

Topic: Computer Networks

Lesson 1: Network Basics

Aim	Objectives
Master communication skills and competences in the network basics, types of networks and networking technologies	At the end of this lesson, students will be able to: <ul style="list-style-type: none">• describe networks and their main features• list the difference between PAN, LAN, MAN, WAN• state network topology, network channels, protocols• discuss and present findings in pairs and small groups• write a summary based on different media

I. Lead-in

1. Match the computing devices in the box with the pictures below.

terminal; cash-point (ATM); fitness tracker; self-service checkout; vending machine; self-service kiosk; headset; speaker; copy machine



2. In today's world it is highly impossible to perform daily tasks and communicate without a computer network. Share your opinion on the questions.

- What computing devices do you use on a regular basis? Address Task 1 if necessary.
- Do you think they are on a network? Is it wired or wireless?
- What are the benefits of using networks for people, businesses?

Wire - thin metal thread with a layer of plastic around it, used for carrying electric current

II. Vocabulary Focus

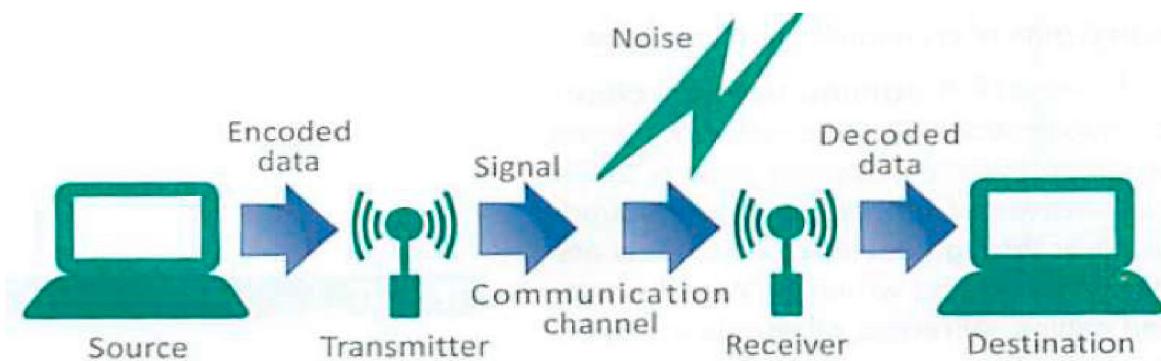
1. Do the quiz to find out what you know on the topic of computer networks. Work in groups of three or four people.

1. A computer network is ... computers connected together	a) two or more b) three or more c) four or more
2. This network typically consists of two or more local area networks, covering a large geographical area	a) LAN b) WAN c) Intranet
3. This type of network does not have a dedicated server; all the computers are independent	a) peer-to-peer b) client-server c) metropolitan area network
4. On this network topology, all devices are connected to the same circuit, forming a continuous loop	a) star b) ring c) bus
5. Before sending data over a network it is divided into small chunks named ...	a) packets b) blocks c) packages
6. The language used by computers to communicate with each other on the Internet is called ...	a) Ethernet b) ADSL c) TCP/IP
7. What cables are used to transfer information to the Internet over long distances at high speed?	a) copper cables b) Ethernet cables c) fibre-optic cables
8. What device allows several computers on a local network to share an Internet connection?	a) an ADSL port b) a router c) an Ethernet port
9. What device serves as a common connection point for devices in a wireless network?	a) wireless access point b) wired router c) wireless adapter
10. Bluetooth is a wireless technology that uses radio waves to transmit data over ...	a) long distances b) medium-range distances c) short distances

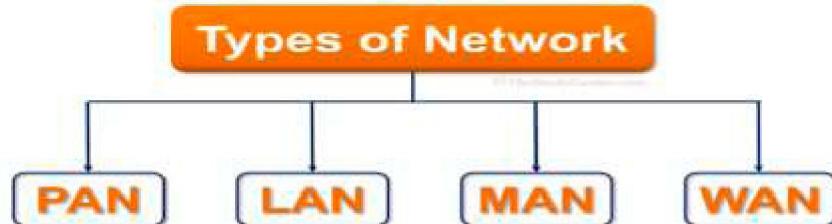
2. Look at the diagram below illustrating the essence of a typical network. Consider the questions using the key verbs in the box. Work with a groupmate. Present your ideas to the group.

- a) How does a network link devices together?
- b) How does a signal travel along a communication channel?

route; convert; transmit; carry; pass; forward; broadcast; flow; interface



3. Networks can be classified according to their size and geographic scope. Look at the abbreviations and complete the statements below with one of the four network types.



1. _____ connects smart devices or consumer electronics within a range of 10 meters and without the use of wires or cables.
2. _____ are data communication networks that connect personal computers within a very limited geographical area – usually a single building.
3. _____ covers a campus or a town and is widely used in cable television networks available in the whole city.
4. Schools, colleges, university computer labs and home networks are examples of _____.
5. _____ covers a large geographical area and usually consists of several smaller networks, which might use different computer platforms and network technologies.
6. Wi-Fi networks that you can access in airports, coffee shops, and other public places are _____.
7. _____ could be used to sync data from a handheld device to a desktop computer, ship data wirelessly to a printer, or transmit data from a smartphone to a wireless headset.
8. The Internet is the world's largest _____.

4. Complete the sentences about networking basics with the words and word combinations in the box.

Ethernet cables; Bluetooth networks; Wi-Fi; WANs;
fibre-optic; cellular networks; cable; Internet

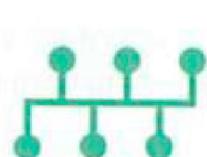
- In a basic network, computers are connected by a _____ allowing file sharing.
- _____ cover large geographic areas, like a country or even multiple countries.
- They are built by large telecommunication companies. The largest WAN in existence is the _____.
- In many homes, _____ are used to connect computers.
- Phone or cable TV lines then connect the home LAN to the ISP. Much of the Internet uses high-speed _____ cables to send data over long distances.
- _____ is the standard technology for building wireless LANs and public hotspots.
- _____ allow handhelds, mobile phones and other devices to communicate over short distances.
- _____ are used in mobile phone communications.

5. Match the network devices on the left with the descriptions.

1. Hub 2. Switch 3. Router 4. Modem 5. Bridge 6. Repeater 7. Wireless access point (WAP) 8. Node	a) connects two similar networks. b) is a device that controls the flow of data within a network and also acts as a gateway to pass data from one network to another; it is used to direct traffic over major Internet trunk lines. c) sends signals to individual nodes rather than broadcasting to all of them. d) allows wireless devices to connect to a wired network. e) extends the range of a network by restoring signals to maximum strength and retransmitting them. f) extends a wired network by adding more ports. g) contains circuitry that converts the data-carrying signals from a digital device to signals that can travel over various communication channels. h) any device in a network
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6. The arrangement of devices in a network is referred to as its physical topology. Label the basic types of network topology below with the terms in the box. Then complete the statements with the appropriate types.

full mesh; point-to-point; star; bus; partial mesh



1. _____

2. _____

3. _____

4. _____

5. _____

- When peripheral devices connect to a host device using expansion ports, USB cables or Bluetooth, these connections are an example of _____ topology.
 - A network arranged as a _____ topology features a central connection point for all workstations and peripherals. The central connection point is not necessarily a server. More typically it is a network device called a hub.
 - A _____ topology uses a common backbone to connect all network devices. The backbone functions as a shared communication link, which carries network data.
 - A _____ topology connects each network device to many other network devices. Data travelling on a mesh network can take any of several possible paths from its source to its destinations.
 - In a _____ topology, some of the devices are connected to many devices together, but other devices are connected only to one or two devices.
7. *Read frequently asked questions (FAQs) about networks below and underline the words and word combinations that give you a view on the following concepts.*

Communication Channel

Network Protocol

Network Architecture

Wired/Wireless Networking

FAQs About Networks

What is a communication channel? A communication channel is the medium used to transport information from one network device to another. Data transmitted over a communication channel usually takes the form of an electromagnetic signal – waves of light, electricity or sound. These waves can travel through the air or through cables, so channels are divided into two general classifications: wired and wireless. Wired channels transport data through wires and cables including twisted pair wires used for telephone land lines, coaxial cables for cable television networks and fibre-optic cables used for high-capacity trunk lines that provide main routes for telephone, cable and Internet communications. Wireless channels transport data from one device to another without the use of cables or wires.

What is a network protocol? This is the language or set of rules, that computers use to communicate with each other. Networks use different protocols. For instance, the Internet uses TCP/IP. Protocols set standards for encoding and decoding data, guiding data to its destination, and reducing the effects of interference. Networks use more than one protocol, and the collection of protocols for a network is referred to as a protocol stack.

What is network architecture? In a client-server network, a computer acts as a server and stores and distributes information to the other nodes or clients. In a peer-to-peer network, all the computers have the same capabilities – that is, share files and peripherals without requiring a separate server computer.

What is wireless networking? Wireless networks, however, use electromagnetic waves, such as radio waves and microwaves, to transmit data. Most wireless connections transport data as RF (radio frequency) signals. These are the main types of wireless networks:

- Satellites – for long distances;
- WiMAX – for connecting Wi-Fi hotspots;
- Wi-Fi – for medium-range distances;
- Bluetooth – for short distances;
- GSM – for mobile phones.

Ethernet – a system for connecting computers into networks

Which is better: a wired or wireless LAN? Wired LANs are more difficult to install, but they are cheaper, faster and more reliable. Wireless networks let you move or roam, from one access point to another, but they are less secure and subject to interference.

8. Perform the following tasks in groups of three or four people.

1. Give two examples of PANs, LANs and WANs.
2. Name the main types of wireless networks.
3. Consider the advantages of wired networks.
4. Explain when it is better to use a wired/wireless connection.
5. State five types of network topology. Compare and contrast the two of them.
6. Present four tasks that are handled by communication protocols.
7. Check the signal strength of a wireless connection on your device.

III. Language Box

1. Watch the video “What Is a Network?” [50] and decide if the following statements are true or false. Correct the false ones.

1. A network is a group of connected computers.
2. There are three basic components that make up a network.
3. Network devices are referred to as nodes or hosts.
4. Network media (cable or wireless media) connect the devices together.
5. Network interface is used to connect the protocol to the medium.
6. Network protocol is a set of rules used by the people to communicate.

