GLOSSARY OF TERMS

The following definitions are included to assist the readers of this Toolkit. They are adapted from non-definitive reference sources and are not intended to replace or contradict the terms and meanings used by each ITU Member State in its national laws and regulations or in international agreements.

2G:	*Second-generation mobile network or service*. A general term for second-generation networks, for example GSM.
3G:	*Third-generation mobile network or service.* Generic term for the next generation of broadband digital mobile cellular systems, which will have expanded broadband capabilities for mobile data applications. See *IMT-2000*.
3GPP:	*3rd Generation Partnership Project:* A cooperation between regional standards bodies to ensure global interworking for 3G systems.
4G:	*Fourth-generation mobile network or service.* Mobile broadband standard offering both mobility and very high bandwidth.
Active optical network:	A network in which the passive splitting point is replaced with an Optical Line Distribution unit which is a powered unit making it possible to have a higher bit rate on individual routes over longer distances than on a passive optical network.
ADSL:	*Asymmetric digital subscriber line*. A technology that enables high-speed data services to be delivered over twisted pair copper cable, typically with a download speed in excess of 256 kbit/s, but with a lower upload speed. Corresponds to ITU Recommendation (standard) ITU-T G.992.1.
ADSL2:	*Asymmetric Digital Subscriber Line 2* (ITU-T G.992.3 and ITU-T G.992.4). A sequel to the original ITU Recommendation. It allows increased line speeds, new power-saving elements, and extends the reach of the original ADSL specification.
ADSL2+:	*Asymmetric digital subscriber line 2 plus* (ITU-T G.992.5). This revised version of ADSL2 enables increased speeds by increasing the frequencies used on the copper line.
Adware:	*Advertising-supported software.* A software package which automatically plays, displays or downloads advertising material to a computer after the software is installed on it or while an associated application is being used.
Analogue:	Transmission of voice and images using electrical signals. Analogue mobile cellular systems include AMPS, NMT *and* TACS.
Analogue network:	A telecommunication network in which information is conveyed as a continuously varying electronic signal (see also *Digital network*).
API:	*Application Program Interface*.
ARPU:	*Average Revenue per User.* Usually expressed per month but also per year.
ASN:	*Autonomous System Number.*
ATM:	*Asynchronous transfer mode.* A transmission mode in which the information is organized into cells; it is asynchronous in the sense that the recurrence of cells from an individual user is not necessarily periodic.

Bandwidth: The range of frequencies available to be occupied by signals. In analogue systems it is measured in terms of Hertz (Hz) and in digital systems in bits per second (bit/s). The higher the bandwidth, the greater the amount of information that can be transmitted in a given time.

Base station: A radio transmitter/receiver and antenna used in the mobile cellular network. It maintains communications with cellular telephones within a given cell and transfers mobile traffic to other base stations and the fixed telephone network.

Basic service: Refers to the provision and carriage of voice telephony service, though some definitions also include telex and telegraph services.

Best-efforts: A traffic delivery standard for which the network exerts its best efforts to ensure that the traffic is delivered, but provides no guarantee that all traffic will be delivered.

Bill and Keep: In contrast to CPNP, this term denotes an interconnection arrangement in which the carriers exchange traffic on a negotiated basis, generally without paying interconnection charges. Each carrier bills its own customers for the traffic and keeps the resulting revenue. Also known as "sender keeps all" interconnection.

Bit (binary digit): A bit is the primary unit of electronic, digital data. Written in base-2 binary language as a "1" or a "0".

Bit/s: *Bits per second.* Measurement of the transmission speed of units of data (bits) over a network. Also kbit/s: kilobits (1'000) per second; Mbit/s: megabits (1'000'000) per second, and Gbit/s: Gigabits (1'000'000'000) per second.

Bit-stream access: A form of network unbundling. With bit-stream access, the incumbent maintains management control over the physical line. Unlike full unbundling and line sharing, access seekers can only supply the services that the incumbent designates.

Blog: Blog is short for weblog. A weblog is a journal (or newsletter) that is frequently updated and intended for general public consumption.

Bluetooth: A radio technology that enables the transmission of signals over short distances between mobile phones, computers and other devices. It is typically used to replace cable connections.

Botnets: A jargon term for a collection of software robots, or bots, which run autonomously. A botnet's originator can control the group remotely, usually through a means such as IRC, and usually for nefarious purposes.

Broadband: Broadband is defined, for the purposes of this report, as Internet access with a minimum capacity of greater or equal to 256 kbit/s in one or both directions. Fixed broadband is implemented through technologies such as digital subscriber line (DSL), cable modem, fibre to the home (FTTH), metro ethernet, wireless local area networks (WLAN), etc. Mobile broadband is implemented through technologies such as wideband CDMA, HSDPA, CDMA 1xEV-DO, etc.

Broadband Over Power Line (BPL): A wireline technology that is able to use the current electricity networks for data and voice transmission.

Broadband Wireless Access (BWA): Encompasses either mobile or fixed access technologies that provide connections at speeds higher than the primary rate (for example, 2 Mbit/s).

Browser: Application that retrieves WWW documents specified by URLs from an HTTP server on the Internet. Displays the retrieved documents according to the Hyptertext Markup Language (HTML).

