

# A Businessperson's Introduction to VoIP

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## Introduction

Voice over Internet protocol (VoIP) is the new darling of the communications world. It is being touted by service providers and manufactures alike. The supporters of VoIP are making extravagant claims of its cost savings and other benefits, while its detractors will claim it is unreliable and has poor quality. The purpose of this white paper is to explain what VoIP is; the benefits and risks of adopting VoIP into your business and how the migration toward VoIP may affect your business.

## Why should a business understand VoIP?

There are two major reasons why a business needs to understand the implications of VoIP

- I. VoIP offers immediate cost savings and productivity enhancements.
- II. The vast majority of new communications products and services are being designed for VoIP. The major equipment and service providers are driving this process. Within two years it will be virtually impossible to implement anything but VoIP based communications networks.

It is important to understand the implications of VoIP on business communications to properly prepare your business for the future.

## Historical Trends

Traditionally a business would have two communications networks. One network was for phones and another network for computers. Each network ran on its own set of cables, used different hardware, often was managed by different personnel and was connected to the outside world by different networks.

Since the early 1980s manufacturers have been trying to integrate the two networks. They wanted to integrate the networks for easier network management, to lower costs and to make it less expensive to add applications to a client's business. In addition, manufacturers believed this integration would make it easier for them to sell more equipment.

Originally, manufactures tried to use the Digital PBX to integrate Voice and Data. However, the introduction of lower cost and higher speed Ethernet based data communications stopped this trend. This created the

situation where you have office PCs communicating through switches, hubs and routers, while voice communications used the PBX or Key system.

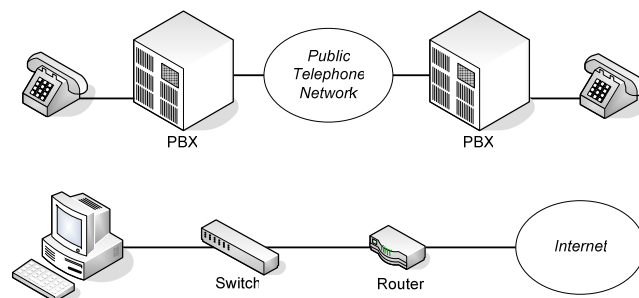
The rapid rise of the Internet helped accelerate the development of VoIP. As the Internet became more important companies needed better Internet connections. Therefore companies began to add high speed connections such as DSL and T1 to their network. At the same time Service Providers began to add large amounts of Internet capacity to their networks. New and improved technology made it easier and more cost effective to expand the capacity of the Internet.

Companies that wanted to take advantage of Internet opportunities needed two external network connections. They had their voice communications network connections such as T1 and PRI and they had their high speed Internet connection. This increased cost and made network management more complex. Service providers and traditional communications providers were faced with a similar situation on a much larger scale. Voice over Internet Protocol (VoIP) offers a solution to this problem.

## What is VoIP?

A traditional non VoIP system uses circuit switching to complete a call. Circuit switching creates a dedicated path known as a circuit between the caller and the called party. No one else can use this circuit for the duration of the call.

A good example is a call from an office phone system to another location. The caller dials a number and the office phone system creates a path from the phone through the office phone system to a line connected to the system. The call is then sent via this line to the phone company who completes the call. The phone company creates a dedicated path for this call through its network.



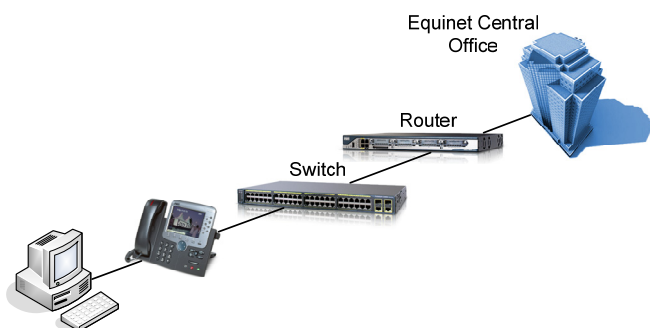
### **Traditional Telephony Network**

Most traditional phone calls are eventually converted from analog to digital. Analog is the natural state of your voice when you are talking. The first phone networks were analog. An example of an analog connection is your home phone line. As technology

evolved the analog phone calls where converted to a digital format for more efficient transmission. Most office phone systems are digital and eventually most phone calls are converted to digital during some phase of their transmission.

VoIP calls are digital. Uncompressed VoIP calls are sent in a 64kbs digital format. This is the same rate used by traditional digital telephony. The sound of a VoIP call and a traditional call in a pure environment is exactly the same. **The main difference between a VoIP and a traditional call is its method of transmission.**

VoIP is packet switched. This is the same transmission method used by your computers to communicate on your local area network and across the Internet. The voice conversation is broken into packets and then given the destination address of the called party's phone. The data network then uses the same routers and data switched used by your computer to send the call to the correct phone. There is no dedicated path to the called phone. The same network is used by the voice and data.



### **Packet Switched Network**

The difference in transmission gives VoIP an advantage over traditional telephony. The voice is virtually identical. However traditional calling creates a dedicated circuit between caller and the called party. VoIP shares the same path as your data. **It is difficult to impossible to use a traditional voice network to send high speed data. A VoIP call can use the same circuit as your high speed data. Therefore you can integrate the two networks and create a more efficient communications network.**

### **VOIP Design Issues**

A VoIP network can have excellent quality. However, it takes planning to ensure quality. Voice communication is more sensitive to delay, inconsistent timing and packet loss than most data traffic. For example, if two computers are communicating over a network they can adjust to delays in packet transmission, use higher-level protocols to sequence packets, request retransmission of lost packets, and use error correction to resend corrupt packets. These techniques are not

effective in correcting voice quality. Networks that converge voice and data must be designed to insure the efficient movement of voice packets through the network.

VOIP has implications for network security policy. Nat servers and Firewalls create difficulty for VOIP gateways and endpoints. In addition, a network virus can severely deteriorate VOIP transmission

If these design issues are properly addressed the network will function very well. To see how Equivoice addresses these issues please visit <http://www.equivoice.com/techequivoiceinfra.htm>

### **Benefits of VoIP and IP Telephony**

The benefits of VoIP are being enjoyed by business with as few as five phones and multinational corporations with thousands of phones. These benefits include:

- I. The telephone and the computer can use the same cable and data switch port. This saves money on wiring and management.
- II. A Business can use its Internet T1 for voice and data. This reduces network costs.
- III. It enables employees who work from home to have an extension off of the office phone system.
- IV. It enables multi location businesses to create a unified communication system with unified messaging. This includes centralized attendants, extension to extension dialing, call transfer between sites and extension mobility.
- V. It increases your network reliability by enabling businesses to use DSL and other alternatives to back up their communications network.
- VI. VoIP enables the easy introduction of Call Centers, CRM, Unified Messaging and other advanced applications.

#### Summary

VoIP is becoming the standard for voice communications. Within five years the majority of business voice communications will utilize VoIP. If properly implemented, VoIP can reduce communications costs and improve productivity.

#### About Equivoice

Equivoice has been implementing and managing VoIP networks since 1998. For more information about Equivoice and its offerings, please visit [www.equivoice.com](http://www.equivoice.com).