The Internet – An introduction

It's hard to imagine life without the Internet. How did people 'do' things before the Internet existed? It does seem hard to fathom, however this technology has a relatively short history. And, over a very short period of time has become an integral part of most people's lives (particularly those who are working and studying).

It is important to understand the difference between the two terms that have become synonymous with the technology: - the *Internet* and the *Web*.

What is the Internet?

The internet interlinks an enormous number of local networks operated by universities, research centres, government departments, non-profit and commercial organisations worldwide. It is a network of networks linking computers within a network to other computers within other networks.

What is the World Wide Web?

The best person to describe the World Wide Web is its inventor – Sir Tim Berners-Lee:

> " The Web is an abstract (imaginary) space of information. On the Net, you find computers -- on the Web, you find documents, sounds, videos,.... information. On the Net, the connections are cables between computers; on the Web, connections are hypertext links. The Web exists because of programs which communicate between computers on the Net. The Web could not be without the Net. The Web made the Net useful because people are really interested in information (not to mention knowledge and wisdom!) and don't really want to have to know about computers and cables."

<div align="right">Tim Berners-Lee</div>

History – A timeline

Like quite a lot of 'new' technologies, the first computers were developed by the military in the Second World War.

The Atanasoff-Berry Computer (ABC) was the first electronic digital computer (but not programmable). It was developed in 1937 and used until 1942 by John V. Atanasoff and Clifford Berry at Iowa State University.

1944 - The Colossus computer was developed in secret by Great Britain during World War II and was used to decode German messages. The prototype was completed in December 1943, and fully operational by February 1944. These were the world's first programmable, digital, electronic, computing devices. The existence of Colossus was kept a secret until 1970, by which time it had been disassembled. Due to the secrecy under which it was developed, almost no details of the construction or architecture of Colossus are known.

Also developed in World War II in the US by IBM, the Harvard Mark 1 was an electromechanical calculator used in constructing navigational tables and tracking and aiming devices for anti-aircraft guns.

