

Information economies

4236 BCE Egyptians devise a 365-day calendar, in large part to better predict when the Nile river will flood

3500 BCE Pictographs written on clay tablets in Sumer

3200 BCE The Narmer Palette offers the earliest known example of an Egyptian hieroglyphic inscription; Egyptologist Bob Brier later calls it “the first historical document in the world”

3100 BCE The appearance in Egypt of the earliest decimal counting system, which allows indefinite counting by way of introducing new symbols

2850 BCE Chinese Emperor Fushi decrees that people be identified with a formal family name and a familiar first name

2800 BCE The beginning of systematic astronomical observation in Babylonia, China, Egypt, and India

2208 BCE The king of Youyu in China founds the Shangyang school, now considered the first higher learning institution, to educate noble youths

2000 BCE Harappans, a culture located along the Indus river in present day Pakistan, adopts a uniform decimal system of weights and measures

1800 BCE The Babylonians’ sexagesimal numbering system, which uses a base of 60 rather than the decimal system’s base of 10, becomes the first known place-value numeral system in which numerical value depends on both the digit and its position

1700 BCE The Rhind papyrus written, showing various techniques used by the Egyptians to solve mathematic problems (such as multiplication based on repeated doubling, division based on successive halving)

1504 BCE One of the oldest water clocks, which measures time by having water drip at a nearly constant rate, placed in the tomb of Pharaoh Amenhotep I

1500 BCE The shadow clock or sundial, possibly the first portable timepiece, used in Egypt

1500 BCE Levantine texts show the use of the Proto-Canaanite alphabet, the predecessor to most alphabets in use today, including Greek, Hebrew, Latin (Roman), Mongol, Tifinagh (Berber), and Thai

1450 BCE Linear B, a written syllabic language, emerges in Crete and soon spreads to continental Greece

1350 BCE The Kassite *kudurru*, or boundary stone, used to record royal grants

1300 BCE Inscriptions on oracle bones from the late Shang period offer evidence of writing in China

1300 BCE According to the Bible, Moses receives directly from God a list of religious and moral imperatives known as the Ten Commandments

1050 BCE The Phoenician alphabet, consisting of 22 letters, develops from the Proto-Canaanite alphabet

1000 BCE The Chinese use counting boards for calculation

800 BCE The Greeks use a phonetic alphabet written from left to right

800 BCE Baudhayana writes one of the earliest Indian Sulbasutras, texts about mathematical problems

776 BCE A homing pigeon used to deliver the results of the Olympic games to Athens

650 BCE Assyrian King Ashurbanipal constructs the first library at Nineveh, with more than 22,000 clay tablets covering history, medicine, astronomy, and astrology

450 BCE The Laws of the Twelve Tables formalizes and codifies Roman law allowing plebeians to have knowledge of the law and its constitution

425 BCE The founding of the University of Constantinople, considered the first higher learning institution with characteristics associated with the modern university (e.g., research and teaching, academic independence)

400 BCE The Greeks use a water clock to measure time by gauging the outflow of water from a vessel

385 BCE Plato founds the Academy, which becomes the most famous teaching institution in the Athenian world

360 BCE Plato writes *The Republic*, a work that attempts to define justice and the philosopher, to evaluate different political aims and regimes, and determine how to inquire into what one does not know

350 BCE Aristotle defines the ten categories needed to represent knowledge: substance, quantity, quality, relation, location, time, position, habit, action, and passion

343 BCE Aristotle becomes the tutor of the 13-year-old Alexander the Great and other noble youths at Mieza's Temple of the Nymphs

338 BCE The earliest surviving fragments of an encyclopedia attributed to Speusippus

320 BCE Aristotle conceives of the *scala naturae* (ladder of life), a classification system for living beings in which all species could be placed in order from "highest" to "lowest"

300 BCE The founding of the Royal Library of Alexandria, once the largest library in the world

213 BCE Emperor Shih Huang Ti, at the urging of legalist philosopher Li Szu, outlaws all schools of thought other than legalism and burns numerous books; Li Szu also draws up an official index of calligraphic characters to unify the written form for scholarly use