2. Watch the video again and complete the sentences with the missing words.

- a) A network is a group of devices that are connected in such a manner that they can 1) _____ information and 2) _____ with each other.
- b) To create a network, we must have a number of basic components such as network 3) _____, network media, network 4) _____ and the network protocol.
- c) When we talk about network devices, we may just think about a group of computers connected together, but the network can also include other items such as 5) _____, printers, game consoles, mobile phones, etc. Generally speaking, we call these devices nodes or 6) _____.
- d) The network devices must be connected to each other in some way. The connection can be in the form of 7) _____ communicating through electrical signals, fiber-optic cables communicating through 8) _____ or wireless connection using 9) _____. The cables or signals used to connect the host to the network refer to as the network 10) _____.

- e) As there are different types of network media the network host should be equipped with an appropriate 11) _____ in order to make the connection.
- f) The function of the network interface card is to 12) _____ the digital signals from the device into a signal that is suitable to be 13) _____ through the network medium.
- g) A protocol is an agreed set of rules on how information is 14) _____ and sent onto the network. The protocol provides the rules of 15) _____ between the hosts.

3. Share your opinion on the questions with a groupmate.

1. What is a network?
2. What are the basic components of a network?
3. What do nodes/hosts refer to on a network?
4. What are the types of network media?
5. What is a network interface used for?
6. What is a protocol?

4. Watch the video “What Is the Cloud?” [58] and decide which ideas in the box are mentioned in it. Explain how they are related to the concept of “cloud computing”.

virtualisation; servers; cloud vendors; Internet; virtual machine; Gmail; Dropbox; databases; hybrid cloud; software; data centre; operating system; private cloud; Google Drive; infrastructure

5. Watch the video again and choose the correct statements.

1.
 - a) The term “cloud” refers to data centres that are accessed over the Internet.
 - b) The term “cloud” applies to servers that are accessed over the Internet.
2.
 - a) Cloud servers are placed in data centres all over the world.
 - b) Cloud servers are tracked down in data centres all over the world.
3.
 - a) Businesses and users do not have to administer physical servers and launch software applications on their own machines thanks to cloud computing.
 - b) Businesses and users are to administer physical servers and launch software applications on their own machines due to cloud computing.
4.
 - a) The cloud enables users to manage computing and storage servers in a data centre instead of locally on the user device.
 - b) In the cloud the computing and storage is implemented on servers in a data centre instead of locally on the user device.
5.
 - a) Gmail users can't access their emails and files via any Internet-connected device.
 - b) Gmail users can retrieve their emails and files via any Internet-connected device.

6. Read the abstract “How Does Cloud Computing Work?” and consider the following key ideas afterwards. Work with a groupmate.

Virtualisation

Virtual
Machine

Sandboxing

Data Centre

Cloud Server

How Does Cloud Computing Work?

Cloud computing is possible because of a technology called virtualisation. Virtualisation allows for the creation of a simulated, digital-only “virtual” computer that behaves as if it were a physical computer with its own hardware. The technical term for such a computer is virtual machine. When properly implemented, virtual machines on the same host machine are sandboxed from one another, so they do not interact with each other at all, and the files and applications from one virtual machine are not visible to the other virtual machines, even though they are on the same physical machine. Virtual machines also make more efficient use of the hardware hosting them. By running many virtual machines at once, one server can run many virtual “servers”, and a data center becomes like a whole host of data centers, able to serve many organisations. Thus, cloud providers can offer the use of their servers to far more customers at once than they would be able to otherwise, and they can do so at a low cost. Even if individual servers go down, cloud servers in general should be always online and always available. Cloud vendors generally back up their services on multiple machines and across multiple regions.

7. Think of 2-3 questions related to the text “How Does Cloud Computing Work?” in Task 6 and address them to your groupmates. Discuss the questions in groups of three or four people.

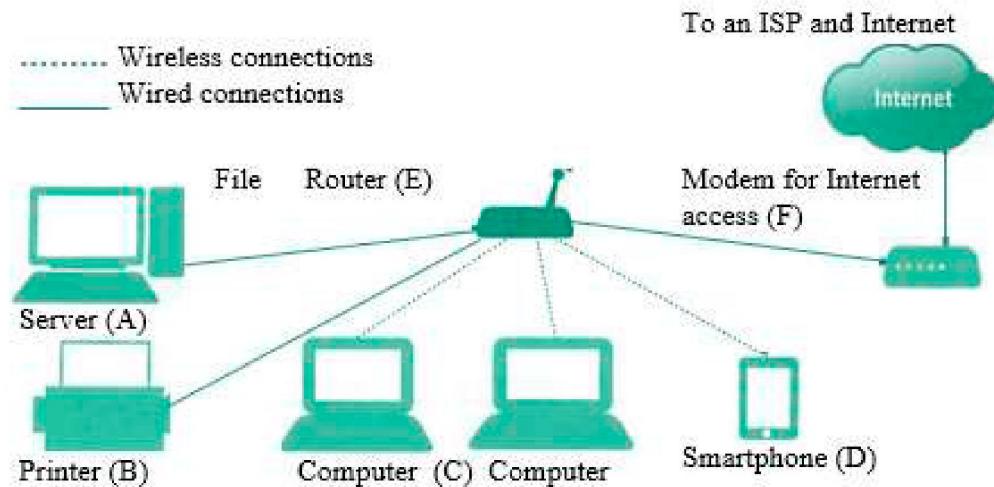
8. Share your opinion on the ideas with a groupmate.

1. Networking technologies have changed the way people work and communicate.
2. Networks are an indispensable part of our lives. When there are outages, things go haywire. When there are slowdowns, we get frustrated.
3. Although the cloud offers apps, storage and connectivity, keeping some of your data local offers security that is not available at remote sites.
4. One of the ways we invite trouble into our digital lives is by careless file sharing.
5. Social networks are a foe.



IV. Decision Bank

1. Look at the diagram illustrating a local area network. Match the features (A–F) of a network based on a centralised router with the descriptions (1–6) below.



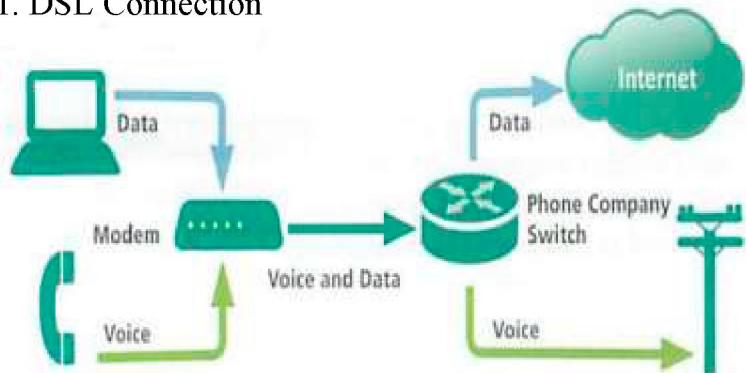
1. Connect a printer to a wired or wireless connection so that all devices on the network can access it.
2. All the devices in your LAN can access the Internet if you connect the router to a modem supplied by an ISP.
3. Connect computers wirelessly, so you can use them in various rooms.
4. Connect a computer to a wired connection for maximum speed. Use it for online games or as a file server where you store and back up your data.
5. The router is the centrepiece of your network. Most wireless routers support five wired devices and a maximum of 255 wireless devices.
6. Connect your smartphone and you'll be able to use the LAN's Internet connection instead of your expensive data plan.

2. Do the following self-assessment task and complete the sentences below with the target vocabulary of this lesson.

1. Networks can be classified as PANs, _____, MANs and WANs.
2. A communication _____ is the medium used to transport information from one network device to another.
3. There are two types of channels – wired and _____.
4. The Internet uses high-speed _____ cables to send data over long distances.
5. A network _____ is a set of rules that computers use to communicate with each other.
6. In a _____ network, a computer acts as a server and stores and distributes information to the other nodes or clients.
7. Networks can be configured in various _____, such as star, mesh or bus.
8. Any device in a network is referred to as a _____.
9. The _____ refers to servers that are accessed over the Internet, and the software and databases that run on those servers.
10. Cloud servers are located in _____ all over the world.

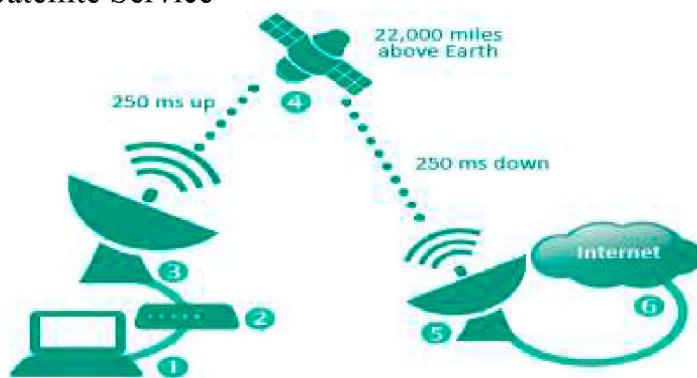
3. Study the diagrams and get ready to illustrate how these networks operate using the prompts. Work in groups of three or four people.