These computers filled a room and existed independently of one another.
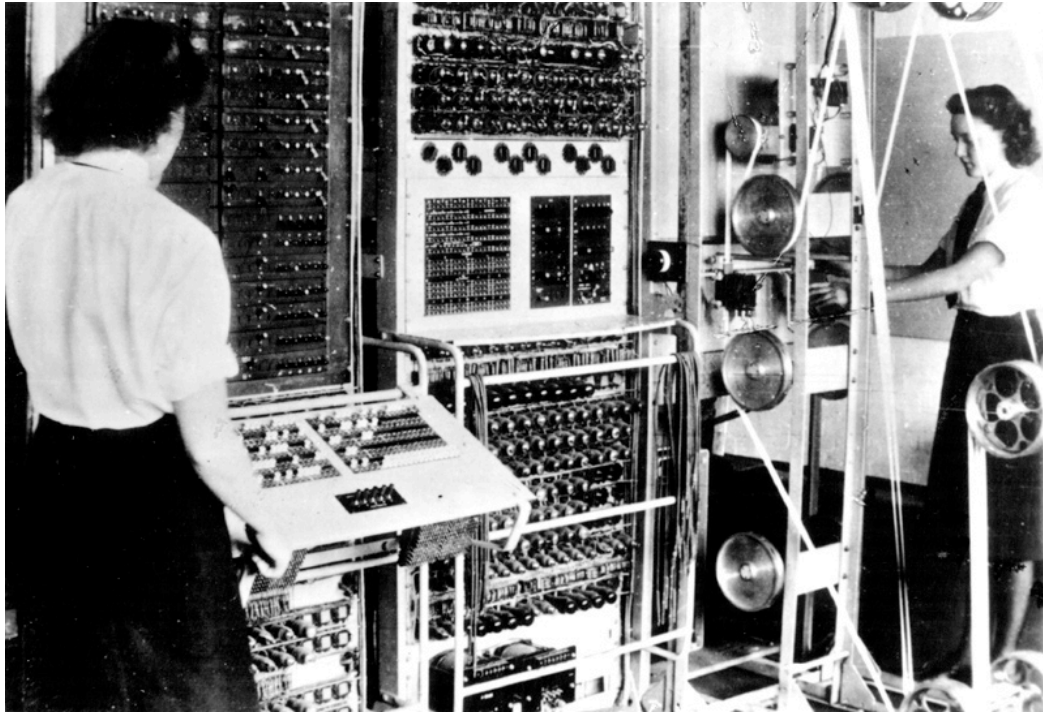
The Colossus
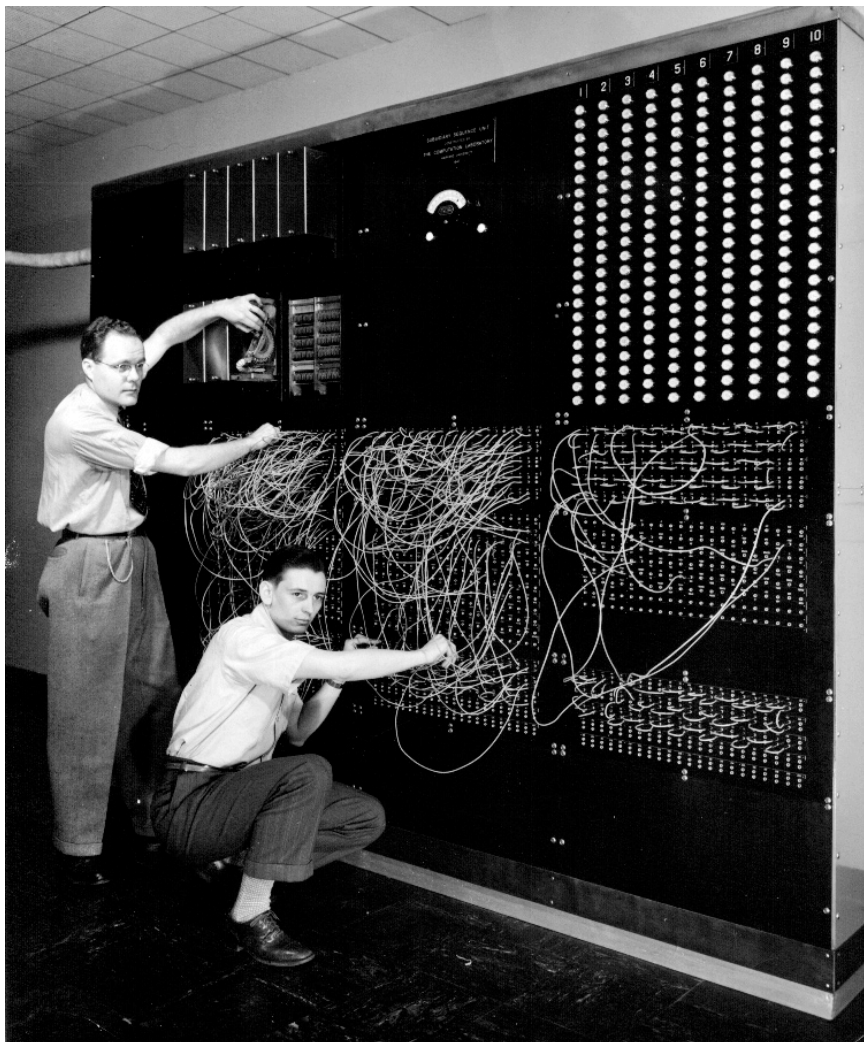
Harvard Mark 1

After the war the technology developed rapidly as there was a huge pool of scientists with experience in digital computing

1945 - Vannevar Bush, the Director of the Office of Scientific Research and Development, writes a paper describing a device called a Memex, which could make and follow links between documents on microfiche. This was the first discussion of interlinked documents (a network).

1957 - USSR launches Sputnik - the first artificial earth satellite

US forms ARPA (Advanced Research Projects Agency). ARPA was housed within the Ministry of Defense and was formed to establish the US as the leader in science and technology. It had a huge budget. Although it was initially set up to focus on space, missiles and nuclear test monitoring, its other interest was on communicating between its operational base and its various subcontractors, preferably between its various computers.

1960's

1960 - J.C.R. Licklider, from MIT, publishes "Man-Computer Symbiosis". He suggested that computers could take over from the time consuming work of problem solving. When man and computers were combined they would be a very efficient system. He was also advocating to make computers more interactive. His ideas were revolutionary at the time but would later shape computer development.

1962 - ARPA opens a computer research program and appoints Licklider as its head. Their main objective was to conduct research into linking computers together and sending messages by breaking them up into 'packages' of information.

