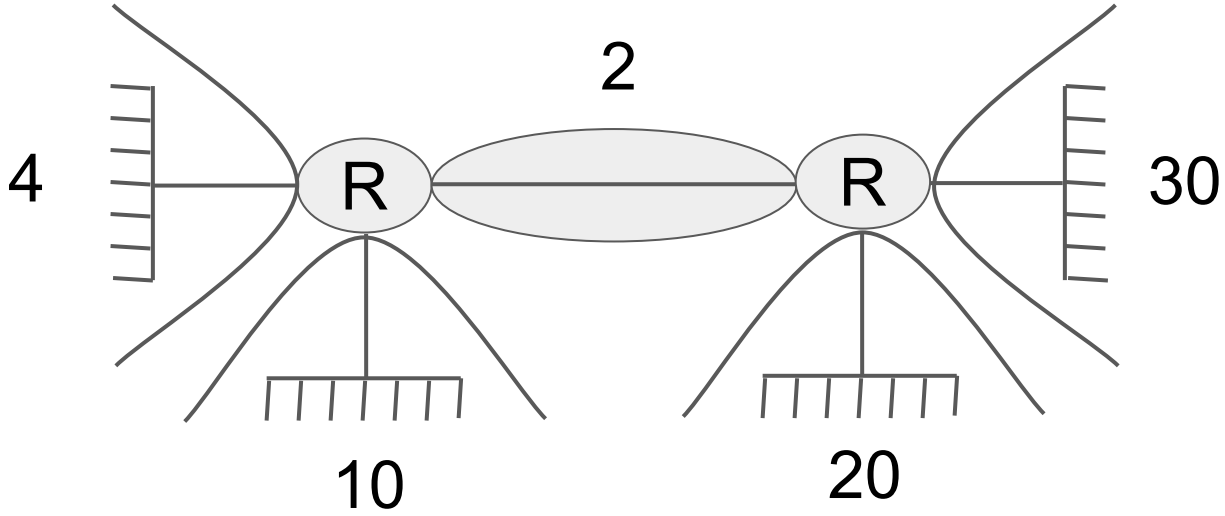
Assalam-u-alaikum

BILAL KHAN

This is my 11th video of DevOps

VLSM/Variable length subnet Mask



Class C IP address: 197.10.10.0

1. 197.10.10.00000000
Subnet Mask: 255.255.255.0

2. $2^n - 2 >= 30$
$2^1 - 2 = 0$
$2^2 - 2 = 2$
$2^3 - 2 = 8 - 2 = 6$
$2^4 - 2 = 16 - 2 = 14$
$2^5 - 2 = 32 - 2 = 30$

n = 5

3. 197.10.10.11100000 → 128+64+32 = 224
197.10.10.224

4. **Subnet 1**: Subnet ID: 197.10.10.0/27

CIDR(Classless Inter Domain Routing)

Subnet Broadcast ID: 197.10.10.31/27

Subnet 2 → Subnet ID: 197.10.10.32

$2^n - 2 >= 20$

$2^1 - 2 = 0$

$2^2 - 2 = 2$

$2^3 - 2 = 8 - 2 = 6$

$2^4 - 2 = 16 - 2 = 14$

$2^5 - 2 = 32 - 2 = 30$

n = 5

197.10.10.11100000 → 128+64+32 = 224

197.10.10.224

Subnet ID: 197.10.10.32/27

Broadcast ID: 197.10.10.63/27

Subnet Mask: 255.255.255.224

Subnet 3 → Subnet ID: 197.10.10.64

$2^n - 2 >= 10$

$2^1 - 2 = 0$

$2^2 - 2 = 2$

$2^3 - 2 = 8 - 2 = 6$

$2^4 - 2 = 16 - 2 = 14$

n = 4

Subnet ID: 197.10.10.64/28

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Broadcast ID: 197.10.10.79/28

Subnet Mask: 255.255.255.240

197.10.10.11110000 → 128+64+32+16 = 240

197.10.10.240

Subnet 4 → Subnet ID: 197.10.10.80

$2^n - 2 >= 4$

$2^1 - 2 = 0$

$2^2 - 2 = 2$

$2^3 - 2 = 8 - 2 = 6$

n = 3

197.10.10.11111000
→ 128+64+32+16+8 = 248
197.10.10.248

Subnet ID: 197.10.10.80/29

Broadcast ID: 197.10.10.87/29
Subnet Mask: 255.255.255.248

Subnet 5 → Subnet ID: 197.10.10.88

$2^n - 2 >= 2$

$2^1 - 2 = 0$

$2^2 - 2 = 2$

n = 2

197.10.10.11111100
→ 128+64+32+16+8+4 = 252
197.10.10.252

Subnet ID: 197.10.10.88/30

Broadcast ID: 197.10.10.91/30
Subnet Mask: 255.255.255.252

Reserved addresses

127.0.0.0/8

Example: Localhost 127.0.0.1

Loopback addresses

The device will work as a client and a server also. It will always be up until the computer is down.

Packets

Apart from the data, the header is of 20 bytes.

It contains IPv, length, identification numbers, flags, protocols, checksums, address, TTL etc.

IPv6 address

IPv4: 2^{32} = 4.3 billion ip addresses.

