Exhibit A

Class 9: Scientific, nautical, surveying, photographic, cinematographic, optical, weighing, measuring, signaling, checking (supervision), life-saving and teaching apparatus and instruments; electric and electronic apparatus and hardware, equipment for the storage and transmission of data and information for use in relation to banking, financial, insurance and general commercial transactions, including those conducted online via the Internet or a computer network, or by telephone or cellular telephone; computer software, computer operating systems, computer peripheral devices and computer software platforms used to enable and facilitate electronic banking, financial, insurance or other commercial transactions, including those via the Internet or a computer network, or by telephone or cellular telephone, including data processing equipment and software for use in relation to banking and financial services including data processing equipment and software; downloadable electronic publications, in the nature of magazines, newsletters reports, guides, charts, worksheets, forms, instructional materials, educational materials, bulletins, pamphlets, and booklets in the field of banking, financing, financial services, insurance, securities and investment; apparatus and equipment for the electronic transfer of and/or financial data, namely, computer terminals, computer peripheral devices, computer software, computer programs and mobile applications; electronic equipment, namely, transformers, baluns and cables, all used in connection with computers, computer peripheral devices, televisions, audio-video equipment, closed-circuit TV equipment and telecommunication equipment excluding radio transmitters, radio receivers or paging systems; automated teller machines; money dispensingcounting and sorting machines, electronic fund transfer, payment or point of sale apparatus, machines and terminals for making contactless payments; card and bar code scanners; magnetic and magnetically encoded key, debit and charge cards; magnetically and non-magnetically encoded and programmable cards; for use as time-tracking and recording cards, access control cards, debit cards, credit cards, charge cards, stored value cards, gift cards and loyalty cards; blank smart cards; cards bearing coded data in magnetic form; cards bearing data for use in computers;identity; computer equipment, namely, wireless cards bearing coded; interface cards for data processing equipment in punched outthe form of printed circuits; cards bearing data for use in data processing apparatus; cards bearing data for use in data storage apparatus; cards bearing electronically recorded data; cards bearing integrated circuits; cards bearing magnetic or encoded data for input; cards bearing micro-chips and computer cards containing chips; magnetically-encoded credit, charge, debit and/or cash cards; prepaymentelectronic and magnetic ID cards; for use in connection with payment for services; electronic loyalty or gift cards, readers, scanners, parts and fittings for the aforementioned goods

~~**Class 36**: Electronic funds transfer~~

Class 38: Telecommunication services for providing multiple-user access to a global computer network; telecommunications services, namely, personal and communications services; providing user access to computer networks or via the Internet for purposes of facilitating commercial, banking or financial transactions and electronic payments; providing telecommunications connections to via the Internet or to data bases for purposes of facilitating commercial, banking or financial transactions and electronic payments services ancillary and related to all of the aforegoing

Exhibit B

WIKIPEDIA

Internet access

Internet access is the ability of individuals and organizations to connect to the Internet using computer terminals, computers, and other devices; and to access services such as email and the World Wide Web. Various technologies, at a wide range of speeds have been used by Internet service providers (ISPs) to provide this service.

Internet access was once rare, but has grown rapidly. In 1995, only 0.04 percent of the world's population had access, with well over half of those living in the United States,[1] and consumer use was through dial-up. By the first decade of the 21st century, many consumers in developed nations used faster broadband technology, and by 2014, 41 percent of the world's population had access,[2] broadband was almost ubiquitous worldwide, and global average connection speeds exceeded 1 Mbit/s.[3]

Contents

History

The Internet developed from the ARPANET, which was funded by the US government to support projects within the government and at universities and research laboratories in the US – but grew over time to include most of the world's large universities and the research arms of many technology companies.[4][5][6] Use by a wider audience only came in 1995 when restrictions on the use of the Internet to carry commercial traffic were lifted.[7]

In the early to mid-1980s, most Internet access was from personal computers and workstations directly connected to local area networks or from dial-up connections using modems and analog telephone lines. LANs typically operated at 10 Mbit/s, while modem data-rates grew from 1200 bit/s in the early 1980s, to 56 kbit/s by the late 1990s. Initially, dial-up connections were made from terminals or computers running terminal emulation software to terminal servers on LANs. These dial-up connections did not support end-to-end use of the Internet protocols and only provided terminal to host connections. The introduction of network access servers supporting the Serial Line Internet Protocol (SLIP) and later the point-to-point protocol (PPP) extended the Internet protocols and made the full range of Internet services available to dial-up users; although slower, due to the lower data rates available using dial-up.

Broadband Internet access, often shortened to just broadband, is simply defined as "Internet access that is always on, and faster than the traditional dial-up access"[8][9] and so covers a wide range of technologies. Broadband connections are typically made using a computer's built in Ethernet networking capabilities, or by using a NIC expansion card.

Most broadband services provide a continuous "always on" connection; there is no dial-in process required, and it does not interfere with voice use of phone lines.[10] Broadband provides improved access to Internet services such as:

- Faster world wide web browsing
- Faster downloading of documents, photographs, videos, and other large files
- Telephony, radio, television, and videoconferencing
- Virtual private networks and remote system administration
- Online gaming, especially massively multiplayer online role-playing games which are interaction-intensive

In the 1990s, the National Information Infrastructure initiative in the U.S. made broadband Internet access a public policy issue.[11] In 2000, most Internet access to homes was provided using dial-up, while many businesses and schools were using broadband connections. In 2000 there were just under 150 million dial-up subscriptions in the 34 OECD countries[12] and fewer than 20 million broadband subscriptions. By 2004, broadband had grown and dial-up had declined so that the number of subscriptions were roughly equal at 130 million each. In 2010, in the OECD countries, over 90% of the Internet access subscriptions used broadband, broadband had grown to more than 300 million subscriptions, and dial-up subscriptions had declined to fewer than 30 million.[13]

The broadband technologies in widest use are ADSL and cable Internet access. Newer technologies include VDSL and optical fibre extended closer to the subscriber in both telephone and cable plants. Fibre-optic communication, while only recently being used in premises and to the curb schemes, has played a crucial role in enabling broadband Internet access by making transmission of information at very high data rates over longer distances much more cost-effective than copper wire technology.

In areas not served by ADSL or cable, some community organizations and local governments are installing Wi-Fi networks. Wireless and satellite Internet are often used in rural, undeveloped, or other hard to serve areas where wired Internet is not readily available.

Newer technologies being deployed for fixed (stationary) and mobile broadband access include WiMAX, LTE, and fixed wireless, e.g., Motorola Canopy.

Starting in roughly 2006, mobile broadband access is increasingly available at the consumer level using "3G" and "4G" technologies such as HSPA, EV-DO, HSPA+, and LTE.

Availability

In addition to access from home, school, and the workplace Internet access may be available from public places such as libraries and Internet cafes, where computers with Internet connections are available. Some libraries provide stations for physically connecting users' laptops to local area networks (LANs).

Wireless Internet access points are available in public places such as airport halls, in some cases just for brief use while standing. Some access points may also provide coin-operated computers. Various terms are used, such as "public Internet kiosk", "public access terminal", and "Web payphone". Many hotels also have public terminals, usually fee based.

Coffee shops, shopping malls, and other venues increasingly offer wireless access to computer networks, referred to as hotspots, for users who bring their own wireless-enabled devices such as a laptop or PDA. These services may be free to all, free to customers only, or fee-based. A Wi-Fi hotspot need not be limited to a confined location since multiple ones combined can cover a whole campus or park, or even an entire city can be enabled.

Additionally, Mobile broadband access allows smart phones and other digital devices to connect to the Internet from any location from which a mobile phone call can be made, subject to the capabilities of that mobile network.

Speed

The bit rates for dial-up modems range from as little as 110 bit/s in the late 1950s, to a maximum of from 33 to 64 kbit/s (V.90 and V.92) in the late 1990s. Dial-up connections generally require the dedicated use of a telephone line. Data compression can boost the effective bit rate for a dial-up modem connection to from 220 (V.42bis) to 320 (V.44) kbit/s.[14] However, the effectiveness of data compression is quite variable, depending on the type of data being sent, the condition of the telephone line, and a number of other factors. In reality, the overall data rate rarely exceeds 150 kbit/s.[15]

Data rate units (SI)

Unit		Symbol	Bits	Bytes
Kilobit per second	(10^3)	kbit/s	1,000 bit/s	125 B/s
Megabit/s	(10^6)	Mbit/s	1,000 kbit/s	125 kB/s
Gigabit/s	(10^9)	Gbit/s	1,000 Mbit/s	125 MB/s
Terabit/s	(10^{12})	Tbit/s	1,000 Gbit/s	125 GB/s
Petabit/s	(10^{15})	Pbit/s	1,000	125

Broadband technologies supply considerably higher bit rates than dial-up, generally without disrupting regular telephone use. Various minimum data rates and maximum latencies have been used in definitions of broadband, ranging from 64 kbit/s up to 4.0 Mbit/s.[16] In 1988 the CCITT standards body defined "broadband service" as requiring transmission channels capable of supporting bit rates greater than the primary rate which ranged from about 1.5 to 2 Mbit/s.[17] A 2006 Organization for Economic Co-operation and Development (OECD) report defined broadband as having download data transfer rates equal to or faster than 256 kbit/s.[18] And in 2015 the U.S. Federal Communications Commission (FCC) defined "Basic Broadband" as data transmission speeds of at least 25 Mbit/s downstream (from the Internet to the user's computer) and 3 Mbit/s upstream (from the user's computer to the Internet).[19] The trend is to raise the threshold of the broadband definition as higher data rate services become available.[20]

			Tbit/s	TB/s
Unit		**Symbol**	**Bits**	**Bytes**
Kilobyte per second	(10^3)	kB/s	8,000 bit/s	1,000 B/s
Megabyte/s	(10^6)	MB/s	8,000 kbit/s	1,000 kB/s
Gigabyte/s	(10^9)	GB/s	8,000 Mbit/s	1,000 MB/s
Terabyte/s	(10^{12})	TB/s	8,000 Gbit/s	1,000 GB/s
Petabyte/s	(10^{15})	PB/s	8,000 Tbit/s	1,000 TB/s

The higher data rate dial-up modems and many broadband services are "asymmetric"—supporting much higher data rates for download (toward the user) than for upload (toward the Internet).

Data rates, including those given in this article, are usually defined and advertised in terms of the maximum or peak download rate. In practice, these maximum data rates are not always reliably available to the customer.[21] Actual end-to-end data rates can be lower due to a number of factors.[22] In late June 2016, internet connection speeds averaged about 6 Mbit/s globally.[23] Physical link quality can vary with distance and for wireless access with terrain, weather, building construction, antenna placement, and interference from other radio sources. Network bottlenecks may exist at points anywhere on the path from the end-user to the remote server or service being used and not just on the first or last link providing Internet access to the end-user.

Network congestion

Users may share access over a common network infrastructure. Since most users do not use their full connection capacity all of the time, this aggregation strategy (known as contended service) usually works well and users can burst to their full data rate at least for brief periods. However, peer-to-peer (P2P) file sharing and high-quality streaming video can require high data-rates for extended periods, which violates these assumptions and can cause a service to become oversubscribed, resulting in congestion and poor performance. The TCP protocol includes flow-control mechanisms that automatically throttle back on the bandwidth being used during periods of network congestion. This is fair in the sense that all users that experience congestion receive less bandwidth, but it can be frustrating for customers and a major problem for ISPs. In some cases the amount of bandwidth actually available may fall below the threshold required to support a particular service such as video conferencing or streaming live video–effectively making the service unavailable.

When traffic is particularly heavy, an ISP can deliberately throttle back the bandwidth available to classes of users or for particular services. This is known as traffic shaping and careful use can ensure a better quality of service for time critical services even on extremely busy networks. However, overuse can lead to concerns about fairness and network neutrality or even charges of censorship, when some types of traffic are severely or completely blocked.

Outages

An Internet blackout or outage can be caused by local signaling interruptions. Disruptions of submarine communications cables may cause blackouts or slowdowns to large areas, such as in the 2008 submarine cable disruption. Less-developed countries are more vulnerable due to a small number of high-capacity links. Land cables are also vulnerable, as in 2011 when a woman digging for scrap metal severed most connectivity for the nation of Armenia.[24] Internet blackouts affecting almost entire countries can be achieved by governments as a form of Internet censorship, as in the blockage of the Internet in Egypt, whereby approximately 93%[25] of networks were without access in 2011 in an attempt to stop mobilization for anti-government protests.[26]

On April 25, 1997, due to a combination of human error and software bug, an incorrect routing table at MAI Network Service (a Virginia Internet Service Provider) propagated across backbone routers and caused major disruption to Internet traffic for a few hours.[27]

Technologies

When the Internet is accessed using a modem, digital data is converted to analog for transmission over analog networks such as the telephone and cable networks.[10] A computer or other device accessing the Internet would either be connected directly to a modem that communicates with an Internet service provider (ISP) or the modem's Internet connection would be shared via a Local Area Network (LAN) which provides access in a limited area such as a home, school, computer laboratory, or office building.

Although a connection to a LAN may provide very high data-rates within the LAN, actual Internet access speed is limited by the upstream link to the ISP. LANs may be wired or wireless. Ethernet over twisted pair cabling and Wi-Fi are the two most common technologies used to build LANs today, but ARCNET, Token Ring, Localtalk, FDDI, and other technologies were used in the past.

Ethernet is the name of the IEEE 802.3 standard for physical LAN communication[28] and Wi-Fi is a trade name for a wireless local area network (WLAN) that uses one of the IEEE 802.11 standards.[29] Ethernet cables are interconnected via switches & routers. Wi-Fi networks are built using one or more wireless antenna called access points.

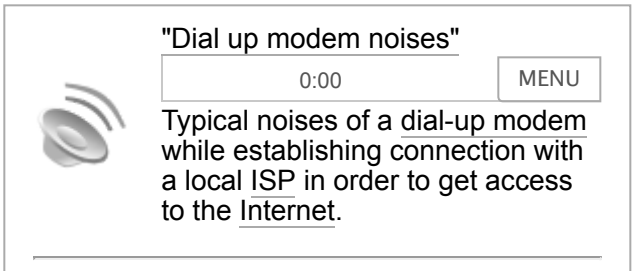
Many "modems" provide the additional functionality to host a LAN so most Internet access today is through a LAN, often a very small LAN with just one or two devices attached. And while LANs are an important form of Internet access, this raises the question of how and at what data rate the LAN itself is connected to the rest of the global Internet. The technologies described below are used to make these connections.

Hardwired broadband access

The term broadband includes a broad range of technologies, all of which provide higher data rate access to the Internet. The following technologies use wires or cables in contrast to wireless broadband described later.

Dial-up access

Dial-up Internet access uses a modem and a phone call placed over the public switched telephone network (PSTN) to connect to a pool of modems operated by an ISP. The modem converts a computer's digital signal into an analog signal that travels over a phone line's local loop until it reaches a telephone company's



switching facilities or central office (CO) where it is switched to another phone line that connects to another modem at the remote end of the connection.[30]

Problems playing this file? See media help.

