History of the Internet

This section is a summary of some of the material contained in Hobbes' Internet Timeline and also contains sources from Pros Online - Internet History and History of Internet and WWW : View from Internet Valley and a variety of text books. Unfortunately some of these web sites are now dead.

For an up-to-date history please see: A Brief Guide to the History of the Internet

1836
   -- **Telegraph**. Cooke and Wheatstone patent it.

   Why is this relevant?

   - Revolutionised human (tele)communications.
   - Morse Code a series of dots and dashes used to communicate between humans. This is not a million miles away from how computers communicate via (binary 0/1) data today. Although it is much slower!!

1858-1866
   -- **Transatlantic cable**. Allowed direct instantaneous communication across the atlantic.

   Why is this relevant?

   - Today, cables connect all continents and are still a main hub of telecommunications.

1876
   -- **Telephone**. Alexander Graham Bell Exhibits.

   Why is this relevant?

   - Telephones exchanges provide the backbone of Internet connections today.
   - Modems provide Digital to Audio conversions to allow computers to connect over the telephone network.

1957
   -- **USSR launches Sputnik**, first artificial earth satellite.

   Why is this relevant?

   - The start of global telecommunications. Satellites play an important role in transmitting all sorts of data today.
   - In response, US forms the Advanced Research Projects Agency (ARPA) within the Department of Defense (DoD) to establish US lead in science and technology applicable to the military.

1962 - 1968
   -- **Packet-switching (PS) networks developed**

   Why is this relevant?

   - As we will see later the Internet relies on packets to transfer data.

- The origin is military : for utmost security in transferring information of networks (*no single outage point*).
- Data is split into tiny packets that may take different routes to a destination.
- Hard to eavesdrop on messages.
- More than one route available -- if one route goes down another may be followed.
- Networks can withstand large scale destruction (Nuclear attack - This was the time of the Cold War).

1969
-- Birth of Internet

ARPANET commissioned by DoD for research into networking

Why is this relevant?

- First node at UCLA (Los Angeles) closely followed by nodes at Stanford Research Institute, UCSB (Santa Barbara) and U of Utah (4 Nodes).

1971
-- People communicate over a network
- 15 nodes (23 hosts) on ARPANET.

- E-mail invented -- a program to send messages across a distributed network.

  Why is this relevant?

    - E-mail is still the main way of inter-person communication on the Internet today.
    - We will study how to use and send E-mail shortly in this course.
    - You will make extensive use of E-mail for the rest of your life.

1972
-- Computers can connect more freely and easily

- First public demonstration of ARPANET between 40 machines.

- Internetworking Working Group (INWG) created to address need for establishing agreed upon protocols.

  Why is this relevant?

    - Telnet specification
    - Telnet is still a relevant means of inter-machine connection today.

1973
-- Global Networking becomes a reality

- First international connections to the ARPANET: University College of London (England) and Royal Radar Establishment (Norway)

- Ethernet outlined -- this how local networks are basically connected today.

- Internet ideas started.

- Gateway architecture sketched on back of envelope in hotel lobby in San Francisco. Gateways define how large networks (maybe of different architecture) can be connected together.

- File Transfer protocol specified -- how computers send and receive data.

1974
- **-- Packets become mode of transfer**
  - Transmission Control Program (TCP) specified. Packet network Intercommunication -- the basis of Internet Communication.

  - Telenet, a commercial version of ARPANET, opened -- the first public packet data service.

1976
- **-- Networking comes to many**

  - Queen Elizabeth sends out an e-mail.

  - UUCP (Unix-to-Unix CoPy) developed at AT&T Bell Labs and distributed with UNIX.

    Why is this relevant?

      - UNIX was and still is the main operating system used by universities and research establishments.
      - These machines could now ``talk'' over a network.
      - Networking exposed to many users worldwide.