1965 - Computers at Berkeley and MIT are linked over a low-speed dial-up telephone line to become the first "wide area network" (WAN)

1966/67 - ARPA publishes a plan for a computer network system called ARPANET

1969 - ARPANET is launched and consists of four host computers.

- UCLA (September)

- Stanford Research Institute (SRI) (October)

- University of California Santa Barbara (UCSB) (November)

- University of Utah (December)

This is the birth of the Internet
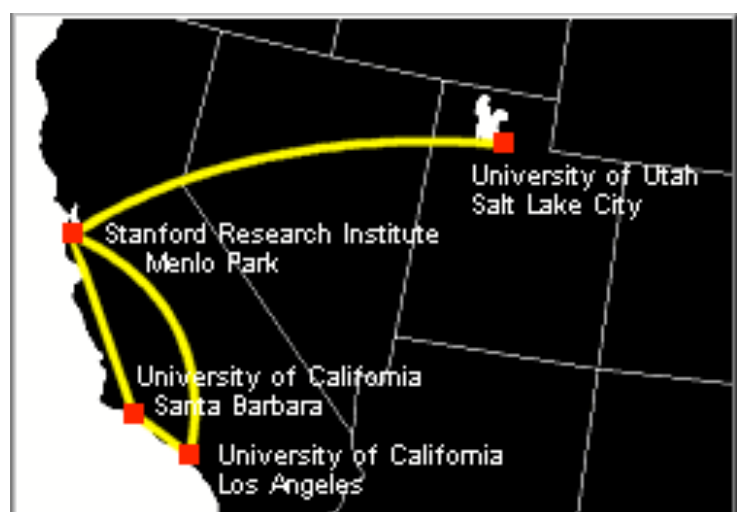
1970's

1971 - ARPANET increases to 23 hosts.

Ray Tomlinson of BBN (Bolt Beranek and Newman) creates a program to send messages across a distributed network. BBN were originally an architectural acoustics design firm but moved into computer consultancy. This is the beginning of email.

1972 - ARPANET goes 'public' at the First International Conference on Computers and Communication. They are now linking computers together from 40 different locations. ARPANET was currently using the Network Control Protocol or NCP to transfer data. This allowed communications between hosts running on the same network.

Internetworking Working Group (INWG) is established to address the need for agreement on protocols or languages.

1973 - Global networking becomes a reality

ARPANET makes its first international connection to the University College of London (England) and the Royal Radar Establishment in Norway (NORSAR).

1974 - Transmission Control Protocol (TCP) by Vint Serf and Bob Kahn is developed. TCP allows diverse computer networks to interconnect and communicate with each other. Establishing a protocol standard meant that if a package of information was unable to go through one route, it could be rerouted to another network and still reach its destination.

Telnet - a commercial version of ARPANET is opened

The File Transfer Protocol (FTP) is developed, simplifying the transfer of data between networked machines.

The term Internet is first used.

1975 - Apple Computer Inc. is founded by Steve Jobs and Steve Wozniak

William Henry Gates III and Paul Allen form Microsoft Inc.