Operating on a single channel, a dial-up connection monopolizes the phone line and is one of the slowest methods of accessing the Internet. Dial-up is often the only form of Internet access available in rural areas as it requires no new infrastructure beyond the already existing telephone network, to connect to the Internet. Typically, dial-up connections do not exceed a speed of 56 kbit/s, as they are primarily made using modems that operate at a maximum data rate of 56 kbit/s downstream (towards the end user) and 34 or 48 kbit/s upstream (toward the global Internet).[10]

Multilink dial-up

Multilink dial-up provides increased bandwidth by channel bonding multiple dial-up connections and accessing them as a single data channel.[31] It requires two or more modems, phone lines, and dial-up accounts, as well as an ISP that supports multilinking – and of course any line and data charges are also doubled. This inverse multiplexing option was briefly popular with some high-end users before ISDN, DSL and other technologies became available. Diamond and other vendors created special modems to support multilinking.[32]

Integrated Services Digital Network

Integrated Services Digital Network (ISDN) is a switched telephone service capable of transporting voice and digital data, is one of the oldest Internet access methods. ISDN has been used for voice, video conferencing, and broadband data applications. ISDN was very popular in Europe, but less common in North America. Its use peaked in the late 1990s before the availability of DSL and cable modem technologies.[33]

Basic rate ISDN, known as ISDN-BRI, has two 64 kbit/s "bearer" or "B" channels. These channels can be used separately for voice or data calls or bonded together to provide a 128 kbit/s service. Multiple ISDN-BRI lines can be bonded together to provide data rates above 128 kbit/s. Primary rate ISDN, known as ISDN-PRI, has 23 bearer channels (64 kbit/s each) for a combined data rate of 1.5 Mbit/s (US standard). An ISDN E1 (European standard) line has 30 bearer channels and a combined data rate of 1.9 Mbit/s.

Leased lines

Leased lines are dedicated lines used primarily by ISPs, business, and other large enterprises to connect LANs and campus networks to the Internet using the existing infrastructure of the public telephone network or other providers. Delivered using wire, optical fiber, and radio, leased lines are used to provide Internet access directly as well as the building blocks from which several other forms of Internet access are created.[34]

T-carrier technology dates to 1957 and provides data rates that range from 56 and 64 kbit/s (DS0) to 1.5 Mbit/s (DS1 or T1), to 45 Mbit/s (DS3 or T3). A T1 line carries 24 voice or data channels (24 DS0s), so customers may use some channels for data and others for voice traffic or use all 24 channels for clear channel data. A DS3 (T3) line carries 28 DS1 (T1) channels. Fractional T1 lines are also available in multiples of a DS0 to provide data rates between 56 and 1500 kbit/s. T-carrier lines require special termination equipment that may be separate from or integrated into a router or switch and which may be purchased or leased from an ISP.[35] In Japan the equivalent standard is J1/J3. In Europe, a slightly different standard, E-carrier, provides 32 user channels (64 kbit/s) on an E1 (2.0 Mbit/s) and 512 user channels or 16 E1s on an E3 (34.4 Mbit/s).

Synchronous Optical Networking (SONET, in the U.S. and Canada) and Synchronous Digital Hierarchy (SDH, in the rest of the world) are the standard multiplexing protocols used to carry high-data-rate digital bit-streams over optical fiber using lasers or highly coherent light from light-emitting diodes (LEDs). At lower transmission rates data can also be transferred via an electrical interface. The basic unit of framing is an OC-3c (optical) or STS-3c (electrical) which carries 155.520 Mbit/s. Thus an OC-3c will carry three OC-1 (51.84 Mbit/s) payloads each of which has enough capacity to include a full DS3. Higher data rates are delivered in OC-3c multiples of four providing OC-12c (622.080 Mbit/s), OC-48c (2.488 Gbit/s), OC-192c (9.953 Gbit/s), and OC-768c (39.813 Gbit/s). The "c" at the end of the OC labels stands for "concatenated" and indicates a single data stream rather than several multiplexed data streams.[34]

The 1, 10, 40, and 100 gigabit Ethernet (GbE, 10 GbE, 40/100 GbE) IEEE standards (802.3) allow digital data to be delivered over copper wiring at distances to 100 m and over optical fiber at distances to 40 km.[36]

Cable Internet access

Cable Internet provides access using a cable modem on hybrid fiber coaxial wiring originally developed to carry television signals. Either fiber-optic or coaxial copper cable may connect a node to a customer's location at a connection known as a cable drop. In a cable modem termination system, all nodes for cable subscribers in a neighborhood connect to a cable company's central office, known as the "head end." The cable company then connects to the Internet using a variety of means – usually fiber optic cable or digital satellite and microwave transmissions.[37] Like DSL, broadband cable provides a continuous connection with an ISP.

Downstream, the direction toward the user, bit rates can be as much as 400 Mbit/s for business connections, and 250 Mbit/s for residential service in some countries. Upstream traffic, originating at the user, ranges from 384 kbit/s to more than 20 Mbit/s. Broadband cable access tends to service fewer business customers because existing television cable networks tend to service residential buildings and commercial buildings do not always include wiring for coaxial cable networks.[38] In addition, because broadband cable subscribers share the same local line, communications may be intercepted by neighboring subscribers. Cable networks regularly provide encryption schemes for data traveling to and from customers, but these schemes may be thwarted.[37]

Digital subscriber line (DSL, ADSL, SDSL, and VDSL)

Digital Subscriber Line (DSL) service provides a connection to the Internet through the telephone network. Unlike dial-up, DSL can operate using a single phone line without preventing normal use of the telephone line for voice phone calls. DSL uses the high frequencies, while the low (audible) frequencies of the line are left free for regular telephone communication.[10] These frequency bands are subsequently separated by filters installed at the customer's premises.

DSL originally stood for "digital subscriber loop". In telecommunications marketing, the term digital subscriber line is widely understood to mean Asymmetric Digital Subscriber Line (ADSL), the most commonly installed variety of DSL. The data throughput of consumer DSL services typically ranges from 256 kbit/s to 20 Mbit/s in the direction to the customer (downstream), depending on DSL technology, line conditions, and service-level implementation. In ADSL, the data throughput in the upstream direction, (i.e. in the direction to the service provider) is lower than that in the downstream direction (i.e. to the customer), hence the designation of asymmetric.[39] With a symmetric digital subscriber line (SDSL), the downstream and upstream data rates are equal.[40]

Very-high-bit-rate digital subscriber line (VDSL or VHDSL, ITU G.993.1)[41] is a digital subscriber line (DSL) standard approved in 2001 that provides data rates up to 52 Mbit/s downstream and 16 Mbit/s upstream over copper wires[42] and up to 85 Mbit/s down- and upstream on coaxial cable.[43] VDSL is capable of supporting applications such as high-

definition television, as well as telephone services (voice over IP) and general Internet access, over a single physical connection.

VDSL2 (ITU-T G.993.2) is a second-generation version and an enhancement of VDSL.[44] Approved in February 2006, it is able to provide data rates exceeding 100 Mbit/s simultaneously in both the upstream and downstream directions. However, the maximum data rate is achieved at a range of about 300 meters and performance degrades as distance and loop attenuation increases.

DSL Rings

DSL Rings (DSLR) or Bonded DSL Rings is a ring topology that uses DSL technology over existing copper telephone wires to provide data rates of up to 400 Mbit/s.[45]

Fiber to the home

Fiber-to-the-home (FTTH) is one member of the Fiber-to-the-x (FTTx) family that includes Fiber-to-the-building or basement (FTTB), Fiber-to-the-premises (FTTP), Fiber-to-the-desk (FTTD), Fiber-to-the-curb (FTTC), and Fiber-to-the-node (FTTN).[46] These methods all bring data closer to the end user on optical fibers. The differences between the methods have mostly to do with just how close to the end user the delivery on fiber comes. All of these delivery methods are similar to hybrid fiber-coaxial (HFC) systems used to provide cable Internet access.

The use of optical fiber offers much higher data rates over relatively longer distances. Most high-capacity Internet and cable television backbones already use fiber optic technology, with data switched to other technologies (DSL, cable, POTS) for final delivery to customers.[47]

Australia began rolling out its National Broadband Network across the country using fiber-optic cables to 93 percent of Australian homes, schools, and businesses.[48] The project was abandoned by the subsequent LNP government, in favour of a hybrid FTTN design, which turned out to be more expensive and introduced delays. Similar efforts are underway in Italy, Canada, India, and many other countries (see Fiber to the premises by country).[49][50][51][52]

Power-line Internet

Power-line Internet, also known as Broadband over power lines (BPL), carries Internet data on a conductor that is also used for electric power transmission.[53] Because of the extensive power line infrastructure already in place, this technology can provide people in rural and low population areas access to the Internet with little cost in terms of new transmission equipment, cables, or wires. Data rates are asymmetric and generally range from 256 kbit/s to 2.7 Mbit/s.[54]

Because these systems use parts of the radio spectrum allocated to other over-the-air communication services, interference between the services is a limiting factor in the introduction of power-line Internet systems. The IEEE P1901 standard specifies that all power-line protocols must detect existing usage and avoid interfering with it.[54]

Power-line Internet has developed faster in Europe than in the U.S. due to a historical difference in power system design philosophies. Data signals cannot pass through the step-down transformers used and so a repeater must be installed on each transformer.[54] In the U.S. a transformer serves a small cluster of from one to a few houses. In Europe, it is more common for a somewhat larger transformer to service larger clusters of from 10 to 100 houses. Thus a typical U.S. city requires an order of magnitude more repeaters than in a comparable European city.[55]

ATM and Frame Relay

Asynchronous Transfer Mode (ATM) and Frame Relay are wide-area networking standards that can be used to provide Internet access directly or as building blocks of other access technologies. For example, many DSL implementations use an ATM layer over the low-level bitstream layer to enable a number of different technologies over the same link. Customer LANs are typically connected to an ATM switch or a Frame Relay node using leased lines at a wide range of data rates.[56][57]

While still widely used, with the advent of Ethernet over optical fiber, MPLS, VPNs and broadband services such as cable modem and DSL, ATM and Frame Relay no longer play the prominent role they once did.

Wireless broadband access

Wireless broadband is used to provide both fixed and mobile Internet access with the following technologies.

Satellite broadband

Satellite Internet access provides fixed, portable, and mobile Internet access.[58] Data rates range from 2 kbit/s to 1 Gbit/s downstream and from 2 kbit/s to 10 Mbit/s upstream. In the northern hemisphere, satellite antenna dishes require a clear line of sight to the southern sky, due to the equatorial position of all geostationary satellites. In the southern hemisphere, this situation is reversed, and dishes are pointed north.[59][60] Service can be adversely affected by moisture, rain, and snow (known as rain fade).[59][60][61] The system requires a carefully aimed directional antenna.[60]

Satellite Internet access via VSAT in Ghana

Satellites in geostationary Earth orbit (GEO) operate in a fixed position 35,786 km (22,236 miles) above the Earth's equator. At the speed of light (about 300,000 km/s or 186,000 miles per second), it takes a quarter of a second for a radio signal to travel from the Earth to the satellite and back. When other switching and routing delays are added and the delays are doubled to allow for a full round-trip transmission, the total delay can be 0.75 to 1.25 seconds. This latency is large when compared to other forms of Internet access with typical latencies that range from 0.015 to 0.2 seconds. Long latencies negatively affect some applications that require real-time response, particularly online games, voice over IP, and remote control devices.[62][63] TCP tuning and TCP acceleration techniques can mitigate some of these problems. GEO satellites do not cover the Earth's polar regions.[59] HughesNet, Exede, AT&T and Dish Network have GEO systems.[64][65][66][67]

Satellites in low Earth orbit (LEO, below 2000 km or 1243 miles) and medium Earth orbit (MEO, between 2000 and 35,786 km or 1,243 and 22,236 miles) are less common, operate at lower altitudes, and are not fixed in their position above the Earth. Lower altitudes allow lower latencies and make real-time interactive Internet applications more feasible. LEO systems include Globalstar and Iridium. The O3b Satellite Constellation is a proposed MEO system with a latency of 125 ms. COMMStellation™ is a LEO system, scheduled for launch in 2015, that is expected to have a latency of just 7 ms.

Mobile broadband

Mobile broadband is the marketing term for wireless Internet access delivered through mobile phone towers to computers, mobile phones (called "cell phones" in North America and South Africa, and "hand phones" in Asia), and other digital devices using portable modems. Some mobile services allow more than one device to be connected to the Internet

using a single cellular connection using a process called tethering. The modem may be built into laptop computers, tablets, mobile phones, and other devices, added to some devices using PC cards, USB modems, and USB sticks or dongles, or separate wireless modems can be used.[68]

Service mark for GSMA

New mobile phone technology and infrastructure is introduced periodically and generally involves a change in the fundamental nature of the service, non-backwards-compatible transmission technology, higher peak data rates, new frequency bands, wider channel frequency bandwidth in Hertz becomes available. These transitions are referred to as generations. The first mobile data services became available during the second generation (2G).

Second generation (2G) from 1991:

Speeds in kbit/s	*down and up*
· GSM CSD	9.6 kbit/s
· *CDPD*	up to 19.2 kbit/s
· GSM GPRS (2.5G)	56 to 115 kbit/s
· GSM EDGE (2.75G)	up to 237 kbit/s

Third generation (3G) from 2001:

Speeds in Mbit/s	*down*	*up*
· UMTS W-CDMA	0.4 Mbit/s	
· UMTS HSPA	14.4	5.8
· UMTS TDD	16 Mbit/s	
· CDMA2000 1xRTT	0.3	0.15
· *CDMA2000 EV-DO*	2.5–4.9	0.15–1.8
· GSM EDGE-Evolution	1.6	0.5

Fourth generation (4G) from 2006:

Speeds in Mbit/s	*down*	*up*
· HSPA+	21–672	5.8–168
· Mobile WiMAX (802.16)	37–365	17–376
· LTE	100–300	50–75
· LTE-Advanced:		
· moving at higher speeds	100 Mbit/s	
· not moving or moving at lower speeds	up to 1000 Mbit/s	
· *MBWA (802.20)*	80 Mbit/s	

The download (to the user) and upload (to the Internet) data rates given above are peak or maximum rates and end users will typically experience lower data rates.

WiMAX was originally developed to deliver fixed wireless service with wireless mobility added in 2005. CDPD, CDMA2000 EV-DO, and MBWA are no longer being actively developed.

In 2011, 90% of the world's population lived in areas with 2G coverage, while 45% lived in areas with 2G and 3G coverage.[69]

WiMAX

Worldwide Interoperability for Microwave Access (WiMAX) is a set of interoperable implementations of the IEEE 802.16 family of wireless-network standards certified by the WiMAX Forum. WiMAX enables "the delivery of last mile wireless broadband access as an alternative to cable and DSL".[70] The original IEEE 802.16 standard, now called "Fixed WiMAX", was published in 2001 and provided 30 to 40 megabit-per-second data rates.[71] Mobility support was added in 2005. A 2011 update provides data rates up to 1 Gbit/s for fixed stations. WiMax offers a metropolitan area network with a signal radius of about 50 km (30 miles), far surpassing the 30-metre (100-foot) wireless range of a conventional Wi-Fi local area network (LAN). WiMAX signals also penetrate building walls much more effectively than Wi-Fi.

Wireless ISP

Wireless Internet service providers (WISPs) operate independently of mobile phone operators. WISPs typically employ low-cost IEEE 802.11 Wi-Fi radio systems to link up remote locations over great distances (Long-range Wi-Fi), but may use other higher-power radio communications systems as well.