1977
- **-- E-mail takes off, Internet becomes a reality**

  - Number of hosts breaks 100.
  - THEORYNET provides electronic mail to over 100 researchers in computer science (using a locally developed E-mail system and TELENET for access to server).

  - Mail specification

  - First demonstration of ARPANET/Packet Radio Net/SATNET operation of Internet protocols over gateways.

1979
- **-- News Groups born**

  - Computer Science Department research computer network established in USA.

  - USENET established using UUCP.

    Why is this relevant?

      - USENET still thrives today.
      - A collection of discussions groups, *news groups*.
      - 3 news groups established by the end of the year
      - Almost any topic now has a discussion group.

1979 (Cont)

  - First MUD (Multiuser Dungeon) -- interactive multiuser sites. Interactive adventure games, board games, rich and detailed databases.

  - ARPA establishes the Internet Configuration Control Board (ICCB).

  - Packet Radio Network (PRNET) experiment starts with ARPA funding. Most communications take place between mobile vans.

1981

   -- **Things start to come together**

- BITNET, the "Because It's Time NETwork" Started as a cooperative network at the City University of New York, with the first connection to Yale

    ○ Provides electronic mail and listserv servers to distribute information, as well as file transfers

- CSNET (Computer Science NETwork) established to provide networking services (specially E-mail) to university scientists with no access to ARPANET. CSNET later becomes known as the Computer and Science Network.

1982

   -- **TCP/IP defines future communication**

- DCA and ARPA establishes the Transmission Control Protocol (TCP) and Internet Protocol (IP), as the protocol suite, commonly known as TCP/IP, for ARPANET.

    Why is this relevant?

    ○ Leads to one of the first definitions of an *internet* as a connected set of networks, specifically those using TCP/IP, and *Internet* as connected TCP/IP internets.

1982 (Cont)

- EUnet (European UNIX Network) is created by EUUG to provide E-mail and USENET services. Original connections between the Netherlands, Denmark, Sweden, and UK

- External Gateway Protocol specification -- EGP is used for gateways between (different architecture) networks.

1983

   -- **Internet gets bigger**

- Name server developed.

    Why is this relevant?

    ○ Large number of nodes.
    ○ Hard to remember exact paths
    ○ Use meaningful names instead.

- Desktop workstations come into being.

    Why is this relevant?

    ○ Many with Berkeley UNIX which includes IP networking software.

    ○ Need switches from having a single, large time sharing computer connected to Internet per site, to connection of an entire local network.

1983 (Cont)

- Internet Activities Board (IAB) established, replacing ICCB

- Berkeley releases new version of UNIX 4.2BSD incorporating TCP/IP.

- EARN (European Academic and Research Network) established on similar lines to BITNET

1984
-- Growth of Internet Continues

- Number of hosts breaks 1,000.
- Domain Name Server (DNS) introduced.

  - instead of 123.456.789.10
  - it is easier to remember something like

    www.myuniversity.mydept.mynetwork.mycountry

    (*e.g.* www.cs.cf.ac.uk).

- JANET (Joint Academic Network) established in the UK
- Moderated newsgroups introduced on USENET.

1986
-- Power of Internet Realised

- 5, 000 Hosts. 241 News groups.
- NSFNET created (backbone speed of 56 Kbps)
- NSF establishes 5 super-computing centers to provide high-computing power for all -- This allows an explosion of connections, especially from universities.
- Network News Transfer Protocol (NNTP) designed to enhance Usenet news performance over TCP/IP.

1987
-- Commercialisation of Internet Born

- Number of hosts 28,000.
- UUNET is founded with Usenix funds to provide commercial UUCP and Usenet access.

