

# History of the Internet

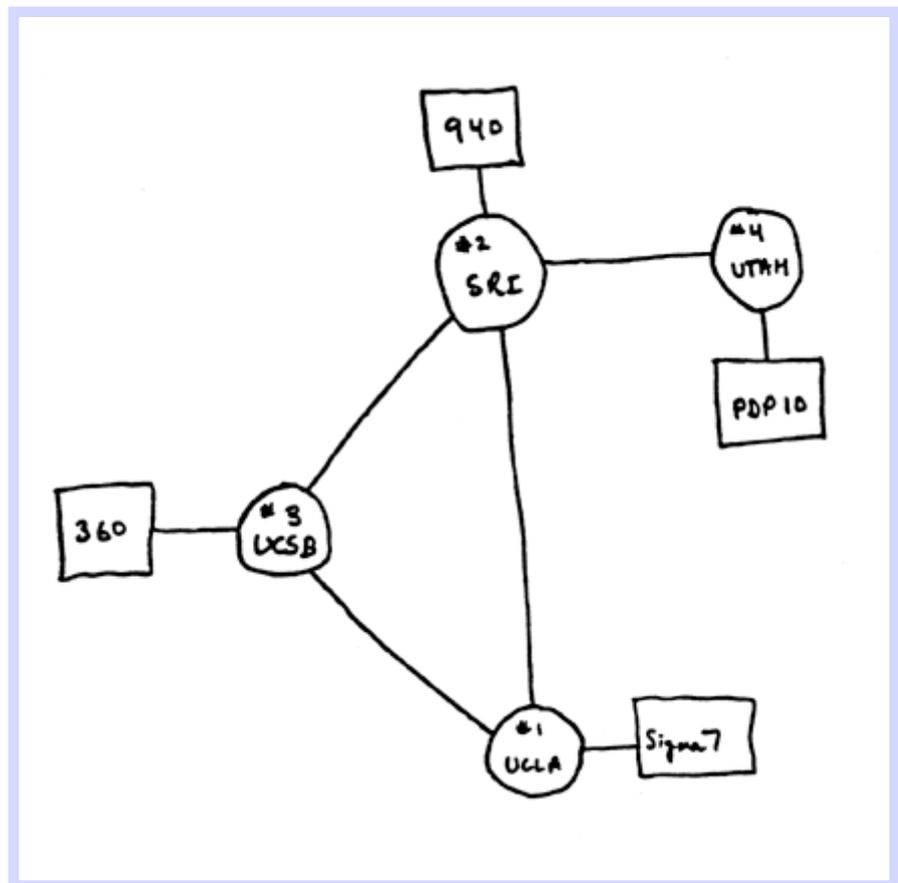


Image courtesy of Computer History Museum



**connected earth**  
How communication shapes the world

Founded by BT

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## Key Stage 3 History

### History Unit 1 – Introductory unit ‘what’s it all about?’

#### Chronology

At the end of this unit, students are expected to have an understanding of chronological terms and be able to organise their knowledge of events in the correct chronological order. The Timeline (either reproduced on paper or viewed online) will help students to improve their understanding of chronology and the way one event can pave the way for another.

Similarly, ‘Genesis’ (Track 1), ‘Early Days’ (Track 2) and ‘Welcome to the Web’ (Track 3) place great emphasis on the importance of the events preceding the birth of the Internet and the World Wide Web in making these developments possible.

#### Sources

References made in the Podcast to situations where there are differences of opinion, highlight very clearly the importance of considering the reliability of different sources, acknowledging the limitations of certain sources and getting into the habit of checking facts against other sources.

This is particularly important when using the Internet as a research tool, bearing in mind that people have the freedom to publish inaccurate articles on the Internet and pass them off as ‘factual’. These issues are dealt with in ‘Genesis’ (Track 1), ‘Searching’ (Track 4) and ‘Community’ (Track 8).

#### Language for Learning

Through the activities relating to the Podcast, students will have the opportunity to ask questions to gain further information about the history of the Internet. Also, when using search engines for the research activities, students will need to be careful to spell words correctly – in order to get the best results from their searches.

In compiling their search results, students will need to group their sentences into coherent paragraphs, using subheadings where necessary. The language used in the Podcast itself, while maintaining a chatty, friendly tone, incorporates subject-specific vocabulary such as ‘chronology’, ‘relevance’ and ‘sources’, in order to familiarise students with these words.

Inevitably a subject such as this involves technical words and terms, many of which are likely to be unfamiliar to students. With this in mind, a glossary of terms will be found beginning on page 29 of this lesson support material. Whilst it would be impractical to present a comprehensive set of all terms relating to the history of the Internet, the glossary does include explanations of all the terminology used in the Podcast.

#### Out of school learning

Many of the activities suggested within the Podcast and in this Lesson support material are suitable for students to undertake out of school, as a homework exercise. The activity inviting students to become a futurologist is particularly suited to an out of school setting, whether students choose to shoot a video, draw a picture or submit their predictions of the future of communications in writing.

## Key Stage 3 History

### Using the Podcast in the classroom

This Podcast is intended to be an interesting starting point, to stimulate students into further research and discussion on the theme of the history of the Internet and its development.

The History of the Internet Podcast is comprised of 10 tracks of about three minutes each. These tracks can be played in sequence or individually and cover the following topics:

1. Genesis – the birth of the Internet
2. Early Days – the Internet before the World Wide Web
3. Welcome to the Web – the development of the WWW as we know it
4. Searching – the first search engines
5. Banking and Buying – the rise and rise of e-commerce and related security issues
6. Internet Everywhere – Broadband, WiFi and mobile devices
7. Play – online games
8. Community – social networks
9. Sound and Vision – convergence, online music, iPods and YouTube
10. What next? – become a futurologist and predict what's in store for communications

### Activities suggested within the Podcast

'Searching' (Track 4) – the narrator encourages students to type 'internet history' into two or more different search engines and compare the kinds of results they come up with. Do the same websites appear in the list, or are they totally different?

'Internet Everywhere' (Track 6) – the narrator suggests that students explore what new technologies are being developed to make the Internet even more useful and accessible by searching the Internet for 'future technology' or by looking at the BT Innovation Centre - [www.btplc.com/innovation](http://www.btplc.com/innovation)

'Community' (Track 8) – the narrator talks about how important it is to check out the reliability of information found on the Internet. Having raised the idea of using library books, newspapers and archive documents to find out about the past, he asks listeners to think about why it is important to use lots of different sources, rather than relying entirely on information found on the Internet. The narrator also ponders the question of how he would have kept in contact with his friends before there was email and social networking sites such as Facebook.

'Sound and Vision' (Track 9) – the narrator raises the issue that users of music-sharing services such as Napster might not have been aware that they were breaking the law. Pupils could discuss the issues of copyright and ownership of information on the internet.

'What Next?' (Track 10) – the narrator encourages listeners to watch the 1969 film 'Telecommunications Services for the 1990s' on the Connected Earth website. He goes on to invite them to make their own predictions about the future by showing what they think communications will be like in 30 years time. These ideas can be shared with other people via the Connected Earth website and/or by making a video that could feature on Connected Earth's YouTube Channel, your own YouTube channel or be profiled on the Connected Earth website. Full instructions for making a video for online use are available at:

[www.google.com/support/youtube](http://www.google.com/support/youtube)

## Key Stage 3 History

### Additional follow-up activities

When students have listened to one or more tracks of the Podcast, the following activities might be suitable to complement their learning.

- Print stories from news websites for discussion in groups. Encourage students to use the Internet and other sources to investigate whether other perspectives on these stories can be found elsewhere. Ask them to consider whose account of the story they can trust and why?
- Research some key developments and significant people mentioned in the Podcast (a list of suggested search terms, key words and names is included in this Lesson support material).

The Connected Earth website contains short biographies of all the people mentioned in the Podcast, which might be useful in exploring the question ‘who is the most important person I know about in the Internet’s history?’. This in itself might be compared with the broader ‘who is the most important person I know about in history?’, which is Section 1 of Unit 1 of the Scheme of work for History at Key stage 3.

- Have a class discussion or debate on an issue which has arisen from the Podcast, such as:
  - ‘Where would we be without the Internet?’
  - ‘Can we believe anything we read on the World Wide Web?’
  - ‘Making friends online – is it the same as making friends in ‘real life’?’
  - ‘Is the Internet always a good thing?’
- Ask students to think about what life was like before the Internet. In groups, get them to compile lists of all the things they can do using the Internet – like emailing friends, buying things, finding out information from websites. Then ask them to describe how people did all these things before the Internet was born. What would they have done instead?
- Encourage students to watch the film on the Connected Earth website (mentioned in the last Podcast track ‘What Next?’) and then to make their own predictions of the future, which they can draw and/or write about and add them to the Connected Earth website. They can also comment on other people’s contributions. Students wishing to make a video of their predictions can, with the consent of a parent, guardian, or from a classroom environment, upload them to YouTube or send them to Connected Earth on CD.
- For students requiring advice as to how to make and upload their videos, full instructions are available at: [www.google.com/support/youtube](http://www.google.com/support/youtube) – those received on CD will be uploaded to Connected Earth’s YouTube channel at: <http://www.youtube.com/ConnectedEarth>. Don’t forget to send us the link to those which are directly uploaded to YouTube. All the best ones will be profiled on the Connected Earth website.