Wi-Fi logo

Traditional 802.11a/b/g/n/ac is an unlicensed omnidirectional service designed to span between 100 and 150 m (300 to 500 ft). By focusing the radio signal using a directional antenna (where allowed by regulations), 802.11 can operate reliably over a distance of many km(miles), although the technology's line-of-sight requirements hamper connectivity in areas with hilly or heavily foliated terrain. In addition, compared to hard-wired connectivity, there are security risks (unless robust security protocols are enabled); data rates are usually slower (2 to 50 times slower); and the network can be less stable, due to interference from other wireless devices and networks, weather and line-of-sight problems.[72]

With the increasing popularity of unrelated consumer devices operating on the same 2.4 GHz band, many providers have migrated to the 5GHz ISM band. If the service provider holds the necessary spectrum license, it could also reconfigure various brands of off the shelf Wi-Fi hardware to operate on its own band instead of the crowded unlicensed ones. Using higher frequencies carries various advantages:

- usually regulatory bodies allow for more power and using (better-) directional antennae,
- there exists much more bandwidth to share, allowing both better throughput and improved coexistence,
- there are less consumer devices that operate over 5 GHz than on 2.4 GHz, hence less interferers are present,
- the shorter wavelengths propagate much worse through walls and other structure, so much less interference leaks outside of the homes of consumers.

Proprietary technologies like Motorola Canopy & Expedience can be used by a WISP to offer wireless access to rural and other markets that are hard to reach using Wi-Fi or WiMAX. There are a number of companies that provide this service.[73]

Local Multipoint Distribution Service

Local Multipoint Distribution Service (LMDS) is a broadband wireless access technology that uses microwave signals operating between 26 GHz and 29 GHz.[74] Originally designed for digital television transmission (DTV), it is conceived as a fixed wireless, point-to-multipoint technology for utilization in the last mile. Data rates range from 64 kbit/s to 155 Mbit/s.[75] Distance is typically limited to about 1.5 miles (2.4 km), but links of up to 5 miles (8 km) from the base station are possible in some circumstances.[76]

LMDS has been surpassed in both technological and commercial potential by the LTE and WiMAX standards.

Non-commercial alternatives for using Internet services

Grassroots wireless networking movements

Deploying multiple adjacent Wi-Fi access points is sometimes used to create city-wide wireless networks.[77] It is usually ordered by the local municipality from commercial WISPs.

Grassroots efforts have also led to wireless community networks widely deployed at numerous countries, both developing and developed ones. Rural wireless-ISP installations are typically not commercial in nature and are instead a patchwork of systems built up by hobbyists mounting antennas on radio masts and towers, agricultural storage silos, very tall trees, or whatever other tall objects are available.

Where radio spectrum regulation is not community-friendly, the channels are crowded or when equipment can not be afforded by local residents, free-space optical communication can also be deployed in a similar manner for point to point transmission in air (rather than in fiber optic cable).

Packet radio

Packet radio connects computers or whole networks operated by radio amateurs with the option to access the Internet. Note that as per the regulatory rules outlined in the HAM license, Internet access and e-mail should be strictly related to the activities of hardware amateurs.

Sneakernet

The term, a tongue-in-cheek play on *net(work)* as in *Internet* or *Ethernet*, refers to the wearing of sneakers as the transport mechanism for the data.

For those who do not have access to or can not afford broadband at home, downloading large files and disseminating information is done by transmission through workplace or library networks, taken home and shared with neighbors by sneakernet.

There are various decentralized, delay tolerant peer to peer applications which aim to fully automate this using any available interface, including both wireless (Bluetooth, Wi-Fi mesh, P2P or hotspots) and physically connected ones (USB storage, ethernet, etc.).

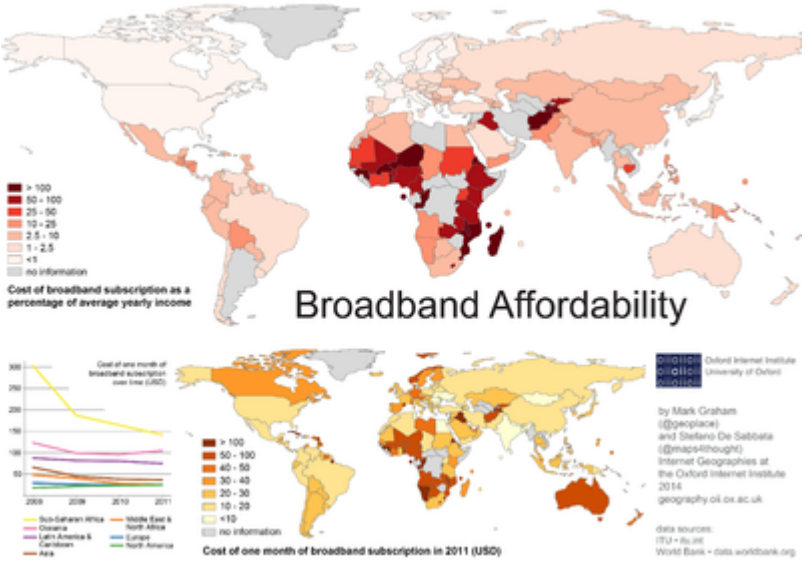
Sneakernets may also be used in tandem with computer network data transfer to increase data security or overall throughput for big data use cases. Innovation continues in the area to this day, for example AWS has recently announced Snowball, and bulk data processing is also done in a similar fashion by many research institutes and government agencies.

Pricing and spending

Internet access is limited by the relation between pricing and available resources to spend. Regarding the latter, it is estimated that 40% of the world's population has less than US$20 per year available to spend on information and communications technology (ICT).[79] In Mexico, the poorest 30% of the society counts with an estimated US$35 per year (US$3 per month) and in Brazil, the poorest 22% of the population counts with merely US$9 per year to spend on ICT (US$0.75 per month). From Latin America it is known that the borderline between ICT as a necessity good and ICT as a luxury good is roughly around the “magical number” of US$10 per person per month, or US$120 per year.[79] This is the amount of ICT spending people esteem to be a basic necessity. Current Internet access prices exceed the available resources by large in many countries.

Dial-up users pay the costs for making local or long distance phone calls, usually pay a monthly subscription fee, and may be subject to additional per minute or traffic based charges, and connect time limits by their ISP. Though less common today than in the past, some dial-up access is offered for "free" in return for watching banner ads as part of the dial-up service. NetZero, BlueLight, Juno, Freenet (NZ), and Free-nets are examples of services providing free access. Some Wireless community networks continue the tradition of providing free Internet access.

Fixed broadband Internet access is often sold under an "unlimited" or flat rate pricing model, with price determined by the maximum data rate chosen by the customer, rather than a per minute or traffic based charge. Per minute and traffic based charges and traffic caps are common for mobile broadband Internet access.



Broadband affordability in 2011

This map presents an overview of broadband affordability, as the relationship between average yearly income per capita and the cost of a broadband subscription (data referring to 2011). Source: Information Geographies at the Oxford Internet Institute.[78]

Internet services like Facebook, Wikipedia and Google have built special programs to partner with mobile network operators (MNO) to introduce *zero-rating* the cost for their data volumes as a means to provide their service more broadly into developing markets.[80]

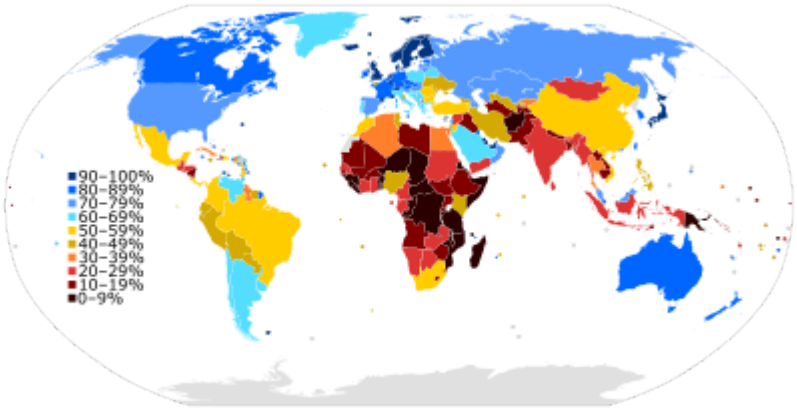
With increased consumer demand for streaming content such as video on demand and peer-to-peer file sharing, demand for bandwidth has increased rapidly and for some ISPs the flat rate pricing model may become unsustainable. However, with fixed costs estimated to represent 80–90% of the cost of providing broadband service, the marginal cost to carry additional traffic is low. Most ISPs do not disclose their costs, but the cost to transmit a gigabyte of data in 2011 was estimated to be about $0.03.[81]

Some ISPs estimate that a small number of their users consume a disproportionate portion of the total bandwidth. In response some ISPs are considering, are experimenting with, or have implemented combinations of traffic based pricing, time of day or "peak" and "off peak" pricing, and bandwidth or traffic caps. Others claim that because the marginal cost of extra bandwidth is very small with 80 to 90 percent of the costs fixed regardless of usage level, that such steps are unnecessary or motivated by concerns other than the cost of delivering bandwidth to the end user.[82][83][84]

In Canada, Rogers Hi-Speed Internet and Bell Canada have imposed bandwidth caps.[82] In 2008 Time Warner began experimenting with usage-based pricing in Beaumont, Texas.[85] In 2009 an effort by Time Warner to expand usage-based pricing into the Rochester, New York area met with public resistance, however, and was abandoned.[86] On August 1, 2012 in Nashville, Tennessee and on October 1, 2012 in Tucson, Arizona Comcast began tests that impose data caps on area residents. In Nashville exceeding the 300 Gbyte cap mandates a temporary purchase of 50 Gbytes of additional data.[87]

Digital divide

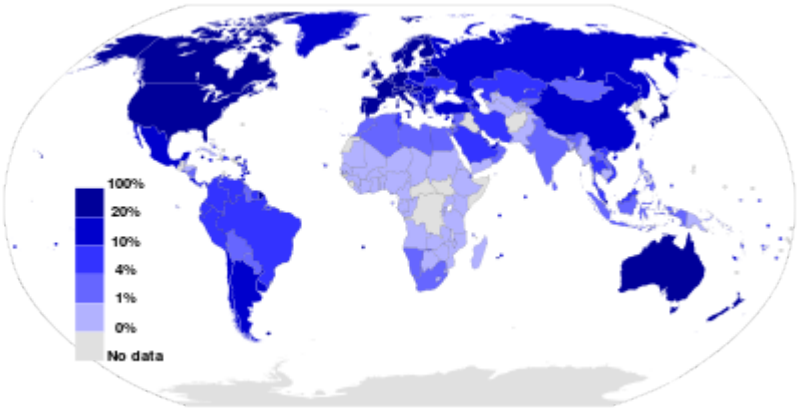
Despite its tremendous growth, Internet access is not distributed equally within or between countries.[92][93] The digital divide refers to "the gap between people with effective access to information and communications technology (ICT), and those with very limited or no access". The gap between people with Internet access and those without is one of many aspects of the digital divide.[94] Whether someone has access to the Internet can depend greatly on financial status, geographical location as well as government policies. "Low-income, rural, and minority populations have received special scrutiny as the technological "have-nots."[95]



Internet users in 2015 as a percentage of a country's population

Source: International Telecommunications Union.[88]

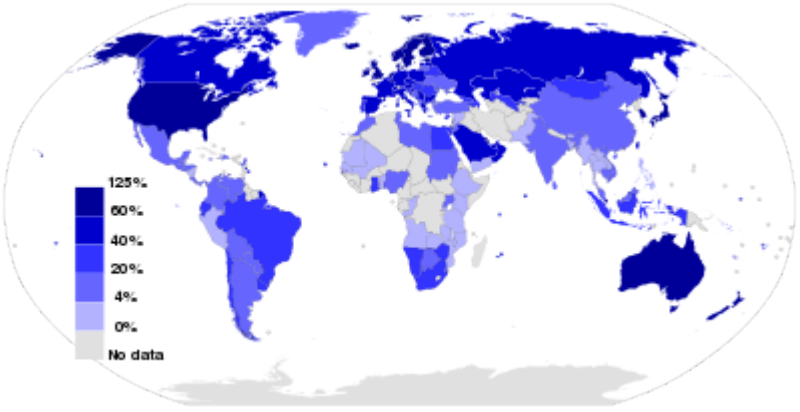
Government policies play a tremendous role in bringing Internet access to or limiting access for underserved groups, regions, and countries. For example, in Pakistan, which is pursuing an aggressive IT policy aimed at boosting its drive for economic modernization, the number of Internet users grew from 133,900 (0.1% of the population) in 2000 to 31 million (17.6% of the population) in 2011.[96] In North Korea there is relatively little access to the Internet due to the governments' fear of political instability that might accompany the benefits of access to the global Internet.[97] The U.S. trade embargo is a barrier limiting Internet access in Cuba.[98]



Fixed broadband Internet subscriptions in 2012 as a percentage of a country's population

Source: International Telecommunications Union.[89]

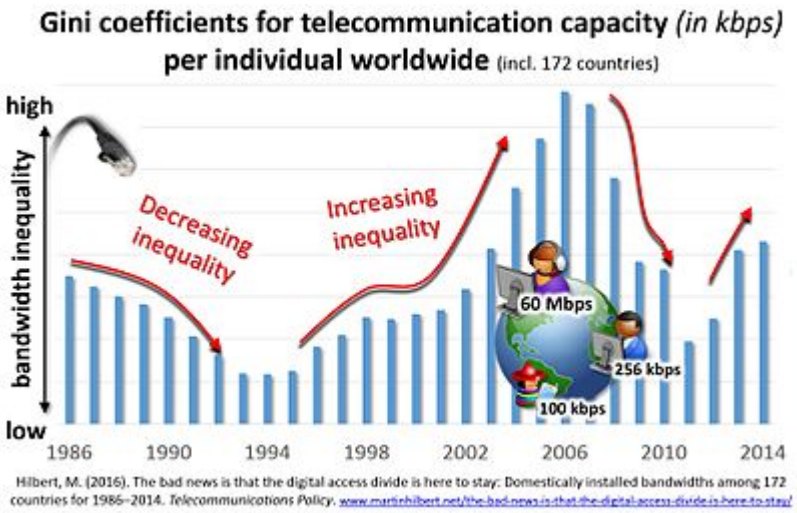
Access to computers is a dominant factor in determining the level of Internet access. In 2011, in developing countries, 25% of households had a computer and 20% had Internet access, while in developed countries the figures were 74% of households had a computer and 71% had Internet access.[69] The majority of people in developing countries do not have Internet access.[1] (http://tech.firstpost.com/news-analysis/most-people-in-developing-countries-have-no-internet-access-facebook-256125.html) About 4 billion people do not have Internet access.[2] (https://www.pcmag.com/article2/0,2817,2484734,00.asp) When buying computers was legalized in Cuba in 2007, the private ownership of computers soared (there were 630,000 computers available on the island in 2008, a 23% increase over 2007).[99][100]



Mobile broadband Internet subscriptions in 2012 as a percentage of a country's population

Source: International Telecommunications Union.[90]

Internet access has changed the way in which many people think and has become an integral part of peoples economic, political, and social lives. The United Nations has recognized that providing Internet access to more people in the world will allow them to take advantage of the "political, social, economic, educational, and career opportunities" available over the Internet.[93] Several of the 67 principles adopted at the World Summit on the Information Society convened by the United Nations in Geneva in 2003, directly address the digital divide.[101] To promote economic development and a reduction of the digital divide, national broadband plans have been and are being developed to increase the availability of affordable high-speed Internet access throughout the world.



The digital divide measured in terms of bandwidth is not closing, but fluctuating up and down. Gini coefficients for telecommunication capacity (in kbit/s) among individuals worldwide[91]

Growth in number of users

Access to the Internet grew from an estimated 10 million people in 1993, to almost 40 million in 1995, to 670 million in 2002, and to 2.7 billion in 2013.[105] With market saturation, growth in the number of Internet users is slowing in industrialized countries, but continues in Asia,[106] Africa, Latin America, the Caribbean, and the Middle East.

