HOW BUSINESS CAN USE INTERNET TECHNOLOGY FOR VOICE COMMUNICATIONS

Businesses will find this booklet useful for learning how they can use Internet technology for voice communications and for clarifying the current available options. The booklet also provides guidance as to whether these options are right for your business and for getting started.

What is VoIP?

The technology that uses the Internet to make telephone calls is called Voice over Internet Protocol (VoIP). VoIP uses Internet technologies, instead of the traditional telephone networks, to transmit voice signals. In simpler terms, VoIP is phone service over the Internet. VoIP is also known as IP Telephony, Internet Telephony, Broadband Telephony, Broadband Phone, and Voice over Broadband.

How Does VoIP Work?

VoIP works like a conventional phone system from the user's point of view. You can make calls directly from a computer (using a microphone or headset), from a special VoIP phone, or from a traditional phone, connected to a special adapter. Your call is connected to the Internet through your traditional phone line (using special technology) or by cable or a wireless network.

If you use VoIP to speak with other VoIP users, then you do not need a service provider, only your Internet Service Provider (ISP). **However, if you want to make calls to other people or receive calls from people who have a traditional phone service, you will need a VoIP service provider (or "Public-Switched Telephone Network (PSTN) gateway services")**. VoIP service is generally cheaper than landline or cell phone services.

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VOIP EQUIPMENT

There are special adapters that allow you to use your traditional phone to make VoIP calls.

There are IP phones that can be attached to a modem or router that will let you make a call even when the computer is not switched on.

There are phones that can be used for both VoIP calls and phone calls that use the traditional telephone network.

The diagram below shows a possible communications pathway. VoIP users can make calls to people who have a traditional telephone service using a special phone adapter. Keep in mind that if you want to communicate with someone who doesn't have VoIP, you will require a VoIP service provider.

Is VoIP Right for My Business?

Review the following list to help you assess whether VoIP is right for you.

• My business regularly calls people (long distance) who have a broadband Internet connection.

• My business regularly makes international calls.

• My business regularly uses mobile cell phone services.

• My business regularly calls people (long distance) who have a broadband Internet connection.

• My employees travel a lot.

• My business operates from more than one site.

If you agreed with any of the above statements, consider comparing the costs of your present phone service with VoIP services. If you decide to go this route, you should also make sure you have a reliable Internet service. Think carefully about cancelling your traditional phone service entirely. Even if you decide to keep your traditional phone service and also use VoIP, you can still save money on phone services.

Possible Communications Pathways Using VoIP

Source: Adapted from Wikipedia (www.wikipedia.com)
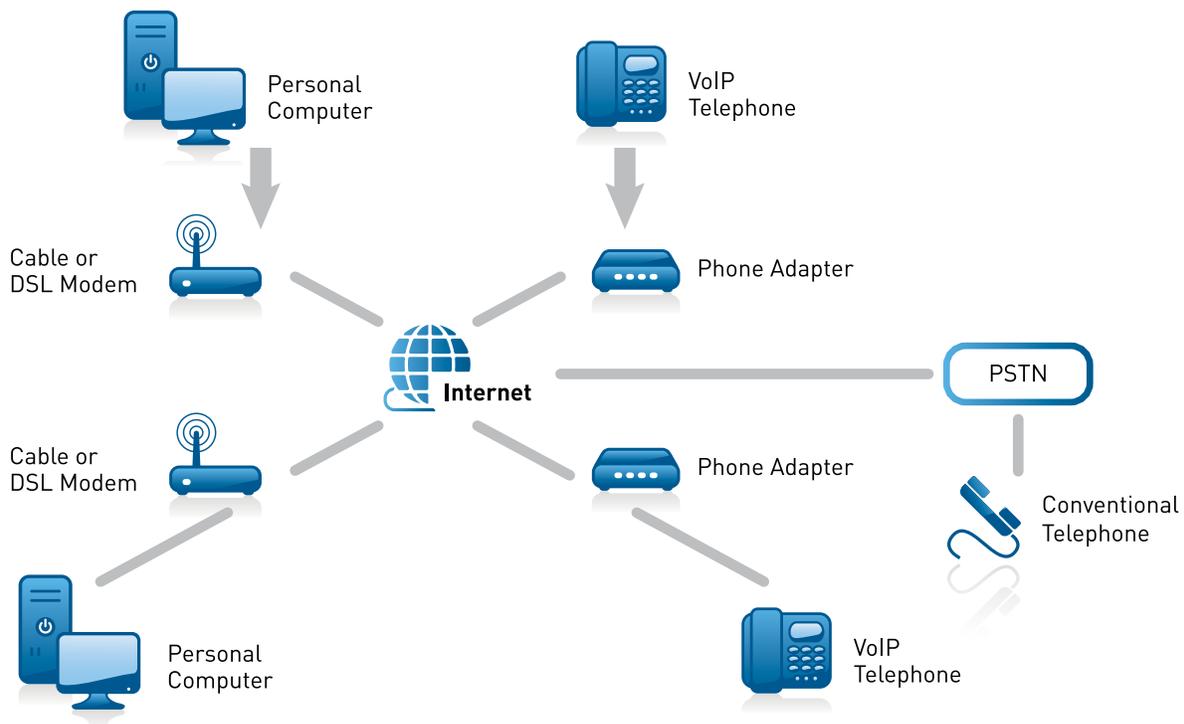
How Does VoIP Benefit Small Business?