1976 - Queen Elizabeth II sends an email announcing that the Royal Signals and Radar Establishment is available on the ARPANET system (March 26).
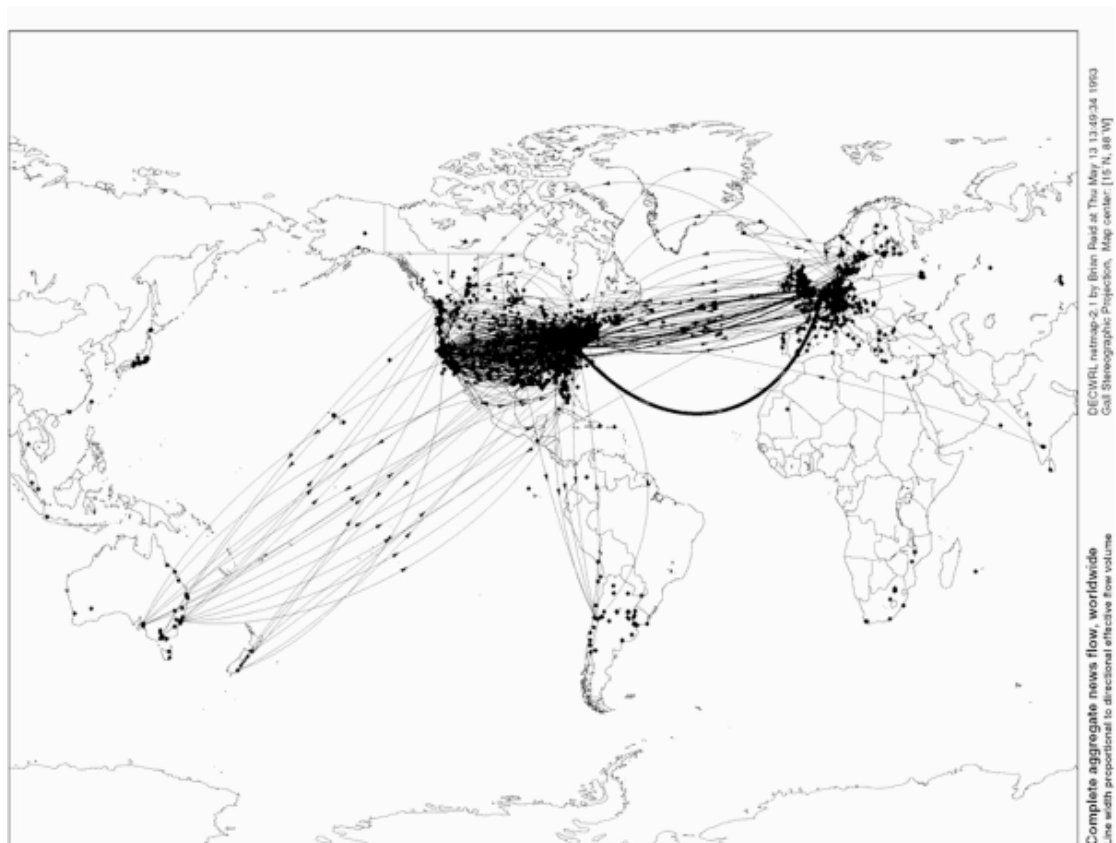
1978 - The first computer Bulletin Board System (BBS) is created

1979 - Newsgroups are born – USENET. These are the first discussion boards. USENET is still in operation today.

The first MUDs (Multi User Dungeons) are created

Dr. Robert M. Metcalfe develops Ethernet, which allowed coaxial cable to move data extremely fast.

The map, from May 1993, showing traffic for the worldwide USENET network.

1980's

1980s - Network and hardware explosion (LANs, PCs and workstations).

Internet used by Researchers and Developers

ARPANET has 213 hosts, with a new host added approximately once every 20 days.

We also start to see the emergence of hackers and viruses

1984 - Domain Name System (DNS) is used to identify the type of institution, which represents the host, for example: edu (education), gov (government), mil (military), com (commercial), org (organization), and net (network resources).

Number of hosts breaks 1,000

1985 - On March 15, Symbolics.com becomes the first registered domain.

1989 - Number of hosts breaks 100,000

Internet arrives in Australia with the set up of AARNet (Australian University network)

1990's

1990 - British researcher Tim Berners-Lee, working at CERN in Geneva, Switzerland, puts forward a proposal for the World Wide Web. The World Wide Web enables easy access to any form of information anywhere in the world.

There are now 300,000 hosts, and 1,000 Newsgroups on the Internet

1992 - The World Wide Web is released by CERN.

Tim Berners-Lee creates HTML, which uses URLs for web addresses.

The Web as we know it is born!

1993 - The US White House goes on-line (http://www.whitehouse.gov)

There are now 2 Million hosts, and 600 www sites

1994 - Marc Andreessen develops the first Internet browser called Mosaic. Mosaic provides a graphical interface, which makes the Internet more visually appealing.

Yahoo!, which stands for "Yet Another Hierarchical Officious Oracle" is founded by two PhD students from Stanford, Jerry Yang and David Filo.

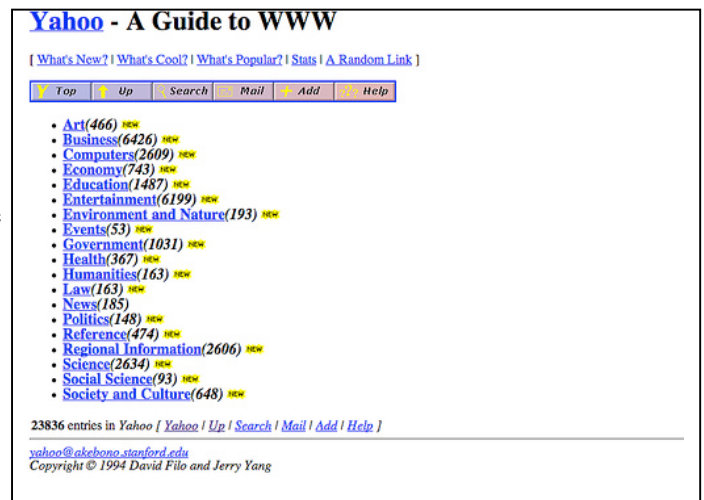Pizza Hut offers pizza ordering on its Web page.

