

# The Story of the Internet

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## Summary

The *Story of the Internet* charts the development of an invention that has had a more dramatic effect on human communication than any since the telephone. The beginnings of the Internet can be found in the early days of the Cold War. Eisenhower's America was stunned by the launch of the Russian Sputnik satellite. For the first time the American public felt vulnerable, and the administration reacted quickly. In 1958 Eisenhower created ARPA (the Advanced Research Projects Agency), and later NASA (the National Aeronautics and Space Administration). America aimed to gain complete technological superiority over the Soviet Union.

Bob Taylor at ARPA was quick to realize that time and money could be saved if the huge mainframe computers, found in government departments and universities, could speak to each other. This was ARPA's first achievement, and in 1969 the first network was created. The first e-mail was sent three years later.

The computer remained huge and cumbersome until work by Bill Gates, and later Steve Wozniak of Apple, led to widespread ownership of personal computers in businesses and in the home. The Internet, however, was still owned and exclusively used by the United States government. George Bush changed all this by allowing it to be used for private and business purposes in 1992.

Central to the way that we use the Internet today was the work of the British scientist Tim Berners-Lee, who created HTML (Hypertext Markup Language) in the early 1990s. The latter enabled a simple network to become a World Wide Web. It is now possible to shop, communicate, chat, find out the latest news, or research any topic that you might think of. This can be done

from any personal computer in the world that can be connected to a telephone line.

**Chapter 1:** At the height of the Cold War in 1957 the Americans received shocking news that the Russians had launched the satellite Sputnik. This worried the Americans, because if the Soviet Union could put a satellite into space what else could they do, and this created a real fear for many Americans. The launch of Sputnik also indicated that the Russians were ahead on innovative ideas. Eisenhower was determined the United States be more advanced than the USSR on all future scientific and technological developments.

**Chapter 2:** 1958 saw the birth of ARPA, which headed research into new scientific and technological developments, but was primarily aimed at trying to win the 'space race'. These projects were soon sectioned off and placed within a new organization called NASA. While NASA took the headlines ARPA worked quietly away in the background on other projects, primarily computing. In 1966 computers were only used to calculate, but Bob Taylor, head of computer projects, envisaged them communicating with each other as well. Initially universities were reluctant to participate as they worried about confidential data, and there was a lack of trust between scientists. But once threatened with a withdrawal of funding they agreed. An initial problem was all computers were speaking different languages, so an interface (IMP computers) was needed. Sending the digital data was also an issue and 'packet switching' was the ideal solution. Packet switching means that each message is broken down into different sections and then sent, it does not matter which order it is sent in, and then when it reaches its destination it is put back together again in the form of the original message. Many companies put a bid in to try and make this new system. BBN won the bid to build the system and the first test connecting four computers to each other succeeded on 1 October 1969.

**Chapter 3:** The network was a great success for the universities as it meant they could all work together without any loss of computer power and at last there was no more repetition of work. There were also many by-products of the network; one was that the network could tell the telephone companies where a fault was on a line. Another major by-product of the network was that it was used for sending e-mail messages. An engineer called Tomlinson wrote a programme that enabled this to happen and has left his mark – the '@' which means 'at' in email addresses. In 1972 the ARPAnet was shown

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to the world, which was greatly impressed by it. After seeing how useful it was other networks were developed but these networks created their own rules and the same problem was created again; networks that could not talk to each other. A new solution was needed to link these networks together and in 1973 the 'internet', which meant 'a network of networks' was born.

**Chapter 4:** In 1975 the world's first personal computer (PC), Altair, was developed and Bill Gates and Paul Allen saw this as their opportunity to write software for it, as they believed that personal computers were the future. At the time IBM had a monopoly on the computer industry and were not pursuing the avenue of making personal computers, but Gates and Allen still believed it was the way forward. Gates and Allen developed software for the new PC, but they were unhappy when it was copied by everyone and Gates wrote a now famous letter to a computer magazine complaining about the copies. Gates and Allen set up their own company called Microsoft. The next step was achieved by Apple Computer. Steve Wozniak designed an efficient and user-friendly computer and Steve Jobs successfully marketed and sold it. One of the major pieces of software to be developed was Visicalc – the first spreadsheet. This gave people answers in a fraction of the time when previously they would have had to wait in a queue for time on an IBM mainframe. By 1979 IBM felt threatened by Apple and hired Microsoft to develop an operating system for their new PC. Microsoft retained ownership of the programme, which meant they could sell it to other companies who had developed their own PCs, thereby ending IBM's monopoly of the market. By the 1980s computers had become commonplace and had begun to appear in every area of life.

