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## Computer Network Services And Applications

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### ABSTRACT:

The Journal of Network and Computer Applications welcomes research contributions, surveys and notes in all areas relating to computer networks and applications thereof. The following list of sample topics is by no means to be understood as restricting contributions to the topics mentioned: new design techniques, interesting or novel applications, components or standards computer networks with tools such as WWW emerging standards for internet protocols Wireless networks Mobile Computing emerging computing models such as cloud computing, grid computing emerging network protocols such as sensor networks, delay tolerant networks, Internet of things applications of networked systems for remote collaboration and telemedicine applications of an educational, transactional and co-operational nature applications of security in computer and networks

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### Introduction:

A computer network is a set of computers sharing resources located on or provided by network nodes. The computers use common communication protocols over digital interconnections to communicate with each other. These interconnections are made up of telecommunication network technologies, based on physically wired, optical, and wireless radio-frequency methods that may be arranged in a variety of network topologies.

The nodes of a computer network may include personal computers, servers, networking hardware, or other specialised or general-purpose hosts. They are identified by network addresses, and may have hostnames. Hostnames serve as memorable labels for the nodes, rarely changed after initial assignment. Network addresses serve for locating and identifying the nodes by communication protocols such as the Internet Protocol.

Computer networks may be classified by many criteria, including the transmission medium used to carry signals, bandwidth, communications protocols to organize network traffic, the network size, the topology, traffic control mechanism, and organizational intent.

Computer networks support many applications and services, such as access to the World Wide Web, digital video, digital audio, shared use of application and storage servers, printers, and fax machines, and use of email and instant messaging applications.

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### History:

Computer networking may be considered a branch of computer science, computer engineering, and telecommunications, since it relies on the theoretical and practical application of the related disciplines. Computer networking was influenced by a wide array of technology developments and historical milestones.

In the late 1950s, a network of computers was built for the U.S. military Semi-Automatic Ground Environment (SAGE) radar system using the Bell 101 modem. It was the first commercial modem for computers, released by AT&T Corporation in 1958. The modem allowed digital data to be transmitted over regular unconditioned telephone lines at a speed of 110 bits per second (bit/s).

In 1976, John Murphy of datapoint Corporation created ARCNET, a token-passing network first used to share storage devices.

In 1977, the first long-distance fiber network was deployed by GTE in Long Beach, California.

In 1977, Xerox Network Systems (XNS) was developed by Robert Metcalfe and Yogen Dalal at Xerox.

In 1979, Robert Metcalfe pursued making Ethernet an open standard.

In 1980, Ethernet was upgraded from the original 2.94 Mbit/s protocol to the 10 Mbit/s protocol, which was developed by Ron Crane, Bob Garner, Roy Ogus, and Yogen Dalal.

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### PRIOR WORK:

A computer network extends interpersonal communications by electronic means with various technologies, such as email, instant

messaging, online chat, voice and video telephone calls, and video conferencing. A network allows sharing of network and computing resources. Users may access and use resources provided by devices on the network, such as printing a document on a shared network printer or use of a shared storage device. A network allows sharing of files, data, and other types of information giving authorized users the ability to access information stored on other computers on the network. Distributed computing uses computing resources across a network to accomplish tasks.

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### **Network service:**

Network services are applications hosted by servers on a computer network, to provide some functionality for members or users of the network, or to help the network itself to operate.

The World Wide Web, E-mail, printing and network file sharing are examples of well-known network services. Network services such as DNS (Domain Name System) give names for IP and MAC addresses (people remember names like "nm.lan" better than numbers like "210.121.67.18"), and DHCP to ensure that the equipment on the network has a valid IP address.

Services are usually based on a service protocol that defines the format and sequencing of messages between clients and servers of that network service. Examples are the Domain Name System (DNS) which translates domain names to Internet protocol (IP) addresses and the Dynamic Host Configuration Protocol (DHCP) to assign networking configuration information to network hosts. Authentication servers identify and authenticate users, provide user account profiles, and may log usage statistics.

E-mail, printing and distributed (network) file system services are common services on local area networks. They require users to have permissions to access the shared resources.

### ***Other network services include:***

- Directory services
- e-Mail
- File sharing
- Instant messaging
- Online game
- Printing
- File server
- Voice over IP
- Video on demand
- Video telephony
- World Wide Web
- Simple Network Management Protocol
- Time service
- Wireless sensor network

### **Application Layer:**

In computer network programming, the application layer is an abstraction layer reserved for communications protocols and methods designed for process-to-process communications across an Internet Protocol (IP) computer network. Application layer protocols use the underlying transport layer protocols to establish host-to-host connections for network services.

### ***TCP-IP network services:***

Many Internet Protocol-based services are associated with a particular well-known port number which is standardized by the Internet technical governance.

For example, World-Wide-Web servers operate on port 80, and email relay servers usually listen on port 25.

### ***TCP versus UDP:***

Different services use different packet transmission techniques.

In general, packets that must get through in the correct order, without loss, use TCP, whereas real time services where later packets are more important than older packets use UDP.