## Key Stage 3 History

### Suggested keywords and names for research activities

**TOP TIP:** When using search engines, eg Google.com, Ask.com, Yahoo.com, remember to enclose any search term of two or more words within double quotation marks. Doing this will mean that a search for “thinking machines” will return only pages with that exact phrase rather than pages which contain the words ‘thinking’ and ‘machines’ but not necessarily joined together as one phrase.

#### 1. Genesis – the birth of the Internet

ARPA	Paul Baran
Joseph Licklider	President Eisenhower
Massachusetts Institute of Technology (MIT)	RAND Corporation
National Physical Laboratories	Ray Tomlinson
packet switching	Sputnik

#### 2. Early Days – the Internet before the World Wide Web

ARPAnet	Steve Walker + MsgGroup
Bob Kahn	Transmission Control Protocol (TCP)
Bulletin Boards	Usenet
Internet Protocol (IP)	Vint Cerf
Internet Relay Chat (IRC)	

#### 3. Welcome to the Web – the development of www as we know it

CERN	Tim Berners-Lee
Hypertext	Vint Cerf + Bob Kahn
Memex (1945)	World Wide Web
Mosaic web browser	
Nexus	

#### 4. Searching – the first search engines

Alan Emtage + Archie	Thinking Machines (in “double quotes”)
Gopher	WebCrawler
Larry Page + Sergey Brin + BackRub	Wide Area Information System (WAIS)

## Key Stage 3 History

### 5. Banking and Buying – the rise and rise of e-commerce and related security issues

e-commerce	online fraud
encryption	Paul Baran
identity theft	phishing
online banking	

### 6. Internet Everywhere – Broadband, Wi-Fi and mobile devices

Bluetooth	Wireless Application Protocol (WAP)
Broadband	WaveLan
BT Openzone	Wi-Fi
dial-up internet access	

### 7. Play – online games

Cyberia + London	Roger Wilco
Legends of Terris	Roy Trubshaw + Richard Bartle
Multi-User Dungeons (MUDs)	Voice Over Internet Protocol (VOIP)
Online role-playing games	Will Crowther + Adventure

### 8. Community – social networks

Chatrooms	Internet Relay Chat (IRC)
Facebook	Internet safety
Friends Reunited	Second Life
MySpace	virtual communities

### 9. Sound and Vision – convergence, online music, iPods and YouTube

Convergence	Shawn Fanning + Napster
iPod + iTunes	YouTube
music + copyright + Internet	

### 10. What next? – become a futurologist and predict what's in store for communications

Connected Earth + Telecommunications Services for the 1990s + 1969  
Joseph Licklider + The Computer as a Communication Device + 1968  
Scientific American + Simon + 1950  
YouTube

## Podcast transcript

### Transcript – Connected Earth’s History of the Internet Podcast

#### 1. Genesis

I don’t know about you, but I’ve always wondered where the Internet came from, who invented it and why. So, I set out to see what I could find out.

There’s a lot of controversy about exactly where the Internet came from. So, when I was doing my research, looking at books, websites and magazine articles, I had to be careful to consider how trustworthy each bit of information was.

To help show how the Internet developed, I put together a timeline – or chronology – that you can look at on the Connected Earth website at [www.connected-earth.com](http://www.connected-earth.com). In 1957, the Soviet Union launched Sputnik, the world’s first satellite. Worried that the United States might get left behind in science and technology, President Eisenhower set up the Advanced Research Projects Agency (known as ARPA) in 1958. ARPA carried out top secret defence research, including work on computers.

Lots of people think that the Internet was a military project, designed to survive a nuclear war – but that doesn’t seem to be the case. Instead, the birth of the Internet was largely because academic researchers needed to share knowledge with each other.

In 1962, Joseph Licklider of the Massachusetts Institute of Technology (or MIT) published a paper on the idea of networked computers, which he called the ‘Galactic Network’. He became the leader of the ARPA computer team and was involved in work exploring the concept of sending messages between computers in small electronic ‘packets’. Separately, in 1964, Paul Baran of the RAND Corporation published research for the US Air Force, which was also about communicating using packets of information. Lastly, research at the National Physical Laboratories in Britain, came up with similar ideas for computer networking and they called it ‘packet switching’. These three teams worked separately until 1967 when they had a meeting and shared their ideas. Their common vision eventually grew into the Internet we know today. So how did this vision become a reality? The ARPA team was spread across several American universities. ARPA staff decided to test out these new ideas of computer networking by connecting all their computer systems together in a simple, uniform way.

In 1969, ARPAnet was born, linking the first four ‘nodes’ at the University of California in Los Angeles, the Stanford Research Institute, the University of California in Santa Barbara and the University of Utah. Because of the special structure of ARPAnet, messages could travel through it using many different paths.

By the time ARPAnet was revealed to the public in 1972, the network had spread to around 50 universities and research centres across the United States. In 1973, ARPAnet went global, when its first international connections were made with University College London and NORSAR, a research centre in Norway. With so many people working on similar research projects, they needed a way of communicating with each other directly, to share and compare information. In 1971, Ray Tomlinson created email. He’d been working on a messaging program for ARPAnet staff and also on an experimental computer program called ‘CYPNET’, which transferred files between linked computers. Ray put the two ideas together and email was born. It was Ray who chose the ‘@’ sign for email addresses. As email became easier to use, there was no turning back. As fast as ARPAnet spread, so did email. The revolution had begun!

## Podcast transcript

### 2. Early Days

I wanted to find out why the Internet was called the 'Internet' and how it actually worked – so I did some research. First off, I looked into the way that information travelled around the network.

All information was broken up and sent in 'packets'. Each packet had its own address and was transferred to its destination through ARPAnet's network of computers, which was created in 1969.

The important thing about ARPAnet was that it didn't matter which way the packets were transferred through the network, so if part of it was damaged, the packet would be sent to its destination via another path.

Tim Berners-Lee, the guy who invented the World Wide Web, describes Vint Cerf and Bob Kahn as the 'fathers of the Internet' because they were the people who, way back in the early 1970s, designed the way the Internet works. According to an article they published in 1974, their design involved 'protocols', called the 'Internet Protocol' and the 'Transmission Control Protocol'.

The Internet Protocol was responsible for getting the packet of information to its destination. The Transmission Control Protocol broke up the packet of information into bits of a manageable size, and put them back together in the right order when they reached the destination computer. If any information got lost along the way, the Transmission Control Protocol asked for it to be sent again.

Basically, these two protocols worked together, to make sure that all information sent via the Internet, got to the right destination and made sense when it got there!

The Internet protocols allowed computers operating any system to connect to ARPAnet, so from the very beginning, it was designed to be accessible to all. As other networks joined ARPAnet and became interconnected with each other, the whole 'network of networks' became known as the 'Internet'. So, what was the Internet first used for? As well as sharing important information for work and research purposes, the people on ARPAnet quickly saw that it could also be used for more sociable activities.

I was interested to find out from Hobbes' Internet Timeline that the first ARPAnet mailing list, called MsgGroup, was created in 1975 by Steve Walker. Apparently, a science fiction list called 'SF-Lovers' became the most popular unofficial list early on. In fact, it was the popularity of these early mailing lists that inspired the development of 'Usenet' for organisations not connected to the ARPAnet.

'Usenet' (or 'user's network') was originally developed simply so files could be shared between computers. It grew into a whole range of 'Newsgroups', covering a wide range of subjects. Essentially, Usenet consisted of virtual bulletin boards, on which users could read and respond to any messages posted. In the 1980s, the popularity of Bulletin Boards grew massively, turning them into popular virtual communities of users.

'Internet Relay Chat' was invented in 1988 by a university student in Finland. This was a really important development, because it laid the foundations for later chat networks and real-time chat websites which became very popular. Lots of the ideas behind Internet Relay Chat were used in the development of instant messaging services, like MSN Messenger.

## Podcast transcript

### 3. Welcome to the Web

Like lots of people, you might think the Internet and the World Wide Web are the same thing. Wrong! So, what's the difference?

Put simply, the Internet is a network of computer networks, linked together by copper wires, fibre optic cables and wireless connections. These connections let the Internet deliver packets of information between computers on the network.

The Internet was around a long time before the World Wide Web was invented. In fact, the Web was just one of the many ways that information got passed around over the Internet – others included email, bulletin boards and Internet Relay Chat.

Unlike the Internet's 'physical' network of computers and cables, the Web is a 'virtual' space of information. You can't see it or touch it. The Web only works because the Internet allows computers on the network to communicate with each other. So without the Internet, the Web couldn't exist.

Tim Berners-Lee developed the World Wide Web at the end of the 1980s, while he was working as a scientist at CERN, a physics laboratory, in Switzerland. He wanted a way for information on different computers to be linked together, to mimic the way a human brain stores and recalls information.

Tim happily admits on his website that the development of the World Wide Web was only possible because of special communication protocols, designed by Vint Cerf and Bob Kahn to make the Internet work. Tim's vision for the Web was to use an idea called 'hypertext' and the Internet, to build a huge information network.

Hypertext lets you browse between different texts and web pages, using links. 'Hyperlinks' are the bits you 'click through' to get from one webpage to another. You might be surprised to know that the idea of jumping between pieces of information had been around for decades before the Web was invented.

