

Internet Protocol (IP)

SANS 401

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Plan

- Network Protocols
- Layer 3
 - Internet Protocol (IP)
 - Internet Control Message Protocol (ICMP)
- Layer 4
 - Transmission Control Protocol (TCP)
 - User Datagram Protocol (UDP)
- Tcpdump



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Internet Protocol

- Layer 3 of the OSI model
- The core of Routing Protocol of the internet
- Transmission of packets between endpoints
- Define addressing scheme for the internet

Traffic Prioritization

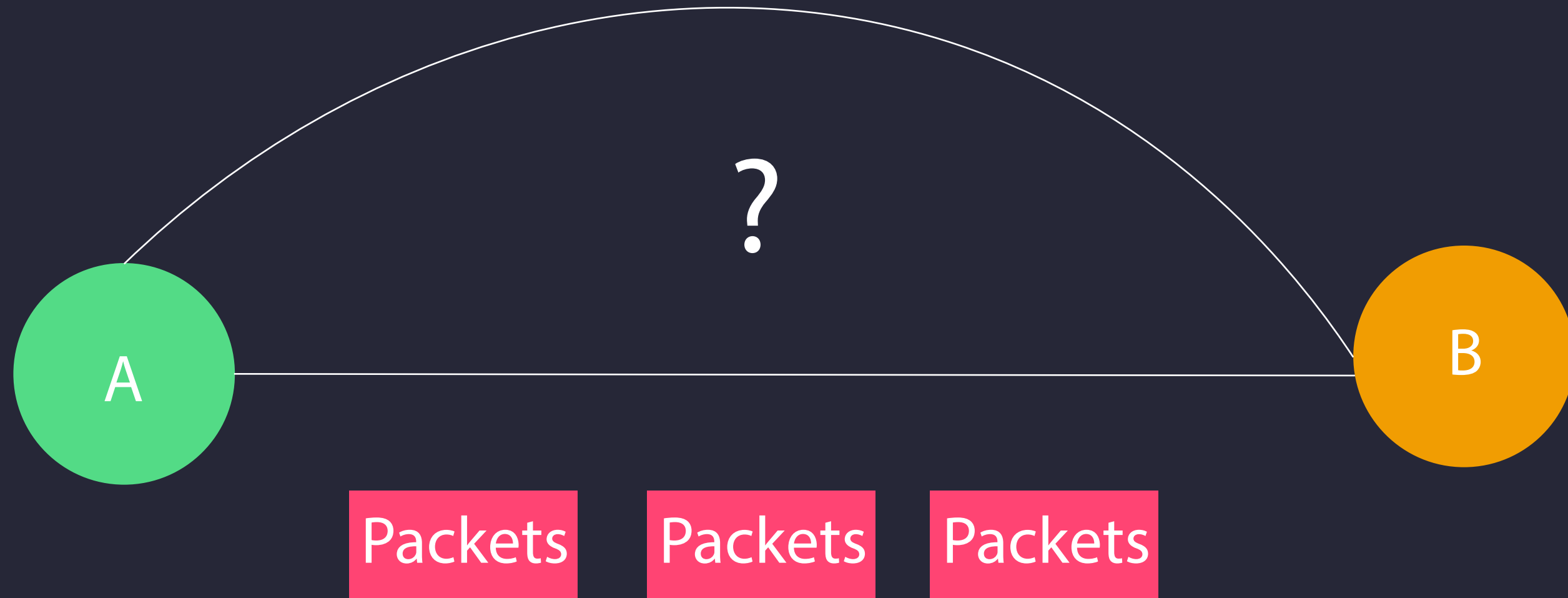
Time To Live (TTL)

