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Guide to VoIP

What is VoIP?

Voice over Internet Protocol (VoIP) is the method for delivering phone calls "over IP." IP covers the public Internet, telecom carriers, office networks, and private clouds, which means that VoIP can transmit pretty much anywhere.

Until the 1980s, traditional phone calls were made via the public switched telephone network (PSTN) over copper wiring and switches. With the invention of VoIP, phone calls could be made over the same IP data networks that your computer (and now smartphone and tablets) leverages for web browsing, email, etc.

How it works

At its core, VoIP technology digitizes voice and video into packets of data that look like 0s and 1s and sends these packets over Ethernet cables. Ethernet has much more bandwidth than traditional copper lines, giving VoIP communications the advantage of high-definition audio and video. But the significant difference for VoIP is found in the flexibility and capabilities of the Internet.

The way in which data is encoded and routed depends on the VoIP provider. Some businesses, like Skype, have developed unique, proprietary solutions to translate call data, but the industry standard is called Session Initiation Protocol (SIP).

For more than a decade, SIP has been the de facto communications protocol for signaling and controlling multimedia communication sessions. SIP excels at managing video, people, and protocols on the fly, enabling callers to switch locations and devices, add participants, and negotiate digital features—all seamlessly within the same call. The emphasis is on connectivity, which is fundamentally what communications are all about.

Advantages of VoIP

More than audio content can be sent alongside the voice signal with VoIP. This added content might regulate the call by telling the audio where to go and when to terminate. The more complex data allows you to find anyone on an IP network. That's why you can Skype other computers, phones, tablets—you name it. Many VoIP services offer text chat, video streams, and file sharing along with the voice data, too.

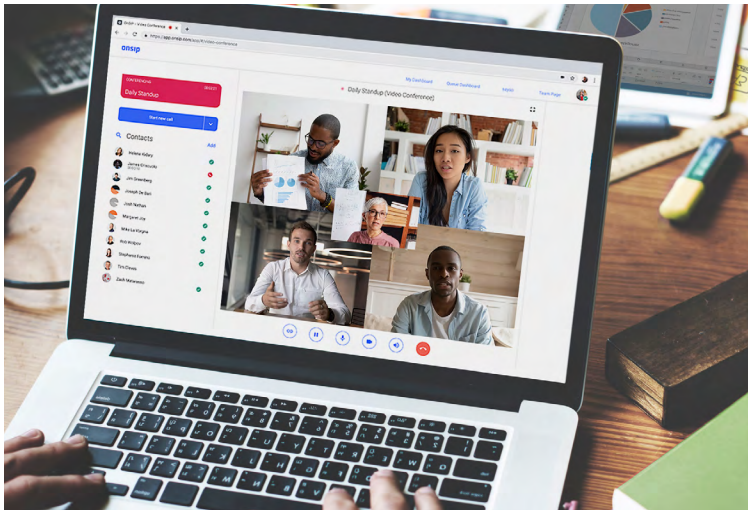
Another advantage of VoIP calling is that, technically, you are not restricted to dialing phone numbers. VoIP-to-VoIP calls can be made to user addresses—e.g., bob@acme.com—via a service provider instead of a phone number. (Think: Skype IDs, Google Hangout usernames, and more.)

Business VoIP

If you are familiar with Skype, Google Hangouts, and FaceTime, you might be wondering: What is the difference between those three applications and business VoIP? A lot. The key understanding, though, lies within the context of a phone system.

Businesses with more than a few employees typically need a phone system to handle their calls. The phone system connects the employees' phones, allowing them to dial extensions and reach each other's voicemail. Phone systems also handle when customers call the business's main number. Features such as auto attendants automatically greet callers who phone in, while a dial-by-name directory allows callers to reach a specific employee by dialing her first or last name on the phone's keypad.

Furthermore, business VoIP typically refers to a VoIP-based phone system, or a phone system that delivers calls to employees over their office IP data network.



One of the first decisions businesses face when they decide to switch to VoIP is the question of installing a PBX in their office (aka on-premise PBX) or using a service on the Internet (aka hosted PBX or cloud PBX). In plain terms, a PBX is a lot like a phone operator. It answers calls on the business's behalf and routes the call to the proper extension or destination that the caller is trying to reach.

An IP PBX is a server, or set of servers, with telephony software installed—specifically the applications that handle and route phone calls.

On-premise vs. Hosted PBX

On-premise

An on-premise PBX is a physical piece of IT hardware that is installed at an office location and programmed as the business wishes. Only one is necessary—even for multiple offices—because incoming calls can be routed anywhere.

Beyond the office's PBX and LAN, there's one more component to make the phones work with an on-premise PBX: a primary rate interface (PRI) or SIP trunking service. These are services a business can buy to connect their on-premise IP PBX to the PSTN. That way, the business can make calls to and from their office to the outside world. Many hosted PBX providers also offer SIP trunking service.

You will most likely need the help of an IT professional, whether an external contractor or an in-house IT administrator, to maintain an on-premise IP PBX. The costs associated with an on-premise IP PBX include equipment (PBX and phones), SIP trunking or PRI service, and the IT professional's time to deploy and maintain the phone system.

- ⊕ Total control
- ⊕ Integration capabilities with existing systems
- ⊗ High upfront investment
- ⊗ Long-term maintenance hassle

Hosted

Hosted PBX is a service in which a third party owns the physical hardware for the phone system. This kind of deployment is also called a "cloud" PBX because it enables a business to subscribe to the service in the cloud without having to maintain bulky telecom equipment in the office. For a monthly or annual fee, a business can customize its phone service by using a website portal. There, the business can set up calling features, configure user preferences and extensions, and download invoices.