There were roughly 0.6 billion fixed broadband subscribers and almost 1.2 billion mobile broadband subscribers in 2011.[107] In developed countries people frequently use both fixed and mobile broadband networks. In developing countries mobile broadband is often the only access method available.[69]

Worldwide Internet users

	2005	2010	2016[a]
World population[102]	6.5 billion	6.9 billion	7.3 billion
Users worldwide	16%	30%	47%
Users in the developing world	8%	21%	40%
Users in the developed world	51%	67%	81%

[a] Estimate.

Source: International Telecommunications Union.[103]

Bandwidth divide

Traditionally the divide has been measured in terms of the existing numbers of subscriptions and digital devices ("have and have-not of subscriptions"). Recent studies have measured the digital divide not in terms of technological devices, but in terms of the existing bandwidth per individual (in kbit/s per capita).[91][108] As shown in the Figure on the side, the digital divide in kbit/s is not monotonically decreasing, but re-opens up with each new innovation. For example, "the massive diffusion of narrow-band Internet and mobile phones during the late 1990s" increased digital inequality, as well as "the initial introduction of broadband DSL and cable modems during 2003–2004 increased levels of inequality".[108] This is because a new kind of

Internet users by region

	2005	2010	2016[a]
Africa	2%	10%	25%
Americas	36%	49%	65%
Arab States	8%	26%	42%
Asia and Pacific	9%	23%	42%

Commonwealth of Independent States	10%	34%	67%
Europe	46%	67%	79%

[a] Estimate.

Source: International Telecommunication Union.[104]

connectivity is never introduced instantaneously and uniformly to society as a whole at once, but diffuses slowly through social networks. As shown by the Figure, during the mid-2000s, communication capacity was more unequally distributed than during the late 1980s, when only fixed-line phones existed. The most recent increase in digital equality stems from the massive diffusion of the latest digital innovations (i.e. fixed and mobile broadband infrastructures, e.g. 3G and fiber optics FTTH).[109] As shown in the Figure, Internet access in terms of bandwidth is more unequally distributed in 2014 as it was in the mid-1990s.

In the United States

In the United States, billions of dollars have been invested in efforts to narrow the digital divide and bring Internet access to more people in low-income and rural areas of the United States. Internet availability varies widely state by state in the U.S. In 2011 for example, 87.1% of all New Hampshire residents lived in a household where Internet was available, ranking first in the nation.[110] Meanwhile, 61.4% of all Mississippi residents lived in a household where Internet was available, ranking last in the nation.[111] The Obama administration continued this commitment to narrowing the digital divide through the use of stimulus funding.[95] The National Center for Education Statistics reported that 98% of all U.S. classroom computers had Internet access in 2008 with roughly one computer with Internet access available for every three students. The percentage and ratio of students to computers was the same for rural schools (98% and 1 computer for every 2.9 students).[112]

Rural access

One of the great challenges for Internet access in general and for broadband access in particular is to provide service to potential customers in areas of low population density, such as to farmers, ranchers, and small towns. In cities where the population density is high, it is easier for a service provider to recover equipment costs, but each rural customer may require expensive equipment to get connected. While 66% of Americans had an Internet connection in 2010, that figure was only 50% in rural areas, according to the Pew Internet & American Life Project.[113] Virgin Media advertised over 100 towns across the United Kingdom "from Cwmbran to Clydebank" that have access to their 100 Mbit/s service.[21]

Wireless Internet Service Provider (WISPs) are rapidly becoming a popular broadband option for rural areas.[114] The technology's line-of-sight requirements may hamper connectivity in some areas with hilly and heavily foliated terrain. However, the Tegola project, a successful pilot in remote Scotland, demonstrates that wireless can be a viable option.[115]

The Broadband for Rural Nova Scotia initiative is the first program in North America to guarantee access to "100% of civic addresses" in a region. It is based on Motorola Canopy technology. As of November 2011, under 1000 households have reported access problems. Deployment of a new cell network by one Canopy provider (Eastlink) was expected to provide the alternative of 3G/4G service, possibly at a special unmetered rate, for areas harder to serve by Canopy.[116]

In New Zealand, a fund has been formed by the government to improve rural broadband,[117] and mobile phone coverage. Current proposals include: (a) extending fibre coverage and upgrading copper to support VDSL, (b) focussing on improving the coverage of cellphone technology, or (c) regional wireless.[118]

Access as a civil or human right

The actions, statements, opinions, and recommendations outlined below have led to the suggestion that Internet access itself is or should become a civil or perhaps a human right.[119][120]

Several countries have adopted laws requiring the state to work to ensure that Internet access is broadly available and/or preventing the state from unreasonably restricting an individual's access to information and the Internet:

- Costa Rica: A 30 July 2010 ruling by the Supreme Court of Costa Rica stated: "Without fear of equivocation, it can be said that these technologies [information technology and communication] have impacted the way humans communicate, facilitating the connection between people and institutions worldwide and eliminating barriers of space and time. At this time, access to these technologies becomes a basic tool to facilitate the exercise of fundamental rights and democratic participation (e-democracy) and citizen control, education, freedom of thought and expression, access to information and public services online, the right to communicate with government electronically and administrative transparency, among others. This includes the fundamental right of access to these technologies, in particular, the right of access to the Internet or World Wide Web."[121]
- Estonia: In 2000, the parliament launched a massive program to expand access to the countryside. The Internet, the government argues, is essential for life in the 21st century.[122]
- Finland: By July 2010, every person in Finland was to have access to a one-megabit per second broadband connection, according to the Ministry of Transport and Communications. And by 2015, access to a 100 Mbit/s connection.[123]
- France: In June 2009, the Constitutional Council, France's highest court, declared access to the Internet to be a basic human right in a strongly-worded decision that struck down portions of the HADOPI law, a law that would have tracked abusers and without judicial review automatically cut off network access to those who continued to download illicit material after two warnings[124]
- Greece: Article 5A of the Constitution of Greece states that all persons has a right to participate in the Information Society and that the state has an obligation to facilitate the production, exchange, diffusion, and access to electronically transmitted information.[125]
- Spain: Starting in 2011, Telefónica, the former state monopoly that holds the country's "universal service" contract, has to guarantee to offer "reasonably" priced broadband of at least one megabyte per second throughout Spain.[126]

In December 2003, the World Summit on the Information Society (WSIS) was convened under the auspice of the United Nations. After lengthy negotiations between governments, businesses and civil society representatives the WSIS Declaration of Principles was adopted reaffirming the importance of the Information Society to maintaining and strengthening human rights:[101] [127]

> 1. We, the representatives of the peoples of the world, assembled in Geneva from 10–12 December 2003 for the first phase of the World Summit on the Information Society, declare our common desire and commitment to build a people-centred, inclusive and development-oriented Information Society, where everyone can create, access, utilize and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life, premised on the purposes and principles of the Charter of the United Nations and respecting fully and upholding the Universal Declaration of Human Rights.
>
> 3. We reaffirm the universality, indivisibility, interdependence and interrelation of all human rights and fundamental freedoms, including the right to development, as enshrined in the Vienna Declaration. We also reaffirm that democracy, sustainable development, and respect for human rights and fundamental freedoms as well as good governance at all levels are interdependent and mutually reinforcing. We further resolve to strengthen the rule of law in international as in national affairs.

The WSIS Declaration of Principles makes specific reference to the importance of the right to freedom of expression in the "Information Society" in stating:

> 4. We reaffirm, as an essential foundation of the Information Society, and as outlined in Article 19 of the Universal Declaration of Human Rights, that everyone has the right to freedom of opinion and expression; that this right includes freedom to hold opinions without interference

> and to seek, receive and impart information and ideas through any media and regardless of frontiers. Communication is a fundamental social process, a basic human need and the foundation of all social organisation. It is central to the Information Society. Everyone, everywhere should have the opportunity to participate and no one should be excluded from the benefits of the Information Society offers."[127]

A poll of 27,973 adults in 26 countries, including 14,306 Internet users,[128] conducted for the BBC World Service between 30 November 2009 and 7 February 2010 found that almost four in five Internet users and non-users around the world felt that access to the Internet was a fundamental right.[129] 50% strongly agreed, 29% somewhat agreed, 9% somewhat disagreed, 6% strongly disagreed, and 6% gave no opinion.[130]

The 88 recommendations made by the Special Rapporteur on the promotion and protection of the right to freedom of opinion and expression in a May 2011 report to the Human Rights Council of the United Nations General Assembly include several that bear on the question of the right to Internet access:[131]

> 67. Unlike any other medium, the Internet enables individuals to seek, receive and impart information and ideas of all kinds instantaneously and inexpensively across national borders. By vastly expanding the capacity of individuals to enjoy their right to freedom of opinion and expression, which is an “enabler” of other human rights, the Internet boosts economic, social and political development, and contributes to the progress of humankind as a whole. In this regard, the Special Rapporteur encourages other Special Procedures mandate holders to engage on the issue of the Internet with respect to their particular mandates.
>
> 78. While blocking and filtering measures deny users access to specific content on the Internet, States have also taken measures to cut off access to the Internet entirely. The Special Rapporteur considers cutting off users from Internet access, regardless of the justification provided, including on the grounds of violating intellectual property rights law, to be disproportionate and thus a violation of article 19, paragraph 3, of the International Covenant on Civil and Political Rights.
>
> 79. The Special Rapporteur calls upon all States to ensure that Internet access is maintained at all times, including during times of political unrest.
>
> 85. Given that the Internet has become an indispensable tool for realizing a range of human rights, combating inequality, and accelerating development and human progress, ensuring universal access to the Internet should be a priority for all States. Each State should thus develop a concrete and effective policy, in consultation with individuals from all sections of society, including the private sector and relevant Government ministries, to make the Internet widely available, accessible and affordable to all segments of population.

Network neutrality

Network neutrality (also net neutrality, Internet neutrality, or net equality) is the principle that Internet service providers and governments should treat all data on the Internet equally, not discriminating or charging differentially by user, content, site, platform, application, type of attached equipment, or mode of communication.[132][133][134][135] Advocates of net neutrality have raised concerns about the ability of broadband providers to use their last mile infrastructure to block Internet applications and content (e.g. websites, services, and protocols), and even to block out competitors.[136] Opponents claim net neutrality regulations would deter investment into improving broadband infrastructure and try to fix something that isn't broken.[137][138] In April 2017, a recent attempt to compromise net neutrality in the United States is being considered by the newly appointed FCC chairman, Ajit Varadaraj Pai.[139]

Natural disasters and access

Natural disasters disrupt internet access in profound ways. This is important—not only for telecommunication companies who own the networks and the businesses who use them, but for emergency crew and displaced citizens as well. The situation is worsened when hospitals or other buildings necessary to disaster response lose their connection. Knowledge gained from studying past internet disruptions by natural disasters could be put to use in planning or recovery. Additionally, because of both natural and man-made disasters, studies in network resiliency are now being conducted to prevent large-scale outages.[140]

One way natural disasters impact internet connection is by damaging end sub-networks (subnets), making them unreachable. A study on local networks after Hurricane Katrina found that 26% of subnets within the storm coverage were unreachable.[141] At Hurricane Katrina's peak intensity, almost 35% of networks in Mississippi were without power, while around 14% of Louisiana's networks were disrupted.[142] Of those unreachable subnets, 73% were disrupted for four weeks or longer and 57% were at "network edges where important emergency organizations such as hospitals and government agencies are mostly located".[141] Extensive infrastructure damage and inaccessible areas were two explanations for the long delay in returning service.[141] The company Cisco has revealed a Network Emergency Response Vehicle (NERV), a truck that makes portable communications possible for emergency responders despite traditional networks being disrupted.[143]

A second way natural disasters destroy internet connectivity is by severing submarine cables—fiber-optic cables placed on the ocean floor that provide international internet connection. A sequence of undersea earthquakes cut six out of seven international cables connected to that country and caused a tsunami that wiped out one of its cable and landing stations.[144][145] The impact slowed or disabled internet connection for five days within the Asia-Pacific region as well as between the region and the United States and Europe.[146]

With the rise in popularity of cloud computing, concern has grown over access to cloud-hosted data in the event of a natural disaster. Amazon Web Services (AWS) has been in the news for major network outages in April 2011 and June 2012.[147][148] AWS, like other major cloud hosting companies, prepares for typical outages and large-scale natural disasters with backup power as well as backup data centers in other locations. AWS divides the globe into five regions and then splits each region into availability zones. A data center in one availability zone should be backed up by a data center in a different availability zone. Theoretically, a natural disaster would not affect more than one availability zone.[149] This theory plays out as long as human error is not added to the mix. The June 2012 major storm only disabled the primary data center, but human error disabled the secondary and tertiary backups, affecting companies such as Netflix, Pinterest, Reddit, and Instagram.[150][151]

See also

- Back-channel, a low bandwidth, or less-than-optimal, transmission channel in the opposite direction to the main channel
- Broadband mapping in the United States
- Comparison of wireless data standards
- Connectivity in a social and cultural sense
- Fiber-optic communication
- History of the Internet
- IP over DVB, Internet access using MPEG data streams over a digital television network
- List of countries by number of broadband Internet subscriptions
- National broadband plan
- Public switched telephone network (PSTN)
- Residential gateway
- Telecommunications network
- White spaces (radio), a group of technology companies working to deliver broadband Internet access via unused analog television frequencies

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Exhibit C

The Standard

BUSINESS CENTER
A self-service business center is available in our Historic Lobby. All that is needed is a credit card to get started. If all you need is a boarding pass, you can print that free of charge.

ATM MACHINE
There is a cash machine in the Historic Lobby to the left of the organ and on the rooftop near the bar.

CAR SERVICES & RENTAL
For thought-free travel, delivered autos and personal drivers are available hourly and daily. Economy and luxury rental cars are available. Rental cars can be delivered to, and collected from, the hotel or the LAX airport. Please contact the Front Desk to arrange these services.

TAXI
Taxis are available 24 hours a day, and are on queue waiting nearby. Just ask one of our valets and they'll hail one over for you.

CHECK OUT
Our check out time is 12 noon. A late check-out may be requested (subject to availability) by dialing "0" on your phone, but you may incur an additional charge.

EXPRESS CHECKOUT
Video checkout is available through the TV system. Simply press the menu button on your remote and follow the on screen instructions. If you choose to leave us in an incognito fashion, we'll e-mail your final charges to you within 24 hours.

FORGOTTEN ITEMS
Toothbrushes, toothpaste, razors, combs, and other toiletries are available. Don't be shy, everyone forgets something. For assistance, please dial "0".

FRONT DESK/CONCEIRGE
We're happy to help with restaurant reservations, transportation, recommendations and any information about the City of Angels. For assistance, please dial "0".

GYM
Our gym is open 24 hours and located on the third floor. There are also a number of full service gyms in close proximity to the Hotel. Please contact the front desk for additional details.

HIGH-SPEED INTERNET / WiFi
Complimentary WiFi is provided everywhere in the Hotel. The log in and password is the last name of the registered guest and the room number. For $9.95 you can upgrade to lightening fast speed up to 6mbps for streaming movies, quicker downloads and video chats. For assistance, please dial "0".