1988

- NSFNET backbone upgraded to T1 (1.544 Mbps)

- Internet Relay Chat (IRC) developed

1989
-- Large growth in Internet

- Number of hosts breaks 100,000

- First relays between a commercial electronic mail carrier and the Internet

- Internet Engineering Task Force (IETF) and Internet Research Task Force (IRTF) comes into existence under the IAB

1990
-- Expansion of Internet continues
- 300,000 Hosts. 1,000 News groups
- ARPANET ceases to exist

- Archie released files can be searched and retrieved (FTP) by name.
- The World comes on-line (world.std.com), becoming the first commercial provider of Internet dial-up access.

1991
-- Modernisation Begins

- Commercial Internet eXchange (CIX) Association, Inc. formed after NSF lifts restrictions on the commercial use of the Net.

- Wide Area Information Servers (WAIS)

  Why is relevant?

  - Provides a mechanism for indexing and accessing information on the Internet.
  - Large bodies of knowledge available: E-mail messages, text, electronic books, Usenet articles, computer code, image, graphics, sound files, databases *etc.*.
  - These form the basis of the index of information we see on WWW today.
  - Powerful search techniques implemented. Keyword search.

1991 (cont)
-- Friendly User Interface to WWW established

- Gopher released by Paul Lindner and Mark P. McCahill from the U of Minnesota.

  Why is relevant?

  - Text based, menu-driven interface to access internet resources.
  - No need to remember or even know complex computer command. User Friendly Interface (?).
  - Largely superseded by WWW, these days.

1991 (cont)
-- Most Important development to date

- World-Wide Web (WWW) released by CERN; Tim Berners-Lee developer.

  Why is relevant?

  - Originally developed to provide a distributed hypermedia system.
  - Easy access to any form of information anywhere in the world.
  - Initially non-graphic (this came later, MOSAIC, 1993).
  - Revolutionised modern communications and even our, way of life (?).

- NSFNET backbone upgraded to T3 (44.736 Mbps). NSFNET traffic passes 1 trillion bytes/month and 10 billion packets/month

- Start of JANET IP Service (JIPS) using TCP/IP within the UK academic network.

1992
-- Multimedia changes the face of the Internet

- Number of hosts breaks 1 Million. News groups 4,000
- Internet Society (ISOC) is chartered.
- First MBONE audio multicast (March) and video multicast (November).

- The term "Surfing the Internet" is coined by Jean Armour Polly.

1993
-- The WWW Revolution truly begins

- Number of Hosts 2 Million. 600 WWW sites.
- InterNIC created by NSF to provide specific Internet services
  - directory and database services
  - registration services
  - information services

- Business and Media really take notice of the Internet.

- US White House and United Nations (UN) comes on-line.

- Mosaic takes the Internet by storm.

  Why is this relevant?

  - User Friendly Graphical Front End to the World Wide Web.
  - Develops into Netscape -- most popular WWW browser to date.
  - WWW proliferates at a 341,634

1994
-- **Commercialisation begins**
- Number of Hosts 3 Million. 10,000 WWW sites. 10,000 News groups.
- ARPANET/Internet celebrates 25th anniversary

- Local communities begin to be wired up directly to the Internet (Lexington and Cambridge, Mass., USA)

- US Senate and House provide information servers

- Shopping malls, banks arrive on the Internet
  - A new way of life
  - You can now order pizza from the Hut online in the US.
  - First Virtual, the first cyberbank, open up for business

- NSFNET traffic passes 10 trillion bytes/month

- WWW edges out telnet to become 2nd most popular service on the Net (behind ftp-data) based on % of packets and bytes traffic distribution on NSFNET

- UK's HM Treasury on-line (http://www.hm-treasury.gov.uk/)

1995
-- **Commercialisation continues apace**
- 6.5 Million Hosts, 100,000 WWW Sites.
- NSFNET reverts back to a research network. Main US backbone traffic now routed through interconnected network providers

- WWW surpasses ftp-data in March as the service with greatest traffic on NSFNet based on packet count, and in April based on byte count

- Traditional online dial-up systems (Compuserve, America Online, Prodigy) begin to provide Internet access

- A number of Net related companies go public, with Netscape leading the pack.

