

## **"History of the Internet" video transcript.**

(<http://vimeo.com/2696386>)

The Internet in the year 2009: we send emails, make calls over the Internet and discuss topics we take an interest in. Even our banking is going virtual. But what we take for granted today was only a vague idea 50 years ago. In order to understand how we got this far let's go back to 1957 when everything began.

Before 1957 computers only worked on one task at a time. This is called batch processing. Of course, this was quite ineffective. With computers getting bigger and bigger they had to be stored in special cooled rooms. But then the developers couldn't work directly on the computers any more. Specialists had to be called in to connect them. Programming back then meant a lot of manual work and the indirect connection to the computers meant a lot of bugs, wasting time and fraying the developers' nerves.

The year 1957 marked a big change. A remote connection had to be installed so that the developers could work directly on the computers. At the same time the idea of time-sharing came up. This is the first concept in computer technology: to share the processing power of one computer with multiple users. On October 4th in 1957 during the Cold War, the first unmanned satellite Sputnik 1 was sent into orbit by the Soviet Union. The fear of a missile gap emerged. In order to secure America's lead in technology the US founded the Defence Advanced Research Project Agency in February 1958. At that time knowledge was only transferred by people. The DARPA planned a large-scale computer network in order to accelerate knowledge transfer and avoid the doubling up of already existing research. This network would become the ARPANET. Furthermore, three other concepts were to be developed, which are fundamental to the history of the Internet. The concept of a military network by the Rand Corporation in America, the commercial network of the National Physical Laboratory in England, and the scientific network, Cyclades, in France. The scientific, military and commercial approaches of these concepts are the foundations for our modern Internet.

Let's begin with the ARPANET, the most familiar of these networks. Its development began in 1966. Universities were generally quite cautious about sharing their computers; therefore small computers were put in front of the mainframe. This computer, the Interface Message Processor took over control of the network activities while the mainframe was only in charge of the initialisation of programmes and data files. At the same time the IMP also served as interface for the mainframe. Since only the IMPs were interconnected in the network they were also called IMP subnet.

For the first connections between computers, the Network Working Group developed the Network Control Protocol. Later on the NCP was replaced by the more efficient Transmission Control Protocol. The specific feature of the TCP is the verification of the file transfer.

Let's take a short detour to England. Since the NPL network was designed on a commercial basis a lot of users and file transfer were expected. In order to avoid congestion of the lines the sent files were divided into smaller packets that were put together again at the receiver. Packet switching was born.

In 1952 American ... aircraft discovered middle and long-range missiles in Cuba, which were able to reach the United States. This stoked fear of an atomic conflict. At that time information systems had centralised network architecture. To avoid breakdown in an attack, a decentralised network architecture had to be developed which in case of loss of a node would still be operative. Communication still used to work through radio waves. That would have caused problems in case of an atomic attack. The ionosphere would be affected and the long wave radio waves wouldn't work any more. Therefore they had to use direct waves which, however, don't have a long range. A better solution was the model of a distributed network. Thus long distances could be covered with a minimum of interference.

Another milestone followed with the development of the French network Cyclades. Since Cyclades had a much smaller budget than ARPANET, and thus also fewer nodes, the focus was laid on the communication with other networks. In this way the term 'Internet' was born. Moreover, Cyclades' concept went farther than ARPA's and the NPL's. During communication between sender and receiver the computers were not to intervene anymore but simply serve as a transfer node. Cyclades protocol went through all machines using a physical layer that was implemented into the hardware providing a direct connection with the receiver and end-to-end structure. Inspired by the Cyclades network and driven by the incompatibility between the networks their connection gained in importance everywhere.

The phone companies developed the X.25 protocol, which enabled communication through their servers in exchange for a monthly basic charge of course. DARPA's transmission control protocol was to connect the computers through gateways. And the international organisation for standardisation designed the OSI reference model. The innovation of OSI was the attempt to standardise the network from its ends and the channel's division into separate layers,

Finally the TCP assimilated the preferences of the OSI reference model and gave way to the TCP-IP protocol a standard which guaranteed the compatibility between networks and finally merged them, creating the Internet

By February 8th 1990 the ARPANET hardware was removed but the Internet was up and running.

*A short animated documentary created using PICOL (pictorial communication language) icons. © Melih Bilgil,  
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