

# IP Addresses

*Scalable Campus Network Design and Operations Training*

*Lilian Maina Chege*

[lmaina@kenet.or.ke](mailto:lmaina@kenet.or.ke)

# Addressing Concepts



- Subnetting
- Q&A



# IPv4

- It is the legacy protocol. Widely used on the internet



- Range from 1.0.0.0 to 223.255.255.255
- 0.0.0.0 to 0.255.255.255 and 224.0.0.0 to 255.255.255.255 have “special” uses
- Private IP address..widely used in campus network
- 10.0.0.0/8
- 172.16.0.0/12
- 192.168.0.0/16

# IPv6

- Internet is has started shifting to IPv6 – IPv4 exhaustion
- Addresses are 128 bits long
- Eight groups of 4 hexadecimal digits, each group with 16bits
- Internet addresses range from 2000::/16 to 3FFF::/16
- The remaining IPv6 range is reserved or has “special” uses
- 2001:0db8:0000:0000:34f4:0000:0000:f3dd/64

# IP address format

- Must have an address and a subnet mask/prefix length
- ❖ IPv4 written as :
  - 12.34.56.78 255.255.255.0 *or*
  - 12.34.56.78/24
- ❖ IPv6 written as :
  - 2001:db8::1/126
- Has a network portion and a host portion
- Hosts within a single network share the same network address.
- Each host also has an address is uniquely identifiable
- ❖ mask represents the number of network bits in the address
- Usually referred to as the subnet size
- ❖ The remaining bits are the host bits

# IPv4 Subnetting

- ◆ **Example 1 – 12.34.56.78/24**
  - 24 bits for the network portion
  - Leaves 8 bits for the host portion
  - 8 bits means there are  $2^8$  possible hosts on this subnet
- ◆ **Example 2 – 12.34.56.78/20**
- × **N/B: 32 bits in an IPv4 address**

# IPv6 subnetting

- ◆ **Example 1 : 2001:db8::1/126**
  - 126 bits for the network portion
  - Leaves 2 bits for the host portion
  - 2 bits means there are  $2^2$  possible hosts on this subnet
- **Example 2: 2001:db8::8/124**

**N/B:128 bits in an IPv6 address**



# **QUESTIONS** **And** **Answers**



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through ICT*

# Thank You

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Jomo Kenyatta Memorial  
Library, University of Nairobi  
P. O Box 30244-00100, Nairobi.  
0732 150 500 / 0703 044 500