- Registration of domain names is no longer free.

- Technologies of the Year: WWW, Search engines (WAIS development).

- New WWW technologies Emerge Technologies

- Mobile code (JAVA, JAVAscript, ActiveX),
- Virtual environments (VRML),
- Collaborative tools (CU-SeeMe)

1996

-- **Microsoft enter**

- 12.8 Million Hosts, 0.5 Million WWW Sites.
- 50 Million Regular Internet Users
- 1% World Population Online, 7% English Speaking World
- Internet phones catch the attention of US telecommunication companies who ask the US Congress to ban the technology (which has been around for years)

- The WWW browser war begins , fought primarily between Netscape and Microsoft, has rushed in a new age in software development, whereby new releases are made quarterly with the help of Internet users eager to test upcoming (beta) versions.

1997

- 19.5 Million Hosts, 1 Million WWW sites, 71,618 Newsgroups.
- 117 Million Regular Internet Users
- 2% World Population Online, 13% English Speaking World

1998

- 37 Million Hosts, 15 Million Web Sites
- 151 Million Regular Internet Users
- 3% World Population Online, 16% English Speaking World

1999

- 62 Million Hosts, 29 Million WWW sites
- 245 Million Regular Internet Users
- 4% World Population Online, 26% English Speaking World

2000

- 90 Million Hosts, 68 Million WWW sites
- 391 Million Regular Internet Users
- 7% World Population Online, 34% English Speaking World
- New Top Level Domians (TLD). Some TLDs Begining to run out? `.com` for example?

  - In November 2000, after extensive discussions throughout the global Internet community, the ICANN Board selected seven TLD proposals to be included in the first addition of a global TLD to the Internet since the 1980s. The selected TLDs are: .aero (for the air-transport industry), .biz (for businesses), .coop (for cooperatives), .info (for all uses), .museum (for museums), .name (for individuals), and .pro (for professions).

    - `.biz` is already fully operational and accepting live registrations. For more information on these `.biz`, please visit the website of NeuLevel, Inc., the company selected to operate this new TLD: ***http://www.nic.biz/***.

    - `.info` is also fully operational and accepting live registrations. More info on .info registration is availble at the website of the `.info` registry operator, Afilias Limited, at ***http://www.nic.info/***.

    - `.name` is fully operational and accepting live registrations. The company selected to operate .name, Global Name Registry, has posted an informational page at ***http://www.nic.name/***.

    - `.museum` is also operational. The `.museum` TLD is sponsored by

Museum Domain Management Association (MuseDoma). MuseDoma's informational site can be located at ***http://www.nic.museum/***.

- ■ `.coop` is operational. The `.coop` TLD is sponsored by the National Cooperative Business Association (NCBA). An informational site for .coop is available at ***http://www.nic.coop/***.

- ■ `.aero` is operational and is sponsored by Societe Internationale de Telecommunications Aeronautiques SC (SITA). For more information on `.aero`, please visit ***http://www.nic.aero***.

- ■ The `.pro` registry agreement is still under negotiation. More information on `.pro` is available at the website of the registry operator, RegistryPro, Ltd., at ***http://www.registrypro.com***.

2001
- 120 Million Hosts Average (Peak 168 Million), 90 Million WWW sites.
- 529 Million Internet Users
- 9% World Population Online, 41% English Speaking World

2002
- 160 Million Hosts Average, 130 Million WWW sites.
- 615 Million Internet Users
- 11% World Population Online, 43% English Speaking World

