

VoIP (Voice Over IP) Demystified

How to choose the best VoIP Plan

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VoIP (Voice over Internet Protocol), aka broadband phone service, IP Telephony, I-Net telephony, Internet Telephony, IP Phones and Internet Phone service is a service that allows you to make and receive phone calls via a broadband Internet connection. You might use the same phone as you have used for POTS (Plain Old Telephone Service), but instead of being connected to the phone line coming into your home or business, it's connected to a small box typically called a **Digital Terminal Adapter** (dta). As with normal phone service, several phones may be connected to the line from the dta. For more information on how to connect a VoIP phone, read the [VoIP Connection](#) section below. Optionally, you can use an IP phone, an instrument which connects directly to your Internet connection.

Transportability: A benefit of VoIP service is that once you have a phone number assigned to your dta or IP phone, you can plug it into practically any broadband Internet connection to make and receive calls. As far as the person at the other end knows, you are in your home or business. They can reach you by dialing your IP phone number and, if you call them and allow caller ID, they will see your IP phone number – even if you are making and receiving calls from across the country or from another country.

Features: VoIP delivers PBX functionality. Thus, many features which were previously only available to large organizations via complex phone systems are now available to you at little or no additional cost. And, new features can easily be added to your service via a software update. Features typically included on VoIP services include voice mail, Caller ID, 3-way calling, Call Waiting, Call Forwarding and On-Line Account Management.

Reliability and Quality: Although you occasionally encounter busy signals, POTS is close to 100% reliable. PCs are less reliable; for example, at times you must reboot them. When it comes to reliability or availability, VoIP service is between POTS and PCs. VoIP service is generally more than 90% reliable; sometimes you need to reboot the dta. Also, there is a delay on some VoIP services. A common result of this delay is that both persons on a phone call may begin speaking at the same time. Of course, reliability of your VoIP service is directly related to the reliability of your Internet connection. If your Internet connection is down, your VoIP phone service is not usable.

And sometimes there are voice quality problems; however, these can usually be corrected by network tuning. To assure good quality of service, you must use MPLS or, at least an approach to provide Quality of Service. With these technologies, priority is given to voice packets so that other data transfers do not clobber the voice signal. If you purchase a VoIP service from the same carrier who is supplying your Internet Access, normally that carrier transmits the voice packets only within their network and can thus provide Quality of Service to assure your voice quality will be equivalent to that of POTs service. With that said, many residences and small businesses use independent VoIP services at a significantly lower cost and experience good quality voice most of the time if they have a good solid Internet Connection.

Porting of Existing Numbers: You may port your current land line phone number to your VoIP service number (move it to your dta or IP phone). Porting success rate is about 80%. For example, if you have DSL service from certain carriers, they do not allow you to port the number associated with the DSL service unless you cancel the DSL service. There is also a flavor of DSL known as Naked DSL that is not associated with any phone number; however, not all carriers offer this option in all locations. A few years ago, porting numbers to a VoIP service would often take more than a month and would sometimes took several months. The process has been improved to where porting today typically takes place within a month - two weeks is not unusual.

More VoIP info for both residential and small business users is included in the [VoIP Slide presentation](#).

In many cases, **unlimited VoIP service** to the USA and Canada costs less than local phone service (including taxes and fees) from your local phone company. Each VoIP plan includes either low cost or unlimited domestic long distance calling plus low cost worldwide long distance calling. The "Unlimited" plans discussed here do not actually allow truly unlimited calling. Each carrier has their definition of "unlimited". Some examples are "amount of calling done by typical residential customers", "amount of calling done by normal businesses that are not call centers", "3000 minutes per line per month", "50,000 minutes per month per T1", and "101,000 minutes per T1 per month". In some cases, carriers charge a specified overage rate if the monthly "unlimited" maximum is exceeded. In other cases, the customer's plan is retroactively changed to a "per minute" plan and all calls since the account was open are retroactively billed at the "per minute" rate. In summary, if you purchase a "residential unlimited" plan for a business or a "business unlimited" plan for a call center type operation, you may be in for an unpleasant surprise.