1. DSL Connection



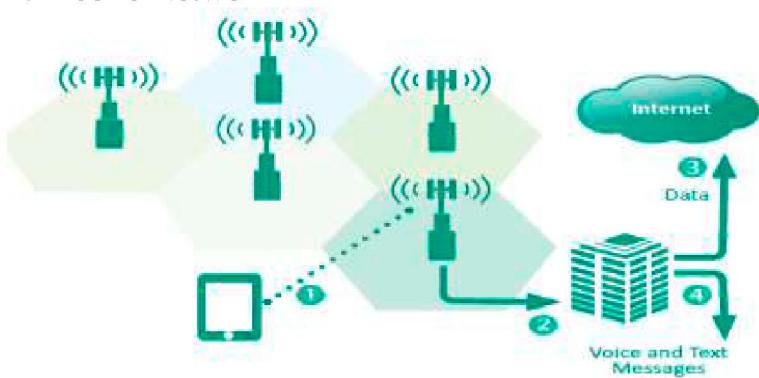
- a DSL modem
- convert computer signals into high-frequency data signals
- voice signals/data signals
- travel over telephone lines
- telephone company switching station
- route to the regular telephone system
- route to the Internet

2. Satellite Service



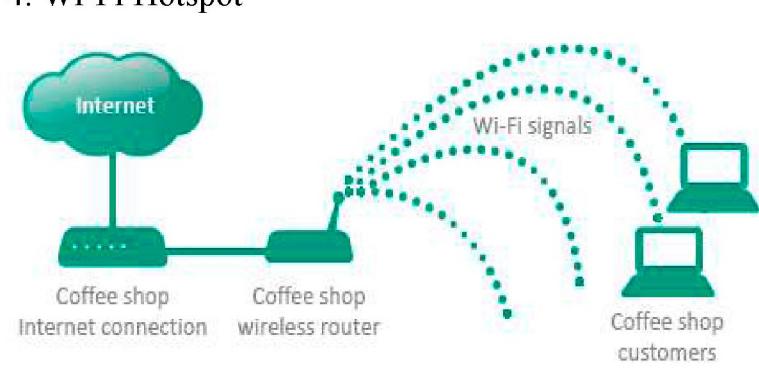
- data from a customer's computer (1)
- convert into signals by the customer's modem (2)
- carried by cables to a personal satellite dish (3)
- broadcast to a communication satellite (4)
- rebroadcast to a ground-based ISP (5)
- forward to the Internet (6)

3. Mobile Network



- cell networks
- transmit voice and data
- use radio signals
- flow to a cellular radio tower (1)
- transmitters and receivers
- cover a specific area
- use a unique frequency
- pass to ground stations (2)
- forward to the Internet (3)
- route to a circuit-switched network (4)

4. Wi-Fi Hotspot



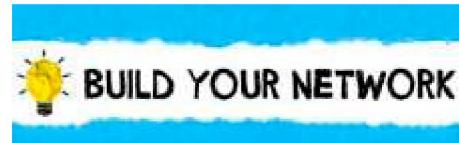
- a wireless local area network
- operated by a business
- offer Internet access to the public
- Internet connection
- a device called an access point
- broadcast Wi-Fi signals
- within a range of a building
- any device with Wi-Fi capability
- detect the signal

4. Divide into two teams and prepare a quiz about networking basics that includes five challenging questions. Make sure you know the answers. Then take turns to ask and answer the questions to see which team scores the more.

V. Conclusion Worksheet

Build and diagram the components and connections of a network. Choose one of the options or choose your own one and present it to the group. Use the ideas from this lesson and your background knowledge. Work in groups of three or four people.

- ✓ home network
- ✓ university network
- ✓ bank network
- ✓ hospital network
- ✓ airport network
- ✓ company network



VI. Web Search

Explore the resources in the list to obtain additional information on network basics. Report your findings to the group.



<https://www.techtarget.com/searchnetworking/definition/networking>



<https://www.softwaretestinghelp.com/computer-networking-basics>



<https://www.studytonight.com/computer-networks/network-topology-types>

VII. Revision Point

1. Read the abstract “Different Types of Cloud Deployments” and get ready to translate it into Belarusian or Russian. Use a dictionary, if necessary.

Different Types of Cloud Deployments

There are five the most common cloud deployments. Private cloud is a server, data centre or distributed network wholly dedicated to one organisation. Public cloud is a service run by an external vendor that may include servers in one or multiple data centres. Unlike a private cloud, public clouds are shared by multiple organisations. Using virtual machines, individual servers may be shared by different companies, a situation that is called “Multitenancy” because multiple tenants are renting server space within the same server. Hybrid cloud deployments combine public and private clouds and may

even include on-premises legacy servers. An organisation may use their private cloud for some services and their public cloud for others, or they may use the public cloud as backup for their private cloud. Multi-cloud is a type of cloud deployment that involves using multiple public clouds. In other words, an organisation with a multi-cloud deployment rents virtual servers and services from several external vendors – to continue the analogy used above, this is like leasing several adjacent plots of land from different landlords. Multi-cloud deployments can also be hybrid cloud and vice versa.

2. Complete the abstract about computer networks with the words in the box.

WAN; Internet; hardware; protocols; cables; enable; LAN; exist

A computer network comprises two or more computers that are connected either by 1) _____ (wired) or Wi-Fi (wireless) with the purpose of transmitting, exchanging or sharing data and resources. You build a computer network using 2) _____ (e.g. routers, switches, access points, and cables) and software (e.g. operating systems or business applications). Geographic location often defines a computer network. For example, a 3) _____ connects computers in a defined physical space, like an office building, whereas a 4) _____ can connect computers across continents. The 5) _____ is the largest example of a WAN, connecting billions of computers worldwide. You can further define a computer network by the 6) _____ it uses to communicate, the physical arrangement of its components, how it controls traffic and its purpose. Computer networks 7) _____ communication for every business, entertainment, and research purpose. The Internet, online search, email, audio and video sharing, online commerce, live-streaming and social networks all 8) _____ because of computer networks.

3. Do the quiz.

1. What type of network is a university that offers wireless Internet access to students and the local community operating?	a) PAN b) LAN c) MAN d) WAN
2. Does data travelling on a wired channel tend to be more secure than data travelling on a wireless channel?	a) Yes b) No
3. Which of the following situations is the most suitable for a network that connects most devices with cables?	a) a university campus b) a bank branch office c) a private home d) a coffee shop
4. What type of wireless channels are most typically used for networks in homes and coffee shops?	a) RF b) coaxial c) microwave d) WiMAX

5. To extend the reach of your wireless network out onto your balcony, which of the following devices would be the best?	a) hub b) router c) repeater d) gateway
6. In the full mesh network how many possible paths are there between any two points?	a) 1 b) 4 c) 9 d) 10
7. What is cloud computing?	a) It is a facility composed of networked computers, storage systems and computing infrastructure that organisations use to assemble, process, store large amounts of data. b) System of storage that allows users to store private content on their hard-drives. c) It is on-demand access, via the Internet, to computing resources hosted at a remote data centre managed by a cloud services provider. d) The process of using computer technology to complete a given goal-oriented task
8. Clouds computing deployment models can be ...	a) public b) private c) hybrid d) all of the above
9. Virtualisation enables cloud providers to make maximum use of their data centre resources	a) True b) False

4. Get ready to speak on the topics below and assess your performance according to the following scale.

Comprehensive 	Rather confident 	Limited 
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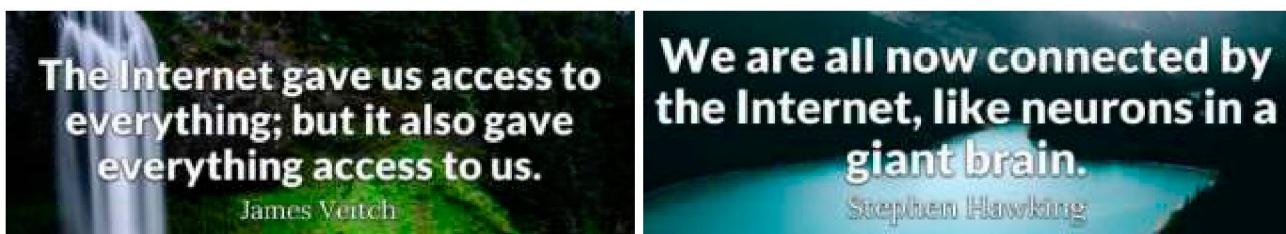
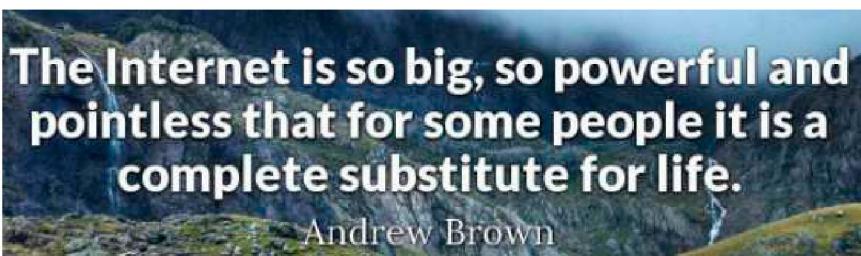
- Definition of a network and its main characteristics.
- Classification of networks based on size and scope.
- Communication channels and their main types.
- Network topology; network architecture.
- Network protocols.
- Cloud computing.

Lesson 2: Web and Internet Technology

Aim	Objectives
Master communication skills and competences in the Web and Internet technology and their role in different spheres of people's life	At the end of this lesson, students will be able to: <ul style="list-style-type: none">• define the Internet and the Web and their basic features• explain the difference between the Internet and the Web• state the technologies and services of the Web• present and discuss findings in pairs and small groups• write a summary based on different media

I. Lead-in

1. Share your opinion on the quotes. Justify your point of view.



The internet could be a very positive step towards education, organisation and participation in a meaningful society.

Noam Chomsky

2. Predict what questions ordinary users can ask about the Internet and the Web. Use the prompts below and make these questions. Then address them to your groupmate.

Internet – an international computer network that allows people to share information around the world

Web – a system for finding information on the Internet, in which documents are connected to other documents

to use the Internet; Internet connection; broadband access; mobile phone; Wi-Fi; type of connection; online games; public access

II. Vocabulary Focus

1. Match the terms on the left with the definitions. Translate the words and word combinations in bold.

1. Message 2. Latency 3. Email 4. Decryption 5. Hypertext 6. Twisted pair 7. Blog 8. Tag 9. Search engine 10. Bandwidth 11. Satellite 12. Microwave	a) a particular word or some keywords which define how web browser will format and display the content of a web page. b) an informational website displaying information in reverse chronological order; it is a platform where a writer shares their views on an individual subject. c) the change of electronic signals that were stored in the form of a secret code back into a form that you understand. d) a method of exchanging messages between people using electronic devices over the network. e) a verbal, written or recorded communication sent to or left for a recipient who cannot be contacted directly. f) the length of time that it takes for a computer to get a signal. g) a document on a computer with built in links to other texts that the reader can access immediately. h) a cable consisting of two wires twined round each other, used especially for telephone or computer applications. i) an artificial body placed in orbit round the earth or moon in order to collect information or for communication. j) a program that searches for and identifies items in a database , used especially for finding particular sites on the Web. k) a range of frequencies within a given band, in particular that used for transmitting a signal, can be narrowband (dial-up) or broadband (DSL). l) an electromagnetic wave with a wavelength in the range 0.001–0.3 m, shorter than that of a normal radio wave but longer than those of infrared radiation
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2. Match the words in Column A with the words in Column B to make collocations. More than one option can be possible. Then make statements using them.