Exhibit D

1 standard

noun | stan·dard | \ˈstan-dərd\

Updated on: 6 Feb 2018

Tip: Synonym Guide

Examples: STANDARD in a Sentence

Definition of STANDARD

1 : a conspicuous object (such as a banner) formerly carried at the top of a pole and used to mark a rallying point especially in battle or to serve as an emblem

2 **a** : a long narrow tapering flag that is personal to an individual or corporation and bears heraldic devices
b : the personal flag of the head of a state or of a member of a royal family
c : an organization flag carried by a mounted or motorized military unit
d : BANNER 1

3 : something established by authority, custom, or general consent as a model or example : CRITERION • quite slow by today's *standards*

4 : something set up and established by authority as a rule for the measure of quantity, weight, extent, value, or quality

7 **a** : a shrub or herb grown with an erect main stem so that it forms or resembles a tree
b : a fruit tree grafted on a stock that does not induce dwarfing

8 **a** : the large odd upper petal of a papilionaceous flower (as of the pea)
b : one of the three inner usually erect and incurved petals of an iris

9 : a musical composition (such as a song) that has become a part of the standard repertoire

10 : a vehicle with a manual transmission : MANUAL • Her new car is a *standard*.

—standardless *adjective*

NEW! Time Traveler

First Known Use: 12th century

SEE WORDS FROM THE SAME YEAR

See *standard* defined for English-language learners

See *standard* defined for kids

Indulge Your Inner Word Nerd

Trending: US Stocks Experience 'Whipsaw'

A Stroll Down the History of 'Boulevard'

2017 Word of Year: Behind Scenes

Examples of STANDARD in a Sentence

By modern *standards*, the house is just too small

Recent Examples of STANDARD from the Web

The Better Business Bureau is an unbiased nonprofit organization that sets and upholds high *standards* for fair and honest business behavior.

— Leah Napoliello, *Houston Chronicle*, "BBB on homes: Hiring organizer firm requires care, consideration," 5 Jan. 2018

Rules for truck emissions such as nitrogen oxides, or NOx, toughened after 2010, when Obama announced a program of new *standards* for medium- and heavy-duty trucks.

— Cliff Pinckard, *cleveland.com*, "Trump clashes with former top aide Bannon: A.M. News Links," 4 Jan. 2018

Unlike Los Angeles and the Central Valley, the Bay Area generally meets annual federal *standards* for fine particle pollution, which can bury itself in people's lungs and contribute to asthma and other respiratory problems.

— Kate Galbraith, *San Francisco Chronicle*, "As wildfires worsen, technology makes smoke in air easier to track," 29 Dec. 2017

These example sentences are selected automatically from various online news sources to reflect current usage of the word 'standard.' Views expressed in the examples do not represent the opinion of Merriam-Webster or its editors. Send us feedback.

Origin and Etymology of STANDARD

Middle English, from Anglo-French *estandard* banner, of Germanic origin; akin to Old English *standan* to stand and probably to Old High German *hart* hard

NEW! Time Traveler

First Known Use: 12th century

SEE WORDS FROM THE SAME YEAR

Synonyms
bar, barometer, benchmark, criterion, gold standard, grade, mark, measure, metric, par, touchstone, yardstick

Synonym Discussion of STANDARD

STANDARD, CRITERION, GAUGE, YARDSTICK, TOUCHSTONE mean a means of determining what a thing should be. STANDARD applies to any definite rule, principle, or measure established by authority. ⟨• *standards* of behavior⟩ CRITERION may apply to anything used as a test of quality whether formulated as a rule or principle or not. ⟨• questioned the critic's *criteria* for excellence⟩ GAUGE applies to a means of testing a particular dimension (such as thickness, depth, diameter) or figuratively a particular quality or aspect. ⟨• polls as a *gauge* of voter dissatisfaction⟩ YARDSTICK is an informal substitute for CRITERION that suggests quantity more often than quality. ⟨• housing construction as a *yardstick* of economic growth⟩ TOUCHSTONE suggests a simple test of the authenticity or value of something intangible. ⟨• fine service is one *touchstone* of a first-class restaurant⟩

Other Heraldry Terms

blazon, cachet, couchant, dormant, escutcheon, potent, totem

2 standard

adjective

Definition of STANDARD

b : sound and usable but not of top quality • *standard* beef

2 **a** : regularly and widely used, available, or supplied • *standard* automobile equipment
b : well-established and very familiar • the *standard* opera

3 : having recognized and permanent value • a *standard* reference work

4 : substantially uniform and well established by usage in the speech and writing of the educated and widely recognized as acceptable • *standard* pronunciation is subject to regional variations

—standardly *adverb*

See *standard* defined for English-language learners

Examples of STANDARD in a Sentence

a window of *standard* width

The movie was a pretty *standard* romantic comedy.

The word is considered *standard*.

Recent Examples of STANDARD from the Web

The apartments' interiors will come *standard* with 9-foot ceilings, stainless-steel appliances, walk-in closets, garden-style soaking tubs, designer fixtures, granite countertops, faux hardwood flooring and carpet.

— *Houston Chronicle*, "Signorelli Company: The Pointe at Valley Ranch Town Center will break ground in January," 28 Dec. 2017

While the 24-point margin of victory was fairly *standard* for Connecticut, the game

That is now *standard*, with big-city mayors prominent in global discussions of climate change, urban policy and investment.

— *The Economist*, "LexingtonEric Garcetti hopes to be the first mayor to make it to the White House," 14 Dec. 2017

These example sentences are selected automatically from various online news sources to reflect current usage of the word 'standard.' Views expressed in the examples do not represent the opinion of Merriam-Webster or its editors. Send us feedback.

First Known Use of STANDARD

1567

STANDARD Synonyms

Synonyms
average, common, commonplace, cut-and-dried (*also* cut-and-dry), everyday, garden-variety, normal, prosaic, routine, run-of-the-mill, ordinary, standard-issue.

Phrases Related to STANDARD

Related Phrases

below standard

standard lamp

the gold standard

up to standard

standard

noun

Definition of STANDARD for English Language Learners

: a level of quality, achievement, etc., that is considered acceptable or desirable

standards : ideas about morally correct and acceptable behavior

: something that is very good and that is used to make judgments about the quality of other things

standard

adjective

Definition of STANDARD for English Language Learners

: regularly and widely used, seen, or accepted : not unusual or special

: generally accepted and used because of high quality or excellence

: accepted and used by most of the educated speakers and writers of a language

STANDARD Defined for Kids

1 standard

noun | stan·dard | \ˈstan-dərd\

Definition of STANDARD for Students

2 : the personal flag of the ruler of a state

3 : an upright support • a lamp *standard*

4 : a figure used as a symbol by an organized body of people

2 standard

adjective

Definition of STANDARD for Students

1 : used as or matching a model or rule to compare against • *standard* weight

2 : regularly and widely used • It's a *standard* practice in the trade.

- The script is *standard* ... and so are the costumes ... —Barbara Robinson, *Best Christmas Pageant*

3 : widely known and accepted to be of good and permanent value • The book is a *standard* reference work on grammar.

Medical Dictionary

1 standard

noun | stan·dard | \ˈstan-dərd\

Medical Definition of STANDARD

: something set up or established by an authority as a rule for the measure of quantity, weight, extent, value, or quality

adjective

Medical Definition of STANDARD

: constituting or conforming to a standard especially as established by law or custom
• *standard* weight

Law Dictionary

standard

noun | stan·dard

Legal Definition of STANDARD

1 : something established by authority, custom, or general consent as a model, example, or point of reference • the *standard* of the reasonable person

2 : something established by authority as a rule for the measure of quantity, weight, extent, value, or quality

3 : the basis of value in a monetary system

Learn More about STANDARD

Thesaurus: All synonyms and antonyms for *standard*

Spanish Central: Translation of *standard*

Nglish: Translation of *standard* for Spanish speakers

Britannica English: Translation of *standard* for Arabic speakers

+ SHOW

WORD OF THE DAY

logomachy

a dispute over or about words

TRENDING NOW

1. whipsaw
   'to beset or victimize in two opposite ways at once'
2. treason
   'the crime of trying to overthrow your country's government'
3. redaction
   'removing sensitive information'
4. spurious
   'false' or 'of a deceitful nature'
5. malfeasance
   'wrongdoing or misconduct'

standage

stand-alone

standard

standard atmosphere

standard-bearer

TEST YOUR VOCABULARY

Words of Snow and Ice Quiz

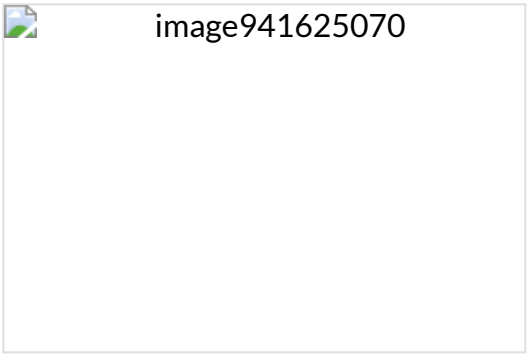
Which of the following refers to thin, bending ice, or to the act of running over such ice?

- kittly-benders
- pince-nez
- duvet
- spindrift

Can you spell these 10 commonly misspelled words?

TAKE THE QUIZ

WORDS AT PLAY



8 Words Formed by Mistakes

"Wait, you were saying what?!?!"

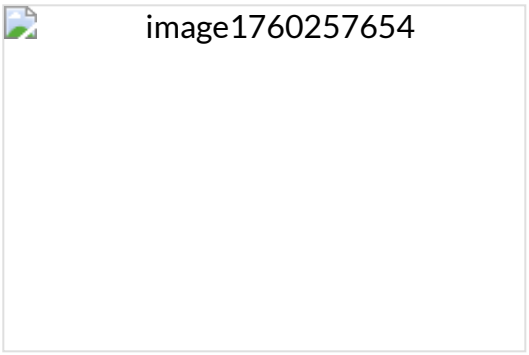
A Stroll Down the History of 'Boulevard'

From fortification to four lanes

What's the 'Sitch'?

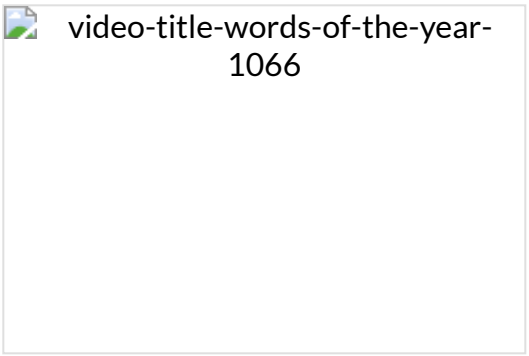
We've got ourselves a situation here.

ASK THE EDITORS



2017 Word of the Year: Behind the Scenes

How we chose 'feminism'



Words of the Year: 1066

Or, Why Pig Meat is Called 'Pork' and Cow Meat is Called 'Beef'

irrespective and regardless

Irregardless

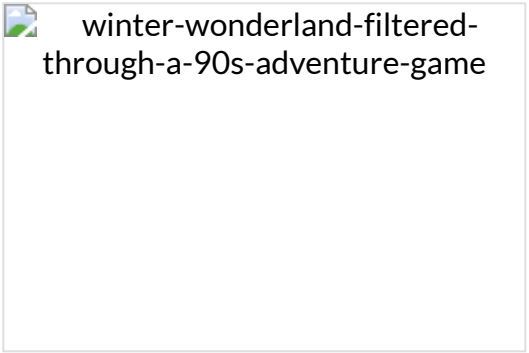
It is in fact a real word (but that doesn't mean you should use it).

WORD GAMES

Words of Snow and Ice Quiz

A selection of words from the chillier parts of the lexicon.

TAKE THE QUIZ



January 2018 Words of the Day Quiz

Spell It

Can you spell these 10 commonly misspelled words?
TAKE THE QUIZ

Learn a new word every day. Delivered to your inbox!

Your email address

OTHER MERRIAM-WEBSTER DICTIONARIES

SPANISH CENTRAL

LEARNER'S ESL DICTIONARY

WORDCENTRAL FOR KIDS

VISUAL DICTIONARY

SCRABBLE® WORD FINDER

MERRIAM-WEBSTER'S UNABRIDGED DICTIONARY

BRITANNICA ENGLISH - ARABIC TRANSLATION

NGLISH - SPANISH-ENGLISH TRANSLATION

FOLLOW US

Exhibit E

NEW YORK

The Glass Stampede

As this last great building boom winds down, our architecture critic asks: Does the new see-through city look better or worse than the one it replaced? A building-by-building survey.

By Justin Davidson Published Sep 7, 2008

1. 110 Third Avenue

The Variety Arts Theater was an institution that seemed to spend most of its 90-year existence in a state of gentle decline. Finally razed in 2004, it gave birth to Greenberg Farrow's impressively awful tower, full of fussy fenestration and clutter. A real loss.

(Photo: From left: Courtesy of Greenberg Farrow Architects (2))

Our city is molting.

Bricks flake away. So do brittle fire escapes, terra-cotta encrustations, old paint, cracked stoops, faded awnings, sash windows, and stone laurels fashioned a century ago by Sicilian carvers. New York is shucking off its aging walk-ups, its small and mildewed structures, its drafty warehouses, cramped stores, and idle factories. In their place, the city is sprouting a hard, glistening new shell of glass and steel. Bright, seamless towers with fast elevators and provisional views spring up over a street-level layer of banks and drugstores. In some cities, a building retains the right to exist until it's proved irredeemable. Here, colossal towers are merely placeholders, temporary arrangements of future debris. New York lives by a philosophy of creative destruction. The only thing permanent about real estate is a measured patch of earth and the column of air above it. The rest is disposable.

And the metamorphosis has sped up. In the past fifteen fat years, more than 76,000 new buildings have gone up, more than 44,000 were razed, another 83,000 were radically renovated—a rate of change that evokes those time-lapse nature films in which flowers spring up and wither in a matter of seconds. For more than a decade, we have awakened to jackhammers and threaded our way around orange plastic netting, calculating that, since our last haircut, workers have added six more stories to that high-rise down the block. Now that metamorphosis is slowing as the economy drags. Buildings are still going up, but the boom is winding down. Before the next one begins is a good time to ask, has this ferment improved New York or eaten away at the city's soul?

Some see this sustained spasm of building as an urban lobotomy, in which the city has sacrificed its eccentricities and variety to placid prosperity. I am more optimistic, but to test that feeling against unsightly reality, I decide to canvass the city, inventory the construction that so many New Yorkers revile, and see what is worth defending. The results of my tour (or 54 side-by-side comparisons, at least) appear on these pages. Half a century ago, similar upheavals resulted from urban-renewal campaigns and social housing planted on the scale of midwestern corn. This time the boom has happened lot by lot. I see single-family houses

on Staten Island and a vertical metropolis at Columbus Circle, juice-carton towers and displays of virtuoso design. In some cases, the same architects have built for sybarites (Polshek Partnership's Standard Hotel, which stands, Colossus-like, astride the High Line) and for the low-income, elderly, and disabled (Polshek's Schermerhorn House in Brooklyn). I hear the wails of those who mourn the city they knew decades, years, or weeks ago, but I come away satisfied that the boom has left us a better town.

I start my peregrinations at the corner of Bowery and Houston Street, which has rolled over from a rank and raffish past to a more sedate kind of glumness. Here, in the last few years, graffiti-encrusted storefronts have made way for a pair of hulking rental boxes by the suburban developer AvalonBay Communities. On the south side of Houston is the company's first Manhattan beachhead, Avalon Chrystie Place, which is marginally edgier than its usual pabulum. Paired with SLCE, Arquitectonica, the firm that brought you the gaudy Westin hotel in Times Square, has restrained itself to the point of invisibility, giving the façade a smattering of texture that does little to lighten the dumpy massing. A vast Whole Foods took most of the retail space, confirming fears of a middle-class takeover of the Lower East Side: The tofu's fine and the living is easy, but couldn't class warfare be waged with better design?