First Virtual, the first cyberbank, opens.

Paul Keating, the then Australian Prime Minister launches 'Creative Nation'. Creative Nation was the Labor government's creative and cultural policy.
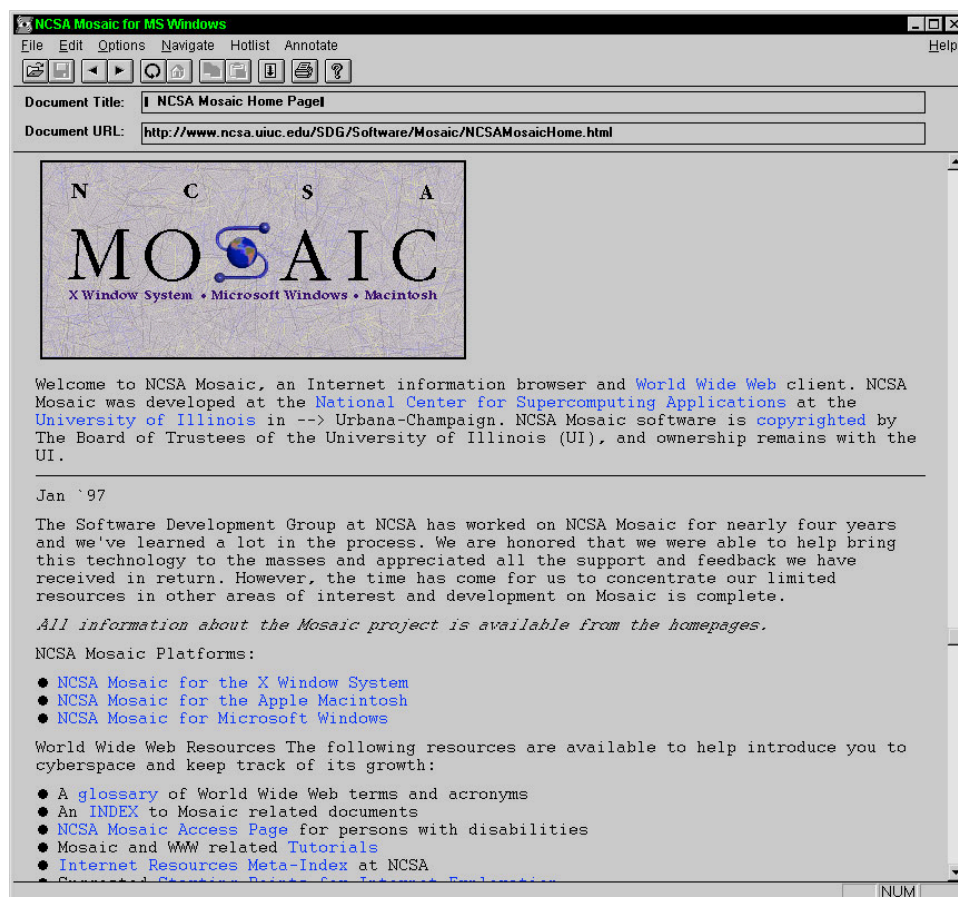
The Mosaic interface

1995 - Amazon.com goes live

Mosaic becomes Netscape

Microsoft introduces Windows 95

AltaVista is launched and becomes the biggest search engine

45% of Americans have heard of the World Wide Web

Telstra took over AARNet and became the main Australian backbone. Telstra Big Pond.

1996 - Browser wars begin: Netscape (87%) of users; Explorer climbing

from 4%.

EBay's AuctionWeb receives its

millionth bid, shortens name to eBay.