Byte: (1) A set of bits that represent a single character. A byte is composed of 8 bits. (2) A bit string that is operated upon as a unit and the site of which is independent of redundancy or framing techniques.

CA: *Conditional Access* (ITU-T J.193 (04), 3.10). The conditional granting of access to cable services and content based upon what service suite has been purchased by the customer.

Cable modem: A technology that allows high-speed interactive services, including Internet access, to be delivered over a cable TV network.

Cable television (CATV): A system for delivery of television video and audio content via a wired network, employing either co-axial cable or fibre.

CAGR: *Compound annual growth rate.*

Calling Party's Network Pays (CPNP): in a CPNP regime, the call receiver's provider levies some predetermined charge per minute on the call originator's provider for termination, while the call receiver's operator pays nothing.

Calling Party Pays (CPP): Billing option whereby the person making the call is charged. By contrast, in a "receiving party pays" (RPP) system, the individual that receives the call pays all charges for that call.

CDMA: *Code division multiple access.* A technology for digital transmission of radio signals based on spread spectrum techniques where each voice or data call uses the whole radio band and is assigned a unique code.

CDMA2000: *Code division multiple access 2000.* A third-generation digital cellular standard based on Qualcomm technology. Includes CDMA2000 1x, 1xEV-DO (Evolution, Data Optimized) and 1xEV-DV (Evolution, Data and Voice). One of the IMT-2000 "family" of standards.

Cellular: A mobile telephone service provided by a network of base stations, each of which covers one geographic cell within the total cellular system service area.

Channel: One of a number of discrete frequency ranges utilized by a base station to transmit and receive information from cellular terminals (such as mobile handsets).

Circuit-switched connection: A temporary connection that is established on request between two or more stations in order to allow the exclusive use of that connection until it is released. At present, most voice networks are based on circuit-switching, whereas the Internet is packet-based. See also *Packet-based.*

CMTS: *Cable Modem Termination System.* Equipment typically found in a cable company's headend and is used to provide high-speed data services, such as Cable Internet or Voice over IP, to cable subscribers.

Collocation: Facility-sharing in which the incumbent operator houses communications equipment of competitive operators to facilitate connectivity to end users.

Competition: Refers to introducing competition among national service suppliers and/or foreign suppliers without any limitations. In the case of mobile cellular, the number of licensees is dependent on spectrum availability. Therefore, all countries allowing more than one operator have been listed in this report as "competitive".

Competitive Local Exchange Carrier (CLEC): A network operator or carrier – often a new market entrant – that provides local telephony in competition with the incumbent carrier.

Connectivity: The capability to provide, to end users, connections to the Internet or other communication networks.

Convergence: A term used to describe a variety of technological and market trends involving the blurring of previously distinct lines between market segments such as cable television, telephony and Internet access, all of which can now be provided through a variety of different network platforms.

Corporatization: Corporatization involves legal changes to grant the telecommunication operator administrative and financial autonomy from central government.

Coverage: Refers to the range of a mobile cellular network, measured in terms of *geographic* coverage (the percentage of the territorial area covered by mobile cellular) or *population* coverage (the percentage of the population within range of a mobile cellular network).

CPE: *Customer Premises Equipment.*

CSMA: *Carrier Sense Multiple Access.* A network protocol in which a node verifies the absence of other traffic before transmitting on a shared physical medium, such as an electrical bus, or a band of electromagnetic spectrum.

DECT: *Digital Enhanced Cordless Standard.*

Distributed Denial of Service (DDoS): An attack on a computer system or network that causes a loss of service to users, typically the loss of network connectivity and services, by consuming the bandwidth of the victim network or overloading the computational resources of the victim system through a system of computers, which are usually zombie computers compromised by viruses or Trojan horse programs.

Digital: Representation of voice or other information using digits 0 and 1. The digits are transmitted as a series of pulses. Digital networks allow for higher capacity, greater functionality and improved quality.

Digital Audio Broadcast (DAB): A technology for broadcasting of audio using digital radio transmission.

Digital Multimedia Broadcasting (DMB): A technology for broadcasting of multimedia (audio, TV, data) using digital radio transmission, mainly used in South Korea.

Digital network: A telecommunication network in which information is converted into a series of distinct electronic pulses and then transmitted as a digital bitstream (see also *Analogue network*).

DOCSIS: *Data over cable systems interface specifications* (ITU-T J.112). An ITU Recommendation for cable modems. It specifies modulation schemes and the protocol for exchanging bi-directional signals over cable.

DOCSIS2: *Data over cable systems interface specifications 2* (ITU-T J.122). The newest, revised version of DOCSIS, approved at the end of 2002.

Domain name: The registered name of an individual or organization eligible to use the Internet. Domain names have at least two parts and each part is separated by a dot (point). The name to the left of the dot is unique for each top-level domain name, which is the name that appears to the right of the dot. For instance, the International Telecommunication Union's domain name is itu.int. "ITU" is a unique name within the gTLD "int".

DSL: *Digital subscriber line*. See also *ADSL, ADSL2, ADSL2+, SHDSL, SDSL, VDSL* and *xDSL*.