Fragmentation

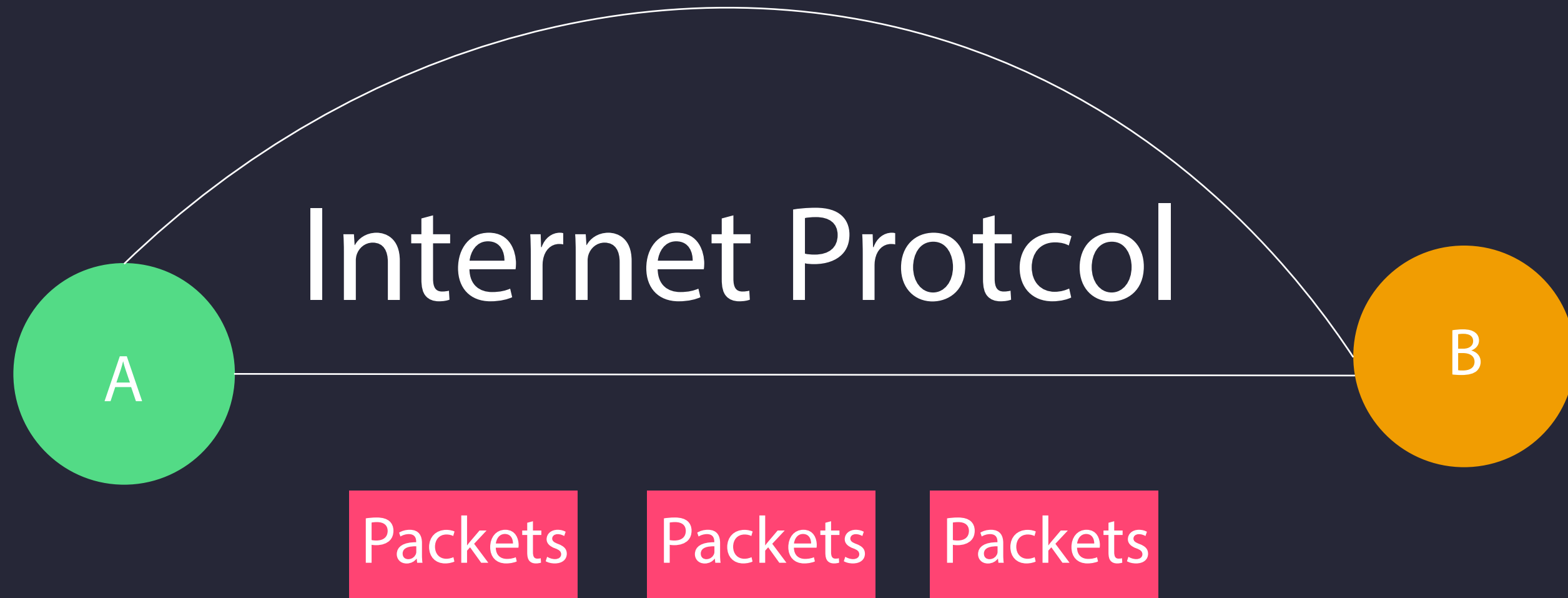
Unique Identifier

Check-sum

Internet Protocol



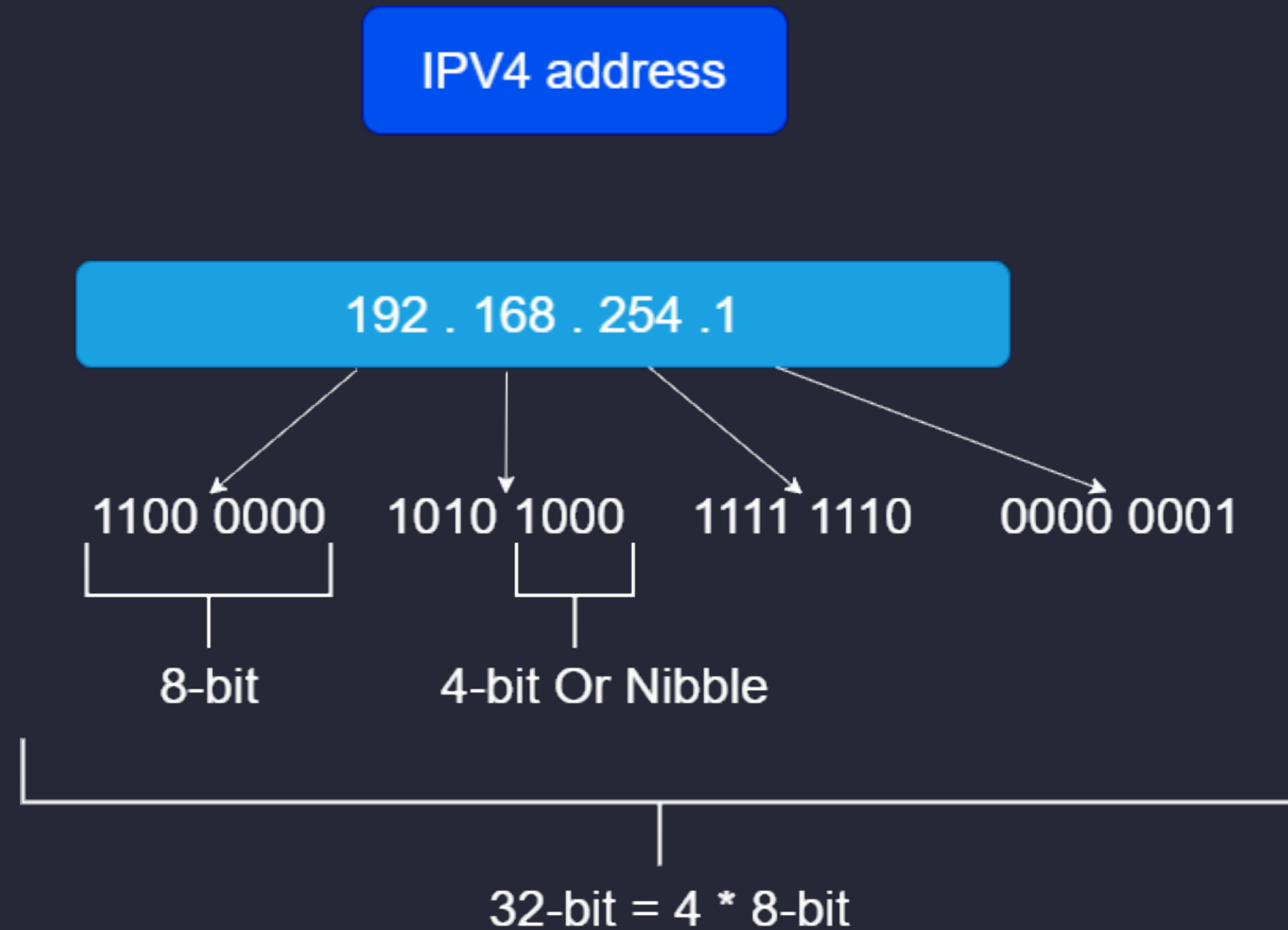
Internet Protocol



IPv4