**Chapter 5:** In 1989 Tim Berners-Lee invented the World Wide Web while working for CERN. Berners-Lee wanted to create links between topics and created Enquire Within, which organized information through 'hypertext'. A hypertext contains links that lead to other places and readers can choose the path that suits their needs best. He then went on to write a programme called the 'World Wide Web'. Today, simply called the Web, it is read by browsers that have followed the original programme. The programme used a new invention, which was a system of addresses. This means that anything on the Internet can have its own address called a URL. He also created a new language called HTML for web authors. Together these inventions changed the world of the Internet and now anyone who has a computer can use it.

**Chapter 6:** In 1992 President Bush signed a law that allowed commercial use of the network. Marc Andreessen developed Mosaic, which allowed users to point at different coloured or styled words than the rest of the text to navigate. Pictures could also be added. Andreessen wanted the Internet to be for 'normal' things like music, art and news. But Andreessen became disillusioned when his university bosses began to take over his idea. He realized that he would have to leave the university and went into business with Jim Clark. Andreessen then went on to develop Netscape Communications, which made the browser Navigator. In 1994 the new software was put on the Web and within an hour the computer had crashed because of the demand for the software. By the summer of 1995 the World Wide Web was the number one cause of traffic on the Net, mainly because there were more than ten million Netscape users.

**Chapter 7:** The World Wide Web contains millions of pages and it is growing quickly every day. No one can say exactly how big the Web is at any moment. It is bigger than any library on earth but the problem is finding the information you need. One answer is to use search engines so the computer can do the work for you. But the computer does not understand the word you are looking for – to it the word is just a string of letters. Yahoo! is one of the most popular sites on the Web as it uses a different way of searching for information. It uses the principle that any site can be fitted into one of fourteen categories and employs professional surfers to look at web sites and categorize them. In 1995 Yahoo! added a news service which was its first step to becoming a destination to other sites as well as a guide. When Yahoo! decided to use advertisements on sites to make money some people were very upset but it did not stop the popularity of the site.

**Chapter 8:** It is impossible to say what the future of the Internet is, but a few recent happenings may give us a glimpse. An example of this is that anyone can report on the world, and such a case was the sexual relationship between President Clinton and Monica Lewinsky, as this was first reported on a web page. Other examples include Internet crime and free software. A worrying example is also the use of the Internet by governments. In 1999 the Indian army's web site was taken over and its contents removed and replaced by stories of crimes by the army against ordinary Kashmiris. Another use of the Internet is the increased ability to work from home or anywhere in the world.

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## Background and themes

With the aid of various government agencies and universities in America the Internet originally began as a military computer network in 1969. It began by creating a network between four computers and from this foundation has since expanded to be a global network of computer networks, which enables computers all over the world to communicate and share information with one another. The book is a factual account about this development, writing in detail on the defining moments.