IPv6: $2^{4*32} = 2^{128} = 3.4 \times 10^{38}$

Cons:

- The devices that are configured with IPv4 can’t access the devices that are configured with IPv6.
- ISPs would have to shift.
- Lots of hardware work.

How the IPv6 is represented?

It contains eight hexadecimal numbers and each number is a 16 bit of size.

2001:0db8:0000:0000:0000:0000:0000:0001

Hexadecimal
16 bit

IPv6 Prefix

- 2001:0db8:0000:0000:0000:0000:0000:0001/64
- 2001:0db8:0:0:0:0:0:1/64
- 2001:0db8::1/64

0000 → 0

1:0000:0000:0000:0000:9 → 1:0:0:0:0:9 → 1::9

Full of zeros

Middleboxes

These are the extra devices that interact with the ip packets and allow them or stop them in between. They are present in the network layer and in the transport layer.

1. Firewall → Global Internet
   Firewall → Trusted network

Firewall filter out ip packets based on various rules.

- Addresses
- Modify packets
- Port numbers
- Flags
- Protocols

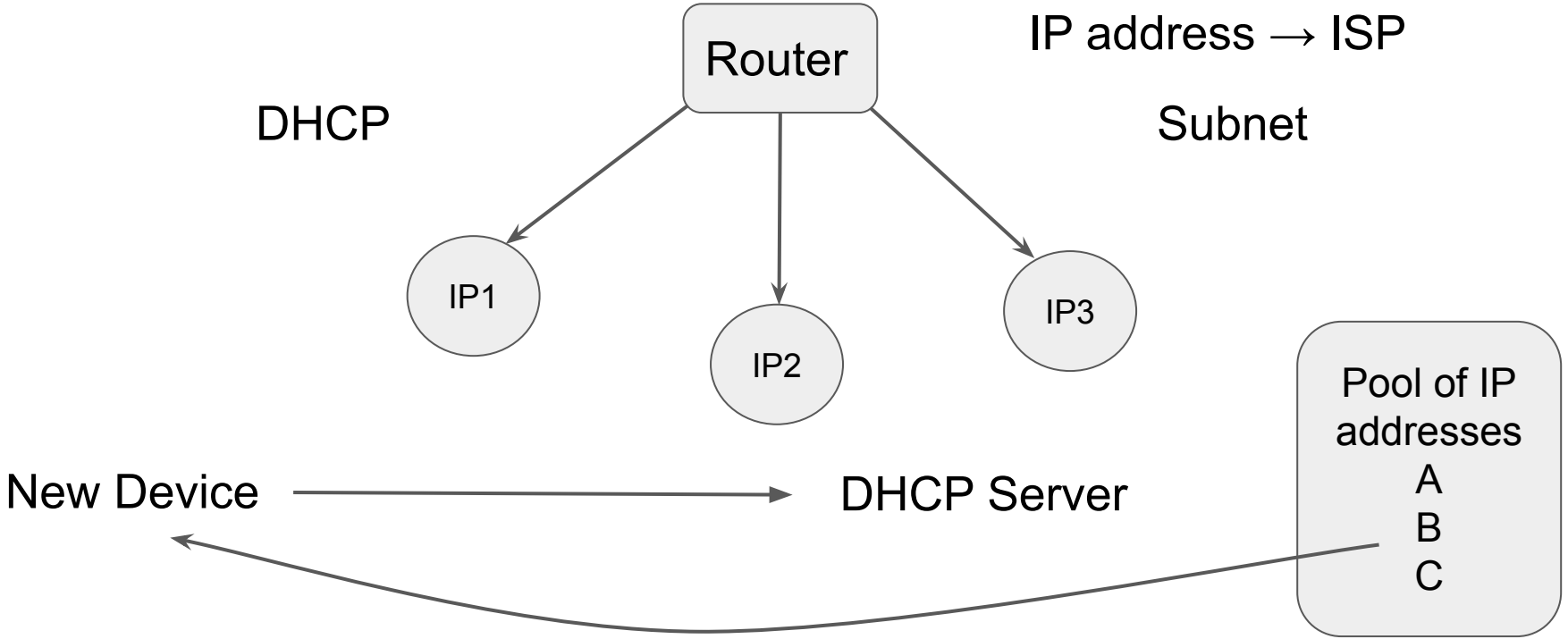
Firewall has two types

1. Stateless firewall
2. Stateful firewall

1. **Stateless firewall** won’t maintain the state of packets.
2. **Stateful firewall** see the packets and store its state by storing it in the cache memory.

Data Link Layer

The data packets that you receive from the network layer will be transferred to the physical layer with the help of data link layer.



Each device will be having an ip address and the data link address.

The data link layer has two sublayers:

- **Logical Link Control:** It deals with protocols, flow-control, & error control.
- **Media Access Control:** It controls the device interaction.

Data-link layer takes packets from Network Layer and encapsulates them into Frames.

ARP(Address Resolution Protocol)

ARP is used to get the mac address from the destination by giving it’s ip address.

ARP will send the request to the destination and the request will be transferred through all the devices and only receives at the destination ip address to take the mac address from it.

What we have learned?

VLSM(Variable Length Subnet Mask)

Reserved addresses, packets, IPv6

Middleboxes, Firewall

Data Link Layer, ARP

That’s It

I hope you will like this video.

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