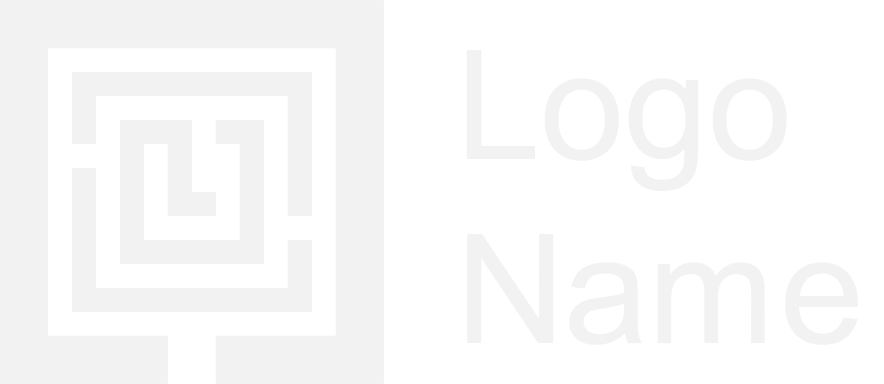
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### **Evolution of the Internet**

The Evolution of the Internet has changed and altered the universe of Information Technology. From the development of the telegraph, telephone, radio and the computer, which all aided and assisted in the evolution of the Internet.

### **(M. Leiner et al., 2020)**

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### **The Origins of the Internet**

The beginning of the first practical schematics began in the early 1960s when J.C.R Licklider from M.I.T. came up with the idea of an Intergalactic network of computers which could communicate with each other. This began computer scientists to start developing the concept of “Packet Switching”. This enabled a procedure to transmit electronic data, which would become of one of the main components of the Internet.

### **(The Invention of the Internet, 2020)**

In 1966 Lawrence G. Roberts Approached the U.S. Department of Defence (DARPA) to develop the concept of computer networks which led to the development of the Advanced Research Projects Agency Network also known as APARNET. APARNET was the first-ever prototype made of the Internet, which was funded by the DARPA in the late 1960s. The ARPANET used packet switching, which enabled various computers to communicate to a single network.

### **(M. Leiner et al., 2020)**

APARNET then delivered there the first Message from one computer to another computer on the 29th of October 1969. The first computer (first node), which was the sending computer was in UCLA Research Lab and the second computer (second node), which was the receiving computer was in Stanford Research Institute (S.R.I.). The Message that was sent was “Login”, but it crashed the APRA network. The receiving computer in Stanford only received the first two letters of the Message which were “Lo”. Shortly after the S.R.I. was connected to the ARPANET. Two additional nods were added to the ARPANET in U.C. Santa Barbara and in the University of Utah. Therefore, by the end of the year 1969, 4 host computers were integrated into the APARNET.

### **(The Invention of the Internet, 2020)**

P.C.s were then quickly adding to the ARPANET, and a Host-to-Host protocol was being created and in December 1970 the Network Working Group (N.W.G.), drove by S.Crocker completed the Host-to-Host protocol called the Network Control Protocol (NCP). After all the APARNET sites had finished implementing NCP, from 1971-1972, Network users started developing applications.

### **(Abbate, 2003)**

### **Internetting Concepts**

### The early stages of the Internet were initially called the APARNET, until it was finally coined the term “Internet”. In 1971 additional organizations were added to the APARNET, for example, the University of Hawaii's ALOHA net, London's University College and the Royal Radar Establishment in Norway. This consequently caused it to be harder to integrate into a single worldwide “Internet”.

### **(The Invention of the Internet, 2020)**

### Robert E. Kahn was an electrical engineer who came up with the idea of an open-architecture network platform in 1972. The "Internetting" program was a program in which a bundle radio framework was a solid end-to-end protocol, which could keep up communication. The NCP did not have the functionality to address machines and networks, and Kahn began the idea of constructing a new version of the NCP Protocol which met the needs of an open architecture network platform, which would be known as Transmission Control Protocol/Internet Protocol (TC/IP). The NCP then acted like a device driver, whereas the new TCP/IP acted like a communications protocols to communicate computers with each other.

### **(M. Leiner et al., 2020)**

### In the late 1970’s Kahn and Vinton Cerf collaborated to start developing the TCP/IP, which enabled them set a standard on how data could be transferred between various networks. Another protocol was added to the provide direct entry to the basic service IP, which was known as the User Datagram Protocol (UDP).

### **(M. Leiner et al., 2020)**

### A key step to the internet is that the model was not just developed for one application however it was a generic infrastructure on which new applications can be built on. This could have just been conceivable with the administration of TCP/IP.