A good **residential VoIP** option is the [Residential Freedom Unlimited](#) \$24.99/month plan for unlimited calling to the USA, Canada, Puerto Rico, the US Virgin Islands and Guam and to land lines in France, Italy, Ireland, Spain and the United Kingdom. Or, the [Monthly Unlimited](#) plan for \$19.95/month if all you need is unlimited calling to the USA and Canada. Note that calls to

mobile phones, premium, special, and information service numbers in France, Ireland, Italy, Spain and the United Kingdom are not included in the unlimited service plan and will be billed at the metered rates. There is an associated \$199 per year option with each of these plans.

The **business VoIP** plan that is most attractive for many small to medium size businesses is the [Packet8 Virtual Office](#) plan. The Packet8 Virtual Office plan includes a business-quality phone system. It is a hosted PBX solution that includes features found in large office PBX systems. For example, it includes an autoattendant. For Virtual Office, there is a minimum of 3 phones that must be purchased. A successful business VoIP implementation may require a better connection to the Internet than some small businesses have today and/or an improved office network. Especially with a hosted PBX, improved latency, jitter and Quality of Service (QOS) may be required for satisfactory operation. Go to the link near the bottom of the next page to test your broadband connection for VoIP.

SIP Trunking is growing as the technology of choice for those organizations that make a lot of outbound calls and/or receive a lot of toll free calls. From the discussion above, you can see that "Unlimited" plans are generally not the solution for call centers and other businesses that have a lot of toll calls. SIP Call origination and termination can be the solution for high traffic customers, for customers who have significant changes in call volumes from time to time, and for customers who would like diverse DIDs in different parts of the world. SIP Trunking is raw IP Telephony service that is used with an IP PBX or gateway connecting to the Internet. The PBX used must be designed with a SIP interface. Otherwise, a gateway can be used to do the conversion. Depending on call volume and other characteristics of the requirement, per minute rates can be in the vicinity of a penny per minute. Some carriers providing SIP services require that their SIP customers use an Internet connection also supplied by the carrier. This way the carrier can assure that the SIP voice packets are given priority over other data traffic. However, many SIP service providers allow the use of any Internet connection. As long as there is plenty of available bandwidth for the SIP traffic, this is usually not a problem. Most SIP implementations use Codec G.729 which requires 20 to 30 Kbps per voice channel. If higher quality voice is desired, Codec G.711 can be used; it uses 80 to 90 Kbps per voice channel. For faxing, T.38 is recommended. It has been found that some PBX specialists seem to be able to readily set up PBXs for T.38 use and others do not seem to be able to get their PBXs to work on T.38. It's not clear if the limitation is in the PBX or has more to do with the expertise of the PBX programmer. For further details on SIP Trunking, request [Voice quotes at t1guy.com](#), include a note about SIP in the comments section, and a consultant will contact you to discuss options for your situation.

Alarm Systems that work on standard analog phone (POTS) lines do not always work over VoIP lines. If you have an existing Alarm System, it is recommended that you keep a POTS line for that system. If you are installing

a new Alarm System, you can install an IP system that will work over the Internet.

Fax machines generally work on VoIP systems. However, sometimes they can not be used at speeds higher than 9600 baud on VoIP and some VoIP providers do not guarantee or recommend the use of Fax machines over their systems. Whether or not a fax goes through depends on such things as which model Fax machine you have and, perhaps, the phase of the moon. Although many of us use Fax machines successfully on VoIP, if your business involves the heavy use of a Fax machine, you should probably keep a POTS line for your Fax machine; this line can also serve as a backup voice line in the rare case that the VoIP system is down. The best IP solution for faxing is to use T. 38 which is supported by some IP Telephony providers.