1. It can save you money!

Low cost is one of VoIP's primary benefits. You can use the Internet network to carry both voice and data, eliminating the need for a dedicated phone line. If a business already has a high quality Internet connection and does not use all of its network capacity, then the business can carry VoIP at minimal cost. VoIP to VoIP phone calls are usually free, while VoIP to traditional telephone networks will have a cost to the VoIP user. VoIP can also deliver features (e.g. call forwarding, call waiting, voice mail, three way calling) at lower costs than traditional phone services.

VoIP can result in significant savings when your business has multiple locations. Even if your business operates from one location, if your customers or suppliers require long distance phone service, you can call them for free or at minimal cost.

> VoIP will likely be less expensive than traditional communication devices, but it's not free of charge. Installing a new VoIP system can require extra routers and switches and new cabling, depending on the size of your business (larger businesses will likely require equipment), as well as staff training.

2. It can provide you with a customized telecommunications package to meet your business needs without significant costs.

In addition to cost savings VoIP can provide businesses with greater flexibility. A telecommunications package can be customized to meet business needs without significant costs.

3. It can give you access to a variety of features and benefits that you might not get from a traditional telephone service.

Some of these features are listed below. They will enable you to:

- **Take your business number with you when you travel.** There are some things that VoIP offers that a traditional phone service does not. For example, incoming phone calls are automatically sent to your VoIP phone wherever you connect it to the Internet. This means that wherever you are people can call you (using the same phone number). This feature requires more specialized equipment and/or a hosted Private Branch Exchange (PBX) service.

- **Access your phone system from your desktop computer.** Most VoIP service providers allow you to access your phone system from your desktop computer when you are not near a handset.

- **Do Mobile Calling.** Employees can access VoIP from any place around the world that has a fast, stable Internet connection.

- **Send telephone messages and faxes to your e-mail inbox.** You can also choose to have your phone messages (and faxes) sent to your e-mail inbox as text messages.

- **Have Multiple Phone Numbers.** You can also opt to have several phone numbers in different countries. This way people in those countries can call you and avoid paying international phone rates.

4. It can provide greater flexibility for telecommuting.

VoIP is a tool that makes telecommuting easier for you and for your employees. Those working from home or on the road will still have access to calling features (like instant messaging and long distance calling) as long as they have an Internet network they can connect to. This provides greater flexibility for employees to work easily from various locations.

5. It can provide your business with a more integrated communication system

VoIP can help integrate the communication systems your business uses. Many cloud-based VoIP service providers offer a combination of features such as phoning, messaging, conferencing, and video from any location. This results in simplified maintenance and support and easy expansion of services through a single vendor. In addition, a cloud-based VoIP system could also provide data on your business' communication records, which could contribute to your customer relationship management strategy.

Limitations of VoIP

Despite the significant benefits of VoIP, it is important to be aware of its limitations. Make sure you think carefully about the options and features provided by your service provider. Many of these limitations can be addressed through specialized technology or through additional features offered through a service provider.

1. Strain on Internal Network

You have to consider whether your Internet connection can handle both your data and Internet phone calls. If you receive a lot of VoIP calls it can hamper your ability to receive e-mails or use the Internet. There is technology available that ensures that VoIP calls are given higher priority than e-mail traffic so that you can receive your calls immediately.

2. Potential Sound Quality Problems

With VoIP, there is the possibility you will experience poor quality calls compared to your traditional phone service. Problems such as breaks in the connection, transmission delays and voice drop out may occur, especially when transmitting over the public Internet. You should also keep in mind that in the event of a power outage some VoIP services will not work and the service provider may not offer backup power.

SOUND QUALITY

If you have a high speed broadband Internet connection, you should find that the sound quality is acceptable. If you have a fairly slow broadband connection, try to minimize other Internet related activities (e.g. downloading) while making a VoIP call.