Leaping across Houston Street, AvalonBay leveled McGurk's, a rickety five-story dive that in the 1890s employed whores so desperate that the place came to be known as Suicide Hall. The glass block that went up instead—Avalon Bowery Place—might not oppress its residents quite that much, but its aggressive blandness has a way of chipping at the soul. A gimcrack look is nearly all that connects the reflective interloper to the dark, medieval dwellings all around. You don't have to be ancient to remember the Bowery's concordance of ravaged masonry and human ruins, who tottered from flophouse to dive to doorway. Now the closest thing to a den of sin is Bruce Willis's wine bar, Bowery Wine Company, which a few dozen neighbors welcomed with placards that read DIE HARD YUPPIE SCUM. The National Trust for Historic Preservation tried more-genteel tactics: It has put the area on its list of "Most Endangered Historic Places."

As I make my way up the new boulevard of Bowery toward the de-punked East Village, I think about the trade-offs. As the grandchild of Lower East Side tenement dwellers, I sympathize with preservationist sentiments. We need to remember, if not actually to relive, the experience of this once colorfully impoverished neighborhood. And yet it's one thing to preserve the traces of history, as the Lower East Side Tenement Museum does; it's another to fetishize misery. This slum sucked in huddled masses who craved less putrid air, more abundant food, and a little more space between one person and the next. Is it right to romanticize what they wanted desperately to escape? Hasn't the birthplace of Gertel's and Katz's earned itself a place to buy organic spelt? Avalon's ersatz châteaux could have been more graceful, but is the transformation they've helped to wreak really so dismal? Bad architecture can be good for people, too.

Think of the alternatives. In the last 25 years, the city's population has increased by a million people, and another million will be here 25 years from now. The

2. Avalon Bowery Place

11 and 22 East 1st Street

The developer AvalonBay paired Arquitectonica with SLCE, hoping the two firms would cook up something spirited. What we got is pretty blah, but not without traces of urbanistic merit, thanks to a community garden on one side and a suggestive alleyway on the other. A poor replacement, even for just tenements.

(Photo: From left: NYC Municipal Archives; Rebecca Sahn)

question is not whether to make room for them but how. We could, in theory, rope off most of Manhattan to new development and push new arrivals to the city's fringes. Had we done that years ago, we would have created a museum of shabbiness. Even doing so now would keep the city in a state of embalmed picturesqueness and let the cost of scarce space climb to even loonier heights than it already has. In its 43-year existence, the Landmarks Preservation Commission has tucked more than 25,000 buildings under its protective wing, which seems about right. Protect every tenement, and eventually millionaires can no longer afford them.

An abundance of new architecture comes with a concomitant amount of demolition, which is not necessarily a bad thing. The most admired, most architecturally resplendent cities are the products of major destruction: Paris, gutted by Baron Haussmann in the mid-nineteenth century, Chicago and London, leveled by fire; Rome, radically reorganized by Pope Sixtus V in the late 1580s; San Francisco, flattened by an earthquake in 1906. I'm not advocating growth through trauma, only pointing out that periods of rapid change can be spectacularly constructive and that the results outlast the pangs. As pieces of the city evaporate, they take our memories with them. It gets hard to remember which block that old Chock Full o'Nuts was on or what was next to a lamented laundromat. This chronic amnesia is part of the New York condition. In his 1962 poem "An Urban Convalescence," James Merrill captured the feverish yet methodical sacking of the city and the way it toys with our sense of comfortable familiarity.

As usual in New York, everything is torn down
Before you have had time to care for it.
Head bowed, at the shrine of noise,
let me try to recall
What building stood here.
Was there a building at all?

Among Merrill's disciples is one Jeremiah Moss, who maintains the engagingly gloomy blog Jeremiah's Vanishing New York, which he terms "an ongoing obituary for my dying city." His topic is the steady erosion of the city's texture. He is the defender of all the undistinguished hunks of masonry that lend the streets their rhythm and give people a place to live and earn a living: bodegas, curio stores, a metalworking shop in Soho, diners, and dingy bars.

The jaundiced view of the Lower East Side is that it can no longer be rescued from the sneaker boutiques, the bulbous Blue condo, or the guests at the Hotel on Rivington who sit at the bar and gaze at the diorama of quaint old tenements. But we should put this

transformation in context. A century ago, when the neighborhood was among the most congested places on Earth, New York kept bounding beyond its three-dimensional borders. By the city's own standards, the current spasms of construction are not really so severe. What makes the current escalation feel so sharp is that it comes after a long period of decline. The fortysomething who grew up here knew a metropolis that was not just smaller but rapidly desiccating. Between 1970 and 1980, more than a million people leached out of the five boroughs, their numbers only partially offset by new immigrants and aspiring actors. Crime rose, property prices collapsed, and plenty of smart people began to write New York off as another Newark, Cleveland, or Detroit.

Urban nostalgists reserve their greatest animus for gentrification, which is a stark word for a complicated phenomenon. It does not describe only the relentless territorial expansion of the rich at the expense of everybody else: Gentrification eddies across the city, polishing formerly middle-class enclaves to an affluent shine, prettying up once-decrepit neighborhoods for new middle-class arrivals, and making awful slums habitable. In the intricate ecology of New York, each current triggers a dizzying series of countercurrents. Low crime rates make city life more desirable, so fewer middle-class families feel like they are being forced to flee to the suburbs. That causes real-estate prices to climb, which forces out some of those same middle-class families. Rising housing costs in low-income areas require the poor to spend a growing slice of their income on rent but also make it financially feasible for developers to build affordable housing.

The way to deal with this tangle of paradoxes is not to rail against gentrification or lunge to halt it but to mitigate its impact on the poor through activism, governance, and good design. New York has the country's largest municipal affordable-housing program, not just now but ever. It doesn't manifest itself in jerry-built towers of despair, because below-market housing is often mixed with the expensive kind; a quarter of the apartments in the Avalon complex are reserved for low-income families. That kind of housing, too, can rescue a neighborhood. The needle-strewn South Bronx seemed beyond redemption until a collective of developers, nonprofits, and city agencies built Melrose Commons, a low-rise, low-income housing complex that is safe, durable, and appealing. That, too, is gentrification.

3. New 42nd Street Studios

229 West 42nd Street

The currency of Times Square has always been razzle-dazzle, but until 42nd Street's magical overhaul, it was mostly ginned up by tired marts and screeching signs. Platt Byard Dovell's

Do the dedicated yearners who would roll back this tide look fondly on the charred South Bronx of the eighties? Would they stick by the most depressed and derelict expanses of Brooklyn, or the cracked-out squats around Tompkins Square Park, or the blocks of boarded-up windows in Harlem? *That* New York was not authentic or quaint; it was miserable and dangerous.

Intelligent preservation is precious, but nostalgia is cheap, and every era nurtures its own variety. Those late-nineteenth-century Upper West Siders who still

rehearsal studios found a more refined way to be brassy. At night, the outer skin of metal slats—little screens, really, for the play of colored lights—performs an electric dance. More than makes up for the departed Selwyn Theater.
(Photo: From left: NYC Municipal Archives; Courtesy of Platt Byard Dovell/Elliott)

thought of Broadway as the bucolic, elm-lined Bloomingdale Road of their youths resented the incursion of brownstones in the 1880s. Their children must have been horrified in turn when those same houses were wiped away by the now-classic apartment buildings that line West End Avenue. Bitterness springs eternal. So rail, if you must, at the forest of mediocrities sprouting furiously in every Zip Code, at the way they bleach out character and promote a bland parade of chain stores. But keep in mind that when all those buildings have begun to age, the architecture of our immediate future will get down to the task of becoming the past.

It would be wonderful if we could stem the Avalonization of New York simply by demanding better buildings. (*Good Design Now!*) The power to do that lies in the hand of the client at the top of the consumer chain, especially the condo buyer. We might wish that an aesthetically enlightened branch of government would commission masterpieces and mandate design standards for everyone else, but this is New York, where an adversarial system bludgeons designs into a collection of compromises. Craving a visionary government with the leeway to reshape large swaths of the city means forgetting a time when bureaucrats and politicians garlanded the Lower East Side with grim brown housing projects and Robert Moses smashed neighborhoods to ram highways through. To give officials such Sim City powers again would violate the spirit of New York, which since the days of the Dutch East India Company has evolved a sophisticated mechanism of controlled venality: Government sets the terms; developers take the risks. This partnership between public and private spheres is ancient and, for all its flaws, corruption, and obstacles to excellence, has nevertheless built a very fine city. The great advantage to top-down planning is that it can hatch and act on a Big Idea. It was not government alone, however, that brought Times Square back to life in the nineties; it was a convergence of planning, zoning, architecture, politics, entertainment, finance, commerce, preservation, and pure civic ambition.

Most architecture in any age is crap, and today's crap isn't as bad as yesterday's.

If we don't want a New York frozen in recollection, and we don't really want politicians with the clout to strew masterpieces, then we must welcome a certain amount—okay, a large amount—of bland architecture. It's paradoxical, I know, to wrinkle my nose at Avalon's Bowery incursions and yet be gladdened by what they say. Much of what has gone up since the early nineties is anonymous and shoddy, but the same could be said for medieval Paris or Gilded Age Chicago—or virtually any of New York's own glorious eras. Most architecture in any age is crap, and today's crap isn't as bad as yesterday's. Fifty years ago, the sweeping attempts to house the city's burgeoning masses produced the alpine bulk of LeFrak City and Co-op City. In their day, our generic would have been considered luxe. "When you compare these new [residential] buildings to the red-brick or white-brick apartment houses that were standard in the fifties and sixties, they're far better," says Alex Garvin, a planner who has been tinkering with ways to improve New York since the Lindsay years. "Both the ordinary

and the exceptional have increased in quality." One reason housing is so expensive is that even your basic rental is a better place to live.

I find myself on West 37th Street at Tenth Avenue, where a pale gray rental by Handel Architects is under construction, its tower bending into a gentle chevron above a squared-off base. "Ten years ago, the developer would have said, *Why does it have to have that shape? It creates strange angles in every apartment. What's in it for me?,"* the firm's principal Gary Handel says. "Now they understand that the formal gesture has a function on the skyline. There's a real change in the client's acceptance of architecture." By which he means not high-flown architecture-as-art, but rank-and-file buildings that are better than strictly necessary.

Few architects have responded more energetically to the tumescent market, or had greater impact on the fabric of New York City, than Costas Kondylis, the prolific Greek-born master of the semi-deluxe. Like a Johnny Appleseed of real estate, Kondylis has sprinkled Manhattan with buildings such as the Lyric, on Broadway at 94th Street. The Lyric is a more or less typical specimen of New York residential architecture at the turn of the 21st century, and to anybody who had a fondness for an earlier incarnation of Upper Broadway—with its low-slung stores and ponderously corniced apartment buildings—it represented the homogenization of New York's most motley avenue. In truth, the Lyric is neither disgraceful nor excellent; it is the soul of adequacy. Symphony Space, a performance hall colorfully and admirably renovated by Polshek, sits under the north corner like a bright block inserted in the base. Above, the 23-story tower does what the zoning says it must: rise a dozen stories to a setback before continuing on up to its allowable height. Red brick frames the obligatory picture windows, which wrap around the corners. A judicious smattering of Art Deco–ish fins makes a perfunctory nod to the glory days. The westward side of the tower extends the arms of a shallow U, offering wide-angle views of the Hudson.

4. Porter House

366 West 15th Street

Gregg Pasquarelli's zinc-clad beauty appears to be riding an Italianate brick warehouse like a horse, its lower stories gripping the older building's flanks. A graceful mix of old and new, with no downside.

(Photo: From left: Courtesy of Shop Architects; courtesy of Shop Architects/Seong Kwon)

Pleasant to live in, harmless to the skyline, equipped with all the standard luxuries, and practically invisible to the casual glance, the Lyric is a chorus member in the opera of New York architecture. But even unradical building has a powerful effect on life at street level. As required, Kondylis lined the Broadway side with glass-faced storefronts that should in theory keep the sidewalks lively. In practice, the economics exclude small businesses with meager credit histories in favor of companies that can back up a twenty-year lease. This block has a New York Sports Club, a Commerce Bank, and a Starbucks, feeding the triumvirate of upper-middle-class needs: fitness, money, and caffeine.

Nobody flat-out hates the Lyric, whereas the nine-story Avalon Bowery Place seems more egregious. That's partly because the Avalon flaunts its hide of metal and glass, and because its sole nod to its proletarian surroundings is in the crudeness of the design: Its curtain wall is so clumsily detailed that it appears to have been patched together out of bulletproof windows salvaged from subway token booths. To accuse a new building of being out of character with the neighborhood is the protest of first resort. But fitting in doesn't mean blending in. Donning red-brick camouflage is a cheap and thoughtless way for a building to assimilate. Truly contextual architecture starts a conversation with the block, the street, and the city.

When that happens, it can yield greatness, and the boom has given us some of that as well. One superb example of elegant context is the fanciful riff on the glass-and-steel fish tank that Winka Dubbeldam, the principal of Archi-Tectonics, bestowed on Greenwich Street. The glass in Dubbeldam's condo has both the liquidity of water, in ripples down the inclined façade, and the roughness and depth of masonry, which links it to the muscular workhorse buildings all around. Equally thrilling is the way the interloper throws an arm over the old brick warehouse next door, making it a partner in the block's modernization. Now *that's* how you transform a block without betraying it.

Dubbeldam's tour de force lends strength to the idea that the context of the city places healthy constraints on artistes of unlimited imagination and equally expansive ego. "The urbanism of the city dominates architecture," says Robert A.M. Stern, who is dean both of the Yale School of Architecture and of New York's traditionalist wing. "The intricacies of the street wall are unending, and the edges of the parks, the streets, the squares, create amazing architecture at the urban scale. I like the fact that European architects are adjusting their techniques so that their work becomes part of the city and not just a piece of Barcelona dropped in here."

In its awkward way, Avalon Bowery Place, too, attempts to absorb some local character. Squeezed along the Houston Street side is Liz Christy Community Garden, founded by the Green Guerrillas in the early seventies. Instead of ravaging it, Avalon paid to restore it, and it now provides a lush haven from the thundering traffic. Around the back of the building is Extra Place, an alley that served as CBGB's vomitorium. Avalon plans to line it with stores and cafés. In their tiny way, these two scraps of land embody New York's powerful urbanistic force.

But if Avalon Bowery Place was so keen on fitting in, what is that big glass paperweight thing doing here? The answer is that each era gives one or two materials a starring role, and our celebrity is a crystalline concoction of fused silica rolled into panes. Architects love glass for an assortment of technical reasons: It is relatively cheap, malleable, and lightweight; it can be used in tiny chips or vast sheets. It can be mounted on movable frames; it can take on a thousand forms, from the plain storefront to the baroque contortions of Gehry's IAC headquarters. It can be environmentally virtuous by letting in more light than heat. Its delicacy can set off an assertive frame, or it can be inconspicuously clipped to a hidden structure and appear to float in midair. But the chief allure of glass in this era of deceptive exhibitionism is its usefulness in crafting illusion. A glass wall carries with it the suggestion of obviousness; it is the architectural equivalent of a magician's rolled-up sleeve. Glass looks

insubstantial and yet it keeps the weather out. It's brittle yet remarkably immune to age; weightless yet able to carry a load; revealing as it keeps secrets. If glass has become the material of our age, it's not because it keeps us honest but because it implies, falsely, that we have nothing to hide. The New York *Times* has moved from a fortress to a glass-walled headquarters, for example, but it has not for that reason become less Kremlin-like. It's still impossible to divine what's going on in a marriage, even if the couple lives in a zoolike pad. So the great glass wall has become an alternative to the ponderous luxuries of the prewar palais. It has also become our vernacular siding—what clapboard is to the Cape Cod saltbox.