DSLAM: *Digital subscriber line access multiplexer*. A device, located at the central office of a DSL provider, that separates and routes the voice-frequency signals and data traffic on a DSL line.

DSP: *Digital signal processing*. The study of signals in a digital representation and the processing methods of these signals

DTT: *Digital Terrestrial Television.*

DVB: Digital Video Broadcasting: An open standard for digital television maintained by the *DVB Project*, an industry consortium with more than 270 members, and published by a *Joint Technical Committee* (JTC) of the European Telecommunications Standards Institute (ETSI), the European Committee for Electrotechnical Standardization (CENELEC) and the European Broadcasting Union (EBU). A number of DVB standards exist including DVB-C (Cable), DVB-H (Handheld), DVB-T (Terrestrial Television) and RCS (Return Channel via Satellite).

E.164: An ITU-T Recommendation which defines the international public telecommunication numbering plan used in the PSTN and some other data networks.

EC: *European Commission*.

E-commerce: *Electronic commerce*. Term used to describe transactions that take place online where the buyer and seller are remote from each other.

ECOWAS: *Economic Community of West African States*.

EDGE: *Enhanced Data rates for GSM Evolution*. It acts as an enhancement to 2G and 2.5G General Packet Radio Service (GPRS) networks. This technology works in TDMA and GSM networks. EDGE (also known as EGPRS) is a superset to GPRS and can function on any network with GPRS deployed on it, provided the carrier implements the necessary upgrades. EDGE provides Enhanced GPRS (EGPRS), which can be used for any packet-switched applications such as an Internet connection. High-speed data applications such as video services and other multimedia benefit from EGPRS's increased data capacity.

E-mail: *Electronic mail*. The exchange of electronic messages between geographically dispersed locations.

End user: The individual or organization that originates or is the final recipient of information carried over a network (i.e. the consumer).

ENUM: Standard adopted by Internet Engineering Task Force (IETF), which uses the domain name system (DNS) to map telephone numbers to Web addresses or uniform resource locators (URL). The long-term goal of the ENUM standard is to provide a single number to replace the multiple numbers and addresses for users' fixed lines, mobile lines, and e-mail addresses.

EPOP: *Expanding point of profitability*. A network topography where the network expands incrementally to unserved areas as they become profitable to operators. Newly connected areas can then be used as backbones to more remote areas as they eventually become profitable to providers.

Ethernet: A protocol for interconnecting computers and peripheral devices at high speed. Recently Gigabit Ethernet has become available, which enables speeds up to 1 Gbit/s. Ethernet can run on several types of wiring including: twisted pair, coaxial, and even fibre optic cable.

***Ex-ante* and *ex-post* regulation:** *Ex-ante* regulation involves setting specific rules and restrictions to prevent anti-competitive or otherwise undesirable market activity by carriers before it occurs; *ex-post* regulation, by contrast, calls for setting few or no specific rules in advance, but applying corrective measures and punishments if and when transgressions do occur.

EU: *European Union*.

EUR: *Euro*. The official currency of the *Eurozone* (European Union member states that have joined the European Monetary Union).

Fixed line: A physical line connecting the subscriber to the telephone exchange. Typically, *fixed-line network* is used to refer to the *PSTN* (see below) to distinguish it from mobile networks.

Firewall: Software or hardware that controls access in and out of a network. Firewalls can be dedicated computers that act as the intermediary between a business network and the Internet, or can be software tools that help individual computers control which programs are allowed access to the Internet.

First mile: A topology in which the user or a local service provider – or perhaps even an apartment building company – owns the access network and connects to service providers using its own upstream links.

FMC: *Fixed-mobile convergence* (ITU-T Recommendation Q.1761 (04), 3.6). Mechanism by which an IMT-2000 user can have his basic voice as well as other services through a fixed network as per his subscription options and capability of the access technology.

Frequency: The rate at which an electrical current alternates, usually measured in Hertz (see *Hz*). It is also used to refer to a location on the radio-frequency spectrum, such as 800, 900 or 1'800 MHz.

FTTH: *Fibre to the home*. A high-speed fibre optic, Internet connection that terminates at a residence. See *FTTx*.

FTTx: *Fibre to the x,* where x is a home (FTTH), building (FTTB), curb (FTTC), or neighbourhood (FTTN). These terms are used to describe the reach of an optical fibre network.

Full unbundling: (Sometimes referred to as access to raw copper). A form of network unbundling where the copper pairs connecting a subscriber to the Main Distribution Frame (MDF) are leased by a new entrant from the incumbent. The new entrant takes total control of the copper pairs and can provide subscribers with all services including voice and ADSL. The incumbent still has ownership of the unbundled loop and is responsible for maintaining it.

Gateway: Any mechanism for providing access to another network. This function may or may not include protocol conversion.

GATS: *General Agreement on Trade in Services*.

GDP: *Gross domestic product*. The market value of all final goods and services produced within a nation in a given time period.

GEO: *Geostationary earth orbit*. A satellite in orbit 35'650 km above the Earth in a rotation that mimics that of the Earth, thus appearing stationary in the sky.