Way back in July 1945, an article was published, describing a futuristic information management system called 'Memex'. If the Memex had ever been built, it could have worked in a similar way to how the Internet works now.

Having successfully combined the Internet and hypertext to create the World Wide Web, Tim was keen to share his new technology with as many people as possible.

As the CERN website points out 'a website is like a telephone; if there's just one it's not much use!' So Tim and his team sent out software and instructions to other people who were interested in the World Wide Web project, to create their own websites.

The address of the first ever website and web server was 'info.cern.ch'. Tim's original browser was called 'WorldWideWeb' (which was written as one long word). It was introduced in February 1991 and at the time was the only way to view the Web. It let people use a mouse to click on a link, which would take them to the next chunk of information. The browser was later renamed 'Nexus', to avoid the obvious confusion with the World Wide Web.

## Podcast transcript

The first graphical web browser that could work on any system was launched in 1993 and was called 'Mosaic'. According to the CERN Website, this 'point and click' browser had a huge impact on the spread of the World Wide Web, because it was so reliable and so easy to use.

Way before the birth of the World Wide Web, the Domain Name System had been launched in 1984. A really useful explanation I found in the Columbia University Press Encyclopedia said that every computer that's directly connected to the Internet has its own unique address made up of a 32-digit number. Because human beings, unlike computers, find it hard to remember long sequences of numbers, the Domain Name System was developed so that computers could have Internet addresses made up of words, like '.com' and '.gov', which are much easier to remember.

And so the Web had been born. The rest, as they say, is history.

## Podcast transcript

### 4. Searching

When anyone mentions ‘search engines’ – I immediately think of Google, Yahoo and Ask.com. Years before these became popular, lots of other searching tools had been used to find things on the Internet.

According to the ‘Living Internet’ website, the first popular Internet search engine was the Wide Area Information Servers system (or ‘WAIS’), which was developed in 1988 by a company called ‘Thinking Machines’. The WAIS system searched index databases on remote computers. So when a user typed a question, WAIS searched its database for the most relevant documents and generated a list of documents, ranked in order of relevance.

Another early search tool was ‘Archie’. Alan Emtage, a student in Canada, wrote the program in 1990. Archie worked by downloading directory listings of all the files available on public sites and building a searchable database of file names. Archie then matched users’ queries to the filenames from this database. However, because the contents of these files weren’t indexed – only the file names – Archie was overtaken by more sophisticated searching tools, like ‘Gopher’.

Gopher was invented in 1991 by a team from the University of Minnesota, in the United States. Unlike Archie, Gopher could index the content of text files, making it a much more useful search tool. Because this system gave people a simple way to navigate around the growing resources on the Internet, many people think that Gopher paved the way for the huge popularity of the World Wide Web we use today.

In 1994, WebCrawler went live on the Internet. It was the first full-text Web search engine that let people search for any word on any webpage. This hadn’t been possible before, so WebCrawler became very popular.

The more you read up on early search engines, the more it becomes clear that there are disagreements as to which search engines came first and how successful they were. This really made me think about the reliability of the different things I was reading and how important it is to check out information using other sources. It’s especially important to get your facts straight when you’re using the Internet to do research, because some websites contain information that’s just not true!

One thing that nobody can deny is the incredible rise in popularity of ‘Google’ from its modest beginnings at Stanford University in the United States. Google began in 1996, when students Larry Page and Sergey Brin began working together on a search engine originally called ‘BackRub’. The Google phenomenon was HUGE. An Internet research company called ‘comScore’ reported in August 2007 that Google was the most-used search engine worldwide, handling more than twice as many searches as its nearest rival Yahoo!

Lots of big companies turn to comScore for information about how the Internet is being used, so I’m confident they’ve got their facts straight.

Google is my favourite site, but I also use Yahoo and Ask.com when I’m looking for information. What other search engines do you use? Do you think they’d show different results? When you’ve finished listening to me, why not try typing ‘Internet history’ into some different search engines and compare the results.

## Podcast transcript

### 5. Banking and Buying

I can't imagine not being able to buy things over the Internet or check my bank account online, so I was keen to find out about how this became so popular.

As the Internet grew, businesses realised that they could attract more customers by making themselves available online and in 1991 the Internet opened for commercial use.

Because the Internet was still pretty new, lots of people were nervous about using it for anything involving money. Special technology was developed to make it safer for people to use the Internet for what we now call 'e-commerce'.

Systems involving 'cryptography' (often referred to as 'encryption') were developed which meant money could be transferred between buyers and sellers without any credit card details being revealed.

The idea of computer encryption was proposed many years before the Internet and e-commerce became widespread. Back in 1964, Paul Baran – one of the Internet's pioneers – said it was important for encryption to be built into large communication systems, to make sure that messages remained private.

Put very simply, encryption meant that messages could be sent from one person's computer to another's without being read by anyone else. Using encryption keys, a message could be 'encoded' or 'locked' by the sender, before being 'decoded' or 'unlocked' by the recipient.

As well as ensuring private communication over the Internet, encryption became a vital tool in safeguarding against online fraud. In 1994, the Secure Sockets Layer protocol (SSL) was introduced that made transactions using this kind of encryption even more secure. As would-be shoppers grew more confident that their credit card details wouldn't get into the wrong hands, the amount of stuff bought and sold over the Internet increased massively.

Amazon was one of the first major companies to sell things over the Internet and was founded in 1995. It started life as an online bookshop, but went on to sell all kinds of stuff.

During the 1990s, banks began to realise that they could reduce their costs by offering services to their customers over the Internet. The 'Security First Network Bank' in the United States was launched on 18 October 1995 and claimed to be the world's first, fully functional, virtual bank.

Since then, lots of 'online banking' services have been set up all over the world with tight security measures to keep their customers' money safe.

Banks now actively warn customers about the ways Internet criminals might try to get access to their money. One of these techniques is called 'phishing' (that's phishing with a 'ph' rather than 'f') and involves a 'phisher' sending bogus messages to people – often pretending to be from a bank or online shop.

Phishing is usually done through email or instant messaging. It's used to gather important personal information, like bank account details or credit card numbers, which the phisher can then use to steal from their victims' accounts.

## Podcast transcript

A phishing message will usually tell the reader to click on a link, which takes them to a fake version of a real bank or company's website. Once on the fake website, the victim is asked to enter their details. Then, when the person's details have been given – BINGO! – the phisher has got just what they need...

Widespread publicity in newspapers, on the TV news and on the Internet has made people very aware of the problem of 'identity theft', phishing and credit card fraud. Technology to fight Internet crime is being developed all the time, so as long as people are sensible about the kind of websites they use and don't fall into the traps laid by would-be Internet criminals, shopping and banking online should be just as safe as handling money in the real world.

## Podcast transcript

### 6. Internet Everywhere

The Internet seems to be everywhere. But how did it happen? And how has it affected the way people work? I'm going to look at a few key moments in the spread of the Internet – but remember, there are loads more and new things are happening all the time.

These days, everyone seems to have broadband, but not so long ago, people had to use 'dial-up' access over a modem, which sounded like this:

THAT is really annoying.

Dial-up modems were really slow when it came to downloading things, because they could only handle a limited amount of information. The big move from dial-up Internet access to broadband started in the year 2000 in the UK. The speed that broadband can send and receive information means people can now access much bigger files – like music and video – which were impossible before.

You probably already know that most mobile phones these days can connect to the Internet, using technology like 'WAP' or via a 'Bluetooth' connection to a computer. WAP stands for 'Wireless Application Protocol' and rather than being the name of one specific thing, WAP actually refers to a whole range of technologies which were developed from the mid 1990s. WAP browsers provide the basic services that computer web browsers offer, so my mobile phone lets me access the Internet.

Bluetooth was also developed in the mid 1990s, not as a specific product, but as a standard way for computers and devices with a Bluetooth chip (such as mobile phones, keyboards and digital cameras) to communicate with each other by radio instead of through cables. Thousands of companies now use Bluetooth in their products and the technology is regularly updated.

Another important development to consider is Wi-Fi, which lets you use broadband without the wires. According to Wikipedia, the first wireless products were developed in the Netherlands in the early 1990s and were sold under the name 'WaveLAN'.

Wi-Fi technology itself started being developed in 1997. It's now found in PCs, games consoles, mobile phones, MP3 Players and handheld computers. To access the Internet using these gadgets, you must be within range of a wireless network that is connected to the Internet. This is often called a Hotspot.

BT Openzone is a network of Wi-Fi Hotspots found in lots of cafés, hotels, stations and airports. It is particularly popular with people who have to travel for work, as it lets them access important information while out and about.

As well as making it easier for people on the move to do their jobs, things like broadband and Wi-Fi have made it much more convenient for people to work from home. Broadband, unlike dial-up, means that you can make and receive phone calls while you're on the Internet and special packages allow several computers to use broadband at the same time, from anywhere in the house.

New technology is being developed all the time to make the Internet even more useful and accessible.

Why not do search for 'future technology' on the Internet, or look at [www.btplc.com/innovation](http://www.btplc.com/innovation)

## Podcast transcript

### 7. Play

When I'm not outside perfecting my footie skills, I enjoy online games. So I thought I'd find out a bit more about them.

