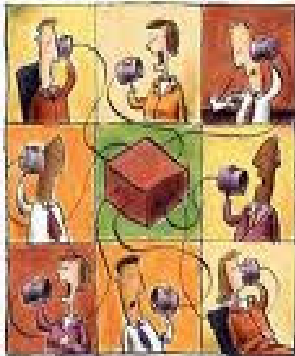


Communications Technology



The main goal of information and communication technology (ICT) is to enable information exchange between humans in conditions (large distances, other barriers) that are beyond the capabilities of our sensory organs (vision, hearing). ICT also enables communications and information exchange between humans and machines (computers) and also strictly between machines (automation processes).

Telecommunications is a branch of information technology that creates theoretical and practical systems for the formation of public communication networks used to transfer information among people digitally and in both directions.

Telecommunications are involved in converting signals in the form of language or data and transferring them from the transmitter to the receiver – via metal conductor, fiber optics or wireless link.

Currently the branch of telecommunications is dominated by information technology and digitalization and therefore it can also be referred to as information and communication technology.

History of Telecommunications

- 1793 in France a telegraph line equipped with semaphores (TACHYGRAPH) was built to connect Paris and Lille (230 km)
- 1832 Samuel Morse created the telegraph alphabet – Morse code.
- 1845 First message was transmitted through the electric telegraph system between Washington D.C. and Baltimore.
- 1850 First submarine communications cable was laid across the La Manche Channel connecting France and Great Britain.
- 1858 First telegram was exchanged between Europe (Great Britain) and the United States.
- 1878 Patent for the telephone filed for by Alexander Graham Bell (USA) was granted.
- 1896 Alexander Stepanovich Popov was the first person to demonstrate the practical application of electromagnetic (radio) waves.
- 1929 BBC began its first television broadcast.
- 1942 First electronic digital computer ENIAC began operating in the United States.
- 1953 Color television broadcasting started using the NTSC system (USA).
- 1965 Communications satellite nicknamed Early Bird was launched into geostationary orbit (it was capable of 1 TV channel and 240 TLF channels).

1969 First computer network was created.

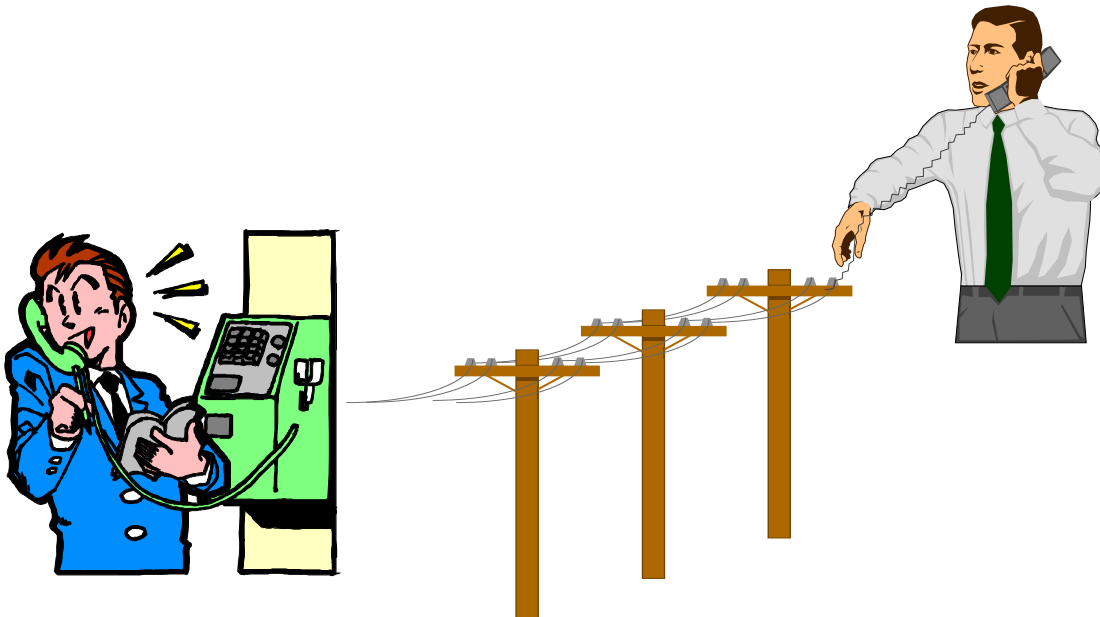
1981 First generation (1G) mobile telecommunications systems launched in the Nordic countries.