## Timeline

- 1957: The USSR launches Sputnik I into space.
- 1958: The USA forms a new organization called ARPA.
- 1966: Bob Taylor appointed head of Computer Projects; development work into a network commences.
- 1968: BBN are awarded the contract to develop the first computer network.
- 1969: Neil Armstrong becomes the first man to walk on the moon.
- 1969: ARPAnet becomes the first working computer network.
- 1972: Ray Tomlinson creates a programme that enables e-mails to be sent and received.
- 1972: The use of the Internet is showcased at the International Conference on Computer Communication. This leads to the development of other networks.
- 1973: Vint Cerf and Bob Kahn write software that allows different networks to communicate. The word 'internet' is used for the first time in their set of rules.
- 1975: Altair, the first personal computer, is built. Bill Gates and Paul Allen write the software programme, BASIC. Gates and Allen set up Microsoft.
- 1977: Apple Computer is created.
- 1977: Apple II is created and becomes the fastest selling personal computer. Visicalc software is developed and is the first spreadsheet software, which is hugely successful.
- 1979: IBM hires Microsoft to develop a software programme for their version of the personal computer. This programme became DOS. Microsoft retained ownership of the programme, therefore it can sell DOS to any company that wants it.
- 1981: The IBM PC is first sold and by 1984 two million have been sold.
- 1980s: Computers become common place and appear in every area of life, and when they are connected they create the Internet that we know today.
- 1980: While working at CERN, Tim Berners-Lee creates the programme Enquire Within, which uses hypertext.
- 1989: Tim Berners-lee writes the World Wide Web programme, which uses a system of addresses called URLs. He also creates a new computer language called HTML for Web authors.
- 1991: CERN puts the browser software on the Internet free for anyone who wants it. Within four years, the World Wide Web is the most popular use of the Internet.
- 1992: President Bush signs a law that allows commercial use of the network.
- 1993: Marc Andreessen and Eric Bina create a browser called Mosaic, which is different as a user can just point at text to follow links and it also has the ability to show pictures.
- 1994: Andreessen and Bina create a company called Netscape Communications who create Netscape Navigator.
- 1994: Netscape Navigator is put on the Web and by 1995 there are more than ten million Netscape users.
- 1994: Yahoo! is designed by Jerry Yang and Dave Filo. Initially it is called 'Jerry's Guide to the World Wide Web'. It uses categories to search for information.
- 1995: Yahoo! has become one of the most popular browsers on the Web and is turned into a proper business which sells advertising space and a news service is created in collaboration with Reuters.

## Discussion activities

### Before reading

- 1 **Discuss:** Ask students to work in small groups to discuss the following inventions, saying who they think the inventors were, when they were invented, and finally ranking them according to how important they consider them to be, justifying their decisions.
- The aeroplane*  
*The telephone*

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*The personal computer and the Internet/World Wide Web*

*The combustion engine*

*The television*

- 2 Discuss:** Ask students to answer the following survey questions. Then ask them to interview two other students, and finally report back to the group.

*Do you own a personal computer?*

*How often do you use a computer?*

*What do you use a computer for?*

*How would your life be different if computers did not exist?*

*If you use the Internet, what do you usually use it for?*

*How do you think the Internet will develop in the future?*

*How did you research projects and find out information before the Internet? Do you still use these other methods?*

### Chapters 1–3

#### After reading

- 3 Pair work:** Ask students to complete the gaps in their information by asking their partners appropriate questions. The answer to their partner's question is below each gapped sentence.

*Student A*

The USSR launched Sputnik on .....

*(NASA stands for the National Aeronautics and Space Administration.)*

The US President in the 1950s was .....

*(Bob Taylor was in charge of APRA.)*

Sputnik crossed the American skies every ..... minutes.

*(IMP's worked as translators for the computers on the network.)*

ARPA stood for .....

*(IMP stands for Interface Message Processor.)*

Ray Tomlinson was responsible for .....

*(The network in Hawaii used radio waves to communicate over mountains.)*

Bob Cart worked together with ..... to find a way to connect different networks.

*(In 1975 the computer industry was dominated by IBM.)*

*Student B*

NASA stands for the .....

*(Sputnik was launched by the USSR on 4 October 1957.)*

..... was in charge of ARPA.

*(The president in the 1950s was Eisenhower.)*

IMP's worked as ..... between computers on the network.

*(Sputnik crossed the American skies every ninety-six minutes.)*

IMP stands for .....

*(ARPA stood for Advanced Research Project Agency.)*

The Network in Hawaii used ..... to communicate over mountains.

*(Ray Tomlinson was responsible for the use of the '@' symbol in messages.)*

In 1975 the computer industry was dominated by .....

*(Bob Cart worked with Vint Cerf to find a way to connect different networks.)*

- 4 Discuss:** Ask students to work in small groups. First they should make notes about the roles of the following people. Then they should discuss them and rank them according to their importance for the development of the Internet.

*Bob Khan*

*Larry Roberts*

*Vint Cerf*

*Neil Armstrong*

*Frank Heart*

*Wes Clark*

*Dwight D Eisenhower*

- 5 Role play:** Ask students to work in pairs/small groups. Ask the students to prepare a presentation to try to win the contract to build the APRAnet. This should include; *how the network will be built with a map/diagram explaining how it will work, as well as telling everyone why they are the best people for the job.* The students will then perform their presentation and at the end of all the presentations a class vote will take place to decide who should win the contract.
- 6 Write:** Ask students to write an e-mail from Ray Tomlinson to Larry Roberts telling him how he managed to send his e-mail and what he thinks it will be used for in the future, for example, business and personal communications.