159 BCE Water clock displayed in Rome

80 BCE The Antikythera mechanism, an ancient Greek gear device designed to calculate astronomical positions, built around this date and is considered the world's oldest computer

27 BCE Marcus Terentius Varro completes *Disciplinarum libri IX* (Nine Books of Disciplines), *Rerum divinarum et humanarum antiquitates* (Antiquities of Human and Divine Things), and *Imagines*, which together document the liberal arts, human efforts, the gods, and biographies of famous Greeks and Romans

27 BCE The Roman *Acta Diurna* (Daily Acts) begin as posted announcements to communicate important political and social events

37 Roman Emperor Tiberius uses heliographs, a device for transmitting messages by reflecting sunlight

77 Pliny the Elder publishes the first ten books of the 37-volume *Naturalis Historiae* (Natural History), one of the earliest and most influential encyclopedias

220 The *Huang-Ian* (Emperor's Mirror), the first known Chinese encyclopedia, prepared on orders of the emperor

285 The Royal Library of Alexandria destroyed in a civil war that occurs under Roman emperor Aurelian

525 The monk Dionysius Exiguus, born in Scythia minor (present-day Romania), conceives of the Anno Domini system of dating to prepare a table of the future dates of Easter

560 Roman statesman Cassiodorus writes the encyclopedia *Institutiones Divinarum et Saecularium Litterarum* (Institutes of Divine and Secular Literature), in which he makes a clear distinction between the secular and profane

560 Aethelberht, the king of Kent, issues the earliest surviving code of Anglo-Saxon laws, which established the clergy's legal position and secular regulations

620 Ou-yang Hsün, Confucian scholar and calligrapher of the early Tang dynasty, prepares the 100-chapter *I-wen lei-chü* (Anthology of Art and Literature)

636 Isadore of Seville writes *Etymologiae* (Etymologies), a compilation of writings from previous encyclopedists, specialists, and Latin writers that is later considered a landmark of glossography (the compilation of glossaries)

751 A Buddhist sutra unearthed at a Korean pagoda from this period offers the earliest known woodblock printed text

801 Tu Yu compiles *T'ung-tien* (Comprehensive Statutes), a nine-section work on economics, examinations and degrees, government, rites and ceremonies, music, the army, law, political geography, and national defense

868 The earliest known printed book discovered in a Chinese cave at Dunhuang; the colophon reads: "Printed on 11 May 868 by Wang Chieh, for free general distribution . . . in deep reverence to perpetuate the memory of his parents"

889 Persian Ibn Qutaybah writes the ten-book *Uyun al-akhbar* (Fountains of Stories), with each book addressing one of the following topics: power, war, nobility, character, learning and eloquence, asceticism, friendship, prayers, food, and women

920 Abu Abdullah Al-Battani makes the remarkably accurate calculation in *Kitab al-Zij*, a 57-volume work on astronomy, that a solar year lasts 365 days, 46 minutes, and 24 seconds

959 Byzantine Emperor Constantine VII organizes a series of encyclopedias about early Christian writings on history, jurisprudence, agriculture, medicine, veterinary surgery, and zoology

961 El-Hakam II, the Umayyad caliph of Córdoba (now Spain) sponsors the creation of a 400,000-book library organized using a 44-volume catalogue

997 Persian scholar al-Khwarizmi finishes *Mafatih al-'Ulum* (Key to the Sciences), which he divides into two sections: indigenous and foreign knowledge

1021 *The Tale of Genji*, attributed to Murasaki Shikibu and sometimes referred to as the first modern novel, completed in its present form

1048 Bi Sheng invents movable type in China

1120 *Suidas*, a Byzantine Greek historical encyclopedia of the ancient Mediterranean world, breaks with tradition by adopting an alphabetical order for its contents

1167 Henry II of France bans English students from attending the University of Paris, forcing more English students to learn at Oxford University