A. online browse upload Internet hotspot broadband surf coaxial	B. message the Internet a website connection point cable a web page service provider
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3. Read the sentences and choose the options from the ones given in italics to make true statements about the Internet.

1. Once you are online, you can *browse/look up/investigate* the Web, visit chat rooms or send and receive emails.
2. *Fast/Current/Instant* messaging can be a great way to communicate with friends.
3. This software may not be fully *suitable/compatible/adaptable* with older operating system.
4. Most webcams *plug/connect/fill* into a USB port.
5. This highly *addictive/obsessive/dependent* game will keep you playing for hours.
6. The technology allows data to be *communicated/carried/transmitted* by mobile phones.

4. Match the types of the Internet protocols in the box with the definitions (1–10) below.

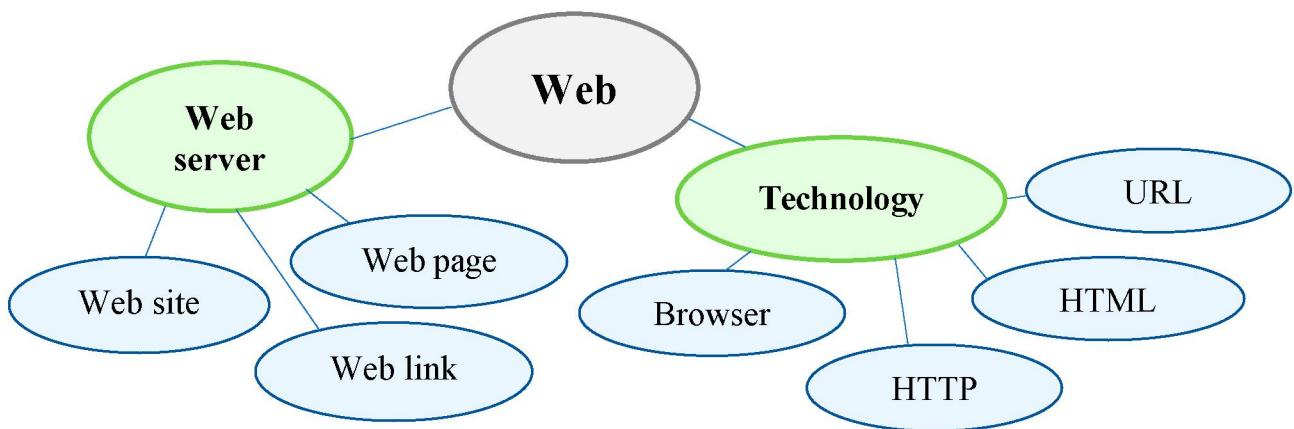
TCP (Transmission Control Protocol)	IP (Internet Protocol)
UDP (User Datagram Protocol)	HTTP (Hypertext Transfer Protocol)
FTP (File Transfer Protocol)	POP (Post Office Protocol)
SMTP (Simple Mail Transfer Protocol)	VoIP (Voice over Internet Protocol)
IRC (Internet Relay Chat)	Bit Torrent

1. It transfers files between a local and remote host computer.
2. It transmits text messages in real time between online users.
3. It creates connections and exchanges packets of data.
4. An alternative data transport to TCP used for DNS, Voice over IP and file sharing.
5. It provides devices with unique addresses.
6. It exchanges information over the Web.
7. It transfers mail from an email server to a client Inbox.
8. It transmits voice conversations over the Internet.
9. It distributes files using scattered clients rather than a server.
10. It transfers email messages from client computer to an email server.

5. Choose the odd one out in the word lines. Justify your choice.

- | | | | |
|--------------|-----------|-------------|---------------|
| a) hypertext | link | webpage | host |
| b) coaxial | bandwidth | fibre-optic | twisted pair |
| c) POP | RF | IRC | UDP |
| d) browser | server | RAM | search engine |

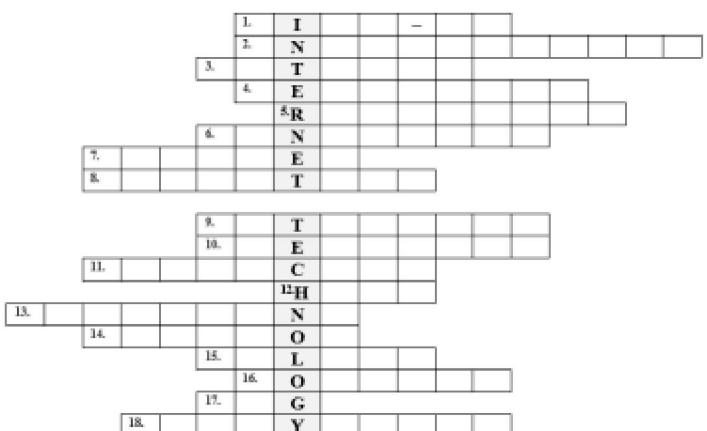
6. Look at the diagram with the target vocabulary of this lesson and match the terms related to the Web with the appropriate definitions below.



1. _____ is a unique identifier for a web page.
2. _____ is a set of connections between web pages.
3. _____ is the software used to get and display web pages.
4. _____ is a collection of HTML documents, images and sound files that can be linked to each other and accessed over the Internet using a protocol called HTTP.
5. _____ is a collection of web pages and related content that is identified by a common domain name. They are organised and formatted, so it can be accessed using a browser.
6. _____ is an Internet-based computer that stores website content and accepts requests from browsers.
7. _____ is a hypertext document provided by a website and displayed to a user in a web browser.
8. _____ is a standard protocol for communication between browsers and web servers. It exchanges information over the Web.
9. _____ is a set of elements for creating documents that a browser can display as a web page.

7. Do the crossword and get the words related to the Internet technology.

1. Used remotely via a phone line.
2. The act or process of blocking.
3. A measure of delay.
4. A person who receives sth.
5. An electromagnetic wave with radio frequency.
6. The maximum amount of data transmitted over an Internet connection in a given amount of time.
7. A computer program with a graphical user interface for displaying and navigating between web pages.
8. A text displayed on a computer display or other electronic devices with references.
9. An artificial body that revolves around a planet.



10. The rate at which sth occurs over a particular period of time.
11. Transmit by radio or television.
12. A computer that controls communications in a network or that administers a database.
13. A connection from a hypertext document to another location activated by clicking on a highlighted word or image.
14. A physical location where people can access the Internet typically using Wi-Fi.
15. Transfer (data) from a smaller computer to a larger computer.
16. A type of shielded and insulated copper cable that is used in computer networks to deliver cable TV services to end users.
17. A set of characters constituting a formatted command for a Web page.
18. A process that transforms encrypted information into its original format.

8. Explain the difference between the following concepts. Work with a groupmate.

1. The Internet and the Web.
2. Upload and download.
3. Broadband access and narrowband access.
4. Wi-Fi connection and cell connection.
5. FTP and Bit Torrent.
6. Web page and blog.
7. Hypertext and text.

III. Language Box

1. Do the quiz to find out how much you know on the topic of the Internet. More than one option can be correct. Work with a groupmate.

1. The Internet was ...	a) invented in the mid-90s b) popular in the 1960s c) probably created in the US
2. To be connected to the Internet, it is necessary to have ...	a) a computer b) a modem c) connection software
3. Speaking about fast, high-bandwidth connection, we mean ...	a) broadband connection b) dial-up connection c) cable connection
4. ADSL stands for ...	a) Additional Digital Subscriber Line b) Audial Digital Subscriber Line c) Asymmetric Digital Subscriber Line
5. The device that converts computer data into the form that can be transmitted over phone lines is ...	a) ADSL b) a modulator/demodulator c) a modem

6. The standard protocol that allows a computer to communicate over the Internet is called ...	a) HTTP b) IP c) TCP
7. The geographical region covered by one or several access points is called ...	a) a wireless access point b) a hotspot c) a wireless network device
8. The way(s) of wireless connection is(are) ...	a) Wi-Fi b) satellite c) GSM

2. Match the following Internet FAQs (1–10) with the answers (a–j) below and check your ideas in Task 1.

1. How old is the Internet (the Net)? When was it created?
2. Who created the Internet?
3. Did the Internet become popular quickly?
4. How do you get online?
5. How fast are today's Internet connections?
6. How long has broadband existed?
7. How much does broadband access cost?
8. Why do you need a modem?
9. What does TCP/IP mean?
10. Are there other ways of accessing the Internet?

a)

Other methods include Wi-Fi, satellite, mobile phones and TV sets equipped with a modem. Wi-Fi enabled laptops allow you to connect to the Net if you are near a WAP, in locations called hotspot (parks, cafes or campus). Satellite services are used in places where terrestrial access is not available (on ships at sea). High end mobile phones provide access through the phone network.

b)

A modem (modulator/demodulator) converts digital signals into analogue ones so that data can be transmitted across the phone or cable network.

c)

Since the late 1990s.

d)

Today, ISPs offer a broadband, high-speed connection. The common types are cables offered by local cable TV companies and ADSL (Asymmetric Digital Subscriber Line), which work through phone lines. They are both faster than the traditional dial-up connection. Broadband access is also offered by some electricity networks.

e)

It took many years for the Internet to become popular around the world. It's only really since the mid-90s that the Internet has been a part of our daily lives.

f)

It is hard to say exactly. The research that led to what we now know as the Internet began in the 1960s.

g)

Again, it is hard to say exactly who created it. The initial research was carried out by the Advanced Research Projects Agency in America, funded by the US government.

h)

To get connected, you need a computer, the right connection software and a modem connected to the phone line. You also need an account with an ISP, which acts as a gateway between your PC and the rest of the Net.

i)

The language used for data transfer on the Internet is known as TCP/IP (transmission control protocol/Internet protocol). This is like the Internet operating system. Every computer connected to the Net is identified by a unique IP address.

j)

It depends on which company you choose. Nowadays some companies even offer free broadband.