5. New York Times Building

620 Eighth Avenue

Renzo Piano's push to put the *Times* on the skyline carried midtown's energy westward and did away with a few very seedy buildings. But the building itself is a craftsmanlike tower that hits the sky with a dull thud. An improvement, but less than it should have been.

(Photo: From left: Courtesy of FX Fowle Architects; Rebecca Sahn)

You can't hold the material responsible for the architecture. To compare the ham-fisted use of glass by Avalon's designers to the wizardry of Dubbeldam is almost grotesque, but they are linked because one represents the vulgarization of the other, in the same way that brick furnished forth both the tenement and the Dakota. The Dakota of glass is Richard Meier's pair (and then trio) of condos in the West Village. When the Perry Street buildings went up in 2002, they were defiantly different from everything else in that bastion of old-time Jane Jacobean preservationism. Meier imported the pared-down, transparent office-building aesthetic of Mies van der Rohe and fused it with the sexy California aeries of Pierre Koenig, Richard Neutra, and John Lautner. The classic modernists shared a worship of visibility, but there was a huge difference in the sights they framed. In midtown, white-collar laborers toil in stacked modules, glancing out at each other from time to time. In Los Angeles and Palm Springs, residents of modern mansions gaze out on vistas of desert, city, or ocean. Meier's Perry Street buildings attempt a compromise between proximity and panorama. They look out on drivers and joggers who gaze right back, enjoying high-def views of the inhabitants and the backs of expensive sofas.

I have mixed feelings about these apartments' watery cool. Their austere beauty jangles with the distasteful look-at-me pose. Meier has fashioned exhibitionist paradises for the wide-screen age. Even when there's nobody home or nothing much to see, they broadcast the illusion that the lives being led within them qualify as public spectacles. How un–New York: What's the point of being a voyeur if everything is on display?

The glamour of living under glass spread quickly, evolving from Meier's impractical purity into both more nuanced and more plebeian uses. The fact that the rich crave it is good, because glass is becoming an ever more complex and flexible material. So long as clients will pay to live behind it, designers will keep finding new ways to bend it, toughen it, color it, coat it, cast it, etch it, fill it with light, and bake it full of ceramic frits. Avalon Bowery Place is a by-product of the market's boiling upper end.

So even here, standing before an icon of discontent, I am not inclined to inhale the nostalgia that thickens an atmosphere already dense with concrete dust. I am convinced that the boom has left New York better off: stronger, suppler, safer, better integrated, and better looking. Yes, it's grown stands of interchangeable rental towers, but it's also given Crown Heights prettier, more livable streets. The wealthy have their decorative bouquets of Tribeca condos; the commuting throngs benefit from an airy new subway terminal in Coney Island. In the rush to satisfy the voracious demand for square footage, the city has also rediscovered the pleasures of good architecture, an art that for years it had written off as a costly frill. We need new buildings just as much as we need the old. I hear in the cacophonic symphony of construction the sound of a still vigorous and hungry city. I see in all that moving of dirt and hoisting of concrete panels the New York I've always known: unsentimental and steadfast in its refusal to stay the same, yet vigilantly proud of its past.

(Photo: From left: NYC Municipal Archives; Rebecca Sahn)

6. 25 Bond Street

Between Bowery and Lafayette Street

The two blocks of Bond Street have it all: antebellum gentility, nineteenth-century decrepitude, industrial energy, decay, and now extreme wealth. One of the new celebrities: BKSK Architect's No. 25, with its softly glowing façade of blond Jerusalem stone.

(Photo: From left: NYC Municipal Archives; courtesy of Davis Brody Bond)

7. Palladium Residence Hall

140 East 14th Street

NYU's dorm preserves the name but nothing more of its namesake concert hall turned nightspot. In place of an ecstatic mural and giant video screens, Roche Dinkeloo gave us stolid brick. Too bad, because one thing New York could use more of is good architecture of sin.

(Photo: From left: NYC Municipal Archives; courtesy Morris Adjmi Architects/Paul Warchol Photography)

8. Scholastic Building

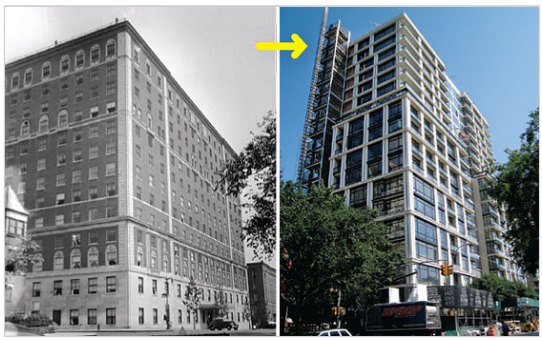
557 Broadway

Few works of architecture offer a subtler reading of a historic New York street than Aldo Rossi's delightful little Soho office building, wedged between cast-iron lovelies and replacing a one-story lumberyard that could only ever have been temporary.

9. 45 Park Avenue

At 37th Street

(Photo: From left: NYC Municipal Archives; courtesy of Edward Caruso)



(Photo: From left: NYC Municipal Archives; Rebecca Sahn)

(Photo: Courtesy of Gluckman Mayner Architects; Harry Zernike)

(Photo: From left: Courtesy of Robert A.M. Stern Architects; Rebecca Sahn)

At ten stories, the solid Sheraton Russell Hotel from 1923 was a waste of air, and so it was doomed. Its replacement, a condo tower by Costas Kondylis, is neither ostentatious nor shoddy, neither short nor overbearing—a 21st-century version of the Sheraton Russell.

10. 170 East End Avenue

Near 88th Street

Across from Gracie Mansion, in place of the solemn brick mass of Doctor's Hospital, Peter Marino is dressing up the classic East Side home in well-tailored, sleekly conservative garb: floor-to-ceiling windows and double-height masonry frames. The neighbors will love it.

11. Gagosian Gallery

554 West 24th Street

Gagosian has to accommodate the steel monoliths of Richard Serra, so architect Richard Gluckman left the former warehouse concrete-floored and bare, confining glamour to the translucent light box on top that hints at mysterious treasure inside. A nifty adaptive reuse.

12. 15 Central Park West

At 61st Street

Robert A.M. Stern's fortress of limestone luxury replaced the Mayflower Hotel, a Puritan brown cube. The new condo building is far more subtly detailed, and were it not for the fresh-plaster smell, you'd think it was from the day when the rich really knew how to build.

13. 40 Bond Street

Near Lafayette Street

Another chic Bond Streeter, designed by Herzog & De Meuron. Bottle-green window frames surround glass with glass, and flamboyant patterns spread from the calligraphic fence to the steel panels on the

(Photo: From left: NYC Municipal Archives; Rebecca Sahn)

(Photo: From left: Courtesy of Arpad Baksa Architects (2))

façade.

14. 8 Union Square South

At University Place

This glassy dud rises on the site of a little drama that took place in 2005 when workers pulverized a quirky glass stairwell tower in a 1949 building by Morris Lapidus—just as the Landmarks commission was issuing its protective decree. Its successor is utterly generic.

(Photo: From left: Jack Manning/The New York Times/Redux; Rebecca Sahn)

15. Reuters Building

3 Times Square

The elegant Art Deco Rialto Theatre, its façade outfitted with graceful aluminum fins, floated above a layer of tawdry storefronts. By 2001 it had all been replaced by the Reuters Building, Fox & Fowle's ungainly collection of intersecting planes.

(Photo: From left: NYC Municipal Archives; courtesy of Museum of Modern Art/Timothy Hursley)

16. Museum of Modern Art

11 West 53rd Street

Yoshio Taniguchi quilted several of the museum's previous versions into a spreading super-MoMA that hasn't stopped growing yet. The density of crowd-drawing buildings irritates the neighbors, but it's a plus for New York as a whole.

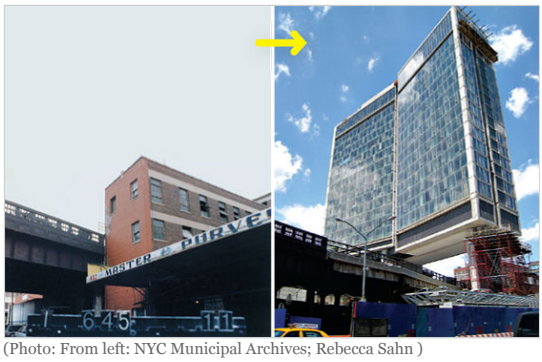
17. The Westminster

180 West 20th Street

Nobody mourns a service station, and anyway, it's hard to justify devoting a prime site in Chelsea to one, even at $6 a gallon. Robert A.M. Stern replaced it with a tasteful, neo-Deco condo in tan brick with a graceful canopy. A definite

(Photo: From left: Courtesy of Robert A.M. Stern Architects; Jack Pottle/Esto)

improvement, unless your tank is running low.

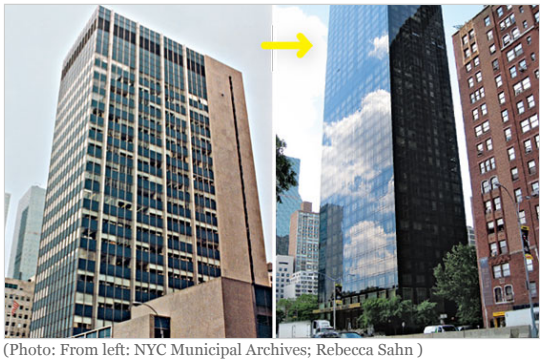


(Photo: From left: NYC Municipal Archives; Rebecca Sahn)

18. Standard Hotel

848 Washington Street

The High Line always dodged through and between buildings; now it's gliding beneath André Balazs's emphatically nonstandard Standard Hotel from Polshek Partnership. Few will miss that brick warehouse.



(Photo: From left: NYC Municipal Archives; Rebecca Sahn)

19. Trump World Tower

845 United Nations Plaza

The site's previous occupant, the 1961 Engineering Societies Center, had all the design grace of a pocket protector; the 861-foot ebony piano key that Costas Kondylis designed for Donald Trump has a certain minimalist suaveness.

(Photo: From left: NYC Municipal Archives; Scott Francis/Esto)

20. 173 and 176 Perry Street

At West Street

Richard Meier's white-and-clear twin towers pierced the low-lying horizon line along West Street and launched an era of glass-walled designer condos. The transformation was inevitable; far better that the interlopers are stylish and bold rather than dumpy and self-effacing.

21. One Astor Place

At Lafayette Street

For years, the Cooper Union husbanded the parking lot at the intersection of Fourth Avenue and Lafayette Street, waiting for the right developer. Finally, the school sprang, and somehow the result is

(Photo: From left: NYC Municipal Archives; Rebecca Sahn)

the most egregious mistake in Charles Gwathmey's eminent career.

(Photo: From left: NYC Municipal Archives; courtesy of David Joseph)

22. Hotel Gansevoort

18 Ninth Avenue

Don't hold Stephen P. Jacobs's big metal box responsible for destroying the area's working-class authenticity, or the firefly flash of nightlife. That was going to happen anyway; at least the hotel is an enclave of good design.

(Photo: Top left, NYC Municipal Archives; bottom left, courtesy of Tiffany & Co.; right, courtesy of ODA)

23. The Three Faces of Union Square

From Tiffany's to white brick to luxe glass condos.

There have always been options for spiffing up a dowdy building: Add, eviscerate, or flay. The survivor at 15 Union Square West —which began life as Tiffany & Co.—has undergone all three. The 1870 cast-iron façade looked as if it would be there forever, with Italianate arches reminiscent of a merchant palazzo. In the 1950s, that dandyish exterior was covered with mild white brick, anonymously modern. Now the building is shedding that skin—and its identity as a bank—to be reborn as a condo. Bits of the Tiffany glory are reappearing, unfortunately only partly visible beneath outerwear of zinc and glass. It's as if the architect, Eran Chen of Perkins Eastman, confronted with an aesthetic past he couldn't quite recover, chose to stow it in a vitrine, treating it with irony, as an artifact.

(Photo: From left: Courtesy of IU + Bibliowicz Architects; courtesy of ArchPhoto)

24. Alvin Ailey Dance Center

405 West 55th Street

The glass-and-steel modernism powerfully erases the memory of the windowless bunker that was there before, but Iu & Bibliowicz's design has had less impact than the antics of rubber-limbed dancers visible from the street. If only the shades weren't drawn most of the time—anyone who likes to watch has to peek in at the corners, transforming the ideal of transparency into a form of voyeuristic lurking. A great swap.

25. 1600 Broadway

At 50th Street

(Photo: From left: Courtesy of Sherwood Equities; Rebecca Sahn)

This lumbering, corporate-looking tower at the top of Times Square is really a stack of pieds-à-terre over an M&M's emporium. With a midsection that looks as if it had been improperly screwed on and a giant billboard attempting to look inconspicuous, Einhorn Yaffe Prescott's design tries too hard to be jaunty. It certainly doesn't make up for the loss of the historic if sedate Studebaker Building, which at various times sheltered the car company, a Ripley's Odditorium, and the birthplace of Columbia Pictures.

(Photo: From left: NYC Municipal Archives; courtesy of FX Fowle Architects/Jess Goldberg/Esto)

26. 4 Times Square

At 42nd Street

A dour, broad-shouldered office building and a Nathan's Famous stood in the way of the glamorization of Times Square. Fox & Fowle's handsome landmark for Condé Nast offered the neighborhood some much-needed architectural sophistication, as well as a nice gastronomic rejoinder to the wiener stand: Frank Gehry's beautifully baroque cafeteria.

(Photo: From left: Courtesy of Pavarini McGovern; courtesy of Philip Johnson Alan Ritchie Architects)

27. Urban Glass House

300 Spring Street

Philip Johnson's finale isn't his best work, but it's still far better than you might expect directly across from a Holland Tunnel ventilation shaft. Transparency in an urban setting is double-edged, so the building's windows are darkened, giving it the appearance of a high-end audio component. The area's quick transition to fine living has made for a competitive climate in residential architecture. Generally a pleasing exchange.

28. 40 Mercer Street

At Grand Street

This is the best sort of metamorphosis: from a parking lot to a work of genuine architecture by Jean Nouvel. The frame updates Soho's cast-iron context, and the red- and blue-tinted windows cast a slightly sacramental glow.

(Photo: From left: Courtesy of Jean Nouvel (2))

29. Westin Hotel

270 West 43rd Street

Rising on a site that desperately needed a jolt of personality, Arquitectonica's hotel is what the French might call a *jolie-laide,* an ugly beauty—a dandy wearing too many plaids— and a nod to the theater district's tradition of outlandishness. When the time comes to tear it down, watch the preservationists mobilize to hold on to some old-time eccentricity.

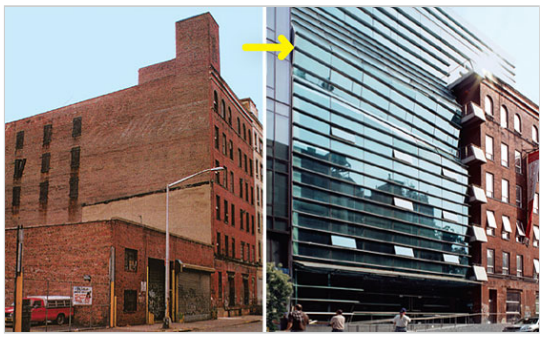
(Photo: From left: Arquitectonica; Norman McGrath)

(Photo: From left: NYC Municipal Archives; Rebecca Sahn)

30. Avalon Chrystie Place

229 Chrystie Street

The staid developer AvalonBay recruited Arquitectonica and SLCE Architects to doll up its façade, and the result is a marriage of expediency and dullness. It has helped lift the neighborhood's fortunes, but at what cost?