There are a number of VoIP service providers that provide online tests for the quality of your Internet connection. Just go to a search engine and type in *Internet Speed Test VoIP* to find a list of online tests.

Poor sound quality may be caused by your equipment, such as your headset, VoIP phone, or router. Make sure to read reviews and forums about the product's quality before you invest in it.

The problem may also reside with the service provider. If this is the case, you may need to contact them about the quality of service you are experiencing.

3. Access to Emergency and Information Services

Not all VoIP services connect directly to emergency services through 9-1-1. Some VoIP providers may not offer directory assistance or white page listings. Check the services and features offered by a service provider. Also note there are some instances where access to emergency services is unreliable. You may want to consider a backup standard phone line to use in emergencies. Caller ID information from VoIP phones may also be unreliable.

4. Lack of Consumer Protection Measures

There is no legal requirement for a VoIP provider to correct a faulty VoIP service, nor is there an obligatory time period in which a fault must be repaired. Likewise, there is no compensation made available if a faulty service is not repaired within a reasonable time. You should also consider that if VoIP services are subject to increased regulation, this could add costs to VoIP in the future.

5. Security Issues

VoIP does not have the same level of security as compared to the traditional phone system. Key areas that need protection are transfer of confidential or personal information and financial transactions.

SECURITY MEASURES

There are security measures that can be taken to enhance protection such as locking up equipment, using and changing passwords frequently, using anti-virus software, intrusion detection systems, firewalls, encryption software/protocols, and consulting a security expert.

What Do I Need to Get Started?

Basic VoIP Requirements to Get Started

- A computer.

- A broadband Internet connection. If you are a larger enterprise or you anticipate a lot of calls you may want to use a T1 Internet connection. One guideline is to have enough capacity for about one third of your employees. If you have 60 employees, you should have capacity to allow 20 of them to be on the phone at any one time.

- Phone or messaging software. There are free downloadable software packages from Skype or Asterisk.

- Microphone and headphones (or speakers) or a headset that lets you keep your hands free while you talk.

- Special software or equipment if you want to use existing phone equipment and traditional telephone connections with VoIP.

What Are My Options for Services?

There are two options for VoIP services that are most applicable to small businesses.

Option 1 (Hosted Service)

The first service option is a hosted service—the equipment and management of the service is hosted by a VoIP Service Provider. This is the solution chosen by most small business. With Option 1, you are basically outsourcing your voice services—like you do with a traditional telephone. You do not have to spend extra time maintaining this system. This Option is the more expensive of the two options, but it is usually less expensive than a traditional telephone service. For the extra investment, you are likely to receive better quality calls, constant service (i.e. service that doesn't stop if you turn your computer off, or if your VoIP software isn't open and running), and the feel of using a traditional telephone.

Option 2 (Business Manages VoIP)

With Option 2, you will need to manage your own service—including buying the necessary equipment and deciding which software to use. The Internet Service Provider supplies the connection. This Option is generally less expensive than Option 1. For the lower price, you will need to accept some of the limitations of VoIP, described above. If you are considering this Option, you should ensure that you have someone on hand who has sufficient technological expertise.

SELECTING A VOIP SERVICE PROVIDER

If you chose a hosted service here are some things to consider:

- Procedures for handling and locating emergency calls.

- The degree of technical support and level of service provided.

- Avoid long-term plans or plans with no expiry date.

- Whether there is a clear explanation of service features and costs.

- Whether the features offered meet your business needs.

- The service plan details, charges, costs and payment options.

- Whether the service provider uses standards-based protocols and open-development environments, which allows you the flexibility to develop and add new features over time.

Options Summary

OPTION 1 (HOSTED)

Price	Quality of Service	Business's Time Required to Maintain System
More expensive	High	Low

OPTION 2 (MANAGE YOUR OWN SERVICE)

Price	Quality of Service	Business's Time Required to Maintain System
Less expensive	Depends on user setup, location and devices used	High

What VoIP Features Will I Need?

You will likely need the same features you currently have via your regular phone service: extension dialing, an auto attendant to answer the phone and route calls to extensions, voice-mail boxes and audio conferencing (under 10 people). These are generally part of most small-business VoIP packages. For features such as voicemail and audio conferences that include more than 10 people you may consider adding more advanced features.