- 7 Discuss:** Ask students to work in pairs to discuss the following questions about their e-mailing habits.
- Do you write e-mails?*
- What do you use emails for? (writing to friends and family, paying bills, internet shopping receipts etc)*
- Who do you write to?*
- Do you communicate in other ways? (letters / telephone / fax etc)*
- Do you think e-mails have made people lazy at keeping in touch or do you think people keep in touch more because of e-mail? Why / why not?*
- Come back and discuss the answers as a group.

### Chapters 4–6

#### After reading

- 8 Discuss:** Ask students to work in pairs. In 1975 Ed Roberts believed that people would want to own their own personal computer. Ask students to write two lists, one with the reasons why people would have wanted their own computer in 1975 and another with the reasons why someone would want to own a computer today. Compare answers with the rest of the class.

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- 9 Research:** In 1975 Bill Gates was angry that computer engineers copied his software programme for free and wrote a letter complaining about it. Ask students to work in pairs to find out what *the laws are today with regard to copying software*. Students should then write a brief summary of their findings and report back to the class.
- 10 Discuss:** Ask students to work in pairs/small groups. Ask them to design and market their own personal computer. Points that students should consider are:  
*What would it look like?*  
*What would it have that would make it unique – its 'unique selling point'?*  
*What software would it have?*  
*How would it be marketed?*  
 Students will then present their personal computer to the class and then decide which one they want to buy.
- 11 Discuss:** Ask students to work in pairs. Ask them to imagine that they could interview the following people from Chapters 4–6. Ask them to prepare questions that they would like to ask (some should relate to the events that take place in Chapters 4–6), decide on their answers and then role play the interview for the group.  
 Tim Berners-Lee  
 Frank Carey  
 Bill Gates  
 Steve Wozniak
- 12 Discuss, research and role play:** Ask students to prepare a presentation on one of the following companies and organizations, either working individually or in pairs, depending on the number of students in the group. If possible, they should use the Internet for research. They should include a company profile as well as any current news about the company. Finally, they should present their findings to the group. (All of the companies are mentioned in Chapters 4–6)  
 IBM  
 Apple  
 CERN  
 Netscape  
 Honeywell  
 Hewlett Packard
- 13 Discuss:** Ask students to work in pairs to discuss their own use of the Internet. *What do you use it for? Who do you e-mail? What do you research? How easy do you find it to use? Do you use it for anything unusual?* Discuss the results with the class and find out what the most common use of the Internet is and what the most unusual one is.

### Chapters 7–8

#### After reading

- 14 Write:** Ask students to send either an e-mail or a memo to a partner in the group (between classes) with questions about the content of Chapters 7 and 8. They should find the answers before the following class, and talk about them with their partners in the class.
- 15 Discuss:** Ask students to work in groups to discuss these questions:  
*Why are search engines important?*  
*What was the last thing you searched for on the Internet?*  
*What kind of Internet crime do you know? What can be done about it?*  
*What are the dangers of the Internet for children? What can be done about them?*  
*Do you think that SETI will find alien life? Why/why not?*
- 16 Artwork:** Ask students to work in pairs. Ask them to design an advertisement for any product of their choice to go on a webpage. Ask them to consider the following: *How would the advertisement work, where would it be placed on the page, which sites would be best to place the advertisement on, would there be any links to other pages, how much would they be willing to pay to advertise their product?* The students will then present their ideas to the rest of the class.
- 17 Discuss:** Ask students to work in pairs/small groups. Ask them to discuss:  
*What other future developments could be a possibility on the Internet?*  
*The Internet can be used to publish both positive and negative material. What would be some negative uses of the Internet and what would be some positive uses?*  
*Should it be possible to 'police' the Internet? Would this be a good idea or bad idea? Why/why not?*  
*Are there any other developments that have happened since this book was written?*

#### Extra activities

- 18 Research:** Ask students to use the Internet, and/or any other method of research, to prepare a presentation about another invention, including the different stages of development in its development, important dates and people involved. They should then give the presentation to the group.
- 19 Discuss:** Ask students to discuss the following questions in small groups:  
*Will the Internet mean the end of paper letters, books and magazines?*  
*What would happen if one government or organization took control of the Internet?*  
*Would you like to work from home? Why/why not?*