3. Distribute the characteristics below between the four types of Internet connections. One can match several types. Then watch the video “Connecting to the Internet” (from 0:01 till 1:26) [30] and check if you were right.

Dial-up

DSL

Cable

3G/4G

- a) It uses your cable TV connection.
- b) It is much slower than other types.
- c) It is a wireless Internet connection.
- d) It may be the only option available in some areas.
- e) It plugs into your phone line.
- f) It is often used by smartphones.
- g) It is known as broadband Internet connection.
- h) It offers much faster speeds.

4. Watch the video (from 1:26 till the end) and mark the options (a–e) as true or false.

You can buy Internet service from ... :

- a) your cable company;
- b) a local technician;
- c) your phone company;
- d) an Internet Service Provider;
- e) shops around.

5. Restore the process of connecting to the Internet by matching the beginnings of the statements (1–10) with the appropriate endings (a–j). Watch the video (from 1:26 till the end) again and check if you were right.

1. Your ISP will guide you	a) a modem and set it up for you.
2. They'll usually need to	b) need to buy one.
3. Your ISP may also give you	c) choose a strong password.
4. You can also	d) create a wireless home network.
5. Once you have everything set up, you can	e) the Internet connection from your modem and broadcasts it throughout your home.
6. If you want to connect several devices, you can	f) through the entire process of connecting to the Internet.
7. To do this, you'll need a wireless router, which takes	g) buy a modem from a computer store and use the included instructions to set it up yourself.
8. Your modem may already have a wireless router built-in, so you may not	h) the instructions included with your router.
9. To set up your wireless connection, follow	i) send a technician to your home to turn on your connection.
10. You should also turn on WPA or WPA2 encryption and make sure you	j) open your Web browser and begin using the Internet

6. To sum up the information you have just obtained, present your ideas according to the plan. Work in groups of three or four people.

- 1. The history of the Internet.
- 2. The hardware for the connection to the Internet.
- 3. The ways of connection to the Internet.
- 4. The speed of the today's Internet.
- 5. The main Internet protocols.

IV. Decision Bank

1. Name and list the key features of today's popular browsers in the pictures (1–5). Mingle with the groupmates to elicit their preferable web search options with the reasoning.



1. _____



2. _____



3. _____

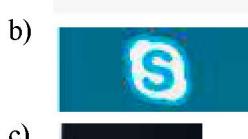


4. _____



5. _____

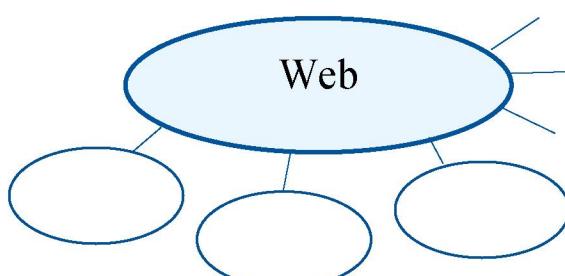
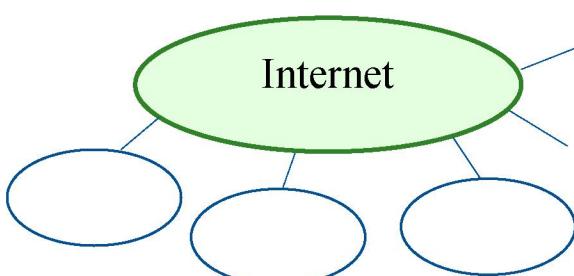
2. Look at the logos (a-l) of the most famous websites. How many do you recognise? What are they used for? Work with a groupmate.



3. Share your ideas on the following statements. Work in groups of two or three people.

1. The Internet isn't just about email or the Web anymore.
2. Thanks to new technologies people are getting together to take collective action like never before.
3. E-commerce has become a practical reality for many people throughout the world.
4. The Internet was initially used for contact with strangers, now it is a platform where people develop and cultivate their already existing relationships.
5. The Internet is a phenomenon that has transformed life as we know it.

4. Complete the concept map and explain the difference between the Internet and the Web, their components and features. Work in groups of three or four people.



V. Conclusion Worksheet

Make a web page of your group. Consider its content, options of page navigation and some essential links. Name the URL of your page and the parts of it, present the toolbar of the page and recommend a browser for a faster access to the page. Work in groups of three or four people.

HOME SERVICE MENU CONTACT US

STUDENT
Community

VI. Web Search

Explore the resources in the list to obtain additional information on Internet and Web technology. Report your findings to the group.



<https://www.geeksforgeeks.org/basics-computer-networking>



<https://www.ibm.com/cloud/learn/networking-a-complete-guide>



<https://www.geeksforgeeks.org/the-internet-and-the-web>

VII. Revision Point

1. Read the abstract “Network Features” and translate it into Belarusian or Russian. Use a dictionary if necessary.

Network Features

ISPs control connection speeds based on the service plan you have selected. Your bandwidth cap is the top speed allowed by your plan. During peak times, ISPs can place further limits on speed, a process called bandwidth throttling.

When Internet upload speed differs from download speed, you have an asymmetric connection. When upload and download speeds are the same, you have a symmetric connection.

Most Internet connections are asymmetrical, with upload speeds considerably less than download speeds. Asymmetric connections discourage subscribers from setting up Web and email servers that would transmit lots of outgoing data.

Ping is utility software designed to measure responsiveness. Ping rate indicates how quickly data can reach a server and bounce back to you. Ping was named after the sound that a submarine's sonar makes when it bounces off an undersea object. Technically, Ping measures latency. Latency is the elapsed time for data to make a round trip from point A to point B and back to point A.

Speed and latency are not the only factors that affect your Internet experience. Jitter measures the variability of packet latency. Network traffic and interference can delay some packets and create erratic data flow.

2. Complete the abstract about finding a Web page with the words in the box.

set of numbers; DNS server; path; request; URL; Web server;
data packets; link; IP address; router computer; browser; Web page

To find the Web page you want, you have to click on a Web page 1) ____ or enter a(n) 2) ____ , a uniform resource locator into a browser. The URL is the address of the page. When you do that, the browser sends the URL to a(n) 3) ____ . The DNS server is the Domain Name Server. It uses a look-up table to find the 4) ____ of the web server referred to in the URL. The IP address is a unique, 32-bit 5) ____ . Every computer on the Web has its own IP address. Once the DNS server has found the IP address, it sends it back to the browser. The browser then uses this IP address to send a(n) 6) ____ to the Web server. The request is sent as a series of separate 7) ____ which include both the IP address of the Web server and the IP address of the browser computer. These data packets are first sent to a(n) 8) ____ , which uses the IP address of the Web server to determine the best available route to each packet. The packets are passed from router to router until they reach the 9) ____ . They may travel by different routes before reaching the server.

As the individual packets reach the Web server, they're put back together again. The Web server now services the request by sending the requested 10) ____ back to the browser computer. It travels as a series of separate data packets from router to router. This time the router uses the IP address of the browser computer to work out the best available 11) ____ for each packet. As the packets arrive at the browser computer, they're combined to form the Web pages you requested and are displayed in your 12) ____ .

3. Match the beginnings of the statements (1–5) with the appropriate endings (a–e).

1. The code behind most Web pages is	a) to tell the Web browser how to display texts or pictures.
2. Tags are placed around pieces of text	b) it is called a Web browser, which lets you search, view and print Web pages.
3. A hyperlink is any clickable text,	c) HTML, which consists of commands called tags.
4. You navigate through the Web using a program,	d) image or button that takes you to another place on the Web.
5. A text-based chat system (IRC) for instant messaging is designed	e) for group communication in discussion forums, called channels

4. Get ready to speak on the topics below and assess your performance according to the following scale.

Comprehensive 	Rather confident 	Limited 
---------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------

- The Internet and the Web.
- Types of the Internet protocols.
- Technologies and components of the WWW.
- Types of communication media: dial-up, DSL/ADSL, cable, 3G/4G.

Lesson 3: Internet of Things

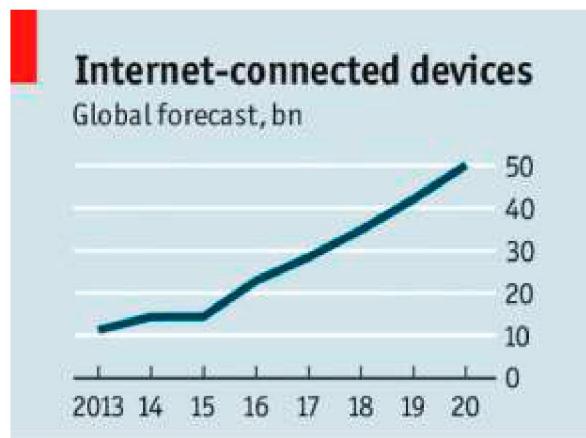
Aim	Objectives
Master communication skills and competences in the Internet of Things and its effect on people's lives, communities, global economy, businesses and consumer choices contributing to this phenomenon	At the end of this lesson, students will be able to: <ul style="list-style-type: none">• define the IoT and areas of its application• consider IoT applications, benefits, problems and offer solutions to them• conduct surveys and interviews• present and discuss findings in pairs and small groups• write a summary based on different media

I. Lead-in

1. *The Internet of Things (IoT) is supposed to revolutionise the way we interact with technology and fundamentally change our lives. Look at the diagram on the right and give your definition of the IoT. Work with a groupmate.*



2. *Analyse the line graph. What does it illustrate? What predictions about the near future can you make?*



II. Vocabulary Focus

1. *Look at several definitions (1–7) of the IoT below. Work out the meaning of the words in bold. Then answer the following questions.*

- a) What do all these definitions have in common?
- b) Which one is the closest to the option that you offered?
- c) Which definition is the most comprehensive? Why?