GMPCS: *Global mobile personal communications by satellite*. Non-geostationary satellite systems that are intended to provide global communication coverage to small handheld devices.

GNP: *Gross national product*. The market value of all final goods and services produced in a nation's economy, including goods and services produced abroad.

GNI: *Gross national income*. The market value of all final goods and services produced in a nation's economy, including goods and services produced abroad. GNI, in constant prices, differs from GNP in that it also includes a terms-of-trade adjustment, and gross capital formation, which includes a third category of capital formation: net acquisition of valuables.

GPRS: *General Packet Radio Service*. This is a mobile data service available to users of GSM mobile phones. It is often described as "2.5G", that is, a technology between the second (2G) and third (3G) generations of mobile telephony. It provides moderate-speed data transfer, by using unused TDMA channels in the GSM network.

GPS: *Global positioning system*. Refers to a "constellation" of 24 "Navstar" satellites, launched initially by the United States Department of Defense, that orbit the Earth and make it possible for people with ground receivers to pinpoint their geographic location. The location accuracy ranges from 10 to 100 metres for most equipment. A Russian system, GLONASS, is also available, and a European system, Galileo, is under development.

GSM: *Global System for Mobile communications*. Digital mobile standard developed in Europe, and currently the most widespread 2G digital mobile cellular standard. GSM is available in over 170 countries worldwide. For more information, see the website of the GSM Association at: www.gsmworld.com/index.html.

H.323: An umbrella Recommendation from ITU-T, that defines the protocols to provide audio-visual communication sessions on any packet network.

HDTV: *High-definition television*. A new format for television that offers far superior quality to current NTSC, PAL or SECAM systems. The resolution of the picture is roughly double previous television signals and the pictures are displayed with a screen ratio of 16:9 as compared with most of today's TV screens, which have a screen ratio of 4:3.

HFC: *Hybrid fibre copper.* A broadband network that utilizes fibre optic cabling to the vicinity and then copper lines to individual users.

HiperLAN: *High-performance radio local area network*. An ETSI standard that operates at up to 54 Mbit/s in the 5 GHz RF band.

HiperLAN2: *High-performance radio LAN Type 2.* Wireless LAN (specified by ETSI/BRAN) in the 5 GHz IMS Band with a bandwidth up to 50 Mbit/s. HiperLAN2 is compatible with 3G WLAN systems for sending and receiving data, images, and voice communications.

Host: Any computer that can function as the beginning and end point of data transfers. Each Internet host has a unique Internet address (IP address) associated with a domain name.

Hotspot: An access point to a wireless local area network (WLAN). Hotspots are areas where wireless data can be sent and received, and Internet access is provided to wireless devices. For example, a laptop computer can be used to access the Internet in a hotspot provided in an airport or hotel.

HSDPA: *High-Speed Downlink Packet Access.* This is a new mobile telephony protocol. Also called 3.5G (or "3½G"). High-Speed Downlink Packet Access is a packet-based data service with data transmission up to 8-10 Mbit/s (and 20 Mbit/s for MIMO systems) over a 5 MHz bandwidth in W-CDMA downlink. HSDPA implementation includes Adaptive Modulation and Coding (AMC), Multiple-Input Multiple-Output (MIMO), Hybrid Automatic Repeat Request (HARQ), fast scheduling, fast cell search, and advanced receiver design.

HTTP and HTTPS: Hypertext transfer protocol (HTTP) is a communications protocol designed to transfer information between computers over the World Wide Web. HTTPS is HTTP using a Secure Socket Layer (SSL). SSL is an encryption protocol invoked on a Web server that uses HTTPS.

Hybrid Fibre/ Coaxial (HFC): A telecommunication industry term for a network that incorporates both optical fibre along with coaxial cable to create a broadband network.

Hz: *Hertz*. The frequency measurement unit equal to one cycle per second.

ICT: *Information and Communication(s) Technology*. A broad subject concerned with technology and other aspects of managing and processing information, especially in large organizations.

IEEE: *Institute of Electrical and Electronics Engineers.*

ILEC: *Incumbent Local Exchange Carrier*.

IMS: *IP Multimedia Subsystem*. A standardized Next-Generation Networking (NGN) architecture for telecom operators that want to provide mobile and fixed multimedia services. It uses a Voice-over-IP (VoIP) implementation based on a 3GPP standardized implementation of SIP, and runs over the standard Internet Protocol (IP). Existing phone systems (both packet-switched and circuit-switched) are supported.

IMT-2000: *International Mobile Telecommunications-2000*. Third-generation (3G) "family" of mobile cellular standards approved by ITU. For more information see the website at: www.itu.int/imt.

Incumbent: The major network provider in a particular country, often a former State-owned monopoly.

Instant messaging (IM): Refers to programs such as AOL Instant Messenger and ICQ that allow users to exchange messages with other users over the Internet with a maximum delay of one or two seconds at peak times.

Interconnection: The physical connection of separate telephone networks to allow users of those networks to communicate with each other. Interconnection ensures interoperability of services and increases end users' choice of network operators and service providers.

Interconnection charge: The charge – typically including a per-minute fee – that network operators levy on one another to provide interconnection.