Predicted Users
> **2003**
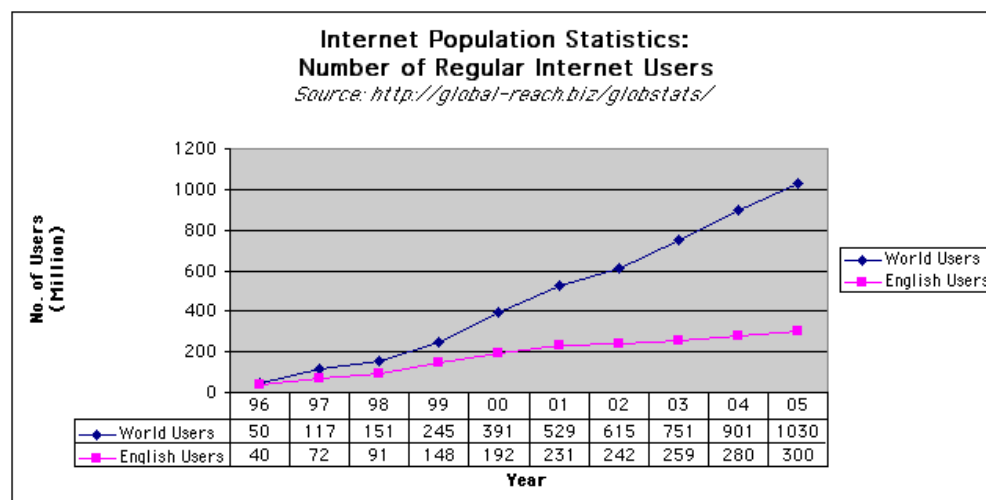> 751 Million (13% World Pop., 46% Eng. Pop.)
> **2004**
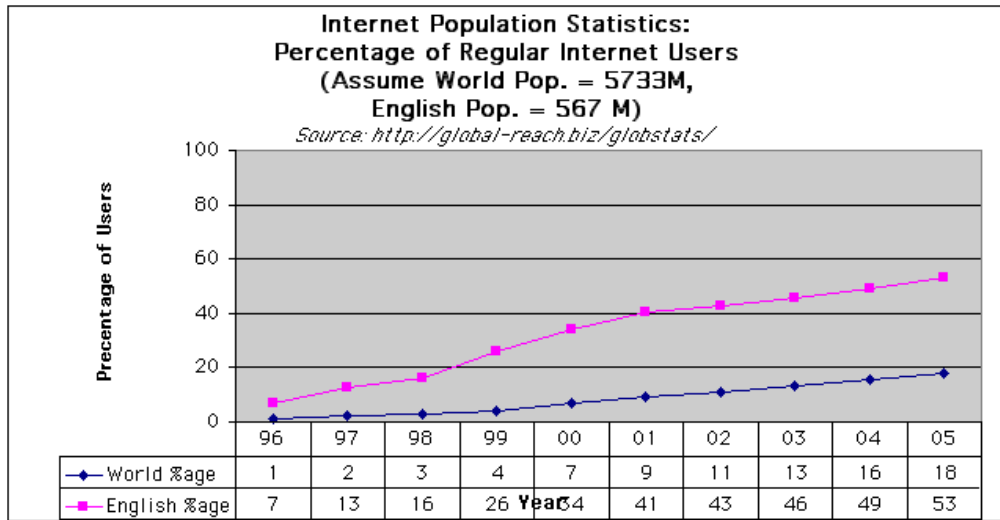> 901 Million (16% World Pop., 49% Eng. Pop.)
> **2005**
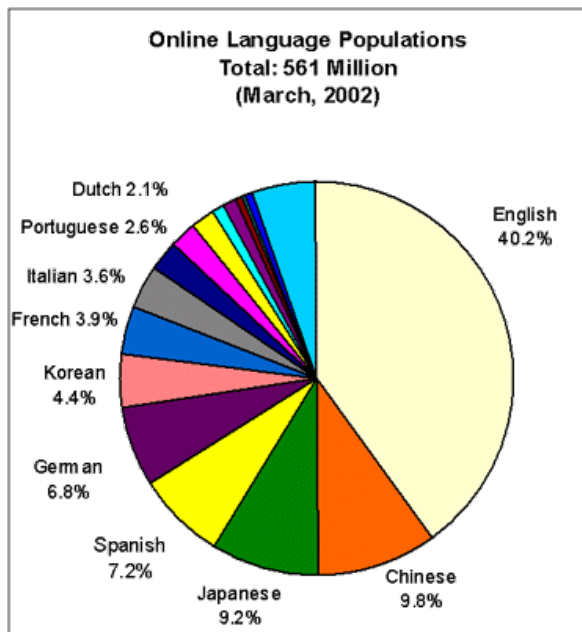> 1030 Million (18% World Pop., 53% Eng. Pop.)

