Chapter 10
Network Security and Internet of Things

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ABSTRACT

Information security is the most critical component of the information system. It is also a challenge of the organizations to build a secure network. Every organization that developed its organizational network has faced security attacks, security risks, and vulnerabilities. Internet of things (IoT) is based on smart devices that connect with each other to formulate a complex network. Therefore, in order to build a secure traditional network and IoT network, understanding the basics of the network layers, network security, and different types of network attacks is essential for network security beginners who are interested in working in the field of information security. In this chapter, the authors reviewed the essential and most important concepts of information security, IoT, and explained these topics in an easy-to-understand way. Furthermore, the chapter discussed the basic level of information security challenges to familiarize the undergraduates and postgraduate students and IoT information security practitioners about it.

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INTRODUCTION

Meaningful data is called information. The Internet is a source to share and distribute information world-wide. The Internet is called internetworking. The Internet connects people with each other and provides help to find useful information. Network to network communication is also called internetworking. The network consists of host and end systems. The host and end system can be a computer, laptop, mobile phone, tablet, and all other devices that have the capability to connect on the internet. Routers and switches are used to connect the host and end systems. Information can be transmitted through wired or wireless media. The network can be classified into two common types such that Local Area Network (LAN) and Wide Area Network (WAN).

Connection of devices with each other in the same network of the same building, company, and organization is called a LAN. Each host has a unique address or identifier in a LAN. The spanning of LAN into small areas is shown in figure 1. The figure depicts the simple architecture of the LAN. Hosts are connected with the switch in the same network and can communicate with each other. A switch is used in the same building and supports the hosts to communicate with each other in terms of secure transmission. The switch is a layer two device that linked the hosts. It can take a decision for the route of information. There is no need for a router to transmit the information between the hosts in the same network.

WAN is also used to link the devices. WAN connects routers and switches with each other. WAN connects organizations, cities and worldwide. Routers are used to link the LAN to the WAN. Switches are used to connect hosts with each other to share the information. Switches are used in the local area network. Figure 2 shows the architecture of internetworking. A WAN is used to communicate outside the organization, city, and country. A router is an intelligent device that is used to transmit information far away and can decide the shortest path to go to the destination. A router is a layer three device. The network is identified by the router. Router A at the left-hand side is connected to Router B. Hosts are connected in the local area network with switch and switch is connected with the router. The User 1 as host desires to connect with User 4 as host. User 1 and User 4 have different networks that can be the same class or different classes. Router A will route the information to Router B. Router B will send this information to the host 4. This is secure communication.

Medium is a significant part of the network. Transmission media can be guided and unguided. Guided media can be categorized into three types that Unshielded twisted pair (UTP), Shielded twisted...
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