VoIP Glossary

VoIP Terms and Definitions

PATTON Electronics Co.

Network Access & Connectivity

Copyright

Trademarks

The terms *SmartNode* and *SmartWare* are trademarks of Patton Electronics Company. All other trademarks are the property of their respective owners.

Printed in the USA.

Introduction—What is VoIP?

Voice over IP or *VoIP* is a term used in IP telephony for a set of facilities that use the Internet Protocol (IP) to deliver voice information. In general, this means sending voice information in digital form in discrete packets rather than in the traditional circuit-committed protocols of the public switched telephone network (PSTN). A major advantage of VoIP and Internet telephony is that they avoid the tolls charged by ordinary telephone service.

The term *VoIP* derives from the VoIP Forum, an effort by major equipment providers, to promote the use of ITU-T H.323, the standard for sending voice (audio) and video using IP on the public Internet and within an intranet. The Forum also promotes the user of directory service standards so that users can locate other users and the use of touch-tone signals for automatic call distribution and voice mail.

In addition to IP, VoIP uses the real-time protocol (RTP) to ensure that packets get delivered in a timely way. Because the nature of public networks such as the Internet makes it difficult to guarantee Quality of Service (QoS), better service is usually possible with private networks managed by an enterprise or by an Internet telephony service provider (ITSP).

A technique used by at least one equipment manufacturer, Adir Technologies (formerly Netspeak), to help ensure faster packet delivery is to use the ping utility to contact all possible network gateway computers that have access to the public network and choose the fastest path before establishing a Transmission Control Protocol (TCP) sockets connection with the other end.

Enterprises use VoIP gateways to enter into the VoIP environment. A gateway receives packetized voice transmissions from users within the company and then routes them to other parts of the company's intranet (local area or wide area network) or—using a T-carrier system or E-carrier interface—sends them over the public switched telephone network.

VoIP Standards

- ITU-T H.320 Standards for Video Conferencing
- H.323 ITU Standards
- H.324 ITU Standards
- VPIM Technical Specification

VoIP Glossary

Asynchronous Communication

A data communications method in which bits are sent without using a clock signal for synchronization. Instead, each character is transmitted surrounded by a start and stop bit that designates the beginning and ending points of the information. This as opposed to synchronous communication where blocks of data are transmitted using a synchronizing clock.

Audio Menu

A verbal choice provided by a recording over the phone. Audio choice menus are common in automated attendant, IVR and fax-on-demand systems. They are prompts for caller input. Audio menus can instruct you to speak commands or press keys on a touch-tone keypad as commands.

Audio Response Unit (ARU)

A computer telephony system incorporating voice store-and-forward technology. There are passive and interactive ARUs. Passive ARUs simply play out messages while interactive ARUs play messages based on input from callers.

Audio Teleconferencing or Audio Conferencing

The original technology used for audio teleconferencing was based on PBX (Private Branch Exchange) conferencing circuits. Setting up conference calls through the PBX is cumbersome, the voice quality degrades as the number of people on a call increases, and there are capacity limitations, so specialized conference bridges were developed to improve capacity and voice quality. Conference bridges, however, require trained operator intervention to schedule and invoke most features. As a result, individual corporations found the cost of owner-

ship prohibitive, and the market for such products has been concentrated on service bureau providers. Today's PC-based systems provide the freedom of conference bridges. By installing a conference server on your voice networks, you can set up, attend, and manage your own conferences over any touch-tone telephone. Additionally, users can schedule meetings using desktop software from their e-mail systems, or from a web browser.

Conference Bridge

A device used to connect multiple parties over the phone. A proctor or operator can man conference bridges or they can be supervised. There are stand-alone conference bridges and conference bridge functions built in to some PBXs (Private Branch Exchange). These systems have circuitry for summing and balancing the energy (noise) on each channel so everyone can hear each other. More sophisticated conference bridges have the ability to "idle" the transmit side of channels of non-speaking parties.

Digital Subscriber Line (DSL)

A high speed digital switched service that uses existing copper pairs to connect subscriber CPE (customer premises equipment) to the CO (central office). DSL handles more data downstream (data flowing towards the subscriber) than upstream (flowing towards the network).

E-1

The designation for the 2.048 Mbps ITU standard for Europe's 30-channel digital telephone service. It is the European version of T-1 (DS-1). The bandwidth is divided into 2 signaling channels (channels 15 and 31 starting from 0) and 30 bearer channels (voice channels). A&B bit signaling (robbed bit signaling) is not used here. E-1 uses one of the control channels for signaling and the other for clock synchronization.