While exploring the 'Living Internet' website, I discovered that the first widely used, interactive computer game was called 'Adventure' and was developed in the mid 1970s by a guy called Will Crowther. In Adventure, the player was part of an ongoing story, set in the fantasy world of a cave. Each time the computer described a new situation the player would type in simple English what they wanted to do next. Will let his workmates try out his game. Lots of them loved it and passed it on to their friends, who then passed it on to their friends. Gradually, Adventure became really popular.

However, Adventure wasn't a 'multi-user' game like the ones played online these days, because each person played on their own, rather than joining in with other players in one big game. In fact, the first truly multi-user game was called 'Multi-User Dungeon' or 'MUD' for short.

The original MUD was created by Roy Trubshaw and Richard Bartle in 1978, at Essex University, in the UK. For the first time in gaming history, loads of players could participate in the same virtual world at the same time. Initially, MUD could only be played by students on the Essex University network. After a while, players from outside were able to join in by dialling in to the university network and the game's popularity grew.

Many players who had enjoyed playing MUD, went on to design their own games. The name 'MUD' was so catchy among gamers that it ended up being used to describe any game played by lots of people on the Internet.

In the early 1990s, advances in MUD technology let participants create new places, objects and abilities in the virtual spaces they explored. Then, in the mid 1990s, commercial MUDs went live on the Internet, attracting even more players.

A game called 'Legends of Terris' was hosted at what is widely believed to be the first Internet café, 'Cyberia', which was in a back street in London's West End. For some time, Legends of Terris was considered one of the largest commercial MUDs in Europe.

The original MUDs were text-based and required players to use their imaginations to create a 'virtual world'. Advances in technology meant that computer graphics started being used to represent the fantasy worlds and the characters within them.

More recently, broadband has let players actually talk to each other while playing, using Voice Over Internet Protocol software (VOIP). One of the most popular choices among online gamers is 'Roger Wilco' – a free voice chat application created in 1999. It's used with a special headset and allows players more control over their game, as they can talk directly to the other competitors, rather than typing messages to them.

When I think about how quickly online gaming is developing – I can't wait to see what players will be able to do next!

## Podcast transcript

### 8. Community

Recently, people seem to be talking more and more about online and ‘virtual’ communities. So I thought I’d find out what all the fuss is about.

Early ‘Chatrooms’ were an important part of the Internet’s ‘virtual community’ before more sophisticated programs came along.

‘Friends Reunited’, a popular social networking website, was created in the UK in 1999 and officially launched in July 2000. The original idea behind the site was that people could use it to track down old school friends. By October 2007, the scope of Friends Reunited had spread beyond finding former schoolmates to include workplaces, universities and the Armed Forces.

More recent social network sites include MySpace (which was created in 2003) and Facebook, which was developed for students in 2004 and opened up to the general public in September 2006.

Another huge online community is ‘Second Life’, a 3-D, Internet-based virtual world that was launched in 2003. According to the official Second Life website, by October 2007, the community had over 9 million registered ‘Residents’ from all over the globe.

The advanced technology used in Second Life lets people explore their surroundings, interact with one another in real-time and create brand new environments and objects. By the end of 2007, it had become so popular that both P Diddy and the comedian Jimmy Carr had performed virtual shows on Second Life!

Clearly, the Internet has become much more than a great source of information. Now it’s a place where you can make friends and interact with people who might live thousands of miles away.

With any exciting new technology, there are always people who will use it to cause trouble and harm. So it’s important to take care when communicating with people that you’ve never met before. It’s very easy to lie on the Internet and pretend to be someone else. Unfortunately, some people have had bad experiences because of this.

But as long as you’re careful when you’re communicating with people online and don’t go off on your own to meet people that you’ve never met before, there’s no reason to panic.

Homework and revision websites are also virtual communities where people can share information. The Internet is a great way of finding out lots of brilliant facts. Internet searches come up with loads of sites, but how do you know which ones to trust? Anyone can put information on the Internet and sometimes, it’s just not right!

Homework sites can be great, but there are loads of other really useful sources of information like documents, library books and newspapers to explore, so don’t just rely on what you find on the Internet next time you’re doing a project.

All this got me wondering; I’d be lost without Facebook and email, so how on earth would I have kept in touch with my friends before the Internet was invented?

## Podcast transcript

### 9. Sound and Vision

One thing that interests me is the way that all the different kinds of media seem to be coming together. You know, like being able to watch a movie preview on the Internet, reading newspaper articles on your computer screen, downloading music onto your iPod or listening to the radio online. None of these activities seems unusual to us – but it hasn't always been like this.

According to the Hobbes' Internet Timeline, the first time a TV show's outcome was decided online by its viewers was on 27 March 1998, when Internet users got to judge the performance of 12 world champion ice skaters! Recently, all kinds of television programmes have been inviting people to participate online in some way, whether it's by entering a competition or prize draw, voting to influence the plot of a TV show or emailing their opinions about a specific subject that's come up in the news.

BT Vision was launched in December 2006 and lets people watch TV programmes and sports events via broadband. This is a really good example of something called 'convergence', which involves different media coming together.

Music is another area that has been revolutionised by the spread of high speed Internet access.

In 1999 a guy called Shawn Fanning created the 'Napster' website, which caused the music industry major problems, because it let people share music files over the Internet, instead of going and buying CDs in the usual way. The US music industry took legal action and in 2001, Napster was ordered to stay offline. The site returned in 2002, but as a service which people had to pay to use.

The Napster story raises an important point about copyright and 'ownership' of information on the Internet. Some of Napster's users won't have stopped to think that by sharing music files over the Internet, they were stealing from the publisher of the songs. The fact that it's so easy for information to be copied and spread between lots of people online is likely to have a very negative effect on publishers, film-makers and video game developers. Throughout 2007 in the UK, people working in these businesses demanded that the government should tighten the laws on this kind of file sharing.

The iPod was designed by Apple and launched in October 2001. To put music on your iPod, you need Apple's special iTunes software. Since April 2003, you've been able to buy and download music for your iPod from the online shop 'iTunes'.

There are other similar gadgets on the market from other companies, but I'm using iPods as an example because I've got one - and I love it!

Another thing I LOVE about the Internet is YouTube. YouTube is a free video sharing website, which has seen a huge increase in popularity since it went live in November 2005. On the site, you can upload, view and share video clips with other people from all over the world – it's brilliant, I love uploading my videos for people to watch. As users began sending clips they found to friends and colleagues via email, the number of visitors to the site increased, making YouTube one of the world's most popular websites.

So what's next for the Internet? Looking at everything we can do using our computers now, it's exciting to think about the developments that might be just around the corner...

## Key Stage 3 History

### 10. What Next?

For centuries, people have predicted what they think will happen in the future. Sometimes their predictions come true and sometimes they don't – but it's always interesting to look back and see how accurate (or far out!) they were.

While researching the development of the Internet, I often came across old archived documents – essays, articles and papers – which showed different people's hopes and dreams about what communications might be able to do in the future and how people might be able to share information with each other across the globe.

One example of an accurate prediction I came across appeared in an article published way back in November of 1950, in a magazine called the Scientific American. The article was about the first personal computer called 'Simon'. At the end of the article, the author predicted that one day people might have small computers in their homes, which would draw energy from electric power lines in the same way as their fridges and radios...

So, he got that one right! In another article, published in 1968, Joseph Licklider predicted that communicating using computers would become as natural as face-to-face communication; that people would be able to make friends with others with common interests, but who might live far away; and that a whole world of information would become available. In fact, his predictions were so accurate that I began to wonder whether he might have had the gift of time travel all those years ago! In sharp contrast to Joseph Licklider's accurate predictions, some people got it very wrong indeed; in 1977, Ken Olsen (the Chairman of a company called 'Digital Equipment Corporation') said he couldn't see any reason why someone might need to have a computer in their home!

If you have a few minutes to spare, watch a film on the Connected Earth website called 'Telecommunications Services for the 1990s'. It shows what some people thought communications would be like in the future (it was made in 1969). Without giving too much away, it's definitely worth a look – if only to enjoy the interesting fashions on show!

Seriously though, looking back at what people predicted all those years ago, might make it easier for us to imagine what communications could be like 30 years from now... What would your predictions be? Start by asking yourself some questions. For instance: how will people use the Internet 30 years from now – if at all? How will people communicate with others? Will we need mobile phones that can work in space? Will children still need to go to school to learn?

If you're feeling inspired, you could make your own short movie, showing what you think the future of communications will be in say, 2030 or 2040. When it's finished, upload your video to the YouTube website for other people to watch and comment on. Once you've made and uploaded your movie to YouTube, whatever you do, don't forget to email the link to Connected Earth at [connectedearth@bt.com](mailto:connectedearth@bt.com) so we can profile the very best ones on the website. Alternatively, why not draw a picture or write an article and then upload it on [www.connected-earth.com/future](http://www.connected-earth.com/future) for other people to look at and add their comments? Who knows, loads of people might see your short film. You might even become famous!

## Timeline

### History of the Internet Chronology

1940

**1945** A journal article by Vannever Bush was published, describing a futuristic device called the 'Memex', which, had it ever been built, could have worked in a similar way to the World Wide Web.