Internet: Interconnected global networks that use the Internet protocol (see *IP*).

Internet backbone: The high-speed, high capacity lines or series of connections that form a major pathway and carry aggregated traffic within the Internet.

Internet content provider: A person or organization that provides information via the Internet, either with a price or free of charge.

IP: *Internet protocol*. The dominant network layer protocol used with the TCP/IP protocol suite.

IP telephony: *Internet protocol telephony*. IP telephony is used as a generic term for the conveyance of voice, fax and related services, partially or wholly over packet-based, IP-based networks. See also *VoIP* and *Voice over broadband*.

IPTV: *Internet Protocol Television*. A system where a digital television service is delivered by using Internet Protocol over network infrastructure, which may include delivery by a broadband connection.

IPR: *Intellectual property rights*. Copyrights, patents and trademarks giving creators the right to prevent others from using their inventions, designs or other creations. The ultimate aim is to act as an incentive to encourage the development of new technology and creations which will eventually be available to all. The main international agreements are the World Intellectual Property Organization's (WIPO) *Paris Convention for the Protection of Industrial Property* (patents, industrial designs, etc.), the *Berne Convention for the Protection of Literary and Artistic Works* (copyright), and the World Trade Organization's (WTO) *Agreement on Trade-Related Aspects of Intellectual Property Rights* (TRIPS).

ISDN: *Integrated services digital network*. A digital switched network, supporting transmission of voice, data and images over conventional telephone lines.

ISP: *Internet service provider*. ISPs provide end users access to the Internet. Internet Access Providers (IAPs) may also provide access to other ISPs. ISPs may offer their own proprietary content and access to online services such as e-mail.

IT: *Information technology*.

ITU: *International Telecommunication Union*. The United Nations specialized agency for telecommunications. See www.itu.int/.

Internet Exchange Point (IXP): A central location where multiple Internet Service Providers can interconnect their networks and exchange IP traffic.

LAN: *Local area network*. A computer network that spans a relatively small area. Most LANs are confined to a single building or group of buildings. However, one LAN can be connected to other LANs over any distance via telephone lines and radio waves. A system of LANs connected in this way is called a wide-area network (WAN). See also *WLAN*.

Last mile: The topology denotes the operator's ownership of the access network.

Layered architecture: The concept of layered network architecture divides a network at any specific point into layers, each of which adds value to the physical medium of communication.

LBS: *Location-based services*. LBS make use of information on the location of a mobile device and user, and can exploit a number of technologies for the geographic location of a user. Some of these technologies are embedded in the networks and others in the handsets themselves. Location capability is already available to some level of accuracy (approx. 150 m) for most users of cellular networks. Increased accuracy can become available through location technologies such as GPS. See *GPS*.

Leased line: A point-to-point communication channel or circuit that is committed by the network operator to the exclusive use of an individual subscriber. Under national law, leased lines may or may not be permitted to interconnect with the public switched network.

Least Developed Countries (LDCs): These are the 50 Least Developed Countries recognized by the United Nations.

Licensing: An administrative procedure for selecting operators and awarding franchises for the operation of particular telecommunication services, for instance cellular radio.

Line sharing: A form of network unbundling that allows a competitive service provider to offer ADSL using the high-frequency portion of a local loop at the same time that an incumbent continues to offer standard switched voice service over the low-frequency portion of the same loop.

LLU: *Local loop unbundling*. The process of requiring incumbent operators to open the last mile of their legacy networks to competitors. Similar reference to *ULL (unbundled local loop)*.

Local loop: The system used to connect the subscriber to the nearest switch. It generally consists of a pair of copper wires, but may also employ fibre-optic or wireless technologies.

Long Run Incremental Costs (LRIC): The added or extra cost entailed in providing a service, over the long term.

Long Run Average Incremental Costs (LRAIC): A costing model based on LRIC analysis, in which the total traffic costs for both interconnecting carriers are divided by the total demand, rather than assigning unique costs to each operator.

MDF: *Main Distribution Frame* (ITU-T Q.9 (88), 5005). A distribution frame to which are connected on one side the lines exterior to the exchange, and on the other side the internal cabling of the exchange.

Malware: Software designed to infiltrate or damage a computer system without the owner's informed consent.

Media gateway: A translation unit between disparate telecommunications networks such as PSTN; NGN; and 2G, 2.5G and 3G radio access networks. Media gateways enable multimedia communications across Next-Generation Networks over multiple transport protocols such as ATM and IP.

Mesh network: A way to route data, voice and instructions between nodes. It allows for continuous connections and reconfiguration around blocked paths by "hopping" from node to node until a connection can be established.

Mobile: As used in this report, the term refers to mobile cellular systems and to mobile phones.

Mobile virtual network operator (MVNO): A company that does not own a licensed frequency spectrum, but resells wireless services under their own brand name, using the network of another mobile phone operator.

MP3: *MPEG-1 Audio Layer-3* (MPEG stands for Moving Pictures Experts Group). A standard technology and format for compression of a sound sequence into a very small file (about one-twelfth the size of the original file) while preserving the original level of sound quality when it is played.