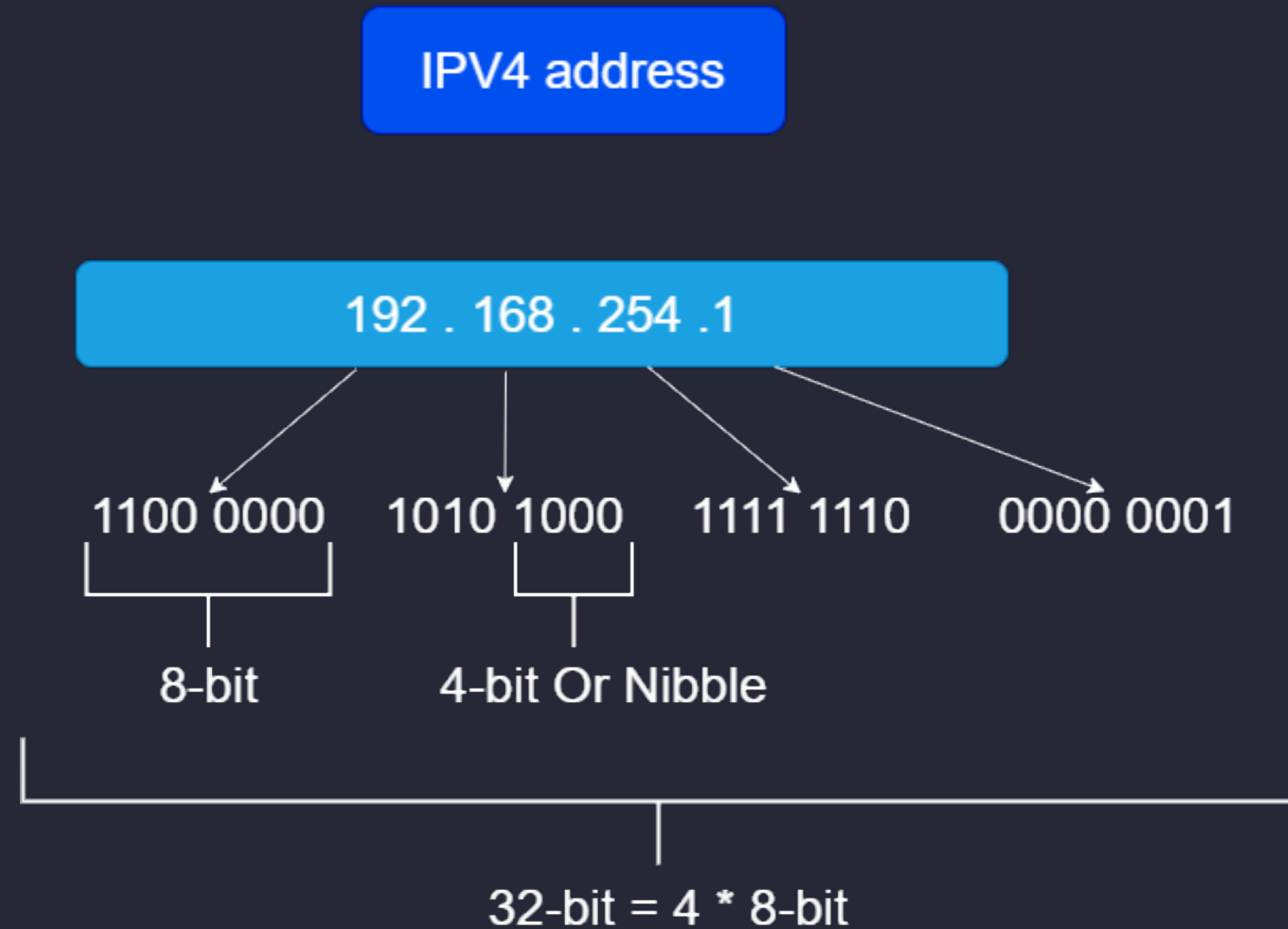
- 32-bit, bit (1 or 0)
- Byte = 8-bit
- General form for IPv4 address:
`XXX.XXX.XXX.XXX`
- 32-bit so 2^{32} value (~ 4.2 Million)

Dotted Decimal Notation



IPv4

- Broadcast address: 255.255.255.255
- Think about it like an address that represent the entire network
- In Binary:
1111 1111 . 1111 1111 . 1111 1111 . 1111 1111