The figure below shows the growth in the population of Internet users in recent years and also include predictions for the coming years:
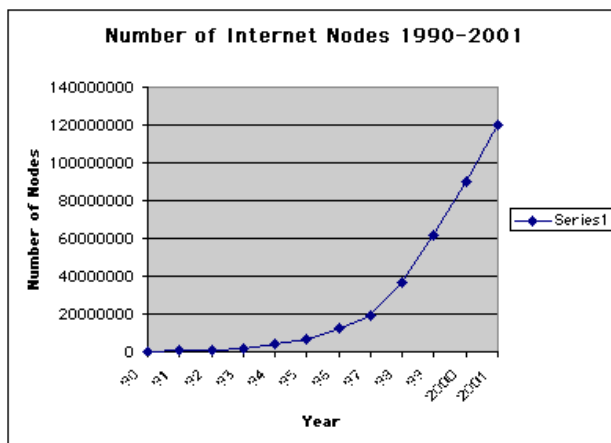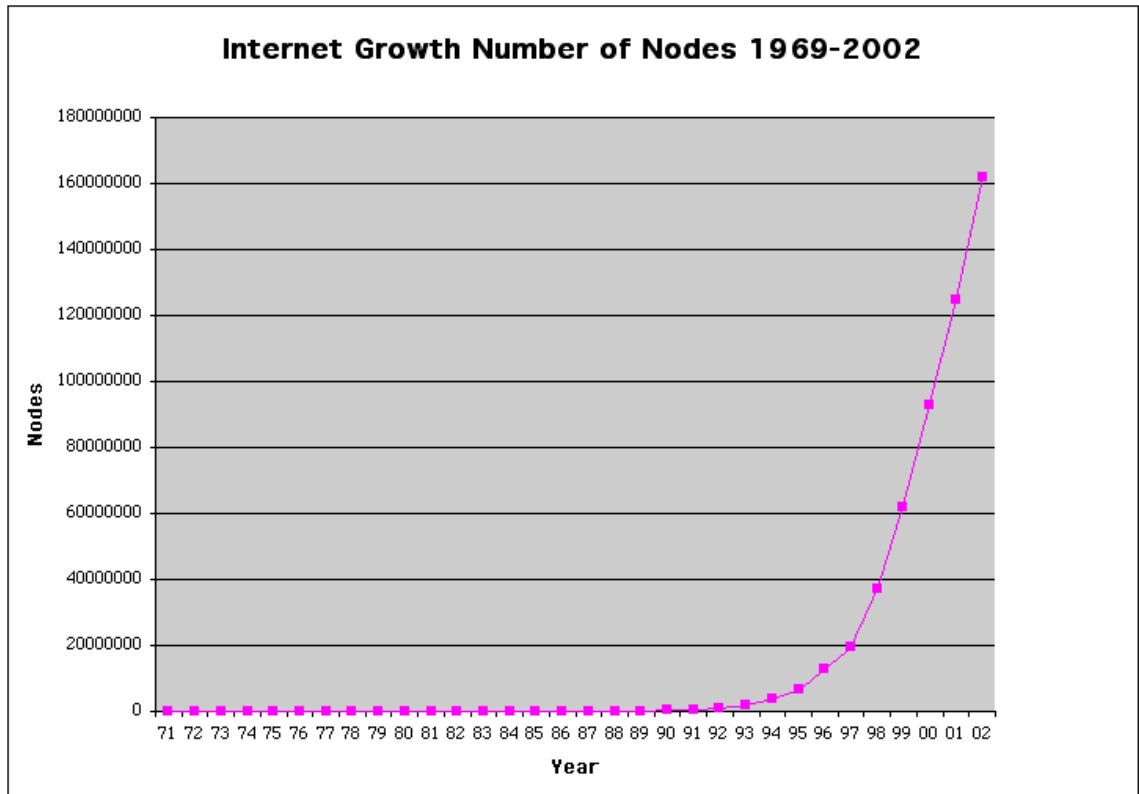