Multimedia: The presentation of more than one medium, typically images (moving or still), sound and text in an interactive environment. Multimedia requires a significant amount of data transfer and bandwidth, and it invariably requires computational facilities.

MPLS: *Multi-Protocol Label Switching.* A data-carrying mechanism which emulates some properties of a circuit-switched network over a packet-switched network.

In practical terms, MPLS is a mechanism that allows the establishment of virtual paths (known as Label Switched Paths) for an unconnected mode protocol. The most famous protocol used with MPLS is IP, even though MPLS is a multi-protocol mechanism.

Multi-Service Access Nodes (MSAN): A device typically installed in a telephone exchange which connects customers' telephone lines to the core network and is able to provide telephony, ISDN, and broadband such as DSL all from a single platform.

NAP: *Network Access Point* (ITU-T Recommendation Q.1290 (98), 2.150). The point of connection of a physical entity that provides network access for users.

National Regulatory Authority (NRA): The regulatory agency or official at the central or federal government level that is charged with implementing and enforcing telecommunication rules and regulations.

Network unbundling: Providing access to, or making available, some or all of the disaggregated elements and/or functions of a telephone network – usually the local portion of the network – for interconnecting carriers to use in serving their own customers.

Network topology: The pattern of links connecting pairs of nodes of a network.

Next-generation network (NGN): A broad term for a certain kind of emerging computer network architectures and technologies. It generally describes networks that natively encompass data and voice (PSTN) communications, as well as (optionally) additional media such as video.

Node: A point of connection to a network. A switching node is a point at which switching occurs.

Number portability: The ability of a customer to transfer an account from one service provider to another without requiring a change in number. Other forms of portability allow end users to change residence or subscribe to a new form of service (e.g., ISDN) while retaining the same telephone number for their main telephone line.

OECD: Organisation for Economic Co-operation and Development

OFDM: *Orthogonal frequency division multiplexing.* A method of digital modulation in which a signal is split into several narrowband channels at different frequencies in order to minimize interference among channels that are close in frequency. OFDM is used in European digital audio broadcast services, and also in wireless LANs.

P2P: *Peer to peer.* P2P refers to networks that facilitate direct connections among individual nodes rather than through a centralized server. However, many famous P2P networks, such as "Napster", actually relied on a central server to connect users. Other networks (such as "Gnutella") offer true peer-to-peer, decentralized connections.

Packet: Block or grouping of data that is treated as a single unit within a communication network.

Packet-based: Message-delivery technique in which packets are relayed through stations in a network. See also *Circuit-switched connection.*

PAN: *Personal area network*. For the purposes of this report, a PAN is referred to as the interconnection of information technology devices within the range of an individual person, typically within a radius of 10 metres. For example, a person travelling with a laptop, a personal digital assistant (PDA) and a portable printer could interconnect these devices through a wireless connection, without the need for physical wiring. Conceptually, the difference between a PAN and a wireless LAN is that the former tends to be centred around one person while the latter has a greater range of wireless connectivity, typically serving multiple users.

PDA: *Personal digital assistant*. A generic term for handheld devices that combine computing and possibly communication functions.

Peering: The exchange of routing announcements between two Internet Service Providers for the purpose of ensuring that traffic from the first can reach customers of the second, and vice-versa. Peering takes place predominantly at IXPs and usually is offered either without charge or subject to mutually agreed commercial arrangements.

Penetration: A measurement of access to telecommunications, normally calculated by dividing the number of subscribers to a particular service by the population and multiplying by 100. Also referred to as *teledensity* (for fixed-line networks) or mobile density (for cellular ones), or *total teledensity* (fixed and mobile combined).

Personal Communication Services (PCS): In the United States, this refers to digital mobile networks using the 1900 Mhz frequency. In other countries, it refers to digital mobile networks using the 1800 Mhz frequency. The term *Personal Communications Network* (PCN) is also used.

Pervasive computing: A concept which describes a situation in which computing capability is embedded into numerous different devices around the home or office (e.g. fridges, washing machines, cars, etc.). Also referred to as *ubiquitous computing. Pervasive communications* implies that the microchips in these devices are also able to communicate, for instance their location and status.

Phishing: The fraudulent practice of disguising spam as legitimate e-mail in an attempt to coax recipients into revealing private financial data.

Plesiochronous Digital Hierarchy (PDH): A technology used to transport large quantities of data over networks such as fibre-optic and microwave radio systems. PDH allows transmission of data streams that are nominally running at the same rate, but allowing some variation on the speed around a nominal rate.

PLC: *Power line communications.* A communication network that uses existing power lines to send and receive data by using electrical signals as the carrier. Power flows on the line at 50-60 Hz while data is sent in the 1 MHz range.

PON: *Passive optical network*. A type of full passive wave division multiplexing (WDM) network that allows multiple locations to connect to one optical fibre strand (or wavelength) by using optical splitters to break up the wavelength of light into allocated time slots for each user. See *Endrun* and *WDM*.

Port 25: The traditional TCP port used by the Simple Mail Transfer Protocol.

Portal: Although an evolving concept, the term portal commonly refers to the starting point, or a gateway through which users navigate the World Wide Web, gaining access to a wide range of resources and services, such as e-mail, forums, search engines, and shopping malls.