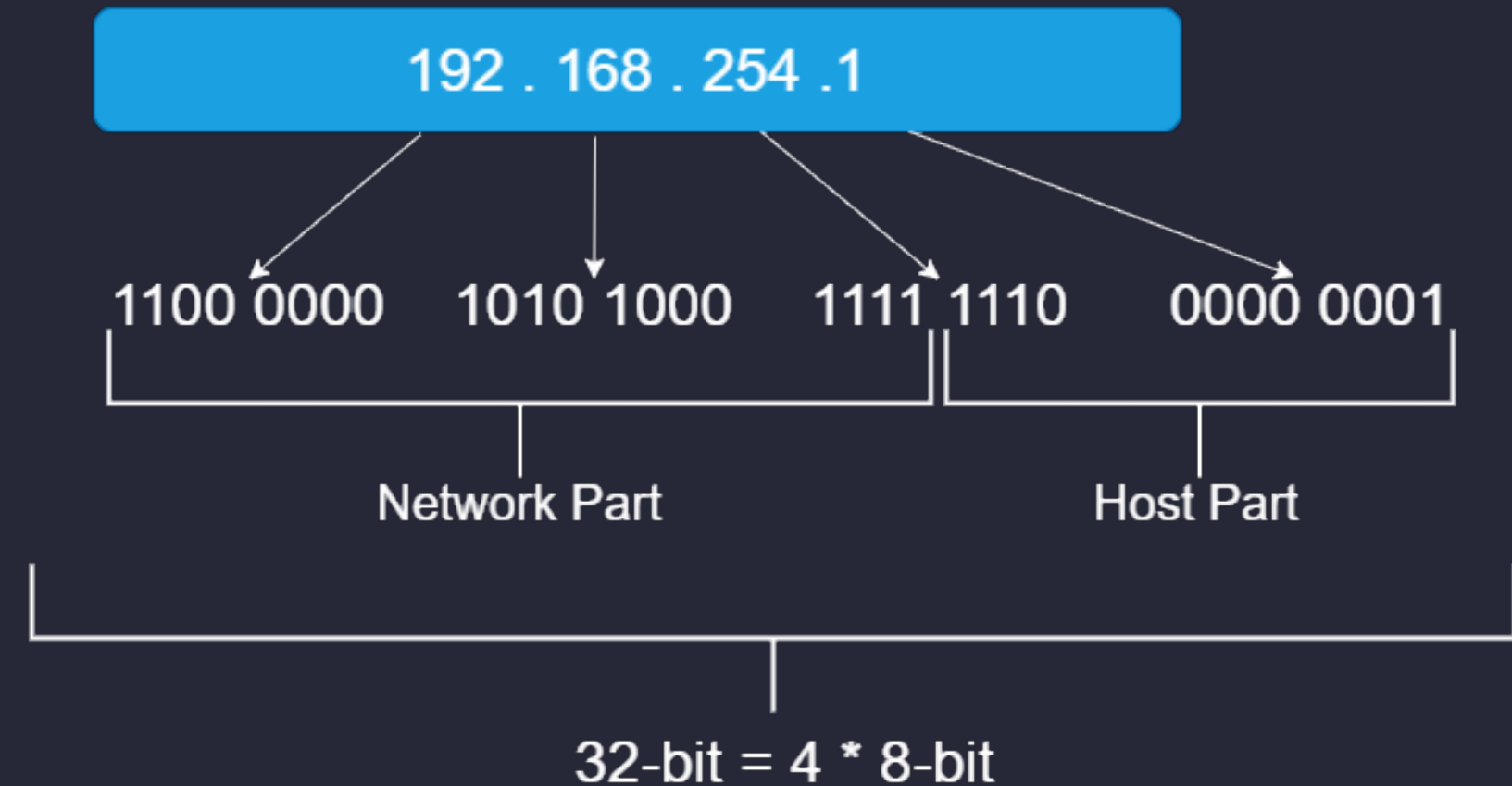
IPv4 Network And Host Part

- Network ID (OR Network Prefix)
- Host ID