1. The Internet of Things, commonly abbreviated as IoT, is a computing concept that describes the idea of **diverse** everyday physical objects being connected to the Internet and being able to **discern** each other.
2. The IoT refers to the **enormous** network of devices and physical objects (“things”) that can connect to the Internet, recognise other devices and objects, and **securely** communicate with them.
3. The IoT describes a world where just about anything can be connected and communicate in an **intelligent** fashion due to **embedded** chips.
4. The IoT is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique **identifiers** (UIDs) and the ability to transfer valuable data over a network without requiring human-to-human or human-to-computer **synergy**.
5. The IoT is the network of devices such as vehicles and home appliances that **apply** electronics, software, **sophisticated** sensors, **actuators**, and connectivity which allows these things to connect, interact and exchange data and use **analytics**.
6. The IoT refers to the connection of devices (other than typical **ware** such as computers and smartphones) to the Internet that can change the way we get energy or **purchase** goods.
7. The IoT refers to the billions of **tangible** devices around the world that are now connected to the Internet, collecting and sharing data.

2. Match the words in the box with the synonyms from the words in bold in Task 1.

utilise; obtain; safely; interaction; detectors; various; physical; drivers; devices; analysis; intelligent; huge; built into; smart; identify

3. Watch the video “How It Works: The Internet of Things” [36] and find out what elements the IoT includes and where it can be implemented effectively. Choose the options in the table that are mentioned.

IoT Elements			IoT Applications		
medicine	education	shopping	sensors	the Web	chips
transportation	sport	entertainment	devices	cloud storage	platform
business	fashion	smart home	apps	controllers	analytics
energy production		industry	nodes	gateway	database

4. Watch the first part of the video (from 0:01 till 1:01) again and complete the gaps with the missing words.

How exactly do all these devices 1) _____ such large quantities of data and how do we put that information to work?

Whether we’re 2) _____ the production of a factory, giving city residents real-time 3) _____ on where to park or monitoring our personal health it’s the common

Internet of Things 4) _____ that brings us diverse information together and 5) _____ the common language for the devices and 6) _____ to communicate with each other.

The process starts with the 7) _____ themselves which securely communicate with an Internet of Things platform. This platform 8) _____ the data from many devices and 9) _____ analytics to share the most valuable data with applications that address industry specific 10) _____.

5. Watch the rest of the video (from 1:02 till the end) again and match each element of the IoT ecosystem on the left with the function it performs.

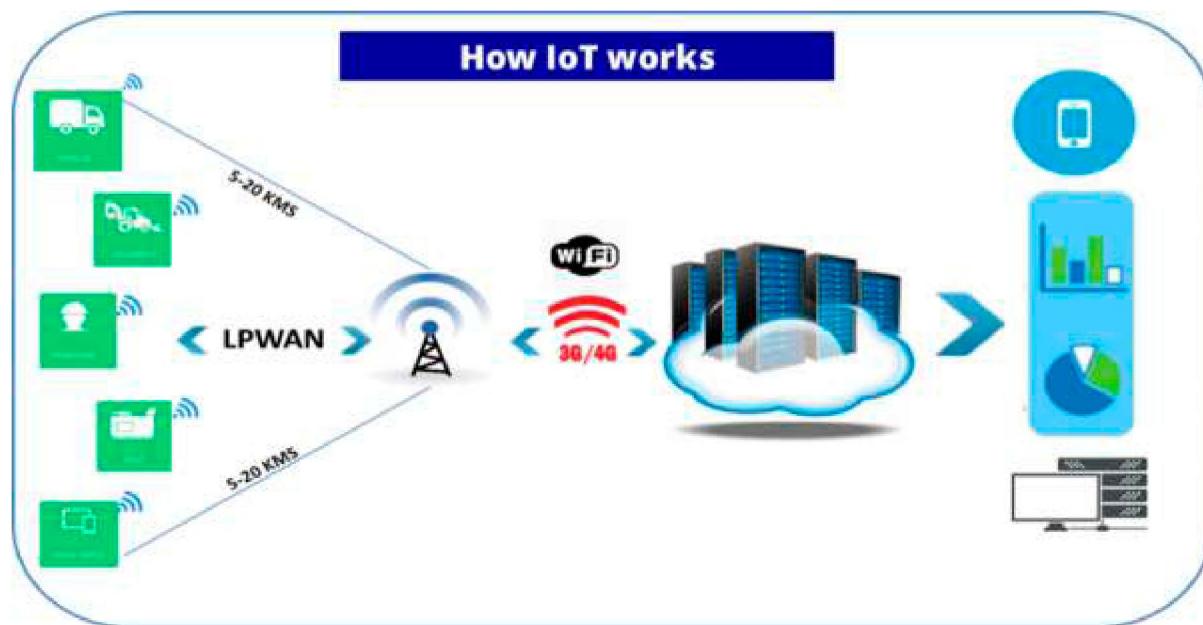
1. Sensors	a) is built with a historical record on a network server
2. Gateway	b) monitor particular characteristics communicating with each other
3. Platform	c) gathers and stores information
4. Database	d) solve specific issues
5. Applications	e) integrates and sorts the data from the sensors

6. Read a passage about the IoT. Complete the gaps with the words in the box. There are synonyms in brackets to help you.

multilateral; engender; notable; vigilance; stem; holistic; pervade; implications

As IoT devices start to 1) _____ (prevail) on the market today some related problems may 2) _____ (derive) from this. They can 3) _____ (cause) rather serious 4) _____ (consequences) when 5) _____ (international) measures are required. Eventually, 6) _____ (integrated) approach on the one hand, and every person's 7) _____ (watchfulness) on the other is the only way to get 8) _____ (significant) results.

7. The diagram illustrates how the IoT works. Describe it. Use the target vocabulary from this section.



8. Address the table and add facts with regard to the IoT. Work in groups of three or four people. Report your ideas to the rest of the group.

IoT Ecosystem	IoT Applications

III. Language Box

1. Read the title “Reasonable Approach to IoT” and predict what the article will be about.

2. Work out the meanings of the words in bold from the context given.

- a) The system should **feature** mechanisms and tools for regular internal performance assessment.
- b) Such transactions can **occur** only between two connected devices.
- c) The effective **implementation** of new software was the solution to the problem.
- d) Can you **spot** the difference between these two devices?
- e) The best way would be to flash the BIOS and **swap out** the cooked CPU.
- f) E-government policies can **facilitate** access to information infrastructure by promoting connectivity and networking.

3. Skim the article “A Reasonable Approach to the IoT” and find the paragraphs (A–G) where the following questions (1–7) are answered.

1. How big is the IoT?
2. Does the IoT have any development perspective?
3. What elements does the IoT ecosystem include?
4. What are the benefits of the IoT for consumers?
5. What device is regarded as an IoT one?
6. What are the benefits of the IoT for business?
7. What is the IoT?

A Reasonable Approach to the IoT

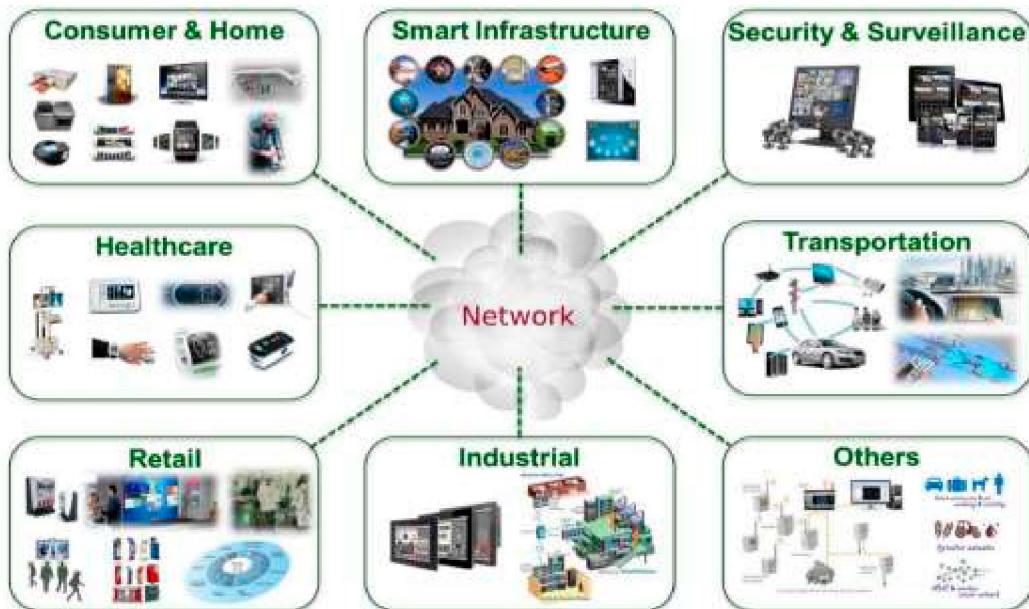
A. Simply put, the Internet of Things (IoT) is the concept of basically connecting any device featuring an on/off switch to the Internet (and/or to each other). This includes everything from mobile phones, coffee makers, washing machines, headphones, lamps, wearable devices and almost anything else. This also applies to components of machines, for example a jet engine of an airplane. The IoT is a giant network of connected “things”.

Wearable device – the device that can be worn, such as clothing or glasses

B. The IoT refers to the ever-growing network of physical objects that feature an IP address for Internet connectivity, and the communication that occurs between these objects and other Internet-enabled devices and systems. In simple words, the IoT is an ecosystem of connected physical objects that are accessible through the Internet. All the

components that enable businesses, governments, and consumers to connect to their IoT devices, including remotes, dashboards, networks, gateways, analytics, data storage, and security are parts of this ecosystem.

C. Any stand-alone Internet-connected device that can be monitored and/or controlled from a remote location is considered to be an IoT device. With smaller, more powerful chips, virtually all products can be IoT devices covering almost every sphere of our life.



D. The IoT is big and getting bigger. There are already more connected things than people in the world. Experts calculate that more than 23 billion IoT devices were in use in 2018, up 35 percent from 2015, and this will likely reach 75 billion by 2025. Out of those 43 billion devices, more than half are consumer products like smart TVs and smart speakers.

E. Occasionally known as the Industrial IoT, the benefits of the IoT for business depend on the particular implementation, but the key is that enterprises should have access to more data about their own products and their own internal systems, and a greater ability to make changes as a result. Manufacturers are adding sensors to the components of their products so that they can transmit back data about how they are performing. This can help companies spot when a component is likely to fail and to swap it out before it causes damage. Companies can also use the data generated by these sensors to make their systems and their supply chains more efficient, because they will have much more accurate data about what's really going on.