1264 Vincent of Bauvais composes *Speculum Majus* (Great Mirror), in which he attempts to provide a comprehensive treatment of all branches of human knowledge; considered the most important European encyclopedia until the 18th century

1273 Ma Tuan-lin writes *Wen-hsien t'ung-k'ao* (Comprehensive Survey of Literary Remains), an encyclopedic documentary history of Chinese institutions

1332 Ahmad ibn Abd al-Wahhab Nuwayri compiles *Nihayat al-'arab fi funun al-adab* (The Aim of the Intelligent in the Art of Letters), one of the best known encyclopedias in Mamluk Egypt

1335 The earliest surviving mechanical public clock completed in Milan, Italy

1418 Egyptian Ahmad Abd Allah al-Qalqashandi compiles the encyclopedia *Subh al-a'sha*, which covers geography, political history, natural history, zoology, mineralogy, cosmography, and time measurement

1455 Johannes Gutenberg prints the first block-printed Bible

1500 More than 200 European cities have printing presses

1529 The *Index Librorum Prohibitorum*, a list of publications censored by the Catholic Church, first published in the Netherlands

1557 Mary Tudor grants a monopoly and perpetual publishing rights to the Worshipful Company of Stationers of London, protecting the rights of publishers rather than authors

1582 Galileo Galilei creates sketches for a pendulum clock: construction of the clock does not occur until after his death

1609 The German *Avisa Relation oder Zeitung* becomes the first regularly published newspaper

1622 *The Weekly Newes* becomes the first English language *coronto*, a small news pamphlet sporadically published about noteworthy events

1637 René Descartes writes *Discours de la méthode pour bien conduire sa raison, et chercher la vérité dans les sciences* (Discourse on the Method of Rightly Conducting the Reason in the Search for Truth in the Sciences), which introduces the Cartesian coordinate system as the foundation for the natural sciences

1642 Blaise Pascal invents the *Pascaline*, a mechanical calculator, based on a stylus and wheel design

1650 *Einkommende Zeitungen* (Incoming News), the first daily newspaper, published in Germany

1656 Christiaan Huygens, a Dutch scientist, makes the first pendulum clock

1665 The *Oxford Gazette*, called the *London Gazette* a year later, becomes the first regularly published newspaper in England

1690 *Publick Occurrences Both Forreign and Domestick* becomes the first multipage newspaper in the American colonies

1702 The *Daily Courant*, the first English daily newspaper, appears in London

1754 London's *Daily Advertiser* first uses the four-column format, increasing the amount of information per page

1755 Samuel Johnson publishes *A Dictionary of the English Language* after writing the definitions of more than 40,000 words and illustrating them with 114,000 quotations; this remains the only English dictionary for more than 100 years

1768 "A Society of Gentlemen" in Scotland first publishes the alphabetically arranged *Encyclopaedia Britannica, or, A Dictionary of arts and sciences, compiled upon a new plan*

1774 Georges Lesage in Switzerland demonstrates the first telegraph

1808 The first edition of the German *Brockhaus Encyclopedia* published as *Konversationslexicon* (The Lexicon of Conversation) for a non-specialist audience

1829 Louis Braille, a blind French educator, invents the Braille language in which each letter corresponds to a six-dot cell, revolutionizing written communication for the blind

1831 Joseph Henry invents the first electric telegraph

1835 Charles Babbage invents a mechanical calculator

1835 Babbage starts work on the "analytical engine," a precursor to the computer

1843 Samuel Morse invents the first long-distance electric telegraph line

1843 Alexander Bain of Scotland invents a forerunner of the facsimile (fax) machine, a device that scans a two-dimensional surface and sends the image over wires

1844 Morse and Alfred Vail create the first operational telegraph system, which made markings on a moving tape as electrical currents were transmitted; this prompts the creation of Morse code so operators can translate the markings