For example, file transfer requires complete accuracy and so is normally done using TCP, and audio conferencing is frequently done via UDP, where momentary glitches may not be noticed.

UDP lacks built-in network congestion avoidance and the protocols that use it must be extremely carefully designed to prevent network collapse.

**Network Application:** Computer network applications are network software applications that utilize the Internet or other network hardware infrastructure to perform useful functions for example file transfers within a network. They help us to transfer data from one point to another within the network.

**There are 2 types of network applications:**

- Pure network applications
- Standalone network application

**Pure Network Applications:** These are applications created to be used in networks; using pure network applications on a single computer doesn't make sense. They help us to transfer data and communicate within a network. Such applications have a separate and distinct user interface that users must learn. Here are some examples.

**1. Email Programs:** These allow users to type messages at their local nodes and then send them to someone on the network. It is a fast and easy way of transferring mail from one computer to another. Examples of electronic mail programs (clients) are:

- Pegasus Mail
- Outlook express
- Eudora Windows mail
- Fox mail

## 2. File Transfer Protocol (FTP)

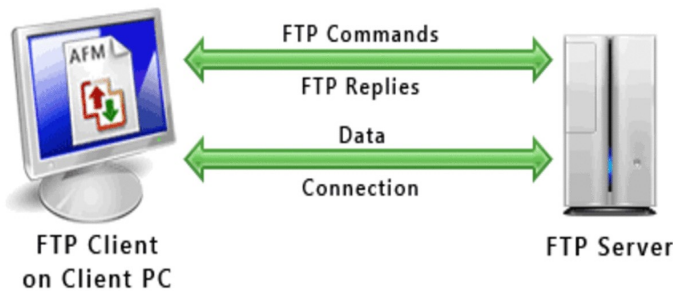
This application facilitates the transfer of files from one computer to another, e.g., from a client to a server. There are two common processes involved in FTP

- *Downloading:* This is the process of obtaining files from a server to a workstation or a client (for example when you download programs and music from a server).
- *Uploading:* This is obtaining of files from a workstation to a server (for instance when you attach documents and upload them to a server, a good example being when you upload photos to Facebook).

*Examples of FTP programs are:*

- FTP in Unix
- FTP in Linux
- FTP in Windows

### File Transfer Protocol Process



**3. Terminal Emulation (TELNET)** This allows a workstation to access the server for an application program. This enables you to control the server and communicate with other servers on the network. The workstation appears as a dumb terminal that is directly attached to the server. The user feels like he/she is using the server directly. *TELNET* enables PCs and workstations to function as dumb terminals in sessions with hosts on inter-networks.

**4. Groupware :** These applications are used to automate the administrative functions of a modern office for *video conferencing* and *chatting*. They facilitate the work of groups for increased productivity; they can be used to communicate, co-operate, coordinate, solve problems, compete, and negotiate.

- *Video Conferencing:*

This is the process of conducting a *conference* between two or more participants at different sites by using computer networks to transmit audio and video data. For example, a *point-to-point* (two-person) video conferencing system works much like a video telephone. Each participant has a video camera, microphone, and speakers mounted on his or her computer. As the two participants speak to one another, their voices are carried over the network and delivered to the other speakers, and whatever images appear in front of the video camera appear in a window on the other participant's monitor.

- *Chatting:*

This is the real-time communication between two users via computer. Once a chat has been initiated, either user can enter text by typing on the keyboard and the entered text will appear on the other user's monitor. The two must be online for a chat to be initiated. Most networks and online services offer a chat feature which enables users to chat as they go on with their work.

- **Stand Alone Applications:** These are applications that run on *stand-alone computers* (computers not connected to any other). In order to extend their activity, they are rebuilt to run on network environments, e.g., word processors, spreadsheets, and database management systems. They function even when the computer is offline.

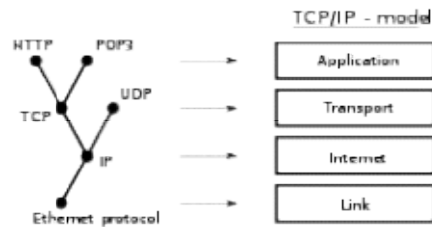
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### Communication Protocols:

The TCP/IP model and its relation to common protocols used at different layers of the model. Message flows between two devices (A-B) at the four layers of the TCP/IP model in the presence of a router (R). Red flows are effective communication paths, black paths are across the actual network links.

A communication protocol is a set of rules for exchanging information over a network. Communication protocols have various characteristics. They may be connection-oriented or connectionless, they may use circuit mode or packet switching, and they may use hierarchical addressing or flat addressing.

In a protocol stack, often constructed per the OSI model, communications functions are divided up into protocol layers, where each layer leverages the services of the layer below it until the lowest layer controls the hardware that sends information across the media. The use of protocol layering is ubiquitous across the field of computer networking. An important example of a protocol stack is HTTP (the World Wide Web protocol) running over TCP over IP (the Internet protocols) over IEEE 802.11 (the Wi-Fi protocol). This stack is used between the wireless router and the home user's personal computer when the user is surfing the web.




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