The hallmark of this approach is low upfront capital expenditure, often making it the best fit for small and medium-sized businesses. Most hosted PBX providers do not require customers to purchase any equipment beyond IP phones.

Historically, larger businesses installed on-site systems, whereas smaller businesses chose to avoid the upfront investment and leverage a hosted PBX. But even that is changing, and more and more companies are outsourcing their communications because it is so easy.

- ⊕ Low capital expenditure and monthly cost
- ⊕ Professional-grade services and automatic upgrades
- ⊗ Reliant on phone service provider

Business VoIP features

Hosted business VoIP offers high-quality, reliable, and affordable service with an abundance of capabilities and features. Here are just a few.

Announcements

Provide important messages to callers at strategic points in the phone system. For example, you can have an announcement inform callers of your office's closure due to severe weather before callers reach your auto-attendant menu.

Auto-attendant

Automatically greets calls with a prerecorded message and a list of self-service options: "Thank you for calling our business! Dial '0' for an operator or '1' to speak with a sales representative."

ACD queues

Automatic Call Distribution queues hold incoming callers in line and send them to the first available representative. Great for sales and support teams.

Business hour rules (BHRs)

Sends incoming phone calls to different destinations in your phone system based on the time and day of the week.

Busy lamp field (BFF)

Displays lights on the user's physical phone to show which lines are in use.

Dial-by-name directory

A company directory that allows callers to spell out a name on their touch-tone keypad to reach that specific person.

e911 emergency calling

Sends the caller's assigned location to an emergency operator when a 911 call is made.

On-net conference suite

Allows multiple people to join one call.

Voicemail to email

Automatically emails voicemail recordings to a specified address, where they can be played directly.

Business VoIP checklist

Most businesses prefer hosted VoIP for its flexibility, cost structure, and advanced features. But the added convenience is the real deal-maker. It is so easy to set up a hosted PBX, we can include everything you need in this one section.

☐ IP phones & softphones

IP phones, or VoIP phones, are desk phones that transform the sound waves of your voice into a digital signal and send it as data packets over your Internet connection. These phones also decode the incoming digital signal and transform it back into soundwaves so that you can hear what the person on the other end of the line is saying. IP phones connect via Ethernet cables instead of being plugged into the phone jack in the wall.

In place of IP phones, your business can opt to use softphones. A softphone is a software-based telephone application that is accessed in a web browser window or downloaded to your computer, laptop, mobile phone, or tablet. Softphones allow you to make and receive work calls from your preferred device without needing a physical telephone. You can also transfer calls, listen to voicemails, start video conferences, send in-app chat messages to your coworkers, and more, all without leaving your monitor or smartphone screen.

☐ Business-grade broadband connection

The only constraint on a hosted VoIP phone system is bandwidth. Ensuring high-quality communications at all times requires high-quality office equipment, such as a broadband connection. This is managed by your Internet Service Provider (ISP).

☐ Business-grade router

You'll need a business-grade router sized appropriately for your business.

☐ Miscellaneous

Some VoIP providers require the purchase of additional on-premise equipment, such as quality of service (QoS) devices. It's important to ask when you're researching so that you know exactly what the provider charges.

Glossary

Direct Inward Dialing (DID)
A phone number. DID numbers allow you great flexibility over where to route calls.

Geographically Distributed
A network with multiple locations. A geographically distributed VoIP provider offers two advantages: 1.) reliability/redundancy; and 2.) efficient call routing.

Hosted (or Cloud) VoIP
A type of business VoIP system in which a VoIP provider maintains the hardware and software of the service in a secured data center and provisions it to subscribers.

IP Phone
Also known as VoIP phones, these are phones that make and receive calls via the Internet.

Jitter
Variation in packet transit delays. As the speed of transmission fluctuates, individual packets of data can arrive out of sync, harming call quality (e.g., choppy sound).

Latency
Amount of time it takes for sound to travel from one call participant to another. A latency of 150ms is barely noticeable, so it is acceptable.

Local Number Portability (LNP)
The process of moving (porting) your phone number from one carrier to another. While mandated by the federal government, there are certain uncommon situations where you may not be able to port your number. Check in with your specific VoIP provider.

Network Address Translation (NAT)
A technology most commonly used by firewalls and routers to allow multiple devices on a local area network (LAN) with “private” IP addresses to share a single public IP address. Many businesses use NATs for security purposes.

On-Premise VoIP
A VoIP deployment that requires physical hardware to be installed and maintained at the business location.

Packet
A collection of bytes of digital data that can be transmitted over the Internet.

Power Over Ethernet (PoE)
Allows enabled phones to use their Ethernet cable as a power source as well as the way to transmit data.

Private Branch Exchange (PBX)
A component of a business-grade phone system that handles call routing, provides calling features, and connects to the telecom carrier. PBXs can be owned on-premise or hosted in the cloud.

Glossary

Public Switched Telephone Network (PSTN)
The phone companies and infrastructure of the traditional telephone network (wires, landlines, switchboards, etc.).

Redundancy
Multiple backup pathways that achieve the same end, so if the primary pathway is blocked, service will continue. This adds reliability because a server can malfunction without interrupting service.

Session Initiation Protocol (SIP)
Internet protocol used to initiate and terminate live communication sessions. These may include instant messages, phone/video calls, and more.

Softphone
A software-based telephone, available in a web browser or as a downloaded app.

Tier-1 ISP
An Internet service provider (ISP) that can communicate data to other networks on the Internet without paying for transmission.

Voice Over Internet Protocol (VoIP)
Digital calling over the Internet. A person's voice is transformed into a digital signal and sent in data packets across the Internet to the other caller.

WebRTC
An open-source project aimed at creating a simple, standardized way of providing real-time communications (RTC)—voice, video, and data—over the web.