

What is the difference between VoIP and IP telephony?

Although many people use the two terms "VoIP" (Voice over Internet Protocol) and IP telephony interchangeably, the two are distinct. In fact IP telephony depends on VoIP for its functionalities. Semantics aside, VoIP is the enabling technology that has enabled and positioned IP telephony to replace the PSTN (Public Switched Telephone Network) with a wholly computer-based solution.

VoIP technology enables the transmission of voice over a data network. VoIP includes the conversion of electronic analog voice signals into a digital format, transmission of the digital data over a network and converting the digital voice data back into an electronic analog voice format. Thus a VoIP solution effectively performs the function of a traditional analog telephone system.

A regular telephone or "endpoint" can be used to input the caller's voice into a VoIP system for this purpose. A series of analog-to-digital conversion and other computer-based processes change the voice signals into data, which is then transmitted via a data network—which can be either a local area network (LAN), wide area network (WAN), or the Internet. A series of complementary computer-based processes then change the voice data back into analog voice signals, which are converted into sound by the recipient's phone. The new breed of telephones, called IP endpoints, are themselves equipped with built-in computers that perform the analog-to-digital and/or digital-to-analog conversions. Such phones can plug directly into a LAN or WAN.

With VoIP, a PBX (Private Branch eXchange) is still used to distribute calls throughout an organization, but the PBX must support the Internet Protocol being used. In actual practice, such an IP-PBX is a computer server. Once received by the IP-PBX and inside the organization, the call may be carried through a data network or via digital or analog communication lines to recipient endpoints. If calls are distributed inside the organization on a data network, the need for a dedicated communications circuit is eliminated and the calls can be carried on the internal LAN as data packets.

IP telephony builds on the VoIP capability and includes a host of additional software-based features running on computers to replace the infrastructure of the PSTN (Public Switched Telephone Network) with a wholly computer-based solution. IP telephony eliminates the need for a dedicated PBX, communications cables, and can even replace ordinary telephones with "soft phones" that enable an audio-enabled PC to serve as the endpoint.

Replicating the calling handling and control functions traditionally provided by the PSTN over a data network including the Internet, requires additional technology. For example, a software-based solution that collectively is called a "softswitch" or "call agent" replaces the electro-mechanical switches that handle calls on the legacy PSTN. The term "softswitch" seems to be winning out over the older term "call agent," because it is more descriptive of the way these systems generally are designed – as software running on a standard computing platform.

Enabled with softswitches, servers replace PBXs in IP telephony systems, with an interesting twist. With legacy PBX systems, a call requires the setting up of a dedicated circuit for the duration of a call. However, with softswitches, as soon as the two communication points establish contact, the softswitch drops out of the path, ready for another connection. Furthermore, the voice signals are transmitted over the data network in packets just like other data, so that the data circuit does many jobs, including carrying voice, alphanumeric data and possibly video. While IP telephony solutions vary in complexity and features, they can include all of the familiar telephony features such as conferencing, call forwarding, transferring and others, with the inherent benefits of efficiency and low cost of transmission over high-bandwidth data networks.

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