Local area network design

Design

Local Area Network (LAN) is a communication network that connects and sufficiently serves users located in a confined geographical area. The physical infrastructure is mainly composed of servers, a network operating system, work stations, and a communication link.

Servers are high speed machines with a capability of holding complex programs and a centralized data location that can be used and shared by users across the network. The workstations serve as the clients or the user’s personal computers. The workstation can perform standalone processes and access the servers within the network as required.

The network operating system is the controlling software in the LAN, such as Netware or UNIX, Windows NT. The software is installed and resides on the server. An extension of a component part of the network operating system resides in the individual workstation. This allows the application to write and read data from the centralized server, as if it is on the local machine.

The physical infrastructure performs data transfer through the access method. This may include Ethernet or token ring, implemented in the network adaptors that plugs into the server and the workstations. The actual communication may be wireless through the WI-FI adopters or through physical connection through a twisted pair cable, coaxial or the optical fiber. This interconnects each network adopter within the network.

This paper is a detailed design of setting up Ethernet LAN (Local Area Network) that will connect ten people in a small office. The design will also include the link from PC or office workstation to the Internet Service Point (ISP) access point within the vendor's network.

Office Network

The office network will be comprised of the following; Workstations

Workstations are basically desktops or laptops, which will be connected to the server. These are the access points through which users will access files and other applications in the server.

Connection cables (fast Ethernet)

This will include the 100BaseT-100Mbs fast Ethernet. The shielded twisted pairs will be connected using the RJ45, this is an eight wire connector, which is used for Ethernet and token ring connections. Servers

This will include application server, the file server and the remote access server (dial up server), Web server, database server, proxy server (firewall). Servers are high speed machines with a capability of holding complex programs and a centralized data location that can be used and shared by users across the network. A hub or switch

The Ethernet network will run through a high speed switch. The switch also acts as the bridge that connects two or more segments in the LAN together. This will provide a synchronized connection of dissimilar components like the workplace to the server, and the server to the modems and routers. Modem

This is a device that adopts a terminal to the public telephone line. It converts digital pulses signals from the digital devices like the computers, to its analog equivalent, for serial transmission to the destination networrk. In the receiving end, the analog audio frequencies are converted back to digital

pulses useful to the computer system. The modem also performs line dialing, answers the call and controls the transmitting speed, which may be up to 56, 600 bps. Comcast Network

The home coax is a screw that connects to the modem and also connects to an optical node in the neighborhood networks. This then connects to a Cable Modem Termination System (CMTS), which create a connection to routers and finally to the Comcast’s internet backbone connection. Office Network. Overview

The office network will comprise of the workplaces, servers, connection cables, switch or hub, modems.

Workstations

Workstations are basically desktops or laptops, which will be connected to the server. These are the access points through which users will access files and other applications in the server. Network Interface Cards

This is an electronic device that connects a computer to the wider Ethernet networks. The card provides an interface to the media using internal internally mounted transceivers embedded into the interface PCB card, or through using external transceiver as well.

Network interface card is mostly abbreviated as the NIC. It is an extension board that is inserted into the circuitboard of the computer to enable the computer connect to the network. Most versions of the NIC are designed for a particular type of network, media or the protocol. A few types of NICs are specially designed to serve in a multiple networks.