82% of Americans have heard of the Web

There are now 12.8 million hosts, 0.5 million www sites

1998 - The final 21 unwired countries (from Afghanistan to Western Sahara) come online. The Web is now global.
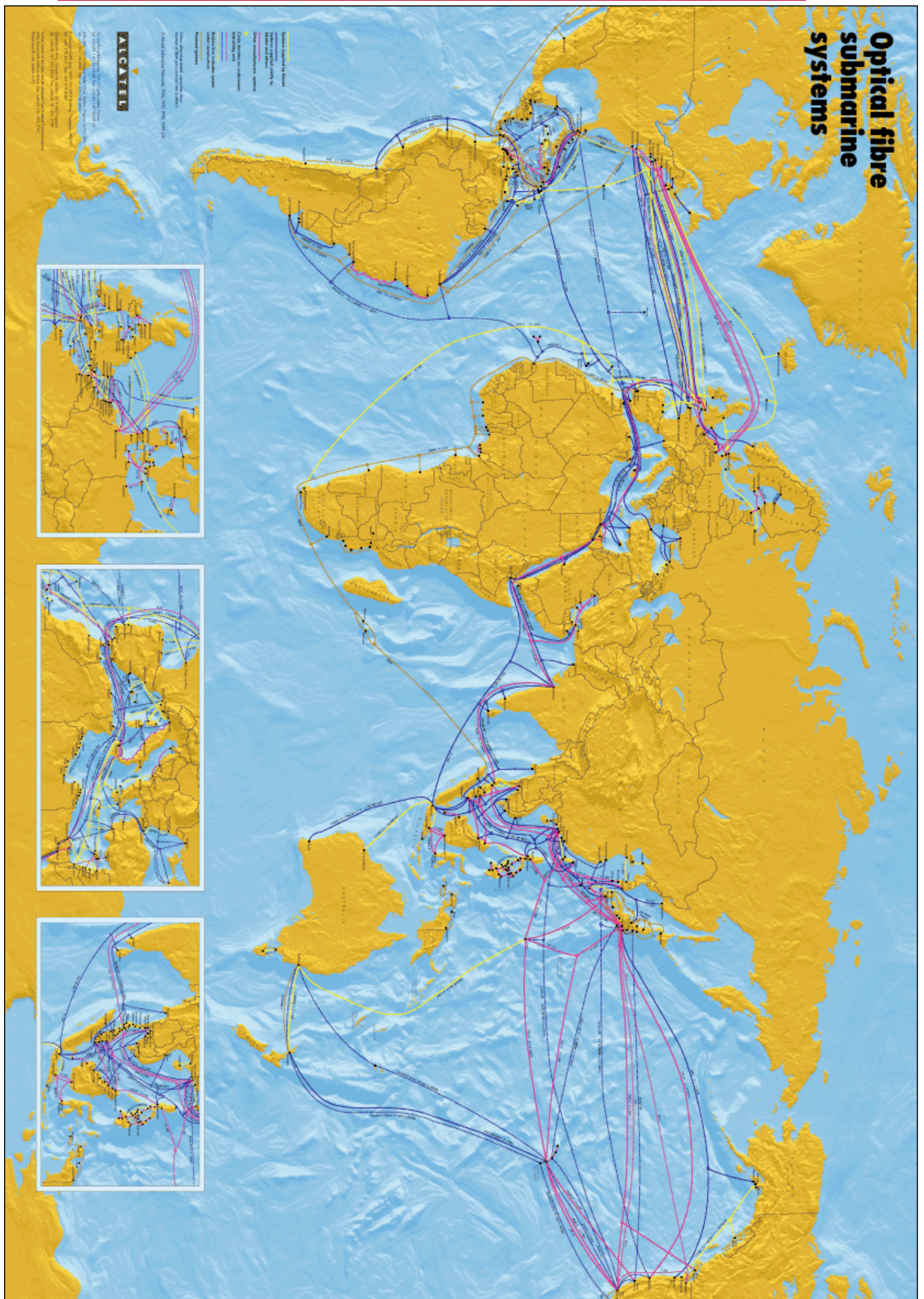
1999 - The late 1990s boom in technology, the dot-com company stocks is a good example of a bubble, which burst in late 2000 and through 2001.

An early screen version of Yahoo - 1994

2000's

- Online gaming
- Social Networking sites
- wikis
- blogs
- Wireless mobile networks
- faster bandwidths
- Internet Security
- Web 2.0 generation - creating your own content

The map on the next page shows the optical fibre submarine network.

Optical fibre submarine systems

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