1852 The Royal Observatory in Greenwich begins transmitting time telegraphically; by 1855 most of the U.K. replaces local time systems with Greenwich time
1858 First transatlantic telegraph cable laid, though it only operates once per month
1861 The U.S. begins its postal service with the Pony Express
1863 Pierre Larousse publishes the *Grand dictionnaire universel du XIXe siècle* (Great Universal 19th-Century Dictionary), the first volume of the Larousse encyclopedia
1867 Christopher Sholes and Carlos Glider develop the first typewriter
1868 Sholes patents the QWERTY keyboard, which separates frequently used pairs of letters to avoid type bars from becoming stuck
1872 Montgomery Ward issues the first mail-order catalog, a one-page flier
1876 Alexander Graham Bell invents the telephone

This “telephone” has too many shortcomings to be seriously considered as a means of communication. The device is inherently of no value to us — Western Union internal memo

1877 Thomas Edison develops the phonograph, the first machine to record and reproduce sound
1879 The Oxford University Press starts work on the Oxford English Dictionary, the first dictionary based on contributions from a large number of volunteer readers, who mailed quotations to the editor
1884 Delegates from 25 countries meet to adopt Greenwich as the prime meridian for setting time
1888 Heinrich Hertz detects and produces radio waves
1893 Nikola Tesla demonstrates wireless communication
1895 Italian Guglielmo Marconi invents wireless telegraphy, which he patents the following year in England
1897 Tesla patents the first radio
1898 Valdemar Poulsen patents the Telegraphone, the first practical machine for recording telephone conversations
1899 Marconi designs wireless telegraph service between England and France
1902 Marconi transmits radio signals from England to Canada, the first radio signals to cross the Atlantic
1910 Telephone booths become common in industrialized countries
1915 First transcontinental telephone call made by Alexander Bell from New York to San Francisco
1920 The first commercial radio station established in Pittsburgh
1926 John Baird gives the world’s first public demonstration of a mechanical television apparatus
1927 Bell Telephone Laboratories sends live television images of Herbert Hoover over telephone lines from Washington, D.C. to an auditorium in New York, becoming the first public demonstration in the U.S. of long-distance television transmission
1927 Intercontinental telephone service begins between New York and London; callers pay \$75 for the first three minutes
1928 The first transatlantic television signal broadcast between New York and London
1930 Vannevar Bush invents the differential analyzer, a mechanical analog computer designed to solve differential equations, creating the first operational, advanced computing device

1933 Edwin Armstrong patents wide-band frequency modulation (FM), which makes radio virtually static-free

1934 Joseph Begun develops the first tape recorder for broadcasting, used two years later during the Olympics

1934

Where is the wisdom we have lost in knowledge? Where is the knowledge we have lost in information — T. S. Eliot, “The Rock”

1935 The German government begins national television broadcasts

1935 Willy Müller invents the first automatic answering machine

1936 The first scheduled television broadcasts in the U.K. begin

1937 Chester Carlson invents Xerography, but it is not commercially available until 1950

1938 Television broadcasts now can be taped and edited, eliminating the need for live footage

1939 The first regularly scheduled television broadcasts begin in the U.S.

1940 90% of American households own at least one radio

1941 NBC (then WNBT-TV) airs the first television commercial

1941 Konrad Zuse completes the Z3, the first functional tape-stored, program-controlled computer

1943

I think there is maybe a world market for maybe five computers — attributed to Thomas Watson, founder of IBM

1944 Howard Aiken invents the Automatic Sequence Controlled Calculator (later renamed the Harvard Mark I), the first information-processing digital computer

1945 Vannevar Bush proposes a hypertext engine called the Memex

1945 The Citizens’ Band (CB) radio service begins as a way to offer U.S. citizens short-distance radios for personal communication

1946 John Mauchly and J. Presper Eckert develop the ENIAC (Electrical Numerical Integrator and Calculator), considered the first all-electronic computer

1947 John Bardeen, Walter Brattain, and William Shockley invent the transistor

1948 A wireless telephone service becomes available in 100 cities and highway corridors to serve utilities, truck fleet operators, and reporters; 5,000 customers use the service to make 30,000 calls weekly