1950

**1950** An article describing the first personal computer, called 'Simon', was published in the magazine *Scientific American*.

**1957** USSR launched its Sputnik satellite, beating the United States into space.

**1958** US President Eisenhower responded by setting up Advanced Research Projects Agency (ARPA).

1960

**1962** Joseph Licklider, of the Massachusetts Institute of Technology (MIT), published a scientific paper, outlining the idea of networked computers called the 'Galactic Network'.

**1964** Paul Baran of the RAND Corporation published research on packets of information and recommended that encryption is built into large communication systems.

**1966** ARPAnet research project began.

**1967** Meeting between the National Physical Laboratories in Britain, RAND Corporation and ARPA to share ideas.

**1968** Joseph Licklider published an article predicting the future of communication using computers.

**1969** ARPAnet connected four host computers, in the United States, to create a 'distributed network'.

**1969** A film called 'Telecommunications Services for the 1990s' was made.

NB Watch this film on the Connected Earth website at: [www.connected-earth.com/learning](http://www.connected-earth.com/learning)

1970

**1971** Ray Tomlinson created email and chose the '@' sign as way of separating a user's name from their computer's address.

**1972** ARPAnet was revealed to the public. It had connections with 50 universities and research centres across the United States.

## Timeline

- 1973** ARPAnet went global, with international connections in England and Norway.
- 1974** Vint Cerf and Bob Kahn published the design of the special communication protocols by which the Internet works today.
- 1975** ARPAnet's first mailing list was created, called 'MsgGroup'.
- 1976** Queen Elizabeth II sent an email, while visiting the Royal Signals and Radar Establishment (RSRE) in Malvern, in the UK.
- 1977** Ken Olsen (the Chairman of a company called 'Digital Equipment Corporation') said he couldn't see any reason why someone might need to have a computer in their home!
- 1978** The original 'Multi-User Dungeon' (or 'MUD') was created by Roy Trubshaw and Richard Bartle at Essex University, in the UK.

### 1980

- 1980** Tim Berners-Lee started working at CERN physics laboratory in Switzerland.
- 1982** Norway and University College London left ARPAnet to become an Internet connection over a 'Satellite Network connection'.
- 1983** A 'Name Server' was developed at the University of Wisconsin, which could deliver email messages without the sender having to specify the exact path they should take to reach their destinations.
- 1984** The Domain Name System is introduced so that computers could have Internet addresses made up of words, like '.com' and '.gov' instead of numbers.
- 1988** Jarkko Oikarinen, a university student in Finland, invented Internet Relay Chat – the forerunner to today's Internet chat movement.
- 1988** 'Thinking Machines' developed the first popular Internet search engine, called the Wide Area Information Servers system (or WAIS for short).
- 1989** Tim Berners-Lee developed the World Wide Web.

### 1990

- 1990** Connections continued to spread through academic institutions in the United States, Canada and Europe – increasing the Internet's size and reach.
- 1990** Alan Emtage, a student in Canada, wrote 'Archie', an early search tool.

## Timeline

- 1991** Tim Berners-Lee's original browser, called WorldWideWeb, was introduced. The first website was info.cern.ch
- 1991** 'Gopher', the most sophisticated search engine so far, was developed at the University of Minnesota, in the United States.
- 1991** The Internet opened for commercial use.
- 1993** 'Mosaic', the first graphical web browser was launched.
- 1994** Pizza Hut announced that Internet users in the United States could now order Pizza online.
- 1994** The metasearch engine WebCrawler went live on the Internet.
- 1994** Secure Sockets Layer protocol (SSL) was introduced to make online financial transactions secure.
- 1995** The 'Security First Network Bank' was launched in the United States.
- 1995** Amazon was founded as an online bookshop.
- 1995** eBay was launched in the United States under its original name 'Auction Web'.
- 1996** Internet giant 'Google' began life at Stanford University in the United States when students Larry Page and Sergey Brin invented BackRub.
- 1997** The development of Wi-Fi technology began.
- 1998** PayPal was set up as a way of transferring money over the Internet – a bit like an electronic bank.
- 1998** Internet users determined the outcome of a TV sports show online for the first time, by judging a performance of 12 world champion ice skaters.
- 1999** The Napster music sharing website was created by Shawn Fanning.
- 1999** 'Roger Wilco' – a free voice chat application used by online gamers – was developed.

### 2000

- 2000** Broadband became available to people in the UK.
- 2000** Friends Reunited was launched.
- 2001** Apple launched the iPod, a portable media player.
- 2001** The Napster website was ordered to stay offline.

## Timeline

- 2002** Napster returned, but as a subscription service.
- 2003** Apple's online shop 'iTunes' was launched.
- 2003** MySpace was created in the United States.
- 2003** Second Life, a 3-D Internet-based virtual world, was launched.
- 2004** Facebook was born at Harvard University in the United States.
- 2005** YouTube went live.
- 2006** Facebook became available to the general public.
- 2006** BT Vision was launched, enabling people to watch TV over broadband.
- 2007** Google was widely considered the most popular search engine.
- 2007** MySpace had over 200 million accounts and Facebook had over 34 million active members.

## Sources

### Sources and further reading

Sources and suggestions for further reading that relate to specific Podcast tracks are listed below. In addition to these, there are three key resources, which are relevant to most tracks.

These are:

- Connected Earth website [www.connected-earth.com](http://www.connected-earth.com)
- The World Wide Web Consortium [www.w3.org](http://www.w3.org)
- The Living Internet website [www.livinginternet.com](http://www.livinginternet.com)

### 1. Genesis

Inventing the Internet, Janet Abbate, MIT Press, 1999

Where Wizards Stay Up Late – The Origins of the Internet by Katie Hafner & Matthew Lyon, Touchstone, 1998.

Hobbes' Internet Timeline 1993-2006 by Robert H Zakon [www.zakon.org/robert/internet/timeline](http://www.zakon.org/robert/internet/timeline)

On-Line Man Computer Communication, J C R Licklider & W Clark, MIT, August 1962

The Computer as a Communication Device, J C R Licklider & Robert W Taylor, Science and Technology, April 1968 (available to read online at <ftp://gatekeeper.research.compaq.com/pub/DEC/SRC/research-reports/SRC-061.pdf>)

On Distributed Communications, P Baran et al, The RAND Corporation, Santa Monica, California, August 1964

The Beginnings of Packet Switching: Some Underlying Concepts, P Baran, IEEE Communications Magazine, July 2002, pp.42 – 48 IEEE (The Institute of Electrical and Electronics Engineers Inc.), 1999 [www.ieee.org/organizations/history\\_center/oral\\_histories/transcripts/baran.html](http://www.ieee.org/organizations/history_center/oral_histories/transcripts/baran.html)

wiwiw ('Who is Who in the Internet World') project website – [wiwiw.org](http://wiwiw.org)

Part VIII: The Unknown History of the Internet, Andreu Vea Baro (Internet Research Invited Scholar at Stanford University working on the wiwiw project), September 2003,

An Historical Study of the Beginnings of Packet Switching, D W Davies, British Computer Society Journal, Volume 44, No. 3, 2001

RAND Corporation website – [www.rand.org/about/history/baran.list.html](http://www.rand.org/about/history/baran.list.html) and [www.rand.org/publications/RM/baran.list.html](http://www.rand.org/publications/RM/baran.list.html)

Stanford University (Internet Technologies Lecture Notes PDF) [www.stanford.edu/class/cs193i/slidesSum2004/01Introduction.pdf](http://www.stanford.edu/class/cs193i/slidesSum2004/01Introduction.pdf)

MIT (Massachusetts Institute of Technology) website [www-evat.mit.edu/report/web.html](http://www-evat.mit.edu/report/web.html)

## Sources

CERN website

[public.web.cern.ch/public/Content/Chapters/AboutCERN/Achievements/WorldWideWeb/WWW-en.html](http://public.web.cern.ch/public/Content/Chapters/AboutCERN/Achievements/WorldWideWeb/WWW-en.html)

### 2. Early Days

Weaving the Web: The Original Design and Ultimate Destiny of the World Wide Web by its Inventor, Tim Berners-Lee & Mark Fischetti, HarperCollins, 2000

Inventing the Internet, Janet Abbate, MIT Press, 1999

Where Wizards Stay Up Late – The Origins of the Internet by Katie Hafner & Matthew Lyon, Touchstone, 1998.