F. The IoT also promises to make our environment – our homes and vehicles – smarter, more measurable, and chattier. Already today smart speakers like Amazon's Echo and Google Home facilitate playing music, setting timers, or getting information. Home security systems make it easier to monitor what's going on inside and outside. Smart car parking systems help you find a parking lot much quicker. Meanwhile, smart thermostats can help us heat our homes before we arrive back, and smart lightbulbs can make it look like we're home even when we're out.

G. Looking beyond the home, in future, autonomous cars and smart cities could change how we build and manage our public spaces. Sensors can help us understand

how noisy or polluted our environment is. Health control devices will be able to monitor person's state 24 hours a day collecting, storing and analysing data to be ready to alert about a coming heart attack or stroke. The most used enterprise IoT devices will be smart electric meters and security cameras.

4. Complete the ideas. Address the article in Task 3 if necessary.

- a) The IoT refers to
- b) The Internet of Things includes
- c) The IoT is an ecosystem of
- d) An IoT device is
- e) Enterprises benefit from using the IoT when
- f) The leading domestic applications of the IoT today are
- g) Our future belongs to

5. While the idea of the IoT has been in existence for a long time, a collection of recent advances in a number of technologies has made it practical. Consider what technologies have made the IoT possible and which of them are the most essential. To expand your ideas, match each technology on the left with the explanation. Work with a groupmate.

<ul style="list-style-type: none">1. Access to low-cost, low-power sensor technology2. Connectivity3. Cloud computing platforms4. Machine learning and analytics5. Conversational AI	<ul style="list-style-type: none">a) The increase in the availability of these platforms enables both businesses and consumers to access the infrastructure they need to scale up without actually having to manage it all.b) Affordable and reliable detectors are making the IoT technology possible for more manufacturers.c) Advances in neural networks have brought natural-language processing (NLP) to IoT devices (e.g. personal digital assistants Alexa, and Siri) and made them appealing, affordable, and viable for home use.d) With advances in these technologies, along with access to vast amounts of data stored, businesses can gather insights faster and more easily. These allied technologies continue to push the boundaries of the IoT, and the data produced by the IoT also feeds these technologies.e) A host of network protocols for the Internet has made it easy to connect sensors to the cloud and to other “things” for efficient data transfer
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6. Consider the ideas below and anticipate the future of the IoT. Work in groups of two or three people.

The IoT will continue to form the backbone of many technologies that will change the way we all live

The potential of the IoT is not just in enabling billions of devices simultaneously but leveraging the huge volumes of actionable data which can automate diverse business processes

As networks and IoT platforms evolve to overcome these challenges, through increased capacity and AI, service providers will edge furthermore into IT and Web scale markets – opening entire new streams of revenue

Advances to the industrial Internet will be accelerated through increased network agility, integrated artificial intelligence (AI) and the capacity to deploy, automate, orchestrate and secure diverse use cases at hyperscale

IV. Decision Bank

1. Skim the article “The IoT Implementation Challenges and Solutions” below and identify what parts of the article the ideas refer to.

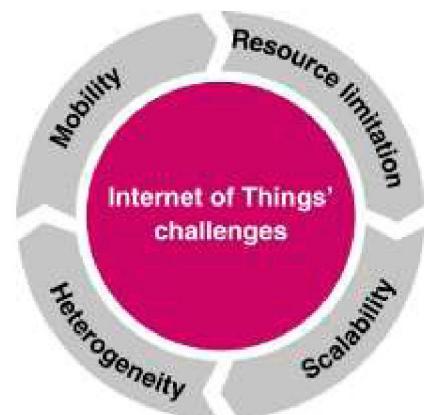
1. It could be years before the market settles enough to crown a single universal standard for home IoT.
2. For consumers to make use of the Internet and all that the IoT has to offer, it is essential to work upon their awareness of the changes taking place within the IoT to make it more efficient.
3. With such strong competition in the IoT market, customers whose expectations aren't met won't hesitate to go elsewhere.
4. In cybersecurity terms, IoT devices greatly expand the “attack surface” or the amount of potential areas for cybercriminals to penetrate a secure network.
5. Quality control in the IoT can be tricky from a regulatory perspective.

The IoT Implementation Challenges and Solutions

In a few short years, the Internet of Things (IoT) has gone from the technologies that were cutting edge to the situation today where connected household items or automobiles are common. And its growth is only really gathering speed now and can comprise as many as 75 billion connected devices by 2025. In fact, according to the researchers and experts, in the future, devices without IoT capabilities may be more expensive because they'll lack data that can be harvested by manufacturers.

That data, though, comes with risks, along with a number of other notable IoT risks and problems that stem directly from this that enterprises will have to overcome in the coming years. If the IoT has a problem, or is exposed to weaknesses, then the users that are connected to it are equally threatened. And here are five major problems connected with the IoT.

Cloud attacks. First of all, since a large amount of data running the IoT will be stored in the cloud, it is likely that cloud providers will be one of the principle targets in this kind of war. While there is growing awareness of this problem, cybersecurity is still under-resourced in comparison to the potential scale of the threat. To get some kind of idea of the problem, the World Economic Forum report cites the analysis suggesting that the takedown of a single cloud provider could



cause \$50 billion to \$120 billion of economic damage – a loss somewhere between Hurricanes Sandy and Katrina.

Lack of regulation about IoT. Another problem is that government regulation often takes a long time to catch up with the current state of technology. With the rapid evolution that's happening every day in the IoT, the government is taking its time in providing standards and regulations and businesses are often left without crucial information they need to make decisions.

Limited AI. The experts also point out that most of the current AI offerings on the market have substantial limits. After all, the machine learning and big data-based AI that currently pervade are powerful tools for identifying associations in large quantities of data, but don't have much on humans in terms of working out the complex phenomena of cause and effect or to identify modifiable factors that can engender desired outcomes.

Challenges with compatibility. Moreover, the researchers have found that home mesh networks are one area where compatibility trouble is looming. Bluetooth has long been the compatibility standard for IoT devices. In fact, it was named after an ancient king, Harald Bluetooth, known for unifying warring tribes. But when it comes to home automation using mesh networking, several competitors have sprung up to challenge Bluetooth's mesh network offerings, including protocols such as Zigbee and Z-Wave.

Understanding IoT. Finally, in 2018, the real issue was how to increase the ability for people to understand the changes and their implications more clearly, and to take concrete actions to take advantage of the potential upside. The IoT is moving into its adolescence as connected devices become smarter and more immersive. Algorithms and data visualisation templates have evolved greatly. All these changes arise the need to provide the public with up-to-date IoT literacy to increase people's flexibility to adopt to fast changing reality.

In fact, while security is undoubtedly one of the major concerns impacting the development of the IoT today, businesses and consumers agree that there should be strong IoT security regulation which will lead to the solution of many other related problems. As it is a multilateral issue it requires a comprehensive, holistic approach. The Internet of Things Security Foundation (IoTSF) is a non-profit body founded by a group of technology companies that will be responsible for vetting connected devices for vulnerabilities and flaws and will offer security assistance to technology providers, system adopters, and end users. But, on the other hand, the latter should remember that vigilance is a key if you want your data to stay yours. You shouldn't simply believe all marketing talks. And it is wise to check reviews of the IoT product and if the manufacturer has a decent track record in advance.

2. Here are some quotes made by the experts in the IoT. Guess which problem from the article in Task 1 each of them addresses. Which one/ones are you ready to support? Why?

1. "The sad thing about AI is that it lacks artifice and therefore intelligence."
2. "The pace of change has exceeded the rate of human capability to absorb."

3. “Some might welcome a move towards a less hyper-globalised online world, but many would not, resistance would be likely, as would the rapid growth of illegal workarounds.”
4. “The flood of information that swamps us daily produces more pain than gain.”
5. “Users need different apps for different devices, and it becomes overwhelming, causing mental overload.”

3. Share your opinion on the questions with a groupmate.

1. Which problem does the author of the article in Task 1 consider the most serious? Why?
 2. Do you agree with the author?
 3. What other challenges concerning the issue can you think of?
 4. What are the solutions to the IoT problems?
 5. What is the future of the IoT?
4. Study the following home applications of the IoT. Consider their benefits, possible problems related to them, and how they can be solved. Which one would you like to obtain? Report to the group. Justify your choice.

Hiku Shopping Button

This device lets consumers use it in the home as a quick way to manage shared grocery lists. In addition to scanning barcodes, this gadget can also accept voice commands and even place grocery delivery orders to save you a trip to the store. Hiku is much more than a chunky fridge magnet. As you scan or tell it which groceries you need, it can integrate with a number of third-party shopping lists. Planned updates will add online price comparisons and online ordering.

Price: \$49



AeroGarden Harvest Elite

This smart device allows you to do just that. Driven by low energy and high-powered LEDs, aquaponic pods will soon substitute ordinary plant soil pots.

It can grow up to 6 plants in soilless pods. You will receive reminders to add water and nutrients.

Most plants germinate within 7–14 days and are ready for harvesting in 46 weeks. You can use non-GMO seeds.

And it consumes only 8W of power.

Price: \$139.95

Hapifork

This device uses data and immediate feedback to help us be more mindful of what we're eating and drinking. One of the best and simplest ways to lose weight – while still enjoying your food – is to eat a little bit slower. Using a capacitive sensor and a built-in vibration motor, Hapifork ("happy fork") will send out gentle physical notifications or flash small indicator lights when it detects that you're shoveling food in faster than you can digest. Price: \$60



Echo

It's an advanced home assistant. It produces rich, detailed sound that automatically adapts to any room. You can stream songs from Amazon Music, Apple Music, Spotify, SiriusXM, and more. It has a built-in hub to voice control compatible lights, locks, and sensors in your home. It sets timers, reminders, and alarms. Alexa answers questions like "Alexa, what time is it?" It can connect to other hands-free devices.

It is built with multiple layers of privacy controls including a mic off button.

Price: \$49.99

V. Conclusion Worksheet

Consider the following key points and get ready to speak about the IoT in the areas presented below. Work in teams.