Suppose That Host
Part is 12 bit

IPv4 address

So $32 - 12 = 20$ -bit
For Network Part

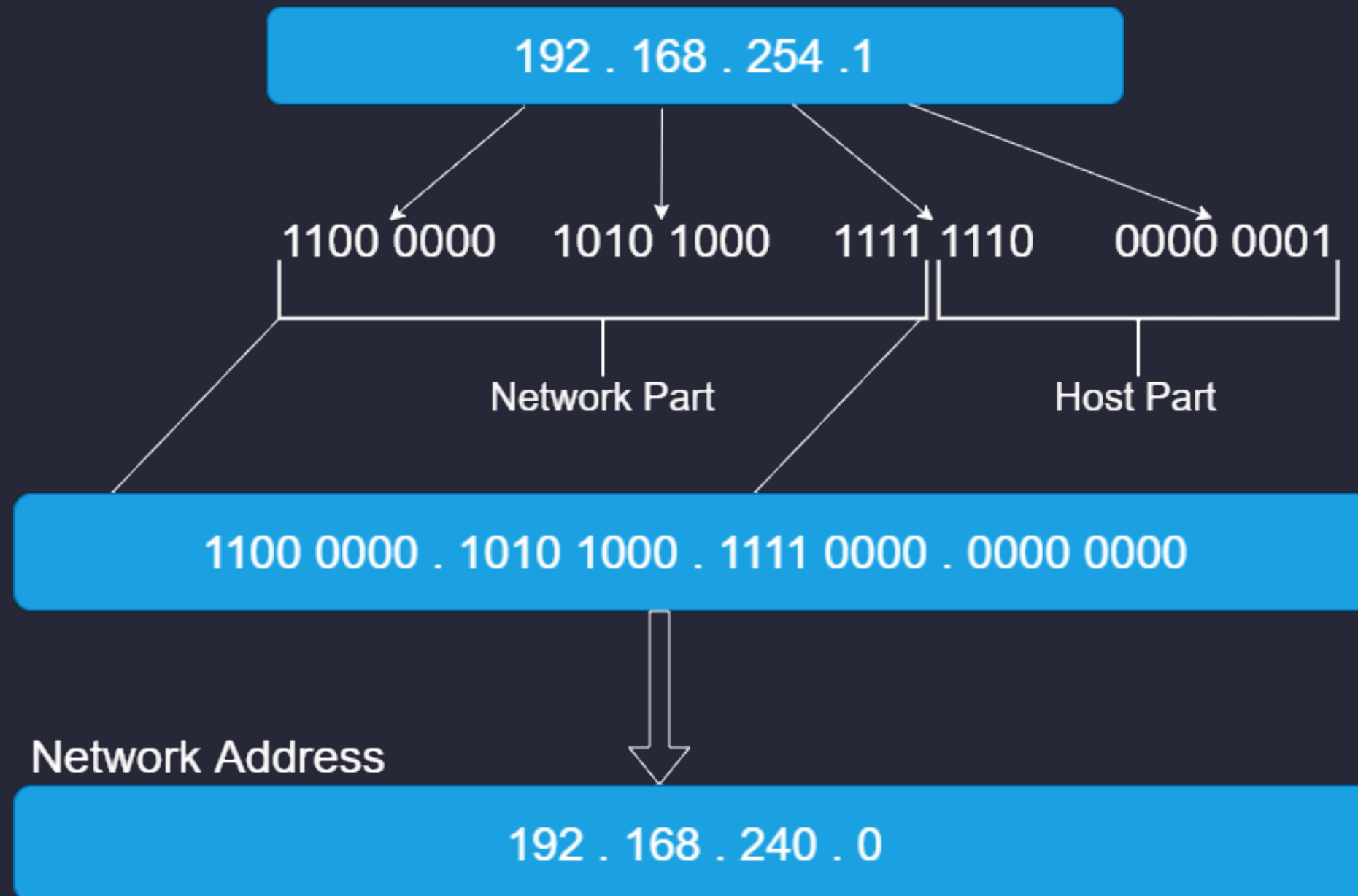