Hobbes' Internet Timeline 1993-2006 by Robert H Zakon [www.zakon.org/robert/internet/timeline](http://www.zakon.org/robert/internet/timeline)

A Protocol for Packet Network Interconnection, Vint Cerf & Bob Kahn, IEEE Transactions of Communications Technology, 1974. PDF available to read online at:  
[www.cs.princeton.edu/courses/archive/fall06/cos561/papers/cerf74.pdf](http://www.cs.princeton.edu/courses/archive/fall06/cos561/papers/cerf74.pdf)

On Distributed Communications, P Baran et al, The RAND Corporation, Santa Monica, California, August 1964

The Beginnings of Packet Switching: Some Underlying Concepts, P Baran, IEEE Communications Magazine, July 2002, pp.42 – 48

RAND Corporation website [www.rand.org/about/history/baran.list.html](http://www.rand.org/about/history/baran.list.html) and  
[www.rand.org/publications/RM/baran.list.html](http://www.rand.org/publications/RM/baran.list.html)

Stanford University (Internet Technologies Lecture Notes PDF)  
[www.stanford.edu/class/cs193i/slidesSum2004/01Introduction.pdf](http://www.stanford.edu/class/cs193i/slidesSum2004/01Introduction.pdf)

MIT (Massachusetts Institute of Technology) website [www-evat.mit.edu/report/web.html](http://www-evat.mit.edu/report/web.html)

CERN website

[public.web.cern.ch/public/Content/Chapters/AboutCERN/Achievements/WorldWideWeb/WWW-en.html](http://public.web.cern.ch/public/Content/Chapters/AboutCERN/Achievements/WorldWideWeb/WWW-en.html)

### 3. Welcome to the Web

As We May Think, Vannevar Bush, The Atlantic Monthly, July 1945. Available to read online at:  
[www.theatlantic.com/doc/194507/bush](http://www.theatlantic.com/doc/194507/bush)

Weaving the Web: The Original Design and Ultimate Destiny of the World Wide Web by its Inventor, Tim Berners-Lee & Mark Fischetti, HarperCollins, 2000

## Sources

How the Web Was Born: The Story of the World Wide Web, Robert Cailliau & James Gillies, Oxford University Press, 2000

Hobbes' Internet Timeline 1993-2006 by Robert H Zakon [www.zakon.org/robert/internet/timeline/](http://www.zakon.org/robert/internet/timeline/)

A Protocol for Packet Network Interconnection, Vint Cerf & Bob Kahn, IEEE Transactions of Communications Technology, 1974. PDF available to read online at:  
[www.cs.princeton.edu/courses/archive/fall06/cos561/papers/cerf74.pdf](http://www.cs.princeton.edu/courses/archive/fall06/cos561/papers/cerf74.pdf)

RAND Corporation website [www.rand.org/about/history/baran.list.html](http://www.rand.org/about/history/baran.list.html) and  
[www.rand.org/publications/RM/baran.list.html](http://www.rand.org/publications/RM/baran.list.html)

Stanford University (Internet Technologies Lecture Notes PDF)  
[www.stanford.edu/class/cs193i/slidesSum2004/01Introduction.pdf](http://www.stanford.edu/class/cs193i/slidesSum2004/01Introduction.pdf)

MIT (Massachusetts Institute of Technology) website [www-evat.mit.edu/report/web.html](http://www-evat.mit.edu/report/web.html)

CERN website  
[public.web.cern.ch/public/Content/Chapters/AboutCERN/Achievements/WorldWideWeb/WWW-en.html](http://public.web.cern.ch/public/Content/Chapters/AboutCERN/Achievements/WorldWideWeb/WWW-en.html)

Internet Society website [www.isoc.org/internet/history](http://www.isoc.org/internet/history)

Science News for Kids website [www.sciencenewsforkids.org](http://www.sciencenewsforkids.org)

## 4. Searching

Columbia University Press Encyclopedia (through Yahoo Kids) [kids.yahoo.com/](http://kids.yahoo.com/)

Hobbes' Internet Timeline 1993-2006 by Robert H Zakon [www.zakon.org/robert/internet/timeline/](http://www.zakon.org/robert/internet/timeline/)

ComScore Press Release: [www.comscore.com/press/release.asp?press=1745](http://www.comscore.com/press/release.asp?press=1745)

Search Engine History website [www.searchenginehistory.com](http://www.searchenginehistory.com)

Google corporate history [www.google.com/intl/en/corporate/history.html](http://www.google.com/intl/en/corporate/history.html)

Wikipedia [en.wikipedia.org/wiki/Search\\_engines](http://en.wikipedia.org/wiki/Search_engines)

## 5. Banking and Buying.

On Distributed Communications, P Baran et al, The RAND Corporation, Santa Monica, California, August 1964

## Sources

'New Directions in Cryptography' – Whitfield Diffie and Martin Hellman, IEEE Transactions on Information Theory, November, 1976. Quoted on 'Living Internet' website at [www.livinginternet.com/i/is\\_crypt.htm](http://www.livinginternet.com/i/is_crypt.htm)

New Scientist [www.newscientist.com](http://www.newscientist.com)

Financial Times [search.ft.com/search?queryText=e-commerce](http://search.ft.com/search?queryText=e-commerce)

Hobbes' Internet Timeline 1993-2006 by Robert H Zakon [www.zakon.org/robert/internet/timeline/](http://www.zakon.org/robert/internet/timeline/)

BBC H2G2 [www.bbc.co.uk/dna/h2g2/A1315919](http://www.bbc.co.uk/dna/h2g2/A1315919)

BBC Bitesize revision site 'Information Technology: the implications of IT'  
[www.bbc.co.uk/schools/gcsebitesize/ict/implications/0moralandsocialissuesrev4.shtml](http://www.bbc.co.uk/schools/gcsebitesize/ict/implications/0moralandsocialissuesrev4.shtml)

Wikipedia [en.wikipedia.org/wiki/E-commerce](http://en.wikipedia.org/wiki/E-commerce)

## 6. Internet Everywhere

New Scientist [www.newscientist.com/search.ns?doSearch=true&query=broadband](http://www.newscientist.com/search.ns?doSearch=true&query=broadband)

Hobbes' Internet Timeline 1993-2006 by Robert H Zakon [www.zakon.org/robert/internet/timeline/](http://www.zakon.org/robert/internet/timeline/)

BBC News [news.bbc.co.uk/1/hi/technology/4758722.stm](http://news.bbc.co.uk/1/hi/technology/4758722.stm)

BBC Webwise [www.bbc.co.uk/webwise/askbruce/articles/connect/bluetooth\\_1.shtml](http://www.bbc.co.uk/webwise/askbruce/articles/connect/bluetooth_1.shtml)  
[www.bbc.co.uk/webwise/askbruce/articles/connect/wifi\\_1.shtml](http://www.bbc.co.uk/webwise/askbruce/articles/connect/wifi_1.shtml)

BT Innovation Centre [www.bt.com/innovation](http://www.bt.com/innovation)

Beginner's Guide to Broadband [www.broadband.co.uk/guide.jsp](http://www.broadband.co.uk/guide.jsp)

Wikipedia [en.wikipedia.org/wiki/Wi-fi](http://en.wikipedia.org/wiki/Wi-fi)

## 7. Play

Early MUD History, Richard Bartle, 15 November 1990. Article published online and available at [www.mud.co.uk/richard/mudhist.htm](http://www.mud.co.uk/richard/mudhist.htm)

Interactive Multi-User Computer Games, Richard Bartle. Available online at [www.mud.co.uk/richard/imucg1.htm](http://www.mud.co.uk/richard/imucg1.htm)

Roger Wilco website [www.rogerwilco.gamespy.com/products/rw/gamers.html](http://www.rogerwilco.gamespy.com/products/rw/gamers.html)

Gamespy Archives [archive.gamespy.com/amdmmog/](http://archive.gamespy.com/amdmmog/)

## Sources

The Colossal Cave Adventure page [www.rickadams.org/adventure/a\\_history.html](http://www.rickadams.org/adventure/a_history.html)

The Brass Lantern (adventure game website) [brasslantern.org/beginners/introif.html](http://brasslantern.org/beginners/introif.html)

Wikipedia [en.wikipedia.org/wiki/MMORPG](http://en.wikipedia.org/wiki/MMORPG)

Internet Café Guide <http://www.internet-cafe-guide.com/internet-cafe-history.html>

## 8. Community

Chat Room Safety Advice [www.chat-rooms-online.com/chat-safety.htm](http://www.chat-rooms-online.com/chat-safety.htm)

Second Life – official website [secondlife.com](http://secondlife.com)

Friends Reunited – official history [www.friendsreunited.co.uk/press/history.htm](http://www.friendsreunited.co.uk/press/history.htm)

MySpace [www.myspace.com/index.cfm?fuseaction=misc.aboutus](http://www.myspace.com/index.cfm?fuseaction=misc.aboutus)

Facebook – corporate history [www.facebook.com/about.php](http://www.facebook.com/about.php)

BBC News [news.bbc.co.uk/1/hi/programmes/click\\_online/5392906.stm](http://news.bbc.co.uk/1/hi/programmes/click_online/5392906.stm)

New Scientist [technology.newscientist.com/channel/tech/mg19225831.200-just-cant-get-enough.html](http://technology.newscientist.com/channel/tech/mg19225831.200-just-cant-get-enough.html)

Science News for Kids [sciencenewsforkids.org/articles/20061025/Feature1.asp](http://sciencenewsforkids.org/articles/20061025/Feature1.asp)

## 9. Sound and Vision

Convergence: The International Journal of Research into New Media, SAGE Publications. Various issues and articles available at [convergence.beds.ac.uk](http://convergence.beds.ac.uk)

Hobbes' Internet Timeline 1993-2006 by Robert H Zakon [www.zakon.org/robert/internet/timeline/](http://www.zakon.org/robert/internet/timeline/)

BBC Radio 4 [www.bbc.co.uk/radio4/hhgttf/convergence2.shtml](http://www.bbc.co.uk/radio4/hhgttf/convergence2.shtml)

