



Introduction to Networking

by Sophia



WHAT'S COVERED

In this first lesson, you will learn about the general context of data communications and networking.

Specifically, this lesson will cover the following:

- [1. Welcome to your Sophia Course: Introduction to Networking](#)
- [2. The Digital Revolution](#)
- [3. Digital Data](#)
 - [3a. Networks](#)
 - [3b. Digitization](#)
- [4. Networks in Action](#)
- [5. The Language of Networking](#)

1. Welcome to your Sophia Course: Introduction to Networking

Welcome to “Introduction to Networking”! This course is designed to teach you the fundamentals of data communications and networking. Although this course is aligned with many of the basic learning objectives of the CompTIA Network+ certification, this course will not fully prepare you for the certification exam. This course is technical in nature; however, it is written in a way that explains technical concepts using examples and analogies that you may find straightforward and relatively easy to understand.

2. The Digital Revolution

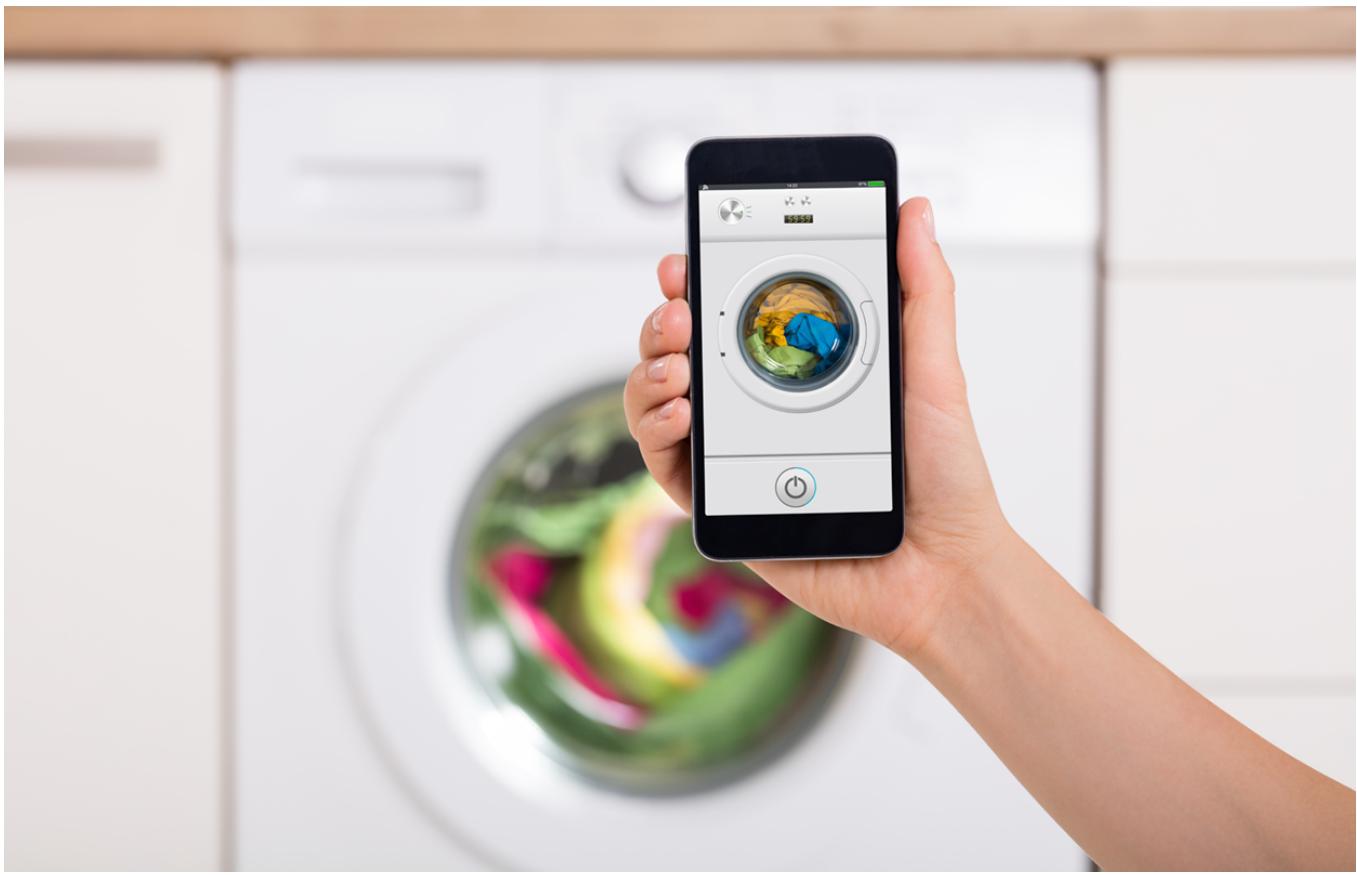
You probably live in an environment that has several **digital devices**. A digital device is any object that has a computer or **microcontroller**. Since the 1950s, society has experienced a shift from analog and mechanical electronics to digital electronic technologies.