VoIP 911 service There has been considerable public discussion about **VoIP 911 service**, or lack thereof, as provided by some VoIP providers. The FCC issued an order that states that "VoIP providers must deliver all 911 calls to the customer's local emergency operator. This must be a standard, rather than optional, feature of the service". It also includes that "VoIP providers must provide emergency operators with the call back number and location information of their customers (i.e., E911) where the emergency operator is capable of receiving it. Although the customer must provide the location information, the VoIP provider must provide the customer a means of updating this information, whether he or she is at home or away from home". VoIP carriers who have not complied must cease accepting new customers in areas where they are not connecting 911 calls with the person's location and phone number. Existing customers do not have to be disconnected even if the 911 service is not yet operative in their area.

Shop and Compare VoIP Services Although it's a work in progress, the following is a link to a spreadsheet that compares various VoIP plans: [VoIP Comparison](#). Features available from at least one VoIP provider are listed in the left column. Then, entries are made indicating which service provides each feature. If you wish to consider a plan that is not on the spreadsheet, simply start a new column and fill in the cells with info from the provider. Once you find a plan or plans of interest, here are the links to various plans: [Unlimited Monthly](#), [Packet8](#), and [myPhoneCompany](#).

If you do not have a broadband Internet connection (for example, cable, DSL, or T1), you can go to [Broadband Internet Access](#) to compare options; shop for, and order the one that you choose.

If you do have a broadband Internet connection and wish to see how good it is, go to [testyourvoip.com](#) to check the connection for VoIP. For a good picture of the suitability of your broadband connection for VoIP, run the test several times during busy times of the day.

How to Connect VoIP Phones

Each provider of VoIP service will give you detailed instructions for connecting their system. You should follow those instructions. The purpose of this page is to give you an idea of what is involved before you purchase a VoIP service. Please note that there may be variations for some VoIP services.

For some VoIP services, especially those for residential use, you may use your same phone as you have used for POTS (Plain Old Telephone service). But instead of being connected to the phone line coming into your home or business, it's connected to a small box called a Digital Terminal Adapter (dta).

As with normal phone service, several phones may be connected to the phone line from the dta so that the phone number can be answered from different rooms. The dta plugs into an Ethernet port on a router connected to your broadband connection.

If you do not have a router, many of the dtas supplied by VoIP providers contain two Ethernet ports. To connect a dta with two Ethernet ports, you can simply unplug the Ethernet cable that currently plugs into your PC, plug this cable into one of the dta Ethernet ports, and then run an Ethernet cable between the other dta Ethernet port and the PC Ethernet port.

The simple setups in the previous paragraphs work well for most of us. However, if there is a lot of data traffic on your network, VoIP voice quality could suffer unless additional steps are taken. Data traffic includes Email being sent or received, surfing the web and ftping files. Again, understand that many use VoIP service with good quality while one or more PCs on the network are being used to surf the web or send and receive Email. However, there are cases especially in an office with many PCs where VoIP service will suffer unless it is given priority over the data traffic. This is accomplished by activating what is called QoS - Quality of Service. To do this, you need a more expensive router than is typically found in homes or small offices. It's best to purchase one of the routers that your VoIP vendor recommends because they routinely recommend routers on which their service has already been successfully tested.

Again, please note that many of us use VoIP service without purchasing a special router. However, if there are a lot of PCs on your network working at the same time, or if just one PC often transmits and receives large files, you probably need QoS. Large files could be Email attachments, large kilobyte web pages or ftp transmissions. There is only so much capacity on your network. If most of the capacity is used by PC data, VoIP service will suffer

Another consideration for many routers is that typically your router is set for

DHCP, which means IP addresses are assigned to PCs and dtas dynamically. Many networks and router default settings are such that the router assigns an IP address for a specified period of time called the lease time. The default typically is something like 99 days. For a PC, this is no big deal. A new lease can be obtained simply by rebooting the PC. But, dtas are not rebooted often. The time will come when the dta and/or the router will have to be rebooted unless the router is set so that there is no lease expiration. Contact your router manufacturer for info on how to do this.

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