(Photo: From left: Courtesy of Archi-tectonics; courtesy of Floto and Warner/Archi-tectonics)

31. 497 Greenwich Street

At Spring Street

Winka Dubbeldam turned this little condo into an essay on the versatility of glass. Rather than aspire to seamlessness, she crumpled the curtain wall into folds. But it's not radicalism for its own sake: the façade marries transparency with the textures of the masonry neighborhood.

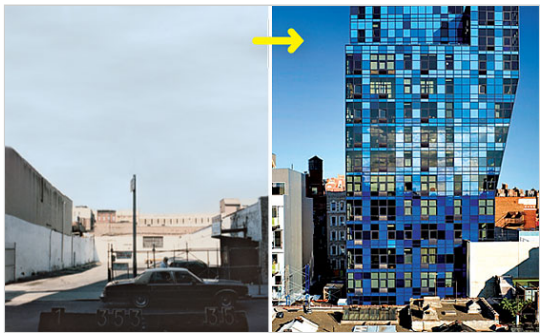
32. One Beacon Court/Bloomberg Tower

731 Lexington Avenue

New Yorkers of a certain age have a soft spot for Alexander's, the full-block department store that closed in 1992 and sat empty for years. But Cesar Pelli's

(Photo: From left: NYC Municipal Archives; courtesy of Kevin Chu and Jessica Paul)

silvery skyscraper tops a fine oval court, its curve embracing the populace.



(Photo: NYC Municipal Archives; Peter Mauss/Esto)

33. Blue

105 Norfolk Street

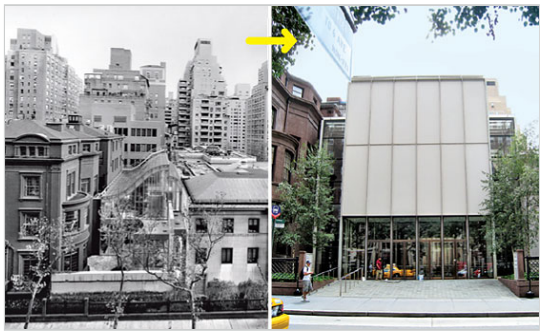
Some fancy new architecture was inevitable and even desirable here, and it's not as if Bernard Tschumi's baublelike condo displaced any gems. But from a certain angle, the swollen blue thing looks disconcertingly like … well, like a sore thumb.

(Photo: From left: Courtesy of Ten Arquitectos; Rebecca Sahn)

34. One York

One York Street

Enrique Norten has plunked a crystal castle on top of a pale Civil War-era warehouse. That's an attractively old-world approach: Pile the present on top of the past, making each adapt to the other. The pleasures of Canal Street living are still a little elusive, though.



(Photo: From left: Courtesy of the Morgan Library and Museum; Rebecca Sahn)

35. Morgan Library and Museum

225 Madison Avenue

In rethinking the Morgan, Renzo Piano harmonized its disparate pieces with poetic rationalism. In keeping with the institution's tranquil dignity, the additions make no hucksterish moves but manage to unify the old buildings while emphasizing their separateness.

(Photo: From left: Courtesy of Lou Madigan; courtesy of Kim Wendel Design LLC)

36. 80 Metropolitan

80 Metropolitan Avenue, Williamsburg

Rather than renovate, Steiner NYC tore down the rather fancy Old Dutch Mustard plant and worked up a new six-story residential complex, currently under construction. There is no evidence that it will be marvelous enough to take the bite out of the loss.

37. Millenium Hilton

55 Church Street

(Photo: From left: Courtesy of Eli Attia Architect P.C.; Rebeca Sahn)

Instead of amicably rubbing shoulders with the 1916 AT&T building at 195 Broadway, Eli Attia's 55-story black-glass financial-district hotel turns a cold shoulder to its stately blockmate. A little extra light and air on that street of skyscrapers was preferable.

38. One Union Square South

At Broadway

Davis Brody Bond's apartments are basically a support for *Metronome,* the ever-puzzling steam-¬breathing artwork that tells time but remains silent about history. The legendary Union Square Theater stood on this site and should never have been allowed to rot.

(Photo: From left: NYC Municipal Archives; Rebecca Sahn)

39. 100 Jay Street

At York Street, Dumbo

Gruzen Samton's brick-and-glass gorilla, known as "J Condo," demonstrates Dumbo's crazy hypnotic power to draw buyers despite the bridge's rumble. The tower looms over the neighborhood, inciting low buildings to rise up. Here's hoping its call goes unheeded.

(Photo: Courtesy of Gruzen Samton; courtesy of Jame Shanks)

40. Bronx Hall of Justice

265 East 161st St., the Bronx

A row of small businesses gave way for Rafael Viñoly's faceted glass courthouse, a spacious, sunlit space where jury duty is less of a trial. The real payoff is in the neighborhood's rehabilitated image: Crystal palace replaces Fort Apache.

(Photo: From left: Courtesy of Rafael Vinoly Architects PC; Rebecca Sahn)

41. New Museum of Contemporary Art

235 Bowery

Simple and inviting on the street, the museum is more aggressive inside, where acres of fluorescent lights give the galleries a bleary, refrigerated feel. Inhabiting a long-vacant lot, Sanaa's brilliant stack of

(Photo: From left: Courtesy of New Museum; courtesy of Dean Kaufman/New Museum)

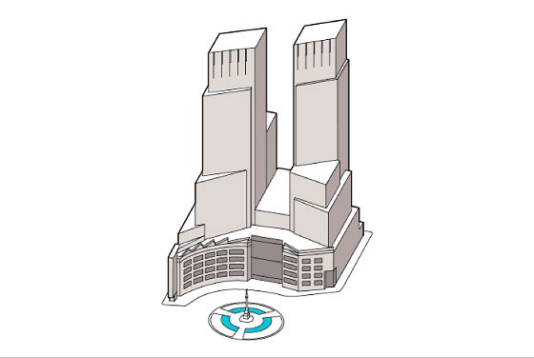


Illustration by Jason Lee

(Photo: NY Historical Society)

(Photo: NY Historical Society)

(Photo: NY Historical Society)

(Photo: NY Historical Society)

(Photo: NY Historical Society)

boxes is perfect in what is—for now—a transitional zone.

42. The Journeys of Columbus Circle

The two blocks on the west side of Columbus Circle—from 58th to 60th Streets—have, over a century and a half, told New York's development story in miniature. The site was first cleared as **farmland (1)**, owned by one John Somerindyke, when this intersection of the Bloomingdale Road (later Broadway) and Eighth Avenue was the southern edge of the village of Harsenville. In the early 1890s, as brownstones and businesses were staking claims to the West Side, the crossroads was shaped into a circle with a monument to Christopher Columbus at its center.

It took a while for the neighborhood to live up to its imagined grandeur. **Durland's Riding Academy (2)** and another stable lined the sides of Broadway.

As the area developed, its dominant business became entertainment—theater at first, then movies. The **Circle Theatre (3)**, a vaudeville-and-burlesque joint at 60th and Broadway, opened its doors in 1901, right where Jazz at Lincoln Center's patron's enter today. It lasted a good four decades, to be briefly replaced by a sweet little **streamlined roller-skating rink (4)**. (Meanwhile, the district's emphasis shifted from theaters to auto dealerships.)

Then came Robert Moses's big-think project, the **New York Coliseum (5)**. Roman in scale (if not in spelling), it brought conventioneers by the trainload, ignored the city around it, and was not mourned one bit upon its demolition in 2000.

(Photo: David Sundberg/Esto)

By then, developers had spent a decade making plays for the site—Mort Zuckerman memorably lost a big chunk of his $33.8 million deposit—and the winner was the Related Companies, which put up the **Time Warner Center (6)**. The complex has turned out to be neither as monstrous nor as glamorous as the various factions anticipated. It efficiently satisfies deluxe desires—for quinoa salad, aromatherapy, boardrooms, park views, extra pillows, and more. As a money magnet, it's a masterpiece; as architecture, it's not half-bad.

(Photo: From left: NYC Municipal Archives;Rebecca Sahn)

43. Cooper Square Hotel

27 Cooper Square

When tenants of a ramshackle four-story building refused to leave, Carlos Zapata simply sucked their homes into his design for the tower clad in milky glass. The result is an elegant building that makes a clumsy intrusion, like a well-dressed passenger on a crowded subway train, forcing his rear onto a too-small slice of seat. Such a radical neighborhood transformation needed more tenderness and care.

(Photo: From left: Courtesy of Costas Kondylis Partners; NYC Municipal Archives)

44. The Lyric

255 West 94th Street

An eminently adequate block-long apartment building wraps itself around Symphony Space. Polshek Partnership's renovation of that beloved but once-dilapidated venue is one of the best things to have happened to the neighborhood.


(Photo: From left: Courtesy of Spine 3D; courtesy of H. Thomas O'Hara Architects)

45. Ten63

10-63 Jackson Avenue, Long Island City

A preservation effort wasn't enough to save the flatiron Hackett Building, a nineteenth-century red-brick pile that had once been Queens's borough hall. It didn't quite rise to landmark status, but the distinctive shape and green cornice should have conferred the staying power that an aging character enjoys. It seems unlikely that H. Thomas O'Hara's eight-story condo Ten63 will be able to compete in the personality department.

(Photo: From left: Courtesy of American Folk Art Museum/Michael Moran; NYC Municipal Archives)

46. American Folk Art Museum

45 West 53rd Street

The eight-story building, a luminous masterpiece by Tod Williams and Billie Tsien, has a bronze-alloy façade creased and cupped like a hand, and an angelic haze of daylight that pierces the glass ceiling. Worth the sacrifice of three battered townhouses.

(Photo: From left: Courtesy of Cetra Ruddy (2))

47. Ariel East and Ariel West

2628 Broadway/245 West 99th Street

The landmarked Metro movie theater remains in façade only, crumbling and vacant. But the paired towers next to it and across the street are a nice surprise, adding variety to Broadway's jagged profile.

(Photo: From left: Courtesy of Philip Johnson Alan Ritchie Architects (2))

48. The Metropolitan

181 East 90th Street

This bland luxury high-rise, designed by Philip Johnson in his dotage, cost New York four tenements and a handful of democratic local businesses, including the charming, tin-ceilinged Victory Café. The Metropolitan's amenities, on the other hand, pamper residents only.

(Photo: From left: NYC Municipal Archives; courtesy DBox)

49. Riverside South

Riverside Boulevard, 59th to 72nd Streets

Donald Trump no longer has much to do with this palisade of apartments. Still, he retains the blame. The buildings aren't terrible, and in theory it was a good idea to build over the tracks, but the plan yielded a forbidding wall severing the rest of the West Side from the river.

50. Columbia University Lasker Biomedical Research Building

3960 Broadway

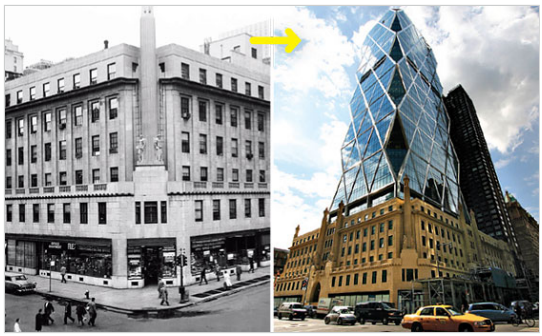
After a big preservation fight, Davis Brody Bond saved portions of the Audubon Ballroom, where Malcolm X was killed, and restored the 1912 façade, gluing it all

(Photo: From left: Courtesy Roy S. Wright; Rebecca Sahn)

(Photo: From left: NYC Municipal Archives; Robert Benson)

(Photo: From left: Courtesy of Feder and Stia Architects; Rebecca Sahn)

(Photo: Courtesy of Stephen B. Jacobs Group; Rebecca Sahn)



(Photo: From left: Courtesy of Hearst; courtesy of Hearst/Michael Ficeto)

awkwardly to a glum block. A Pyrrhic victory.

51. Columbia University School of Social Work

1255 Amsterdam Avenue

Cooper Robertson's blond masonry building at 122nd Street mitigates the effect of the oppressive wall that Columbia long ago built fronting the avenue, but it's still pretty timid.

52. Graceline Court

106 West 116th Street

A condo has sprouted over the roof of Malcolm Shabazz Mosque No. 7. Arguably better than the vacant lot that was there before, but couldn't Graceline Court have a more graceful line?

53. 325 Fifth Avenue

Near 32nd Street

To make room for Stephen Jacobs's mutant tower, the developer scooped out the middle of the block. The collateral damage included a quaint red townhouse, its aspirations all out of proportion to its size. A textbook case of a street that lost texture and variety.

54. Hearst Tower

300 West 57th Street

The best work of corporate architecture to grace New York in decades, Norman Foster's Hearst Tower negotiates deftly between its crystalline exoskeleton and the fanciful 1928 base by Joseph Urban. Turns out one era's version of modernity can always talk to another's.

Exhibit F

TEL (323) 650-9090

8300 Sunset Blvd, West Hollywood CA 90069

HOLLYWOOD

A true original since day one, The Standard, Hollywood is located in the heart of West Hollywood on the legendary Sunset Strip. From the wavy Mid-Century Modern facade to the blue AstroTurf pool deck to the floor-to-ceiling shagged lobby, the hotel abounds with curious, unexpected touches at every turn (see: The Box). The laid-back public spaces include the restaurant, the beloved top-top-secret nightclub mmhmmm, and the desert backdrop Cactus Lounge.

HAPPENING AT THE STANDARD

LOS ANGELES
@ CACTUS LOUNGE

WED NOV 11
7:30 PM

Desert Nights

SEE DETAILS

See All Happenings

Guest DJ: Renata Do Valle
byThe Standard

BOOK NOW

75°F 3:03 PM LA

Exhibit G

MIAMI BEACH

Located on Belle Isle, steps away from the action on South Beach, The Standard Spa, Miami Beach is less a "hotel," and more a spa with guest rooms. Set amidst peaceful tropical gardens, the breezy, soothing rooms feature private terraces, many with outdoor soaking tubs, as well as an indoor and outdoor hydrotherapy playground, complimentary to hotel guests. The Spa encourages the communal rituals of ancient bathing traditions and serves as a hub for sessions by some of the world's top yogis and treatments by expert practitioners. The Lido Restaurant & Bayside Grill offers the perfect warm-weather, sun-kissed Mediterranean-inspired menu. There's also a juice café, fitness center, clothing boutique, nail salon, and Danish modern bar and lounge.

HAPPENING AT THE STANDARD

MIAMI
@ SPA

WED FEB 07
7 - 8:30P

Attract Abundant Love

SEE DETAILS

See All Happenings

Guest DJ: Renata Do Valle
byThe Standard

74°F 6:05 PM MIAMI

Exhibit H

EAST VILLAGE, NYC

Located off Cooper Square in one of New York's most vibrant, artistic neighborhoods, The Standard, East Village is cozy, charming, and eccentric in equal measure—very much in the spirit of its surroundings. You enter the 21-story tower through an original tenement-style building before ascending to unparalleled views of Manhattan. There's a quiet, calm garden tucked away at street level, Michelin-starred chef John Fraser's widely acclaimed Narcissa, and the bustling, street-side Café Standard, which hums from morning until late night.

HAPPENING AT THE STANDARD

NEW YORK
@ EAST VILLAGE, NYC

SAT NOV 25 - SAT MAR 03
WEEKDAYS 4PM - 9PM, WEEKENDS 12PM - 9PM

Winter Garden

SEE DETAILS

See All Happenings

Guest DJ: Renata Do Valle
byThe Standard

35°F 6:06 PM NYC