1951 The first commercial computer, the UNIVAC I (Universal Automatic Computer I), sold to the U.S. Census Bureau

1953 The black box flight recorder invented after jet flight experts fail to understand why a number of de Havilland Comet airliners crash

1954 The transistor radio, a small transistor-based radio receiver, first made commercially available

1956 The first submarine transatlantic cable completed, carrying 36 telephone channels

1956 IBM introduces its first magnetic hard disk, which stores 5 megabytes on 50 aluminum disks 2 feet in diameter; annual lease fees come to about \$250,000 in today’s dollars

1957 IBM introduces FORTRAN (Formula Translator), allowing engineers and scientists to write computer programs more simply

1958

Jack Kilby and Robert Noyce develop the integrated circuit, also known as a microchip

What we didn't realize then was that the integrated circuit would reduce the cost of electronic functions by a factor of a million to one — Jack Kilby

1958 The first modem, a device using audio telephone lines to transmit data, invented at Bell Labs

1961 The Worldwide Standardized Seismic Network (WWSSN) established to supply critical data about the Earth's deformational processes and monitor earthquakes and nuclear testing

1962 Philips Company releases the first compact audio cassette

1962 Bell Labs designs and launches Telstar I, the first active communications satellite, which increases the use of satellites to transmit voice, video, and data across continents

1963 Zip codes first used in the U.S., based on the Zoning Improvement Plan (ZIP) conceived of by postal worker Robert Moon

1964 John Kemeny and Tom Kurtz develop BASIC (Beginning All-Purpose Instruction Code) as a computer programming language simple to learn and easy to translate

1964 IBM launches a family of mainframe computer systems that run on the same command set, allowing customers to upgrade to larger systems without rewriting software

1964 Sharp introduces the CS-10A, an all-transistor desktop calculator, for roughly \$2,500

1965 James Russell invents a progenitor of the compact disk to better preserve the recording quality over time than vinyl records or audio cassettes

1965 Ted Nelson founds Project Xanadu, one of the original hypertext projects that inspired the Web

1965 Three years before co-founding Intel, Gordon Moore publishes a paper in which he observes that microchip capacity doubles every 18 to 24 months (later known as Moore's law)

1966 Xerox invents the Magnafax Telecopier, the first facsimile (fax) machine that could be connected to any telephone line

1966 President Lyndon Johnson signs into law the Freedom of Information Act, which ensures public access to U.S. government records and puts the burden on the government to substantiate why information may not be released

1967 Texas Instruments patents the first handheld calculator

1968 IBM's Robert Dennard patents a one-transistor DRAM cell; dynamic RAM (random access memory) becomes the standard short-term storage vehicle for programs and processing data

1968 Hewlett-Packard introduces the first programmable scientific desktop computer, which the company advertises as "the new Hewlett-Packard 911A personal computer"

1969 The first link established for the U.S. military's ARPANET (Advanced Research Projects Agency Network) system, a progenitor of the Internet and the world's first operational packet switching network; packet switching later becomes a dominant way to exchange data and voice communication

1970 Alvin Toffler coins the term *information overload* in his book *Future Shock*

1971 The first edition of UNIX Time-Sharing System (V1) launched as a portable, multitasking, multi-user system

1971 IBM introduces the first floppy disk, an 8-inch plastic disk called the "memory disk"

1971 Gary Boone of Texas Instruments patents the microprocessor

1971 PhoneMate introduces one of the first commercially viable answering machines

1972 HBO becomes the first major pay cable network

1972 Automatic Electronic Systems introduces the first programmable word processor, which includes a video screen, magnetic disks for storage, and a custom built processor

1972 Robert Metcalfe invents the Ethernet, a system by which computers communicate over a shared coaxial cable

1973 The Universal Product Code (UPC) and its bar code symbols announced to reduce labor costs and improve inventory management in the grocery industry