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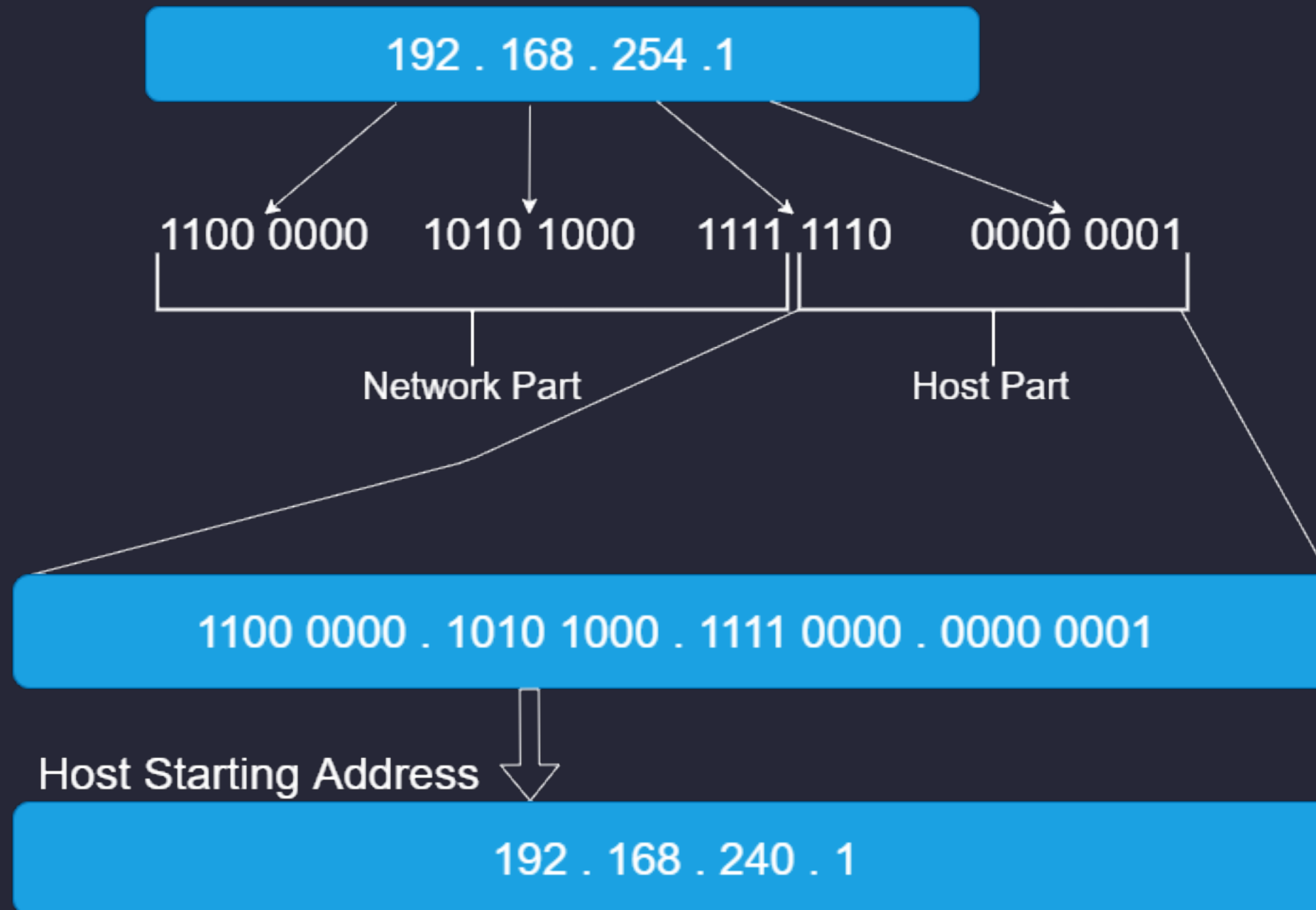


