This paper discusses the advantages and disadvantages of using VoIP services, focusing primarily on security issues that may affect those who are new to VoIP.

What is VoIP?

Voice over Internet Protocol (VoIP) is a form of communication that allows you to make phone calls over a broadband internet connection instead of typical analog telephone lines. Basic VoIP access usually allows you to call others who are also receiving calls over the internet. Interconnected VoIP services also allow you to make and receive calls to and from traditional landline numbers, usually for a service fee. Some VoIP services require a computer or a dedicated VoIP phone, while others allow you to use your landline phone to place VoIP calls through a special adapter.

VoIP is becoming an attractive communications option for consumers. Given the trend towards lower fees for basic broadband service and the brisk adoption of even faster internet offerings, VoIP usage should only gain popularity with time. However, as VoIP usage increases, so will the potential threats to the typical user. While VoIP vulnerabilities are typically similar to the ones users face on the internet, new threats, scams, and attacks unique to IP telephony are now emerging.

VoIP configurations

Dedicated routers

These devices allow you to use your traditional phone to place VoIP calls. They are connected to cable/DSL modems (or any high-speed internet source) and allow you to attach an ordinary telephone. Once configured, and with an appropriate VoIP provider and service plan, these devices require no special software or interaction with a computer. In fact, you only need to pick up your phone and dial a number at the dial tone. You also may bring your adapter with you when you travel and make calls wherever broadband internet access is available.
Adapters (USB)
These devices also allow you to use a traditional phone to place VoIP calls. They usually come in the form of USB adapters that are slightly larger than the typical thumb drive. They feature a standard modular phone jack to which you can attach an ordinary phone line. Once connected, your phone behaves as if it were connected to standard phone service. Behind the scenes, however, the included software is actually setting up a VoIP call.

Software-controlled VoIP applications: “softphones”
There are many software applications (“softphones”) that allow you to place VoIP phone calls directly from an ordinary computer with a headset, microphone, and sound card. Internet telephony service providers usually give away their softphones but require that you use their service. Together, these applications and services enable users to talk to other people using the same service at no cost, and to the rest of the world for a fee. Software-based VoIP applications are quite attractive to consumers because they often already have most of the components necessary to get started at little to no cost.

Dedicated VoIP phones
A VoIP phone looks like an ordinary corded or cordless telephone, but it connects directly to a computer network rather than a traditional phone line. A dedicated VoIP phone may consist of a phone and base station that connects to the internet or it may also operate on a local wireless network. Like the VoIP adapters mentioned above, dedicated VoIP phones also require a provider and service plan.

Requirements, Availability, and Service Limitations
When considering VoIP service, you should not assume that its features, functionality, and options will equal those of traditional landlines; you should be familiar with the requirements, availability, and possible service limitations of VoIP service before switching to VoIP as either a primary means of communication or an enhancement to your current services.

Requirements
VoIP requires a connection to the Internet through an ISP, a VoIP service to extend the reach to traditional landlines, and VoIP software to actually place calls. Plain Old Telephone Service (POTS) requires none of these prerequisites. It is important to note that Digital Subscriber Line (DSL) internet service uses traditional phone lines for your internet connection; in this case, you already have telephone service to begin with. You may wish to weigh the expected benefits of VoIP against these costs given your current operating environment.
**Availability due to power outages**

During a typical power outage, VoIP becomes unavailable because VoIP devices (computers, routers, adapters) usually rely on a power source to function. Traditional phone lines are usually still available during such an outage, which is a major advantage in an emergency. Ultimately, it may be necessary to use an uninterruptible power supply (UPS) with a VoIP installation if connectivity is desired during a power outage or some other kind of emergency.

**Availability due to bandwidth**

VoIP communication nearly always requires a high-speed (broadband) internet connection for reliable functionality. Even given typical broadband connection speeds, though, service interruptions or degradation of quality is possible due to high internet traffic. For example, if you are trying to place a VoIP call while other people are using a lot of bandwidth on the same internet connection, the sound quality of your VoIP call or general VoIP availability may be affected.

**911 services**

911 services are not guaranteed with a basic (VoIP to VoIP) setup. However, it is available with many of the interconnected services that extend VoIP connectivity to traditional landlines. You should not assume that 911 services are present and working (even with interconnected VoIP services) but should consult with the terms of your service agreement. The FCC has described some of the challenges of VoIP services and has provided tips for VoIP subscribers. For more information, visit: [http://www.fcc.gov/cgb/consumerfacts/voip911.html](http://www.fcc.gov/cgb/consumerfacts/voip911.html).

**Threats / Risks**

Many of the threats associated with VoIP are similar to the threats inherent to any internet application. Internet users are already familiar with the nuisance of email abuse in the form of spam and phishing attempts. VoIP opens yet another pathway for these annoyances, which can lead to spam over internet telephony (SPIT), spoofing, and identity theft. Additionally, the confidentiality of VoIP conversations themselves has come into question, depending on service type or VoIP configuration.

**Spam over internet telephony (SPIT)**

As VoIP usage increases, so will the pesky marketing strategies associated with it. Perennial annoyances like telemarketing and spam have been plaguing consumers and internet users for years. A new sort of hybrid of these two concepts is SPIT, or spam over internet telephony. Like email spamming, sending commercial messages via VoIP is fast and cheap. Unlike traditional telemarketing, though, VoIP offers the potential for large volumes of unsolicited calls, due to the wide array of tools already available to attackers on the internet. Telemarketers could easily send
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