1974 The UPC makes its first commercial appearance on Wrigley's chewing gum

1974 The U.S. Privacy Act guarantees citizens access to governmental files about themselves and prohibits agencies from disclosing personal information except under court order or other limited circumstances

1975 Motorola's Martin Cooper patents the first cellular phone

1977 Steve Jobs and Steve Wozniak invent Apple II, the first commercially viable home computer

1977 AT&T and GTE install fiber optic telephone systems in Chicago and Boston, leading to an increase in fiber optic telephone networks

1978 AT&T and Bell Labs conduct public tests of a new cellular phone system in Chicago

1978 CompuServe, one of the earliest online service providers, introduces electronic mail to commercial customers

1979 Japan launches its first cellular phone communication network

1979 Sony begins selling the Walkman, a transistorized portable cassette player

1979 The launch of Inmarsat, one of the largest civilian communications satellite providers offering voice and data communication services to governments, aid agencies, and media companies in need of communicating in remote regions with unreliable land networks

1980 After a year of collaboration, Sony and Philips produce standards for the compact disk

1981
640KB [of computer memory] ought to be enough for anybody — Bill Gates

1981 MTV's first broadcast on cable television

1981 The Osborne 1 becomes the first commercially available laptop

1981 IBM awards Microsoft a contract to provide a clone of the CP/M (Control Program/Monitor) operating system in its upcoming Personal Computer (PC); Microsoft purchases a clone and renames it DOS (Disk Operating System)

1982 Compact disks first sold in Asia, then in other continents a year later

1982 Minitel — a French online service accessible through telephone lines that allows users to make purchases and train reservations, chat, check stock prices, and search the telephone directory — launched and later becomes one of the most successful pre-World Wide Web online services

1984 The Apple Macintosh invented

1985 The CD-ROM (Compact Disk Read-Only Memory) introduced as a computer data storage device

1985 Microsoft releases its first retail version of Microsoft Windows

1986 The National Science Foundation Network (NSFNet), which becomes a major part of the public Internet's backbone in the early 1990s, goes online to connect five university supercomputer systems

1987

Information can tell us everything. It has all the answers. But they are answers to questions we have not asked, and which doubtless don't even arise — Jean Baudrillard, *Cool Memories*

1988 TAT-8, the first successful fiber-optic transatlantic telephone cable, installed with 40,000 channels

1988 The digital cellular phone, which offers clearer voice quality and the capacity to support more advanced services than analog phones, developed

1989 After creating a prototype with Robert Cailliau, Tim Berners-Lee designs and builds the first Web browser and editor, which he called WorldWideWeb, and the first Web server named httpd

1991 The open-source software movement starts as Linus Torvalds creates Linux, a Unix-like operating system kernel further developed with the assistance of developers worldwide

1991 GSM (Groupe Spéciale Mobile), which becomes the most popular standard for mobile phones, launched

1993 Vinod Dahm invents the Intel Pentium processor

1994 The Simon, a combined cell phone and PDA (personal digital assistant), appears on the market

1994 The first spam message, a Green Card Lottery advertisement offering the chance for non-Americans to enter a U.S. work permit raffle, sent via e-mail

1995 Caller ID devices become available

1995 Java, an object-oriented computer language designed so programmers can “write code once and run it anywhere,” launched

1996 Palm Computing introduces the Palm 1000 and 5000, the first generation of personal digital assistants (PDAs), selling a million units in 18 months

1996 Microsoft launches Web TV to allow users to surf the Internet via a standard television set

1996 American Online (AOL) launches its unlimited pricing plan for Internet users; membership grows from 7 million to 10 million

1998 The U.S. Justice Department files an antitrust lawsuit against Microsoft, which is settled in 2001 after Microsoft agrees to various restrictions designed to restore competition

This settlement will promote innovation, give consumers more choices, and provide the computer industry as a whole with more certainty in the marketplace — Charles James, Assistant Attorney General, Department of Justice