New Scientist [www.newscientist.com/article/mg14920193.900-nattering-on-the-net.html](http://www.newscientist.com/article/mg14920193.900-nattering-on-the-net.html)

'History of the Net' timeline [members.magnet.at/dmayr/history.htm](http://members.magnet.at/dmayr/history.htm)

Webopedia Brief Timeline of the Internet [www.webopedia.com/quick\\_ref/timeline.asp](http://www.webopedia.com/quick_ref/timeline.asp)

Wikipedia [en.wikipedia.org/wiki/Convergence](http://en.wikipedia.org/wiki/Convergence)

## Sources

### 10. What Next?

The Ultimate Entrepreneur: The Story of Ken Olsen and Digital Equipment Corporation, G Rifkin and G Harrar, Rochlin, Calif: Prima Publications, 1990

Extract from an Article about 'Simon' by Edmund Berkeley, originally published in the Scientific American journal, November 1950 now available online at:

[www.historyofscience.com/G21/docs/timeline/timeline\\_1950.shtml](http://www.historyofscience.com/G21/docs/timeline/timeline_1950.shtml)

The Computer as a Communication Device, J.C.R Licklider & R.W Taylor, Science and Technology, April 1968 available to read online at <ftp://gatekeeper.research.compaq.com/pub/DEC/SRC/research-reports/SRC-061.pdf>

YouTube website – step by step instructions for making and uploading videos

[www.google.com/support/youtube/?hl=en\\_US](http://www.google.com/support/youtube/?hl=en_US)

### Timeline Sources and general background reading

Where Wizards Stay Up Late – The Origins of the Internet by Katie Hafner & Matthew Lyon, Touchstone, 1998.

Inventing the Internet, Janet Abbate, MIT Press, 1999

Weaving the Web: The Original Design and Ultimate Destiny of the World Wide Web by its Inventor, Tim Berners-Lee & Mark Fischetti, HarperCollins, 2000

Convergence: The International Journal of Research into New Media, SAGE Publications  
Various issues available at [convergence.beds.ac.uk](http://convergence.beds.ac.uk)

Connected Earth website

[www.connected-earth.com](http://www.connected-earth.com)

Hobbes' Internet Timeline 1993-2006 by Robert H Zakon

[www.zakon.org/robert/internet/timeline/](http://www.zakon.org/robert/internet/timeline/)

The World Wide Web Consortium

[www.w3.org/](http://www.w3.org/)

The Living Internet website

[www.livinginternet.com](http://www.livinginternet.com)

Stanford University website

[www.stanford.edu/](http://www.stanford.edu/)

MIT (Massachusetts Institute of Technology) website

[web.mit.edu/](http://web.mit.edu/)

## Sources

CERN website

[public.web.cern.ch/public/Content/Chapters/AboutCERN/Achievements/WorldWideWeb/WWW-en.html](http://public.web.cern.ch/public/Content/Chapters/AboutCERN/Achievements/WorldWideWeb/WWW-en.html)

The Computer History Museum

[www.computerhistory.org/internet\\_history/](http://www.computerhistory.org/internet_history/)

'History of the Net' timeline

[members.magnet.at/dmayr/history.htm](http://members.magnet.at/dmayr/history.htm)

Webopedia Brief Timeline of the Internet

[www.webopedia.com/quick\\_ref/timeline.asp](http://www.webopedia.com/quick_ref/timeline.asp)

From Gutenberg to the Internet - a Sourcebook on the History of Information Technology

[www.historyofscience.com/G2I/docs/timeline/timeline\\_1950.shtml](http://www.historyofscience.com/G2I/docs/timeline/timeline_1950.shtml)

New Scientist

[www.newscientist.com](http://www.newscientist.com)

BBC Bitesize revision site 'Information Technology: the implications of IT' –

[www.bbc.co.uk/schools/gcsebitesize/ict/implications/0moralandsocialissuesrev4.shtml](http://www.bbc.co.uk/schools/gcsebitesize/ict/implications/0moralandsocialissuesrev4.shtml)

WOW Academy

[www.historyoftheinternet.org/wowacademy/timeline08.cfm](http://www.historyoftheinternet.org/wowacademy/timeline08.cfm)

Search Engine History website

[www.searchenginehistory.com](http://www.searchenginehistory.com)

Columbia University Press Encyclopedia (through Yahoo Kids)

[kids.yahoo.com/](http://kids.yahoo.com/)

## Glossary of terms

### Learn more about terms mentioned in the History of the Internet.

To find out more about people who have been important in the history of the Internet, individual biographies can be found at: [www.connected-earth.com/Galleries/Pioneersandpersonalities](http://www.connected-earth.com/Galleries/Pioneersandpersonalities)

#### **Amazon**

An American e-commerce company based in Seattle, Washington. Founded by Jeff Bezos in 1994, and launched in 1995. One of the first major companies to sell goods over the Internet. Began as an online bookstore but soon widened product lines by adding videos, music, software, video games, electronics and more.

#### **Archie**

A search tool for finding files stored on anonymous File Transfer Protocol (FTP) sites. You needed to know the exact file name or at least part of it to find something. By 1999 Archie had been almost completely replaced by web-based search engines.

#### **ARPA**

The Advanced Research and Projects Agency of the United States Department of Defense. Also known as DARPA (the 'D' stands for 'Defense').

#### **ARPAnet (Advanced Research Projects Agency Network)**

The fore-runner to the Internet. Developed in the late 1960s and early 1970s by the US Department of Defense as an experiment in wide area networking to connect together computers that were each running different systems, so that people at one location could use computing resources from another location.

#### **Ask.com**

Search engine (see page 6) founded in 1996. Originally known as Ask Jeeves, where 'Jeeves' was the name of the 'gentleman's personal gentleman', or valet, fetching answers to any question asked. The character is allegedly based on Jeeves, Bertie Wooster's fictional valet from the works of P G Wodehouse.

#### **BackRub**

Google began in January 1996 as a research project by Larry Page, a PhD student at Stanford. In his research project, nicknamed 'BackRub', he was soon joined by Sergey Brin, a fellow Stanford PhD student and close friend. Page and Brin devised a way of rating the importance of a web page by finding out how many other pages on the web linked to it. Existing search engines at the time mainly ranked results according to how many times the search term appeared on a page.

#### **Bluetooth**

A global standard for cable-free connectivity between mobile phones, mobile PCs, handheld computers and other devices. It uses short-range radio links in the 2.4 GHz Instrumentation Scientific and Medical (ISM) band.

#### **Broadband**

Generally refers to connections to the Internet with much greater bandwidth than are possible with a modem. There is no specific definition of the speed of a 'broadband' connection but in general any Internet connection using Digital Subscriber Line (DSL), Asymmetric Digital Subscriber Line (ADSL) or via cable TV may be considered a broadband connection.

## Glossary of terms

### **Bulletin Board System (BBS)**

A computerised meeting and announcement system that allows people to have discussions, upload and download files, and make announcements without the users being connected to the computer at the same time. In the early 1990s there were many thousands of BBS's around the world. Most were very small, running on a single PC with 1 or 2 phone lines.

### **CERN**

Centre Européen pour la Recherche Nucleaire (European Center for Particle Physics), a large particle-accelerator laboratory located near Geneva, on the French-Swiss border. The World Wide Web originated here, largely due to the efforts of Tim Berners-Lee.

### **Chatroom**

A place where people talk (chat) through writing messages eg using instant messaging in a group (room) on the Internet. There is usually more than one conversation going on at the same time in a given room, this is why they are called 'chatrooms'.

### **Convergence**

The idea that all the different communications media, such as radio, TV, print media, music players, video recorders, telephones and the Internet, are coming together to form one information channel.

### **Cryptography**

A coding method in which private or secret information is encrypted (translated into an unreadable format) and then decrypted (translated back into a readable format) by someone with a secret key.

### **CYPNET**

An experimental computer program developed in 1971 by Ray Tomlinson, which transferred files between linked computers.

### **Domain Name System (DNS)**

The system which translates Internet domain names (eg connected-earth.com) into IP numbers (eg 213.120.226.78). A 'DNS Server' is a server that handles this kind of translation.

### **Domain Name Server**

A name server, or domain name server, is the way in which cross-referencing between domain names and their corresponding IP addresses happens. Name servers are used so that people don't have to remember long numerical IP addresses.

### **eBay**

An online auction and shopping website in which people and businesses buy and sell goods and services worldwide. Founded in 1995 by French-born Iranian computer programmer Pierre Omidyar as AuctionWeb.

### **E-commerce (Electronic commerce)**

Business (eg buying and selling) conducted over the Internet. Commerce can be between two businesses (commonly referred to as B2B) or between a business and a consumer (commonly referred to as B2C).

## Glossary of terms

### Email (Electronic Mail)

Messages, usually text, sent from one person to another via computer. Email can also be sent automatically to a large number of addresses. Sometimes this is unwanted information, which recipients would term 'spam'.

### Encryption

To convert data from its original form to a version that can only be read by someone who can reverse the encryption. The purpose of encryption is to prevent unauthorised reading of the data.

### Facebook

A social networking website launched in February 2004. Initially restricted to university students, after September 2006 anyone 13 or older could join. The name of the site refers to paper facebooks depicting members of campus community that some US colleges and preparatory schools give to incoming students and staff as a way of getting to know other people.

