

Unit 3 Network Fundamentals

Objectives:

- Present a brief history of networking.
- Discuss the ISO/OSI 7-layer model and how it relates to modern networks.
- Introduce TCP/IP and describe how it forms the basis of the internet.
- Describe some basic internet tools including ping, traceroute and dig.
- Discuss what is meant by IPv4 and IPv6.

Outcomes:

- Describe the fundamental concepts of networks.
- Evaluate a number of widely available tools to use for basic network troubleshooting.
- Explain the differences between the IPv4 and IPv6 standards.

Reflection:

Networks are collections of two or more computers linked to one another to facilitate the sharing of resources (such as printers and CDs), the exchange of data, or the facilitation of electronic interactions. There are various ways to join computers in a network, including infrared laser beams, radio waves, satellites, and cables (Usf.edu. 2013). The first connected computer network, known as ARPANET, was built in 1969, which is considered to be the beginning of the history of modern computer and device networking. It was the first program to use the TCP/IP protocol suite, which would later become the foundation of the Internet.

The internet is a global network that connects many billions of different computer systems and other kinds of electrical devices all around the globe. Because of the internet, it is now possible to have access to practically any kind of information, communicate with people located anywhere in the world, and carry out various other tasks. For many years, networking experts, students, and academics have turned to the OSI model to understand networking and create strategies for resolving issues that might arise at any stage of a network's lifespan. Information security specialists can still utilize an inventory of this kind as recently as today. According to the OSI model, seven abstraction levels separate computer-to-computer communication: physical, data link, network, transport, session, presentation, and application. Some of the main terms regarding the network and networking are given below.

- **TCP/IP**, refers to a series of communication protocols used over the internet to bring together different networked devices (Carl-Mitchell, 2020). Private computer networks may also use the TCP/IP as a communications method.
- **Traceroute**: A HostGator server ought to be the destination of the trace's last hop.
- **Whois**: Check to verify that all of the name servers are pointing to HostGator and that they have not been changed in the last two days.

- **Ping:** Ping merely shows the final IP address from the traceroute, although a further Ping test may be necessary for unusual instances.
- **Dig:** The Dig will be shown in the Answer Records section, displaying DNS zone data. This is a much deeper and more sophisticated comprehension.

The Internet Protocol Suite (IPS), which comprises the Internet Protocol (IP), is used by networking hardware such as computers, laptops, and fiber switches to route and address packets. This protocol has the potential to connect a large number of networks with one another. IPv4 and IPv6 are the two versions of the Internet Protocol that are currently in use (Margaret 2022).

- **Internet Protocol version 4 (IPv4):** is a standard protocol for internetworking used in a variety of packet-switched networks, including the internet and others. IPv4 was the first version to be put into production, and it did so on SATNET in 1982 and on the ARPANET in January 1983, respectively (Crocker, 2020).
- **IPv6:** is the most recent version of the Internet System, a communications protocol that identifies and locates devices on networks and directs Internet traffic (Maheshwari and Martin, 2018). IPv6 was established by the Internet Engineering Task Force (IETF) to solve the long-anticipated issue of IPv4 address depletion and is intended to replace IPv4.

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