Тема

A Computer Network is a system of connected computers, peripherals and communication devices that can exchange(обмениваться) data and share resources. If the network is limited to a single building or group of buildings, it is described as a Local Area Network (LAN). Computers in a LAN can be linked together directly but more commonly they are linked through a hub or switch. The network connections can be cable, fiber-optic or wireless.

A hub is used to link computers and peripherals together in a cabled network that uses a star network topology. data is sent to all connected ports resulting in a data collision.

A switch is used in the same way as a hub but the switch uses the IP address of the data packet to send the data to the correct device. It greatly reduces data packet collisions resulting in a faster network

A wireless access point is a device that allows computers and printers etc. to connect to a wired network using radio waves rather than cabling.

***Client-server network***. On a client-server network there are two types of computers with two distinct roles. the server controls access to shared files and client computer's access to the Internet, installs software on client computers.

Several client computers (workstations) are connected to server computers. this is where the user actually works.

***Peer-to-peer networks***. In a peer-to-peer network computers are linked together using cables and a hub or with a wireless connection. All the computers in the network have equal status so there is no server controlling the network. Any computer on the network can access data from of any other computer. A peer-to-peer network is cheaper to set up, but it has less secure.

Network topology is a way to connect devices to a network. There are three common network topologies: ring; line (bus) and star.

***Ring topology***. This is typically a peer-to-peer network. The devices are connected in a ring and data travels in one direction using a control signal called a ‘token’.

If any device fails then the whole network will fail. It is inconvenient to modify it, because for this you need to disconnect the network

***Bus (line) topology***. This is typically a peer-to-peer network. Devices are connected to a main (bus) cable using special T-connectors.

*Advantages:* Failure of one device does not affect the rest of the bus network. Simpler than a ring topology to troubleshoot if there is a cable failure because sections can be isolated and tested independently.

*Disadvantages:* The bus cable has a limited length and if it fails then the whole network will fail. Performance of the network slows down rapidly with more devices.

***Star topology***. This is typically a client-server network. A central computer (server) is connected to the other devices through a switch or hub.

*Advantages:* The most reliable because the failure of one device does not affect other devices. Simple to troubleshoot. Easy to add extra devices. Adding further devices does not greatly affect performance.

*Disadvantages:* installation is more expensive than the other two topologies. If the hub/switch fails, the whole network will fail.

Текст В

The largest WAN (Wide Area Network) is the Internet. Smaller examples of a global network include a national ATM network used by a bank to provide customers with access to cash.

*IP Addressing.* An Internet Protocol (IP) address is a unique address number that is allocated to devices on a computer network that uses the Internet Protocol. Each address must be unique to identify the device on the network. This allows you to send data to the correct device. An IP address can be private or public

*MAC Addressing*. In computer networking, a Media Access Control address (MAC address) is a unique 48-bit number assigned by the manufacturer to any hardware device used to connect to a network. MAC addresses can only be used on a local network.

*Data Packets*. Modern computer networks, including the Internet, transmit data by breaking it down into a series of blocks called data packets, instead of sending it as a continuous stream of data. A typical data packet might contain 1,000 to 1,500 bytes.

*Protocols.* A communications protocol is a description of the format that digital data should be presented and the rules for hardware/software to transmit that data.

The Internet Protocol (IP) is used to route data packets between networks and over the Internet.

The Transmission Control Protocol (TCP) is used to exchange data directly between two networked computers.

*HTTP (HyperText transfer Protocol)* is used on the Internet to transfer web pages and files contained on them.

*FTP (File Transfer protocol):* is used to transfer files from one computer to another.

Network security methods include *Access restrictions* (users can only log in during certain hours of the day and from certain computers.), *Firewall* (this is a device that is used to block unauthorized hacking of network access from the Internet), *User access levels, Suitable passwords, Encryption ,Physical security ,Antivirus software, Proxy server, Wi-Fi access restrictions, Filtering.*