

One Ringy Dingy!

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One of my favorite characters from the 1960s *Laugh In* television show was the telephone operator Ernestine created by Lilly Tomlin. Playing the role of an AT&T operator sitting in front of an old-fashioned PBX, she would make, receive, and connect calls by using patch chords and dialing her rotary phone. Telephone communication has changed dramatically since then, and the PBX is no exception!

Phone systems used by churches and ministries come in all sizes and prices! There are many worthwhile options; in this article we'll look at phone system features and options to help prepare you for identifying the system that's right for you and your church.

Phone System Categories

Most phone systems fall into one of three categories. The telephone industry has a lot of acronyms and terms, and being familiar with them is important when looking for a new phone system (see the accompanying sidebar *Phone System Glossary of Terms*).

- **Key System:** Also called Key Telephone Systems (or KTS), these are often the systems of choice for small businesses with ten-to-forty employees. The Key Service Unit, or KSU, is 'the brain' of a Key Telephone System. Each phone has buttons corresponding to the lines available, and a user selects an open line by pressing an unlit button on their phone and dialing. Some Key Systems hallmarks are their feature sets and their less-than-PBX price.
- **KSU-less System:** These phone systems are similar to Key Systems, but don't require a KSU. The software that supports the extensions (sixteen seems to be the typical maximum) is built into the phones, making this a good starting point for offices with less than ten employees. The low cost of these systems is the major driving factor for KSU-less Systems.
- **PBX:** The technology that manages a phone system is called an *exchange*. A PBX, or *Private Branch Exchange*, is an exchange that is located and run at a business' location rather than at a local phone company. If it is located and run at a local phone company or service provider, it is a Centrex. PBX systems are especially important for organizations with more than forty employees, but are often advantageous in smaller ones too because of their expanded feature set.

What Is VoIP?

VoIP, or *Voice over IP*, is the technology that changes voice streams into small pieces and then groups them together in packets to be sent over an IP network, like a data network or the Internet.

VoIP is a term that is often used in two different ways:

1. VoIP phone *systems*, and
2. VoIP phone *service*.

VoIP phone *service* is the way a home or business connects to the outside world (vs traditional phone service) and is often marketed as a way to save on monthly fees; VoIP phone *systems* are PBX systems that businesses install for their internal use. A VoIP phone system may or may not connect to the outside world via VoIP phone service. Some of the hallmarks of VoIP phone systems include lower cost, rich feature sets, and high quality.

Why Consider a VoIP Phone System?

VoIP phone systems have some compelling features. Some that churches like are:

- **Auto Attendant.** An automated receptionist that greets callers and helps route their calls. This helps make the office team more efficient because those who would normally answer and route calls can instead spend their work time accomplishing tasks.

Helpful Hint: Some churches that want to have a 'real person' answer the phones use the auto attendant only after the call rings a specified number of times so no one is left hanging, so to speak.

- **Computer - Telephone Integration.** Some VoIP phone systems can bridge to your database or email address book to bring up the record of the person calling in based on their Caller ID.
- **Follow-Me.** A feature allowing your calls to be routed to other phone numbers after a set number of unanswered rings. If you have a direct dial extension and your phone rings a preset number of times, it can automatically transfer the call to a number of your choosing.

- **Simplicity of adding and moving phones.** As staff changes desks, moving phones with a VoIP phone system is a simple setting, eliminating the need to call in a PBX vendor.
- **Low Cost.** Some VoIP phone systems are free or have very low-cost options. You may be able to use a simple PC or even a retired server for the phone system because they usually run on operating systems that require very little in hardware resources, like Linux. In addition, you can pick your handsets, making them vendor-independent and improving their affordability.
- **Remote Location IP Phones.** VoIP phone systems can also use phones that convert voice into discreet packets and send them over the Internet. These can be handsets that only need an Internet connection, WiFi phones, cell phones, or even software running on a computer (known as 'soft phones') and turn the computer into a phone. Team members working away from your campus with one of these phones connected to the Internet is just like an extension phone on your phone system!
- **Voicemail that can even interface with your email system.** Because the system is IP based, voicemails can be sent to your email account where you can listen to them by clicking on them.

Joel Lingenfelter, High Desert Church in Victorville, California's CFO & Technologist said, "We recently implemented an Asterisk phone system. It is simply outstanding, and was a fraction of the cost of our last phone system."