1999 Canadian Internet company icrave.com begins offering live television programming from 17 Canadian and American television stations over the Internet; the company is later shut down after a U.S. judge rules that the practice violates copyright laws

1999 Napster, a free peer-to-peer, file-sharing program often used to swap copyrighted music, launched, though an injunction won by major music labels forces its shutdown in 2001

2000 WizCom introduces a handheld scanning pen to scan, store, and translate text, which can be transferred to a PC or PDA

2001 Wikipedia, the encyclopedic website with content written collaboratively by volunteers, launched online

2001 The number of Internet users reaches 513.41 million worldwide (about 8% of the total population)

2001 Filipinos use text messaging to organize during the People Power II revolt against President Joseph Estrada

2002 The total number of phone lines grows by 40% compared to 1997, and the number of mobile phone users increases by 547%

2002 HP and Compaq launch the Tablet PC, which combines a fully functioning PC and a note-taking tablet that can translate handwriting to text

2002 Poma launches the first wearable PC, which includes a small head-mounted monitor placed in front of an eye, a processor the size of a paperback, and a handheld mouse

2002 The Braille Glove, which translates the sign language of the wearer into text displayed on a nearby monitor, invented to facilitate communication between the deaf and the non-deaf

2003 The mobile phone and wireless e-mail successfully combined in the Blackberry PDA

2003 The U.S. Do Not Call Registry opens for registration

2003 VXL Instruments launches the first "thin client," a low-cost computer with little or no application logic that depends on a central server for its processing activities

2003 Mobile phone penetration rises to 36% in Albania, 21% in China, 9% in India, and 30% in Paraguay compared to 0% in 1995; much of this growth occurs because launching mobile phone systems is far cheaper than building fixed-line systems

2004 The University of San Francisco organizes Flash Mob I, for which 700 users combine their individual PCs to amass the strength of a supercomputer to solve a complex computational problem

2004 New York gives six wireless phone companies the rights to install cell phone antennas and Internet transmitters on 18,000 city lampposts

2004 Philadelphia begins a project to offer a free wireless network across its 135 square miles; other cities, like Chicago, announce plans for low-cost citywide wireless access

2004 Researchers show that nanotechnology can be used to create an Internet entirely based on light

2004 More than 50 nations agree to implement a plan for the Global Earth Observation System of Systems (GEOSS), an effort to make existing hardware and software compatible and to share data and information, particularly about the environment, at no cost

2004 83% of all e-mail traffic in the U.S. attributed to spam

2004 Samsung announces that it will create cell phones that function as contact-less smart cards so users can make wireless payments

2004 The United Nations launches the International Open Source Network (IOSN) to help developing countries in the Asia-Pacific region access free or open-source software to increase their competitiveness and productivity

2004 All travelers to the U.S., including those from countries in the Visa Waiver program, must enroll in the U.S.-VISIT program, which requires they be digitally photographed and submit to a finger scan

2004 The U.S. Federal Drug Administration approves the first radio frequency identification (RFID) tags that can be implanted in humans

2005 Tsunami Warning System developed internationally as a result of the 2004 tsunami

2005 The U.S. Federal Trade Commission receives 253,000 identity theft complaints, a 19% increase over 2003

2005 The U.S. begins a test of radio frequency identification technology at five entry points near the borders of Canada and Mexico to record the entry and exit of foreign visitors

2006 A laptop with the personal data of 26.5 million veterans and their spouses stolen from the house of a U.S. Department of Veteran Affairs employee; in response, the federal government adopts more stringent security measures, including encryption, two-factor identification for remote access, and the erasure of sensitive data 90 days after use

2006 Novatium unveils its \$175 Nova netPC, a server-based “thin client” computer targeting clients in developing economies

2006 The number of Internet users exceeds 1 billion (16% of the total population); the markets with the greatest users as a percent of the population include North America (69%), Oceania / Australia (53%), and Europe (37%)

2006 The U.S. begins issuing passports with a small computer chip that stores personal ID information and a digital photograph to facilitate biometric comparison