The figure below shows the percentage growth in the population of Internet users in recent years. Note the number of english speaking population is growing at an astonishing rate and is almost up to half of the total english speaking population.

Internet Population Statistics:
Percentage of Regular Internet Users
(Assume World Pop. = 5733M,
English Pop. = 567 M)
Source: http://global-reach.biz/globstats/

	96	97	98	99	00	01	02	03	04	05
World %age	1	2	3	4	7	9	11	13	16	18
English %age	7	13	16	26	34	41	43	46	49	53

The figure below shows the breakdown of different language speakers who use the web as of March 2002:

Online Language Populations
Total: 561 Million
(March, 2002)

Dutch 2.1%
Portuguese 2.6%
Italian 3.6%
French 3.9%
Korean 4.4%
German 6.8%
Spanish 7.2%
Japanese 9.2%
Chinese 9.8%
English 40.2%

The figures below show the growth in registered nodes at the DNS registry:

The figure below shows an estimate in the growth of web sites:

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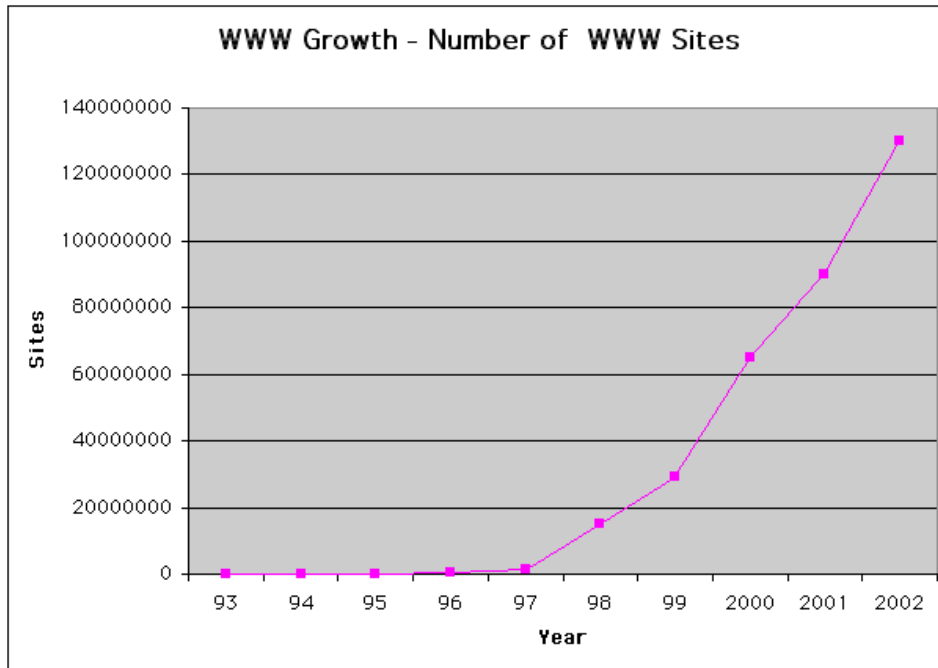
n   prev

Next: Searching the WWW **Up:** Introduction Internet **Previous:** What is the Internet?
Dave Marshall 2002-10-01