⇒ EXAMPLE Mechanical parking meters that accept coins as payment have been replaced by parking meters that accept credit cards or even touchless payments from your smartphone.



Not every device is a **digital** device.

⇒ EXAMPLE Many washing machines are still mechanical devices that have analog controllers. However, some washing machines have digital controllers that can be operated remotely from a smartphone.



There are many types of digital devices, ranging from desktop computers, laptop and tablet computers, and smartphones. Digital devices also include those embedded in cars, televisions, watches, doorbells, coffee pots, and security cameras.



TERMS TO KNOW

Digital Device

Any object that has a computer or microcontroller.

Microcontroller

A microcomputer on a single chip, used to control some device such as an automobile engine or a toy.

Digital

The property of representing values as discrete, often binary, numbers rather than a continuous spectrum.

3. Digital Data

Digital data refer to any types of information that can be digitized and transmitted over a network, including text, files, photographs, videos, and voice calls. You likely create and consume digital data as you text your friends and family, take selfies on your smartphone, or make a telephone call.

3a. Networks

Networks enable digital devices to communicate with each other by sharing digital **data**. The word “data” means “a fact given or granted.” Data are a representation of facts or ideas in a formal manner that is capable of being communicated or manipulated by some process. Many kinds of information can be digitized, including text, voice, and video.



REFLECT

You may have had experience using a smartphone to send a text message, speak with another person, or share a picture or video.

No matter what form information takes, everything that you send from or receive on your smartphone is digital data.



TERMS TO KNOW

Network

Multiple computers and other devices connected to each other to share information.

Data

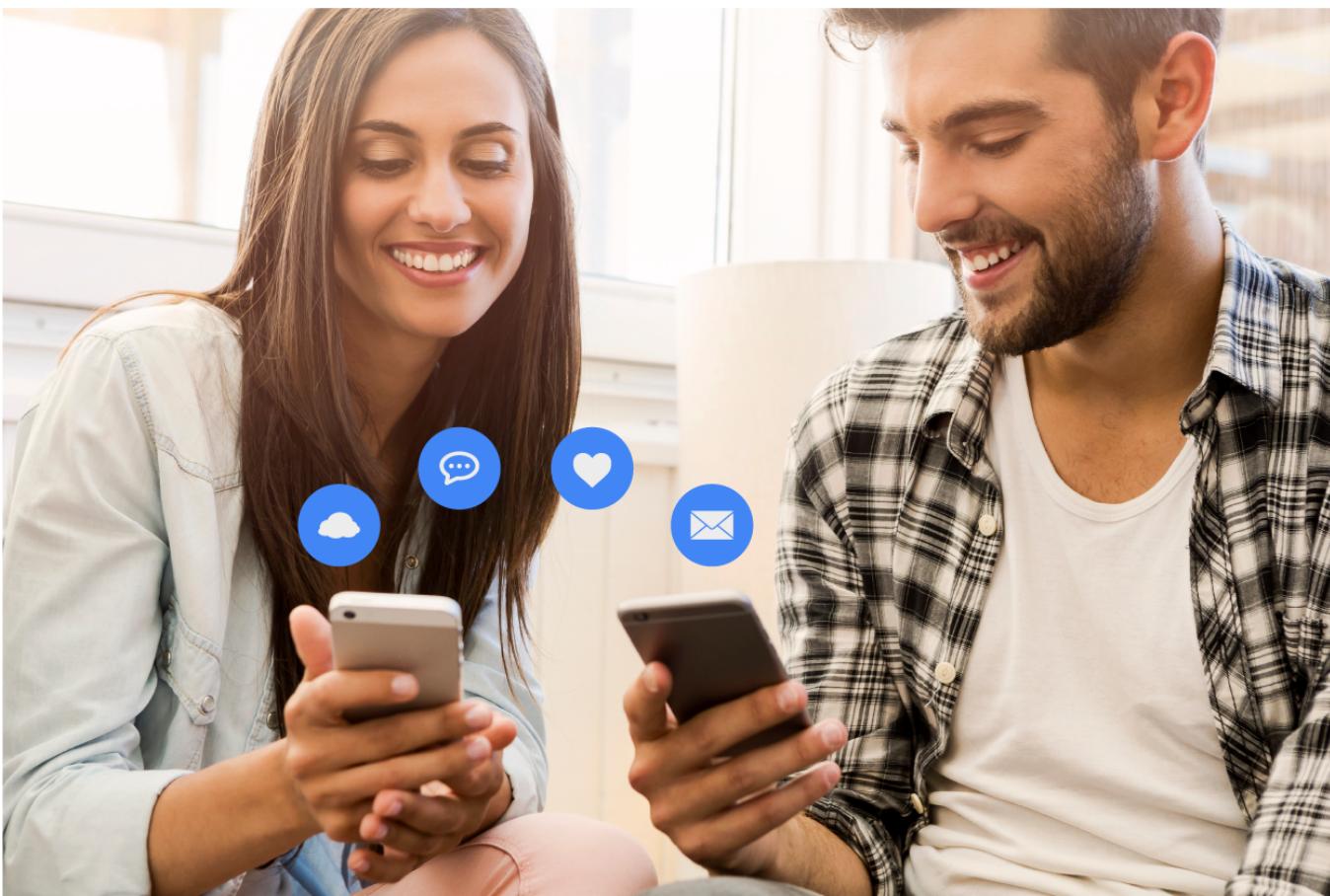
A representation of facts or ideas in a formal manner capable of being communicated or manipulated by some process.