Fax Server

A computer based fax machine. Fax servers are "shared use" devices, typically installed on a LAN. Clients on the LAN can use the fax server from their PCs in much the same way they share a network-based (shared) printer. Faxes can be generated by users at their workstations and "printed" to the fax server for transmission. Likewise, fax servers can route incoming faxes to printers, file server directories, or to individual users. Fax servers save users from having to print documents, carry them to the fax machine, and subsequently wait for them to be transmitted after creating a cover page.

Frame Relay

In data communications, Frame Relay is a packet switching method that uses available bandwidth only when it is needed. This fast packet switching method is efficient enough to transmit voice communications with the proper network management.

Full Duplex

In telephony and data communications, full duplex means the ability for both ends of a communication to simultaneously send and receive information without degrading the quality of the content.

Interactive Voice Response (IVR)

In computer telephony, IVR is a horizontal application wherein computer-based information is accessed over the phone by using a telephone instead of a computer. An IVR platform uses computer telephony components to translate callers' touch-tones or voice commands into computer queries after the callers listen to an audio menu. For example: "Please enter your account number using the touch-tones on your telephone." These queries are then "fetched" by the IVR platform from the host computer. In some cases, the information resides in the same platform (self-hosted). The information is converted into voice commands that are spoken over the phone to the caller.

Internet

The Internet consists of the world's combined public IP-based packet-switched networks. The Internet is an outgrowth and combination of a variety of university and government sponsored computer networks. Federal and private sector subsidies supported the DARPA-NET, NSFnet (National Sciences Foundation,) and thousands of other subnetworks, which were used to do inter-agency research and communication. Today, the Internet is made up of millions upon millions of computers and subnet-

works—almost entirely supported by commercial funds except in countries where deregulation has not occurred. The Internet is the substrate and chief communications backbone for the world wide web (WWW).

Internet Telephony

Any means of transmitting the human voice (real-time or near real-time) over the Internet. There are several components: 1) On the client side, a multimedia-equipped PC with special client software will digitize your voice. This can be done with a voice modem or other voice encoding method; 2) A direct or dial-up connection to the Internet allows your voice to be transmitted in packet form to its destination; 3) Connection with the far side is achieved by IP address search, common servers or beacons to identify the called party (and to "ring" that person's phone); 4) A similar arrangement on the far end completes the call and allows both parties to speak. There are also PSTN/Internet gateways that allow regular telephone callers to make phone-to-Internet-to-phone connections. There are PC-to-phone connections and phone-to-PC connections.

Internet Service Provider (ISP)

A business that provides subscriber-based access to the Internet. Subscribers can be individuals or businesses. According to Jack Rickard, publisher of Boardwatch Magazine, ISPs operate at the fourth or lowest level of the Internet. At the third level, regional providers aggregate traffic from lower-order ISPs to the second, backbone level. The highest level in North America is the NAP (Network Access Point), which acts as peer-to-peer interconnection points for the largest backbones. There are three "official" NAPs located in San Francisco, California; Chicago, Illinois; and Pennsauken, New Jersey. ISPs use Internet routers, servers and Rrack-mounted modems to provide a variety of services, including web site hosting, FTP service, e-mail accounts, unified messaging, audio and video broadcasting, and—in some cases—Internet telephony and fax gateway services.

Messaging

In computer telephony, any means of storing and forwarding messages. This includes fax mail, voice mail, and broadcast messaging. This horizontal application is the most popular of all voice solutions. Messaging systems provide for the storing and forwarding of "non-real time" communication. For example, a recorded voice message can be stored for later playback either locally or remotely, or a fax can be received and stored before it is re-transmitted to the ultimate recipient. Messages can vary in content and media type—the distinction being that they are recorded or stored for pick up in the future.

Modem

A modem (modulator/demodulator) is equipment that converts digital signals to analog signals and vice-versa. Modems are used to send data signals (digital) over the telephone network, which is usually analog. A modem modulates binary signals into tones that can be carried over the telephone network. At the other end, the demodulator part of the modem converts the tones to binary code.

Packet

A logically grouped unit of data. Packets contain a payload (the information to be transmitted), originator, destination, and synchronization information. The idea with packets is to transmit them over a network so each individual packet can be sent along the most optimal route to its destination. Packets are constructed on one end of the communication and de-constructed on the receiving end based on the header addressing information at the front of each packet. Routers in the network will store and forward packets based on network delays, errors, and re-transmittal requests from the receiving end.