Telecommunications chain

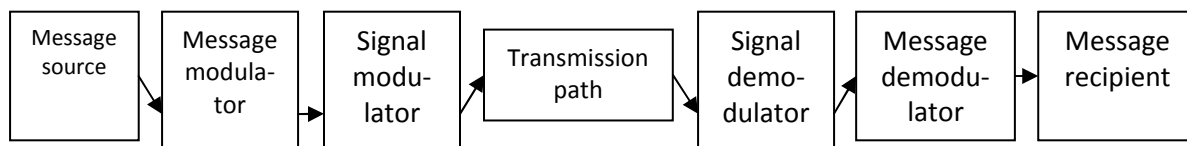
The basic technical condition for creation of information system is the establishment of a telecommunication link. Telecommunications link is a set of technological capabilities that facilitates a transmission of messages between two points.



Communication between humans within earshot without the aid of technology.



Extending the communication distance using telecommunications technology



The beginning and the end of a message must be perceivable by human sensory organs. Electronically transmitted signal (via a channel) must be transformed in a special way. Digital messages are coded and then decoded in modulator and demodulator. The role of the modulator and demodulator is to prepare the signal for transmission via telecommunications channel (whether it is metallic, optic or wireless).

For duplex transmission it is necessary to have an additional channel for the opposite direction.

Telephone Communication

Telephone communication is facilitated by telephone instruments that are connected to telephone center via fixed lines. Each participant in the telephone network is assigned a unique number for that given network which enables the participant to connect with any other participant in the same network. To connect, we dial the number assigned to the participant.



The convertor of a message is a microphone which transforms acoustic signal to electronic signal and the inverter is a speaker which in turn converts electric signal to an acoustic one.

Mobile phones represent a combination of radio and data communication. They enable communications between participants in motion.

Radio Communication



Is used for simplex transmission which transmits data only in one direction. The simplex transmission is divided into radio and television transmission. Based on the frequency, radio transmission is divided into low frequency, medium frequency, high frequency, and very high frequency. Television signal is transmitted strictly in very high and ultra high frequency.



The message modulator at the transmitting end of a television broadcast is a video camera. On the receiving end the encoded picture signal is displayed using a television set or a monitor. The recorded image is split into image rows. The number of these rows varies with the transmission standard (such as PAL, SECAM or NTSC). Television broadcast is transmitted at 25 frames per second.

In the last few years a new 3D television technology is making headway. It will enable us to experience the third dimension – depth. This new technology requires new set of television sets and also new way of transmitting the specially encoded 3D signal via a television channel.

Computer (digital) communications

Computer communications utilize existing telecommunication networks. The Internet network currently represents the majority of computer communication. The modulators/demodulators of the messages are end terminals (computers) that need to have a serial port and modems or other network interface such as Ethernet in order to connect to a communication channel. Additionally, they also need to have communication program that works together with the hardware and reliably transmits messages between participants. Communication program utilizes various network protocols (such as FTP, HTTP, SNMP and so on) for data exchange. Communications protocol is a set of rules that are standardized for data exchange over the network medium.

VOCABULARY

conditions – podmienky
beyond – mimo
capabilities – schopnosti
broadcast – prenos
participant – účastník
rotary dial pad – rotačná číselnica

branch – vetva, pobočka
involved – zapojený
equipped – vybavený
nicknamed – prezývaný
earpiece – slúchadlo
depth – hĺbka