3b. Digitization

The **digitization** of data is the process of converting written text, voice, or video into **binary code**. The prefix “bi” means two.

☞ **EXAMPLE** The word “bicycle” literally means two wheels. The **binary** code that digital devices use to communicate with each other uses only two symbols, 0 and 1, to send information. A single binary digit, either a single 0 or a single 1, is called a **bit**, and a series of eight binary digits is called a **byte**. Each byte can have any of 256 possible values (00000000 through 11111111).

When you send data from your smartphone to another smartphone, for example, a text message, the letters in the message are converted to a series of 0s and 1s.



☞ **EXAMPLE** In one byte of binary code, the letter “A” is represented as 01000001, B as 01000010, and C as 01000011.



HINT

Many forms of data, including text, voice, and video, can be converted into bytes of 0s and 1s. These bytes can be sent from one digital device across a data communications network to another digital device.



TERMS TO KNOW

Digitization

The conversion of data or information from analog to digital or binary.

Binary code

A code that uses the binary digits 0 and 1, usually in groups of eight, to represent characters, machine instructions, or other data.

Binary

Being in one of two mutually exclusive states, such as on or off. Binary states are often represented as 1 and 0 in computer science.

Bit

The smallest unit of storage in a digital computer, consisting of a binary digit.

Byte

A unit of computing storage equal to eight bits, which can represent any of 256 distinct values.

4. Networks in Action

It is likely that networks play a significant role in your everyday life.

IN CONTEXT

Think about your experience of going grocery shopping. If you drive a car or take a bus, many operations of the vehicle that transports you to the grocery store are controlled by a computer connected by a network to a large number of sensors that monitor and measure tire pressure, engine performance, fluid levels, cabin temperature, and many other operations.

Once inside the grocery store, you are probably being video-recorded by a network of security surveillance cameras as you move through the aisles. You may weigh some produce on a networked digital scale, which prints out a barcode label that will then be scanned at the checkout register. If you are a thrifty shopper, you may use the internet on your smartphone to compare the price of a product to the price at another store or to redeem a digital coupon.

When you check out either with a cashier or at a self-checkout kiosk, the point-of-sale cash register system is typically fully computerized and connected to a network. When you swipe your customer loyalty card, all the data about your purchases are sent to a database that will be used to track your buying habits and send you customized coupons.



Alternatively, you may rely on an online service to do your shopping for you, and they deliver groceries to your home. Either way, during your regular routine of getting groceries, you may encounter several different networks that support you as you do your shopping.