- ✓ applications ✓ tech solutions ✓ challenges ✓ perspectives

Industry

Healthcare

Transportation

Agriculture

VI. Web Search

Explore the resources in the list to obtain additional information on the IoT, including topical IoT applications. Report your findings in writing.



[https://www.iotworldtoday.com/
subject/iiot](https://www.iotworldtoday.com/subject/iiot)



[https://www.itransition.com/blog/
iot-history](https://www.itransition.com/blog/iot-history)



[https://builtin.com/internet-
things/iot-examples](https://builtin.com/internet-things/iot-examples)

VII. Revision Point

1. Choose the odd one out in the word lines.

a) various	diverse	ubiquitous	miscellaneous
b) recognise	discern	identify	understand
c) varied	integrated	embedded	fixed into
d) driver	ware	actuator	tangible
e) allot	apply	utilise	implement

2. Complete the sentences with the words from Task 1.

- a) Such _____ is used by the majority of IT companies today.
- b) Due to security concerns, most enterprises have to _____ extra resources to defence schemes.
- c) Devices can't _____ each other without specific fixed into chips.
- d) Issues surrounding the IoT are _____ and complicated.
- e) Firefox can now adjust images with _____ colour profiles.

3. Read the article “How Will the Future IoT Industry Look Like?” published on the 101 Blockchains and get ready to render it orally. Record your speech and send it to your groupmate for assessment according to the checklist below. Your overall mark will be provided at the end of the table.

How Will the Future IoT Industry Look Like?

Written by Georgia Weston
Mar 8, 2023

The rapid growth in the IoT industry, with a gradual rise in the number of IoT devices by 2030, is a favorable indicator for the industry. However, it is also important to learn about the implications of IoT in the future. The following trends could provide an effective answer for understanding the prospects for future of IoT.

Circular Economy and IoT

IoT companies have opened up avenues for minimising waste and improving personal autonomy alongside energy efficiency. However, IoT projects can be sustainable only if it has access to rich sources of data. The responsiveness of IoT networks and their actions would depend on the network's effectiveness in data connectivity. The recommended actions for achieving a responsive and high-performance IoT system focus on increasing use of IoT devices alongside extension in the use cycle through predictive maintenance.

5G Networks and IoT

The highlights of predictions for future of IoT would also include the plans for adoption of 5G networks. 5G broadband cellular networks could offer support for

higher data transfer rates with considerably minimal latency. The arrival of 5G could increase the number of IoT-connected devices by 2030 as it can power real-time network performance requirements for IoT applications. At the same time, low-latency benefits of 5G networks can improve connectivity and performance of IoT networks.

Empowering IoT with Artificial Intelligence

The next prominent expectation in the future of IoT would point to possibilities for a combination of AI and IoT. Artificial intelligence is one of the prominent strategic technology trends and has significant implications for transforming IoT. Artificial intelligence and IoT complement each other and help in accessing highly valuable insights. Artificial intelligence can help in extracting viable insights from the massive volume of data generated by IoT devices.

Giving Users What They Want

The IoT forecasts for 2030 would also emphasise the necessity for introducing user-centric functionalities in IoT platforms. Spending on IoT solutions would continue growing. However, the major share of IoT spending would go towards IoT software development.

The number of companies dealing with IoT devices would need effective methods for managing the software associated with different devices. Therefore, developers could look up to containerised applications as a solution for the future of IoT software ecosystem. Containers could help IoT companies introduce beneficial functionalities for improving user experiences.

Foundations of Industry 4.0

The domain of technology is in the most dynamic phase right now, with many innovative developments ranging from blockchain to machine learning. Internet of Things can serve as one of the prominent entries among revolutionary technologies which can transform manufacturing and industrial applications.

The IoT-connected devices forecast estimates point out how IoT would become a mandatory requirement for data collection and improvement of operational efficiency. Industries believe that IoT is the most important component of Industry 4.0, alongside big data analytics, cloud infrastructure and AI.

Strengthening the IoT Security Landscape

The adoption of IoT would increase the amount of user data at risk of unprecedented vulnerabilities. According to Palo Alto Networks, around 57 % of IoT devices are vulnerable to malicious attacks. In addition, the findings of Palo Alto Networks also suggest that 83 % of medical IoT devices use unsupported operating systems.

The growth in the number of IoT devices by 2030 calls for integration of blockchain as an important IoT security tool. Blockchain could offer the benefits of cryptographic security for IoT data alongside identity management for IoT networks.

Decentralisation of the IoT Landscape

Decentralisation of IoT through blockchain technology not only improves security but also reduces the burden of computing on the IoT network. Decentralisation could offer significant advantages for helping IoT platforms in making better decisions with comprehensive data analytics.

Summary checklist	Yes	Undecided	No
1. The origin of the publication was mentioned			
2. The date of the column was provided			
3. The style of the script was defined and justified			
4. The genre of the post was indicated and justified			
5. The author of the article was called			
6. The title of the post was given			
7. The main idea of the article was identified			
8. The important points were included			
9. The unnecessary details were left out			
10. The personal opinion/impression of the article was given			
11. The personal view on the topic/problem was provided			
12. The summary included own vocabulary not citations			
13. The summary was full of varied grammar structures			
The overall mark (excellent/good/satisfactory/below average/bad)			

4. Get ready to speak on the topics below and assess your performance according to the following scale.

Comprehensive 	Rather confident 	Limited 
---------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------

- Definition and applications of the IoT.
- IoT ecosystem.
- Benefits that the IoT brings.
- Problems related to the IoT and their solutions.
- Future of the IoT.

Wordlist

Topic: Computer Networks

Allot <i>v</i>	Packet <i>n</i>
Analytics <i>n</i>	Pervade <i>v</i>
Artificial <i>adj</i>	Ping <i>n, v</i>
Bandwidth <i>n</i>	Range <i>n, v</i>
Bridge <i>n, v</i>	Recipient <i>n</i>
Broadband <i>adj</i>	Repeater <i>n</i>
Broadcast <i>v, n</i>	Router <i>n</i>
Browser <i>n</i>	Sandboxing <i>n</i>
Cellular <i>adj</i>	Satellite <i>n</i>
Compatible <i>adj</i>	Securely <i>adv</i>
Demodulator <i>n</i>	Sophisticated <i>adj</i>
Dial-up <i>adj</i>	Spot <i>n, v</i>
Discern <i>v</i>	Stem <i>n, v</i>
Diverse <i>adj</i>	Swap <i>n, v</i>
Driver <i>n</i>	Synergy <i>n</i>
Download <i>n, v</i>	Tag <i>n, v</i>
Engender <i>v</i>	Terrestrial <i>adj</i>
Enormous <i>adj</i>	Upload <i>n, v</i>
Ethernet <i>n</i>	Utilise <i>v</i>
Extend <i>v</i>	Viable <i>adj</i>
Extension <i>n</i>	Vigilance <i>n</i>
Fibre-optic <i>adj</i>	Ware <i>n</i>
Frequency <i>n</i>	Wavelength <i>n</i>
Gateway <i>n</i>	Wire <i>n, v</i>
Holistic <i>n</i>	Wired <i>adj</i>
Host <i>n, v</i>	Wireless <i>adj</i>
Hotspot <i>n</i>	<i>Collocations:</i>
Hub <i>n</i>	Client-server network
Hyperlink <i>n, v</i>	Cloud computing
Hypertext <i>n</i>	Cloud storage
Identifier <i>n</i>	Coaxial cable
Immersive <i>adj</i>	Data centre
Implication <i>n</i>	Domain name
Instant <i>n, adj</i>	IoT ecosystem
Jitter <i>n</i>	Full/Partial mesh
Latency <i>n</i>	Network topology
Link <i>n, v</i>	Search box
Medium (media <i>pl</i>) <i>n</i>	Search engine
Modem <i>n</i>	Signal interference
Modulator <i>n</i>	Twisted pair
Multilateral <i>adj</i>	Wearable device
Narrowband <i>adj</i>	Virtual machine
Node <i>n</i>	
Notable <i>adj</i>	

List of Abbreviations

- ADSL – Asymmetric Digital Subscriber Line
AI – Artificial Intelligence
ALU – Arithmetic Logic Unit
API – Application Programming Interface
AR – Augmented Reality
ATM – Automated teller machine (Cash-point)
BIOS – Basic Input Output System
BSoD – Black screen of death
CPU – Central Processing Unit
CU – Control Unit
DDoS - Distributed denial-of-service
DIMM – Dual in-line memory modules
DL – Deep learning
DNS – Domain Name Server
DoS – Denial of service
dp – dot pitch
DSL – Digital subscriber line
DSS – Decision support system
FTP – File Transfer Protocol
GSM – Global System for Mobile Communication (Groupe Spécial Mobile)
GUI – Graphical User Interface
HDD – Hard Disk Drive
HTML – Hypertext Markup Language
HTTP – Hypertext Transfer Protocol
ICT – Information and Communications Technology/Technologies
ID – Identity document
InfoSec – Information security
IoT – Internet of Things
IRC – Internet Relay Chat
IS – Information System
ISP – Internet Service Provider
LAN – Local Area Network
MAN – Metropolitan Area Network
MIS – Management information system
ML – Machine learning
OOP – Object-oriented programming
PAN – Personal Area Network
PC – Personal computer
PDA – Personal digital assistant
PIN – Personal identification number
POP – Post Office Protocol
P2P – Peer-to-peer
P2P – Point-to-point
QoS – Quality of service
RAM – Random Access Memory

ROM – Read Only Memory
RSS – Really Simple Syndication
SDLC – System development life cycle
SDSL – Symmetric Digital Subscriber Line
SMTP – Simple Mail Transfer Protocol
SSD – Solid State Drive
STOP – Security Tracking of Office Property
SU – System Unit
TCP/IP – Transmission Control Protocol/Internet Protocol
TelNet – Telecommunication Network
TPS – Transaction processing systems
UDP – User Datagram Protocol
UID – Unique identifier
URL – Uniform Resource Locator
USB – Universal Serial Bus
VoIP – Voice over Internet Protocol
VR – Virtual Reality
WAN – Wide Area Network
WAP – Wireless access point
Wi-Fi – Wireless Fidelity
WWW – World Wide Web
XML – Extensible Markup Language