### Fibre optic

A transmission technology in which modulated light wave signals, generated by laser or LED (which convert digital information into light that is turned on and off very rapidly) are sent along a glass or plastic strand, and then demodulated (so as to become digital information again) by a light-sensitive receiver.

### Google (also see BackRub)

A popular search engine, which is a tool for finding resources on the World Wide Web. Google scans web pages to find instances of keywords you have entered in the search box.

### Gopher

Invented at University of Minnesota in 1993 just before the World Wide Web, Gopher was a method of making menus of material available over the Internet. It was designed to be easier to use than File Transfer Protocol (FTP), allowing users to access information through clicking text-only hyperlinked menus. Although Gopher spread rapidly across the globe in only a couple of years, it has now been largely replaced by the World Wide Web.

### Hotspot

A specific geographic location where public wireless broadband network service is provided to mobile visitors through a wireless Local Area Network (LAN). Hotspots are often located in places such as airports, railway stations, libraries and coffee shops.

### Hyperlink

A clickable link in the text or graphics on a web page that takes you to another place on the same page, another page, or a whole other site.

### Hypertext

Text that contains links to other documents - these are words or phrases in the document that can be selected by a reader, causing another file (eg document or image) to be retrieved and displayed.

## Glossary of terms

### Internet

A vast collection of interconnected networks that are connected using TCP/IP protocols (see Transmission Control Protocol) that developed from the ARPAnet of the late 1960s and early 1970s. The Internet (capital I) connects tens of thousands of independent networks into a vast global internet (lowercase i). Because it is truly a global computer network it is probably the largest Wide Area Network in the world.

### Internet Protocol

see **Transmission Control Protocol**

### Internet Relay Chat (IRC)

Basically a huge multi-user live chat facility. There are a number of major IRC servers around the world which are linked to each other. Anyone can start a conversation, known as a channel. Anything that anyone types in a given channel is seen by all the others in the channel. Private channels can be (and are) created for multi-person conference calls.

### iPod

A brand of portable media player designed and marketed by Apple, launched in 2001.

### iTunes

Digital media player software, introduced by Apple in January 2001. Used for playing and organising digital music and video files.

### Memex

The 'Memex' (a word made up by combining the first letters of the words 'memory extender') was the name given by Vannevar Bush to an imaginary hypertext computer system he proposed in 1945.

### Modem

A device that connects a computer to a phone line, allowing the computer to talk to other computers through the phone system. Basically, modems do for computers what a telephone does for humans.

### Mosaic

The first web browser available for Macintosh, Windows, and UNIX – all with the same design. Mosaic really started the popularity of the web. The first version was released in late 1993.

### MP3

Stands for MPEG-1 or MPEG-2 audio layer 3. A way of making audio files (eg music) smaller while still allowing a relatively high sound quality. A compression rate of 12:1 is possible through MP3.

### Multi-User Dungeons (MUDs)

A simulation environment that can be used by many people at the same time, and that is usually text-based. Some are purely for fun and socialising, others are used for serious software development, or education purposes. A significant feature of most MUDs is that users can create things that stay after they leave and which other users can interact with in their absence, thus allowing a world to be built gradually and collectively.

## Glossary of terms

### **MySpace**

Social networking website created by eUniverse in 1998.

### **Napster**

A file sharing tool that opened up the P2P (Person-to-Person) file-sharing software market. This sort of software can download music, movies, and other files direct from the computers of other users.

### **National Physical Laboratory (NPL)**

The NPL is the UK's National Measurement Institute, founded in 1900. Donald Davies at the NPL developed packet switching in 1966.

### **Newsgroup**

The name for discussion groups on USENET.

### **Nexus**

The world's first web browser and hypertext markup language (HTML) editor was called WorldWideWeb (all one word). It was introduced in February 1991 by Tim Berners-Lee. It was later renamed Nexus to avoid confusion with the World Wide Web itself.

### **NORSAR**

Located at Kjeller, north of Oslo, NORSAR or Norwegian Seismic Array was established in 1968 as part of the Norwegian-US agreement for the detection of earthquakes and nuclear explosions. Since 1999, NORSAR has been an independent research foundation.

### **Packet**

A formatted block of data carried by a computer network. Computer communications links that do not use packets, such as traditional point-to-point telecommunications connections, simply transmit data as a series of bytes, characters, or bits alone. When data is formatted into a packet, the network can transmit long messages more efficiently and reliably.

### **Packet switching**

A method used to move data around on the Internet. In packet switching, all the data coming out of a computer is broken up into chunks. Each chunk has the address of where it came from and where it is going. This enables chunks of data from many different sources to travel along the same lines, and be sorted and directed along different routes by special computers along the way.

### **PayPal**

An e-commerce business allowing payments and money transfers to be made through the Internet. It serves as an electronic alternative to traditional paper methods such as cheques and money orders.

### **Phishing**

A form of Internet fraud that aims to steal valuable information such as credit card numbers, social security numbers, user IDs and passwords. Phishing involves someone sending emails, for example, impersonating a bank or other trusted institution. The goal of the impersonation is to extract passwords or other sensitive information from the victim.

## Glossary of terms

### **RAND Corporation**

The RAND Corporation (Research AND Development) is a non profit-making global policy think tank first formed to offer research and analysis to the US armed forces. RAND was set up in 1946 by the US Army Air Forces as Project RAND.

### **Roger Wilco (see VoIP)**

Voice Over Internet Protocol (VoIP) application used by multiplayer computer game players on the PC, usually in combination with a headset. The software gives gamers the advantage of not having to communicate by typing, allowing them better control over their games.

### **Search engine**

A system for searching the information available on the web. Some search engines work by automatically searching the contents of other sites and creating a database of the results. Other search engines contain only material manually approved for inclusion in a database (many would call this a directory). Some combine the two approaches.

### **Second Life**

An Internet-based virtual world launched in 2003, developed by Linden Research, Inc (commonly referred to as Linden Lab). Enables its users, called 'Residents', to interact with each other through moving avatars (a computer user's representation of himself or herself).

### **Secure Socket Layer protocol (SSL)**

System designed by Netscape Communications to enable encrypted, authenticated communications across the Internet. It enables buying and selling to take place securely.

### **Social networking**

Websites that link people to each other in some way. Digg is an example of a social network (using social bookmarking). Users work together to rate news and are linked by rating choices. Generally, social networks are used to enable various types of activity whether commercial, social or some combination of the two.

### **Sputnik**

The first satellite launched into outer space, by the Soviet Union in October 1957. The launch was an embarrassment for the US, because at the time American rockets were not large or reliable enough to put a satellite in orbit. It sparked US fears of Soviet dominance in technology and outer space, which led to the creation of NASA and the space race.

### **Transmission Control Protocol/Internet Protocol (TCP/IP)**

Agreed methods of communications used by computers. A specification that describes the rules and procedures that products should follow to transmit data on a network, and which underpins the Internet. Originally designed for UNIX (a unique computer language), TCP/IP software is now included with every major kind of computer operating system. To be truly on the Internet, your computer must have TCP/IP software.

## Glossary of terms

### **USENET**

A world-wide system of discussion groups, with comments passed among hundreds of thousands of machines. Not all USENET machines are on the Internet. USENET is completely decentralised, with over 10,000 discussion areas called newsgroups.

### **Voice Over Internet Protocol (VoIP)**

A specification and various technologies used to allow telephone calls to be made over IP networks, especially the Internet. One example is Skype. Just as modems allow computers to connect to the Internet over regular telephone lines, VoIP technology allows humans to talk over Internet connections. Because the IP networks are packet-switched, this allows for completely different ways of handling connections and more efficient use of network resources.

### **WaveLan**

Wireless network technology originally designed by NCR Corporation and introduced to the market in 1990.

### **Web browser**

Software that interprets the markup of files in hypertext markup language (HTML), formats them into web pages, and displays them to the user.

### **WebCrawler**

A search engine of search engines and/or databases (metasearch engine). It displays the top search results from Google, Yahoo!, Live Search (formerly MSN Search), Ask.com, About.com, MIVA, LookSmart and other popular search engines. WebCrawler was the first web search engine to provide full text search. It went live in April 1994.

### **Wide Area Information System (WAIS)**

Developed in the early 1990s, WAIS was the first truly large-scale system to allow the indexing of huge quantities of information on the Web, and to make those indices searchable across networks such as the Internet. WAIS was also pioneering in its use of ranked (scored) results where the software tries to determine how relevant each result is.

### **Wi-Fi (Wireless Fidelity)**

A popular term for a form of data communication without cables for connection – hence wireless. Wi-Fi is really a nickname, based on the term Hi-Fi, which itself originated in the 1950s and was used to describe top quality equipment used to reproduce music.

### **Wireless Application Protocol (WAP)**

The system that enables content (eg websites) to be displayed on a mobile phone display.

### **Yahoo!**

Internet services company providing a range of products. In addition to acting as a point of access to information on the Internet (web portal), it also offers a search engine, the Yahoo! Directory and Yahoo! Mail. It was founded by Stanford University graduate students Jerry Yang and David Filo in January 1994.

### **YouTube**

A video sharing website where users can upload, view and share video clips. YouTube was created in mid-February 2005 by three former PayPal employees.