We installed an Asterisk VoIP phone system in our MBS offices recently and are very pleased with the feature set and the low cost of implementation.

Asterisk is a Digium product (www.digium.com) that comes in various flavors one that's free! Because it runs on Linux we were able to use a server we had retired (it is about six years old) as our Asterisk server. We were also able to use our existing analog phones (we had just recently bought them) and phone system cabling by buying some cards from Digium for the server. We decided to buy the version of Asterisk that came with technical support because we hadn't installed a phone system before. The total cost for our seven-phone office with one extension in another state was under \$1000.

Asterisk support was very helpful in helping us configure the system... the little we spent for the supported version was well worth it!

Cautions & Landmines

As a computer network engineering and support firm we get calls from churches about computer network slowness after installing their VoIP phone system. We strongly caution all to avoid running VoIP on your computer network to save money. There are two reasons:

1. Most who run phones and computers on the same network do so to save on cabling cost. Their plan is to plug their VoIP phone into the network, and the computer into the phone. But it will slow computer data down to the speed of the phone. Computers want to move data at 1000mbps (also known as gigabit), but most VoIP phones are only 10mbps or 100mbps.
2. If your network occasionally goes down or has issues, your phones will too.

There are compelling reasons to also consider VoIP phone service. When considering VoIP phone service, research how the provider connects endpoints. Make sure they are national in scope, have lots of redundancy built into their system, and are multihomed to multiple top-tier Internet backbones.

Phone system decisions can be daunting. High quality feature-rich phone systems don't have to be costly. As organizations tasked with good stewardship and with communicating the most important message in the world, having a good phone system can help!

Phone System Glossary of Terms

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The telephone industry has a lot of acronyms and terms, and being familiar with them is important when looking for a new phone system. Some of them are:

- **ACD:** Automatic Call Distribution routs an inbound call to the next available agent and can include on-hold messages with wait times.
- **CLI:** Caller Line Identity is the industry term for what most of us know as Caller ID.
- **Clipping:** When there is a loss of the end of words or phrases of one or both parties in a call.
- **Compression:** Technology that 'squeezes' data transmission by removing the transmission's unused or inefficient portions. Though there are lots of compression types; higher compression often means a loss of quality.
- **Dial Tone Delay:** A measurement in milliseconds of the time it takes to hear a dial tone when the phone is picked up.
- **Digital Transmission:** Voice transmission is converted to 1's and 0's. Its predecessor, analogue transmission, was a waveform that diminished over distance and needed to be amplified, and that amplification usually added background line noise. Digital transmission is cleaner and has less line noise.
- **DID:** Direct Inward Dialing allows inbound callers to dial a specific extension without human or automated intervention.
- **DTMF:** Dual-Tone Multi-Frequency is the term for what most of us know as Touch Tone Dialing.
- **Echo Canceller:** A device that eliminates echo caused by delays in transmission, an essential in VoIP.
- **Endpoint:** Any piece of equipment, like a telephone or fax machine, that sits on the end of a communication connection.
- **Frame Relay:** An inexpensive and efficient technique for transmitting data using a series of frames.
- **IP:** Internet Protocol is a multi-layered protocol used to transmit data over networks.
- **Packet Loss:** When some packets don't make it to their destination, it will sound like the person talking is missing parts of what they're saying; like they're cutting out.
- **IVR:** Interactive Voice Response is a technology that lets callers 'talk' to computers by saying their responses to a menu rather than keying in responses.
- **MOS:** Mean Opinion Score is a rating index reflecting the quality of human speech on a network.
- **POTS:** Plain Old Telephone System is the traditional phone system.
- **PSTN:** Public Switched Telephony Network is what most of us think of as the traditional phone network within a country that is not IP based.
- **QoS:** Quality of Service is the ability of a VoIP network to deliver calls with minimum delay and have maximum availability to network users.
- **Ring Group:** A group of extensions whose inbound calls all ring at once so that any available person in the group can answer.
- **Signaling:** The contents of a call that manage the setup of a call over a network. It would include the Touch Tone Dialing tones, for example, over a traditional phone network.
- **SIP:** Session Initiation Protocol is a text-based protocol that initiates, maintains, and terminates calls using multimedia streams like voice, data, and video. SIP is the protocol of preference in VoIP and in some mobile network operators.
- **VPN:** Virtual Private Networks use encryption technology to create a secure *virtually* private network over a publicly accessible network.

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