Grocery shopping is just one example of how networks impact your daily life. Think about how networks support business functions in other settings, and you may discover that networks are central to many of your regular activities, including eating at a restaurant; doing your banking; attending school; and going to a concert, movie, or sporting event.



REFLECT

Take a minute to reflect on all the ways that digital devices and networks impact your life during a typical week.

5. The Language of Networking

Perhaps the most challenging aspect of learning about data communications and networking is the way in which information technologists, and networkers in particular, use language to communicate. The language of networking is dominated by the use of acronyms. An **acronym** is an abbreviation formed by the first letters of other words. You may already be familiar with the use of acronyms.

☞ **EXAMPLE** If you are a sports fan, you may recognize acronyms like NBA (National Basketball Association), NFL (National Football League), NASCAR (National Association for Stock Car Auto Racing), PGA (Professional Golfers' Association), and NCAA (National Collegiate Athletic Association).

Similarly, the language in modern business and work environments has a set of acronyms that are used quite commonly.

☞ **EXAMPLE** TGIF (thank goodness it's Friday), EOD (end of day), OOO (out of office), and TIA (thanks in advance)

Understanding networking acronyms, and technical concepts related to them, is an important skill that you will build as you progress in this course.

You may wonder why networking professionals use language in a way that may be difficult for other people to understand. Sometimes in networking it is easier to pronounce the acronym than to say the entire phrase. For example, IEEE, which is pronounced “i-triple-e,” takes much less effort to say than actually saying “the Institute of Electrical and Electronics Engineers.” This course will provide you with tips on how to pronounce networking acronyms properly when discussing networking in professional settings.



BIG IDEA

One way professionals in technical fields recognize their peers is through the use of specialized terms and acronyms for important concepts in their work. Familiarity with these terms conveys ideas more concisely and indicates your skill and training. Like it or not, people who do not know how to properly use the technical jargon associated with enterprise networking may be judged to be uninformed or, worse, not be taken seriously by those who are fluent in speaking the jargon. It may be particularly important for you to focus on learning the language of networking well so that you can use it correctly. The great news is that this course will help you to do that!

You will have an opportunity to learn the language of networking in all of the tutorials in this course. The next tutorial provides you with an opportunity to learn about the different types of networks and the features that distinguish one from another, including LAN, VLAN, WLAN, WAN, PAN, CAN, MAN, and SAN networks. While these acronyms may seem strange to you now, you need not worry because learning to understand what these terms mean is not too difficult. You can do it, so let's go!



DID YOU KNOW

Flash cards, both written and electronic, may be a great way for you to learn new networking terms. Consider making a set for each of the lessons in this course.



TERM TO KNOW

Acronym

An abbreviation formed by the first letters of other words.



SUMMARY

In this lesson, you learned about the **digital revolution**, which was a technological movement that saw the **digitization** of information via voice, video, and text. This digital information became a primary resource to be shared via data communications **networks**. This lesson explored the nature of the **language of networking**, which is dominated by acronyms and other technical jargon, and the critical importance of understanding and speaking this language well as a prerequisite for professional success.

Source: This content and supplemental material has been adapted from CompTIA Network+ Study Guide: Exam N10-007, 4th Edition. Source [Lammle: CompTIA Network+ Study Guide: Exam N10-007, 4th Edition - Instructor Companion Site \(wiley.com\)](#)



TERMS TO KNOW

Acronym

An abbreviation formed by the first letters of other words.

Binary

Being in one of two mutually exclusive states, such as on or off. Binary states are often represented as 1 and 0 in computer science.

Binary Code

A code that uses the binary digits 0 and 1, usually in groups of eight, to represent characters, machine instructions, or other data.

Bit

The smallest unit of storage in a digital computer, consisting of a binary digit.

Byte

A unit of computing storage equal to eight bits, which can represent any of 256 distinct values.

Data

A representation of facts or ideas in a formal manner capable of being communicated or manipulated by some process.

Digital

The property of representing values as discrete, often binary, numbers rather than a continuous spectrum.

Digital Device

Any object that has a computer or microcontroller.

Digitization

The conversion of data or information from analog to digital or binary.

Microcontroller

A microcomputer on a single chip, used to control some device such as an automobile engine or a toy.

Network

Multiple computers and other devices connected to each other to share information.