### **(The Invention of the Internet, 2020)**

### **Proving Internetting Ideas**

The DARPA send three contracts to Stanford, BBN and UCL, to implement the TCP/IP. This stage was the development which led to the final evolution of the Internet concepts and technology. The first three networks, APARNET, Packet Radio and Packet Satellite where then used to incorporate every form of network. David Clarke from MIT began starting to prove that a compact and simple implementation of TCP was possible. Clarke and his research team then developed an implementation for the Xerox Alto, which was an early pc workstation developed at Xerox PARC, quickly after an implementation was also developed for the IBM PC. In 1976 Kleinrock wrote and published the first ever book on the APARNET. This book tended to be very prominent as it was used to evolve the internet to the new era of packet switching networks to a wider community.

### **(Ryan, 2013)**

Major development of LAN’s PC’s and various workstations in the 1980s allowed the Internet to progress to new levels. As many people starting using the network, hosts were assigned different names, so it was unnecessary to remember the numeric addresses. The transition to having a large amount of independent managed networks consequently meant that having one table of hosts would be no longer feasible, and the Domain Name System (DNS) was invented by Paul Mockapetris of USC.

### **(Abbate, 2003), (M. Leiner et al., 2020)**

The rapid fluctuations in the size of the internet made capabilities of the routers more difficult to operate, which were then advanced. Two new protocols were implemented the first of which was the Interior Gateway Protocol (IGP), used inside each location of the internet and the second of which was an Exterior Gateway Protocol (EGP), which was used to tie the locations together.

### **(M. Leiner et al., 2020)**

As the internet further evolved, the CS research community started using Unix BSD for their day to day computing environment and looking for a method on how to incorporate the internet protocols into an operating system for the research community. This aided to it be one of the key factors in the successful widespread implementation of the Internet.

### **(Andrews, 2020)**

TCP/IP was finally implemented by the DARPA as a defense standard in on the 1st of January 1983. By 1985 Internet was well built as a technology supporting a wide community of research developers. This stage set the emergence of other communities being formed for daily computer communications.

### **(The Invention of the Internet, 2020)**

### **Transformation to Widespread Infrastructure**

### Between the period 1984-1985 the British Janet and U.S. NSFNET which were two government businesses declared their intention in order to serve the higher education community. In 1986 Steve Wolff recognized the crucial demand for a wide area networking infrastructure to support the general academic and research community. Along with the need for developing a strategy for such an infrastructure independent of direct funding. The Internet grew to having 50,000 networks on all seven continents and outer space, with 29,000 networks in the United States alone. And with the APARNET being decommissioned in 1990, TCP/IP had replaced most of the wide-area computer network protocols worldwide, thereby making IP to become the main service for the Global Information Infrastructure.

### **(M. Leiner et al., 2020)**

### **Formation of the Broad Community**

### As the Internet began to evolve further, The Networking Group transformed into the Internetting Working Group. In 1985 the Internet began to grow mainly on the practical side. This growth aided in the enlargement in the wider community. The extension of the commercial side of the internet grew beyond the research community, to also incorporate a broad user community, thereby increasing commercial activity. For this reason and the reason for a community support the Internet Society was formed in 1991. The world took a more changed approach when in 1989 when Tim Bernes-Lee, who was a computer programmer introduced the World Wide Web (WWW), which enabled people to access a “web of information” that anyone could retrieve and view on the internet. The (W3C) World Wide Web Consortium was then founded by both Tim Bernes Lee and Albert Vezza on October 1st of 1994 in order to evolve the various standards and protocols associated with the web.

### **(Berners-Lee, Fischetti and Dertouzos, 2008), (Abbate, 2003)**

### **Commercialization of the Technology**

The Internet was also changed in many ways. In the year 1992 students at the University of Illinois developed a browser known as “Mosaic”, which was later known as Netscape. Mosaic provided a user—friendly experience to search the web. Mosaic enabled users to see content and images on the same page using a scrollbar and hyperlinks, for the first ever time. The web helped publicize the internet to the wider community and served as a major factor in order to developing the vast amount of information that most of our community access on a regular basis. On the 6th of August 1991, the U.S Congress decided that the web would be used for commercial purposes. This urged various companies and services to set up websites of their own. E-Commerce entrepreneurs then began to sell their products online on the internet, to sell products directly to the customers. Social networking platforms also began developing websites soon afterwards on the Internet. The Internet then also became a way for different people around the globe to stay connect online.

### **(Andrews, 2020)**

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### **(Abbate, 2003)**

### **(Andrews, 2020)**

### **(Berners-Lee, Fischetti and Dertouzos, 2008)**

### **(M. Leiner et al., 2020)**

### **(Ryan, 2013)**

### **(The Invention of the Internet, 2020)**