Packet Switching

A means of economically sending and receiving data over multiple network channels. Packet switching takes data and breaks it down into packets—small bundles of information containing the payload and routing information. The packets are then transmitted to the receiving end, where they are converted back to the original data

format. One feature of packet switching is that packets can be received out of order and then be quickly arranged into the correct order. There are slow packet switching networks—like the old SNA networks—and fast packet networks based on Frame Relay and ATM. Although traditionally used for data, packet networks—especially well-managed ones—are suitable for real-time transmission of voice and video.

Private Branch Exchange (PBX) or Private Automatic Branch Exchange (PABX)

In telephony, a PBX system behaves as a customer's premises over trunk lines (thus the term *branch*). At first, PBXs mimicked a small telephone company switchboard. Users would use an operator to make telephone calls to the PSTN (public switched telephone network). Now, users dial directly, without using an operator; computer telephony platforms such as automated attendants are able to route incoming calls automatically, too.

Point of Presence (PoP)

The equivalent of a local phone company's central office (CO). The place where your long distance carrier terminates your long distance lines just before those lines are connected to your local phone company's lines, or to your own direct hookup.

Post Office Protocol (POP)

An Internet standard for storage and retrieval of email messages.

Public Switched Telephone Network (PSTN)

The world's combined public circuit-switched telephone networks make up the PSTN. At one time, the PSTN consisted of analog telephone systems, now the PSTN is almost entirely digital, and includes mobile telephones along with fixed telephones.

Real-Time

Communications wherein perceptible delays between the sender and receiver are minimal and easily tolerated are considered to take place in real-time. Regular telephone calls are real time. Point-to-point fax transmissions are near to real-time. Voice messaging is not real-time.

Registered Jack-11 (RJ-11)

The designation for connecting a tip and ring circuit to a standard, modular, 6-position jack.

Registered Jack-45 (RJ-45)

Eight-position modular connector used for data transmission over standard twisted or flat pairs.

Service Provider

A company that provides services to Internet, telephone, and mobile phone users.

Signaling System #7 (SSY7)

The basis for routing traffic with out-of-band signaling. Its forerunner, CCIS (Common Channel Interoffice Signaling), used 4.8 kbps data links to transmit call set up and tear down messages to switching office adjunct computers and packet switches. SS7 in itself is not a network service offering, but rather the underlying infrastructure upon which many existing and proposed offerings are based. For example, local Basic Rate ISDN (BRI) services can tap into SS7, so 64 kbps packetized data can be routed with the help of the network's out-of-band signaling capability. In addition, nationwide Primary Rate ISDN (PRI) services can use the same backbone.

Speech Recognition

Speech recognition describes a technology that enable callers to speak words that are used to control applications.

Store and Forward

The method for storing a message or transmission for later playback or transmission. As opposed to real-time communication, store and forward is the basis for all messaging systems, including email, fax-on-demand, unified messaging, etc. In data communications, store and forward applies to momentary buffering of packets or other data strings.

T-1

North American digital standard for high capacity transmission of telephony and data communications. In telephone T-1 provides a 1.544 Mbps link which is divided

into 24 discrete, 64 kpbs voice-grade channels. In data communications, T-1 links are used to directly connect CPE (Customer Premises Equipment) routers to the Internet and for Private Data Network or VPN circuits.

T-3

North American standard for DS-3. Operates at a signaling rate of 44.736 Mbps, or the equivalent of 28 T-1s.

Transmission Control Protocol (TCP)

The transport layer protocol developed for the ARPAnet which comprises layers 4 and 5 of the OSI model. TCP controls sequential data exchange in TCP/IP for remotely hosts in a peer-to-peer network.

Telephony

Taken from Greek root words meaning "far sound", telephony means the process of converting or transmitting voice or other signals over a distance, and then re-converting them to an audible sound at the far end.

UNIX

A multi-user, multi-tasking operating system originally developed in 1969 by Ken Thompson of AT&T Bell Laboratories. UNIX is used in telephone company and mission-critical applications.

Web Browser

Client software used to view information on WWW servers. Web browsers are also packaged with email clients, newsreaders and IP telephony clients.

Web Server

On the world wide web, a server dedicated to storing data (such as web pages in HTML format) and distributing it to users. Web browsers are able to download video, text, still images and audio from web pages. Some servers support Unified Messaging.