PPP: *Purchasing power parity*. An exchange rate that reflects how many goods and services can be purchased within a country, taking into account different price levels and cost of living across countries.

Protocol: A set of formal rules and specifications describing how to transmit data, especially across a network.

Private network: A network based on leased lines or other facilities, which are used to provide telecommunication services within an organization or within a closed user group as a complement or a substitute to the public network.

Private ownership/Privatization: The transfer of control of ownership of a state enterprise to private parties, generally by organizing the enterprise as a share company and selling shares to investors. More generally, the term is sometimes used to refer to a wide range of modalities whereby business is opened to private enterprise and investment.

PSTN: *Public switched telephone network*. The public telephone network that delivers fixed telephone service.

PTO: *Public telecommunication operator*. A provider of telecommunication infrastructure and services to the general public ("public" refers to the customer base). Also referred to as an operator, service provider, carrier or "telco".

QoS: *Quality of service*. A measure of network performance that reflects the quality and reliability of a connection. QoS can indicate a data traffic policy that guarantees certain amounts of bandwidth at any given time, or can involve traffic shaping that assigns varying bandwidth to different applications.

Quadruple play: A term referring to the bundling of the triple play services of broadband Internet access, video and fixed voice with mobile services.

RFID: *Radio-frequency identification*. A system of radio tagging that provides identification data for goods in order to make them traceable. Typically used by manufacturers to make goods such as clothing items traceable without having to read bar code data for individual items.

RIO: *Reference Interconnection Offer*.

SDR: *Software defined radio*. A radio communication system which uses software for the modulation and demodulation of radio signals.

SDSL: *Symmetrical DSL*. A proprietary North American DSL standard. However, the term SDSL is often also used to describe SHDSL.

Server: (1) A host computer on a network that sends stored information in response to requests or queries. (2) The term server is also used to refer to the software that makes the process of serving information possible.

Service Level Agreement (SLA): An SLA provides a way of quantifying service definitions by specifying what the end user wants and what the provider is committed to provide. The definitions vary at business, application or network level.

Session Initiation Protocol (SIP): A protocol developed by the IETF MMUSIC Working Group and proposed standard for initiating, modifying, and terminating an interactive user session that involves multimedia elements such as video, voice, instant messaging, online games, and virtual reality. In November 2000, SIP was accepted as a 3GPP signalling protocol and permanent element of the IMS architecture. It is one of the leading signalling protocols for Voice over IP, along with H.323. The SIP server initiating the call will unambiguously be aware of the time at which the voice session was initiated, and will in general also know the time at which the voice session ended. The VoIP service provider, which is not necessarily the network operator, will generally be the party operating the SIP server.

SHDSL: *Single pair high-speed DSL*. The informal name for ITU-T Recommendation G.991.2 that offers high-speed, symmetrical connectivity over a twisted copper pair.

SIM: *Subscriber Identification Module (card).* A small printed circuit board inserted into a GSM-based mobile phone. It includes subscriber details, security information and a memory for a personal directory of numbers. This information can be retained by subscribers when changing handsets.

SMP: *Significant Market Power.*

SMS: *Short Messaging Service.* A service available on most digital mobile phones that permits the sending of short messages (also known as text messages, messages or, more colloquially, "SMSes", texts or even txts) between mobile phones, other handheld devices and even landline telephones (though the service availability of SMS to landline telephones does not appear to be available in the United States). Other uses of text messaging can be for ordering ringtones, wallpapers and entering competitions.

SMTP: *Simple Mail Transfer Protocol*. The *de facto* standard for e-mail transmission across the Internet.

Softswitch: A type of telephone switch that uses software running on a computer system to carry out the work that used to be carried out by hardware.

Spam: Unwanted, nuisance e-mail, some of which may contain computer viruses or worms, fraudulent consumer scams or offensive content.

Spam zombie: (see *Zombie*)

Spectral efficiency: A measure of the performance of encoding methods that code information as variations in an analog signal.

Spectrum: The radio-frequency spectrum of hertzian waves used as a transmission medium for cellular radio, radiopaging, satellite communication, over-the air broadcasting and other services.

Spread-spectrum technology: A radio technique that continuously alters its transmission pattern either by constantly changing carrier frequencies or by constantly changing the data pattern.

SPIM: *Spam over Instant Messenger.* An unsolicited message made using instant messenger over the Internet.

SPIT: *Spam over Internet Telephony.* An unsolicited telephone call made using IP telephony over the Internet.

Spyware: Software that is installed surreptitiously on a personal computer to intercept, monitor or take partial control over the user's interaction with the computer, without the user's informed consent.

Switch: Part of a mobile or fixed telephone system that routes telephone calls or data to their destination.

Synchronous Digital Hierarchy (SDH): A standard developed by ITU (G.707 and its extension G.708) that is built on experience in the development of SONET. Both SDH and SONET are widely used today: SONET in the United States and Canada, SDH in the rest of the world. SDH is growing in popularity and is currently the main concern, with SONET now being considered as the variation.

TCP: *Transmission control protocol.* A transport layer protocol that offers connection-oriented, reliable stream services between two hosts. This is the primary transport protocol used by TCP/IP applications.