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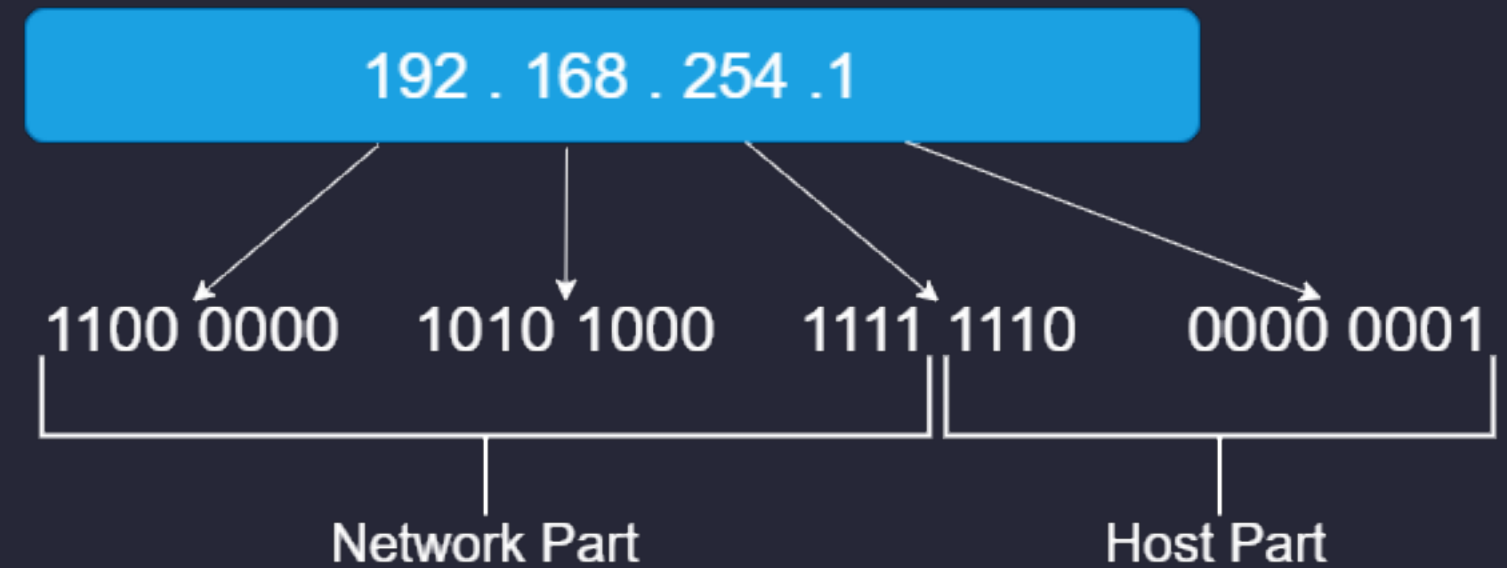
Subnet Mask

- Number of bits used for host ID
- Using subnet address you will be able to know the network address
- To obtain network address bitwise AND the IP address with the subnet mask

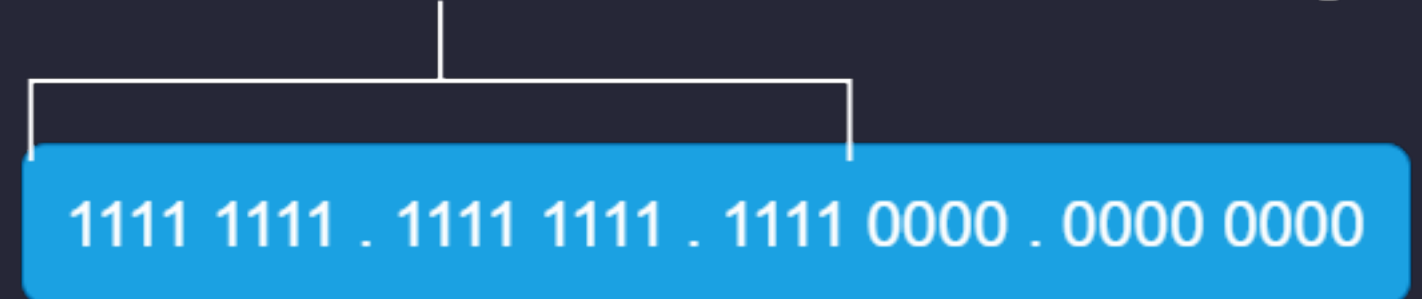
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For Network Part



20-bit for network fill them with 1's from left to right



255 . 255 . 240 . 0