

# Welcome to week 2,

# Network protocols

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Congratulations on the progress you've made so far!

In this section, you'll learn about how networks operate using tools and protocols.

These are the concepts that you'll use every day in your work as a security analyst.

The tools and protocols you'll learn in this section of the program will help you protect your organization's network from attacks.

Did you know that malicious actors can take advantage of data moving from one device to another on a network?

Thankfully, there are tools and protocols to ensure the network stays protected against this type of threat.

As an example, I once identified an attack based solely on the fact they were using the wrong protocol.

The network traffic volumes were right, and it was coming from a trusted IP, but it was on the wrong protocol, which tipped us off enough to shut down the attack before they caused real damage.

First, we'll discuss some common network protocols.

Then we'll discuss virtual private networks, or VPNs.

And finally, we'll learn about firewall security zones and proxy servers.

Now that you have an idea of where we're headed, let's get started.

## Network protocols

Networks benefit from having rules.

Rules ensure that data sent over the network gets to the right place.

These rules are known as network protocols.

Network protocols are a set of rules used by two or more devices on

a network to describe the order of delivery and the structure of the data.

Let's use a scenario to demonstrate a few different types of network protocols and how they work together on a network. Say you want to access your favorite recipe website. You go to the address bar at the top of your browser and type in the website's address. For example: [www.yummyrecipesforme.org](http://www.yummyrecipesforme.org). Before you gain access to the website, your device will establish communications with a web server. That communication uses a protocol called the Transmission Control Protocol, or TCP. TCP is an internet communications protocol that allows two devices to form a connection and stream data.

TCP also verifies both devices before allowing any further communications to take place. This is often referred to as a handshake. Once communication is established using a TCP handshake, a request is made to the network. Using our example, we have requested data from the Yummy Recipes For Me server. Their servers will respond to that request and send data packets back to your device so that you can view the web page.

As data packets move across the network, they move between network devices such as routers. The Address Resolution Protocol, or ARP, is used to determine the MAC address of the next router or device on the path. This ensures that the data gets to the right place. Now the communication has been established and the destination device is known, it's time to access the Yummy Recipes For Me website.

The Hypertext Transfer Protocol Secure, or HTTPS, is a network protocol that provides a secure method of communication between client and website servers. It allows your web browser to securely send a request for a webpage to the Yummy Recipes For Me server and receive a webpage as a response.

Next comes a protocol called the

Domain Name System, or DNS, which is a network protocol that translates internet domain names into IP addresses. The DNS protocol sends the domain name and the web address to a DNS server that retrieves the IP address of the website you were trying to access, in this case, Yummy Recipes For Me. The IP address is included as a destination address for the data packets traveling to the Yummy Recipes For Me web server. So just by visiting one website, the device on your network is using four different protocols: TCP, ARP, HTTPS, and DNS.

These are just some of the protocols used in network communications. To help you learn more about the different protocols, we'll discuss them further in an upcoming course material.

But how do these protocols relate to security? Well, on the Yummy Recipes For Me website example, we used HTTPS, which is a secure protocol that requests a webpage from a web server. HTTPS encrypts data using the Secure Sockets Layer and Transport Layer Security, otherwise known as SSL/TLS. This helps keep the information secure from malicious actors who want to steal valuable information.

That's a lot of information and a lot of protocols to remember. Throughout your career as a security analyst, you'll become more familiar with network protocols and use them in your daily activities.