VoIP Service Basic Features

Many VoIP providers supply traditional features such as:

- Three way calling
- Call waiting
- Caller ID
- Forwarding a call
- Dial repeating
- Returning last call

More Advanced Features

VoIP can offer more advanced features through specialized equipment or through service providers. These features are associated with increased costs (although they still may be cheaper than traditional landline or cell phones). Examples of more advanced features include:

- Conference calling – more than ten people.
- Handling of e-mail, fax and voice with specialized software.
- Call queuing – the ability to put calls into queues to be answered in turn by groups of operators or by designated extensions.
- Call centre functions – features that can help a business operate a call centre.
- Find/follow features – can automatically reroute calls to employees wherever they are located, including mobile numbers.
- Remote office features – to support satellite offices – to operate as a distinct entity or as part of the main office.
- Handling of toll-free lines (some service providers offer this feature).
- Special phones that allow you to make cell phone calls as well as VoIP calls by connecting to a Wi-Fi (wireless) access point. This has potential for reducing your cell phone bill when you travel as you can use this phone over a hotel or airport wireless network.
- With special equipment, you can make VoIP calls on your mobile computer (Wi-Fi enabled) or smart phone (connected to a 3G cellular network).

Future Trends

With the added features available and significant cost-savings, many businesses are making the transition to VoIP from traditional telephone networks. These businesses also now have the option of choosing a cloud-based VoIP system, where the only equipment on site is the phones - the rest is run from the service provider's facilities. Compared to premise-based VoIP, where all the equipment resides and is only accessible at the user's office location, cloud-based VoIP provides businesses with the advantage of having access to calling features from any location with an Internet connection. For example, through cloud-based VoIP users may send and receive calls and text messages, check voice mail, conference, and access a web-based dashboard which lets them view others on the system and transfer calls.

In addition, with increased investment in VoIP by businesses, there will be even stronger emphasis in the future on protecting against security issues, such as eavesdropping and phishing. While traditional phone lines are vulnerable to security threats, VoIP calls are even less secure because they encompass all of the existing security issues associated with both the Internet and personal computers. Some VoIP service providers such as Skype have taken steps to encrypt their calls to decrease the chances of interception, but others such as Google Voice have not implemented these measures. As VoIP becomes more widely used in the future, greater advances in technology to respond to security threats are anticipated.

Lastly, many businesses are moving toward Unified Communications (UC), in which integrated messaging, conferencing, video, location and IP telephones are provided by the same supplier.

Sources: http://www.resourcenation.com/blog/ is-it-time-to-move-your-phone-system-into-the-cloud/35230/, http://www.pcworld.com/article/221118/is_void_secure.html

Related Topics Covered in Other Booklets

- *Open Source Software*

- *Customer Relationship Management*

- *Cloud Computing*

To view or download these booklets visit ontario.ca/ebusiness.

Glossary – Key Terms Related to VoIP

Cable modem: A device used to connect a computer to a cable television service for Internet access.

DSL (Digital Subscriber Line) modem: A device to connect a computer to a telephone company DSL service for Internet access.

Firewall: A set of related programs, usually located at the network's gateway that protects a private network's resources from external users.

Gateway: A network interface that converts calls in real time from a public-switched telephone network (PSTN) to data on an IP network.

H.323: An international standard for real-time voice, video and data communication over packet-based networks, including the Internet.

IP (Internet Protocol): The network layer protocol in the TCP (Transmission Control Protocol)/IP communications protocol suite that forms the foundation of the Internet and intranets.

PBX (Private Branch Exchange): PBX is a commonly used term for a private branch exchange – a telephone exchange system that serves one business. This switching system interconnects telephone extensions to each other as well as to the public-switched telephone network (PSTN).

Phishing: Sending an e-mail to a user and falsely claiming to be a legitimate enterprise in an attempt to scam the user into divulging private information that will be used for identity theft.

POTS (Plain Old Telephone Service): A term which describes the voice-grade telephone service for basic residential and small business service connection to the public switched telephone network.

PSTN: Public-Switched Telephone Network. The traditional phone network.

QoS (Quality of Service): A measure of the ability of a network (including applications, hosts, and infrastructure devices) to deliver traffic with minimum delay and maximum availability.

VoIP (Voice over Internet Protocol): A term for the family of technologies that use the Internet Protocol's packet-switched connections to exchange voice, fax, and other forms of communication that have traditionally been carried over the traditional telephone network.

SIP (Session Initiation Protocol): A protocol that provides telephony services similar to H.323, but is less complex and requires fewer resources.

Softswitch: A programmable network switch that can process signaling for all types of packet protocols, including IP.

VPN (Virtual Private Network): Often used by companies to create WANs (Wide Area Networks) that cover large geographic areas. VPNs let IP packets travel securely over a public IP network by encrypting all traffic from one network to another.

WAN (Wide Area Network): A network that covers a wide geographic region, such as a state or country.

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