TCP/IP: *Transmission Control Protocol/Internet Protocol.* The suite of protocols that defines the Internet and enables information to be transmitted from one network to another.

TDMA: *Time Division Multiple Access.* This is a technology for shared medium (usually radio) networks. It allows several users to share the same frequency by dividing it into different time slots. The users transmit in rapid succession, one after the other, each using their own time slot. This allows multiple users to share the same transmission medium (e.g. radio frequency) whilst using only the part of its bandwidth they require.

TD-SCDMA: *Time Division Synchronous Code-Division Multiple Access*. A 3G mobile telecommunication standard, being pursued in China by the Chinese Academy of Telecommunications Technology (CATT), Datang and Siemens AG, in an attempt to develop home-grown technology and not be "dependent on Western technology". TD-SCDMA uses Time Division Duplexing (TDD), in contrast to the Frequency Division Duplexing (FDD) scheme used by W-CDMA.

TISPAN: *Telecoms and Internet Converged Services and Protocols for Advanced Networks*, developed by the European Telecommunications Standards Institute (ETSI).

Teledensity: Number of fixed telephone lines per 100 inhabitants. See *Penetration*.

Total teledensity: Sum of the number of fixed lines and mobile cellular subscribers per 100 inhabitants. See *Penetration*.

TPC: *Transmit power control*. A technical mechanism used within some networking devices in order to prevent too much unwanted interference between different wireless networks.

Traffic exchange point: Traffic exchange points are used by operators to exchange traffic through peering directly between service networks rather than indirectly, via transit through their upstream providers.

Triple play: A term referring to the bundling of fixed voice, video and broadband Internet access services.

True access gap: The shortfall between market-based regulatory measures and universal access.

UASL: *Unified Access Services Licensing.* A licensing framework in India that gives the licensee freedom to offer both fixed and mobile services using any technology.

Ubiquitous computing: A term that reflects the view that future communication networks will allow seamless access to data, regardless of where the user is. See *Pervasive computing.*

ULL: *Unbundled local loop.* See *LLU.*

UMTS: *Universal mobile telecommunications system*. The European term for third-generation mobile cellular systems or IMT-2000 based on the W-CDMA standard. For more information, see the UMTS Forum website at: www.umts-forum.org/.

Universal access: Refers to reasonable telecommunication access for all. Includes universal service for those that can afford individual telephone service and widespread provision of public telephones within a reasonable distance of others.

UN: *United Nations.*

USD: *United States Dollar.*

USO: *Universal service obligations*. Requirements that governments place on operators to offer service in all areas, regardless of economic feasibility.

Value-added network services (VANS): Telecommunication services provided over public or private networks which, in some way, add *value* to the basic carriage, usually through the application of computerized intelligence. Examples of VANs include reservation systems, bulletin boards, and information services. Also known as *enhanced services.*

VDSL: *Very-high-data-rate digital subscriber line* (ITU-T G.993.1). The fastest version of DSL that can handle speeds up to 52 Mbit/s over very short distances. Often used to branch out from fibre connections inside apartment buildings.

Voice over broadband or Voice over DSL (VoDSL): A method of making voice calls over a broadband connection. The calls can be either made via a computer or through traditional phones connected to voice over broadband equipment. See also *IP telephony* and *VoIP.*

VoD: *Video on Demand* (ITU-T J.127 (04), 3.3). Program transmission method whereby the program *starts* playing after a certain amount of data has been buffered while receiving subsequent data in the background, where the program is completely created by the content provider. Using this system, users are able to select and watch video and multimedia content over a network as part of an interactive television system. VoD systems either "stream" content, allowing viewing in real time, or "download" it, in which the program is brought in its entirety to a set-top box before viewing starts.

VoIP: *Voice over IP*. A generic term used to describe the techniques used to carry voice traffic over IP (see also *IP telephony* and *Voice over broadband*).

VPN: *Virtual private network*. A method of encrypting a connection over the Internet. VPNs are used extensively in business to allow employees to access private networks at the office from remote locations. VPNs are especially useful for sending sensitive data.

VSAT: *Very Small Aperture Terminal*. A 2-way satellite ground station with a dish antenna that is smaller than 3 metres, as compared to around 10 metres for other types of satellite dishes.

WAN: *Wide area network*. WAN refers to a network that connects computers over long distances.

W-CDMA: *Wideband code division multiple access*. A third-generation mobile standard under the IMT-2000 banner, first deployed in Japan. Known as UMTS in Europe. See also *CDMA*.

WDM: *Wave division multiplexing*. Technology that allows multiple data streams to travel simultaneously over the same fibre optic cable by separating each stream into its own wavelength of light.

Web 2.0: A term referring to a perceived second generation of web-based communities and hosted services such as social-networking sites and wikis which facilitate collaboration and sharing between users.

Website/ Webpage: A website (also known as an Internet site) generally refers to the entire collection of HTML files that are accessible through a domain name. Within a website, a webpage refers to a single HTML file, which when viewed by a browser on the World Wide Web could be several screen dimensions long. A "home page" is the webpage located at the root of an organization's URL.