

6.3_A

Word	Part of speech	Similar word
link /lɪŋk/		
function /'fʌŋkʃn/		
radio /'reɪdiəʊ/		
location /ləʊ'keɪʃn/		
incoming /'ɪŋkʌmɪŋ/		
outgoing /ˌaʊt'ɡəʊɪŋ/		
equipment /ɪ'kwɪpmənt/		

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Answers

Word	Part of speech	Similar word
link /lɪŋk/	v [T]	join
function /'fʌŋkʃn/	v [I]	work
radio /'reɪdiəʊ/	adj	wireless
location /ləʊ'keɪʃn/	n [C]	address
incoming /'ɪŋkʌmɪŋ/	adj	inbound
outgoing /ˌaʊt'ɡəʊɪŋ/	adj	outbound
equipment /ɪ'kwɪpmənt/	n [U]	device

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Answers

Computer networks: Key concepts and developments

A network can be defined as the connection of two or more computer systems which allows them to exchange data. Networks, especially the internet, are a very important part of daily life. They work by transferring data between different devices or nodes and allow many types of communication such as email, instant messaging or chat. The simplest example of a network is two or more computers linked directly to each other, which is known as a peer-to-peer network. In a peer-to-peer network, all participants have equal status, which means sharing resources equally. In client-server networks, one computer – usually more powerful – provides data to client machines on the network. It can also provide shared access to peripherals. Networks can be LANs (Local Area Networks), where computers are relatively close to each other, or WANs (Wide Area Networks) where computers are located further apart. WANs are connected together in national or regional networks and these networks link together to form the wider internet.

There are a number of different ways in which users can connect to the internet. An ISP (internet service provider) creates a link between the user and other parts of the network. The ISP either owns or purchases space to allow them to transfer data between networks. Until the mid-2000s, wired connections through a phone line using a modem were the only real option for most people. During the 2010s, much of the copper wire which connected the phone network was replaced by fibre-optic cables. This enabled ADSL (Asymmetric Digital Subscriber Line) or broadband technology to be used to provide increased bandwidth and transfer speeds. From the early 2000s, Wi-Fi became more common, providing internet connections for laptops or other mobile devices over short distances, without the need to link with a cable. The iPhone and other smartphones enabled internet access directly from the phone, using phone company gateways.

Various hardware devices are needed to make a network function properly. These devices include adapters, switches and routers and they are linked together using wired (copper or fibre-optic cable) or radio connections. To connect to a network, computers need some type of network adapter which can be wired (e.g., Ethernet) or wireless. Switches send signals they receive to a specific device on the network, reducing the amount of unnecessary network traffic. Routers are more sophisticated devices which can join multiple networks together. They can read the IP addresses of packets and they use a routing table – a list of internet addresses – to decide where to send each outbound packet. This location can be another router, or a computer which is the final destination of the packet. Gateways link networks together to enable computers running different protocols to exchange data. Finally, a firewall is a very important part of network infrastructure. This is a device which filters incoming data and outgoing data and uses various rules to decide whether to allow it through or not.

To make effective use of the physical infrastructure of networks, computers need clear standards for communication. A communication protocol is a standard which defines the rules that all computers need to follow when communicating. TCP/IP is the core protocol which enables data transfer on the internet, for example, when clicking on a hypertext link. It links together devices which are identified with unique numerical IP addresses which DNS (Domain Name Servers) interpret and translate into human readable form. TCP/IP has seven different layers: some control low-level interactions with hardware. Others check the number of packets and the quality of the inbound data, so that missed packets can be re-sent. By checking and acknowledging data packets, TCP/IP can guarantee the integrity of the data it receives. Other protocols have different features. For example, UDP (User Datagram Protocol) does not acknowledge receipt of data which makes data transmission much faster. For this reason, it is often used for gaming where speed is very important. Other protocols, such as POP and IMAP, are used for transferring email data.

A network backbone is a network which contains high-capacity connectivity infrastructure that links lower-capacity parts of the network. It is formed of cabling, switches, routers and other equipment and it transfers data between networks using established protocols. The internet backbone describes a collection of networks with a very high capacity, which link internet networks with a lower capacity together. Cables are an important part of this backbone, especially undersea cables. On land, networks sometimes use microwave transmitters and receivers to reduce the cost of cabling. Some internet backbone traffic is also carried on satellites. Much of the internet backbone is provided by private companies, but government and academic institutions also provide capacity.