



EXTENDA'S GUIDE TO ORDERING TELEPHONE SERVICE

As recently as 1984, customers had one choice for telephone service: Ma Bell. They also had one choice for a telephone system, and one choice for how they received telephone service – standard copper telephone lines.

Fortunately, with successive waves of technological change and increased competition in the marketplace, the cost of making a phone call has plummeted. In addition, there are a number of ways to get telephone service using technologies that were not available only a few years ago.

The Basics

To make a telephone call, you need a telephone service provider. Usually, the telephone service provider will charge you monthly for the service, and charge you per call for using the service.

There are four main factors you need to consider when picking out telephone service:

- 1) What services are available in my area?
- 2) How many calls do I want to make AND receive at the same time?
- 3) Are my calls local to a few miles around my location, long distance within California, long distance outside of California, or international?
- 4) What services are available in my building?

Why are these factors important?

- 1) Some services are not available based on your local providers.
- 2) A phone line, channel, or trunk can only handle one call at a time. Knowing what your peak usage is going to be is important to sizing your order correctly.
- 3) Your carrier can customize your plan based on your calling patterns, and some types of services make certain calls for much less money than others.
- 4) Some buildings are not wired for some services, or are situated such that certain services such as satellite or wireless are going to provide inferior call quality.

Phone Lines

Traditional telephone lines (a.k.a. copper, PSTN or POTS lines) can typically be installed in a couple of weeks, but are the most expensive on a per line basis. Each line has a unique telephone number and can handle one call at a time. Lines can be put in what is called hunt or rotary by the phone company, so that if the first line is busy, the call automatically goes to the second line, or the third and so on. This lets you give out a single phone number instead of a dozen different numbers.

Nationally, the telephone carriers have gigantic fiber optic wires connecting all of their offices and international fiber optic links that let calls travel across the world. From your local carrier office, called a Central Office or CO, runs the local loop to your building, also known as the “last mile” of telephony. This consists of a copper wire from the CO to a spot on your property called alternatively the Minimum Point of Entry (MPOE, pronounced “em-poh”) or Demarcation Point (Dmarc, pronounced “dee-mark”).

In practice, most commercial buildings have a bundle of wires running to their office, so that adding new lines is as simple for the phone company as activating a new wire. The next step is tying in the lines, which is where your phone system (called CPE, or customer-premise equipment, by the phone company) is connected to the telephone lines so you can start to use them.

Ordering telephone lines requires just a few steps

- 1) Find out which carriers can provide service in your area. You are no longer forced to use either Verizon or AT&T, so be sure to give us a call if you want a few different quotes
- 2) Determine how many phone lines you will need. Be sure to count...
 - a. Voice lines – one per conversation outside of the office
 - b. Fax machines
 - c. Credit card machines
 - d. Alarm lines
 - e. Postage machines
- 3) Features you will need – businesses typically order caller ID and call forwarding
- 4) Rotary/Hunt – be sure to tell your carrier to put the telephone lines in rotary, so if one line is busy, the next call goes to your next telephone line



T1 Circuits

T1 circuits come in several flavors, the two most common being **PRI** and **integrated access**. A standard PRI lets you make or receive 23 calls at the same time on a single wire, so think of it as a 23-pack of telephone lines. The cost per line makes it so that organizations with as few as 10-12 telephone lines will find a PRI less expensive than traditional telephone lines. PRIs also let you have many more choices of providers, unlike regular phone lines. Like cell phones, PRIs typically include bundled minutes, and charge less per minute than telephone lines. PRIs also offer direct dial numbers, called DIDs. Unlike a traditional telephone line, with PRIs you can have one telephone number or 1,000 telephone numbers. Depending on your carrier, you may be able to get phone numbers from other area codes. DIDs give you much more flexibility, letting you give phone numbers to individual phones, departments, ad campaigns, and more.

Integrated Access circuits let you get both voice and data on a single circuit. Your internet bandwidth goes up and down based on how many calls are taking place at the same time. Otherwise, these circuits have the same features as a PRI.

T1 circuits are also available for just internet access, long distance only, or local call only. T1s can take anywhere from 2 to 8 weeks to be installed, with 4-6 weeks the most typical for PRIs.

Ordering T1 circuits requires just a few steps

- 1) Find out which carriers can provide service in your area. There are a lot of T1 carrier choices available.
- 2) Cost wise, if you have a need for as few as 10 lines, you should consider a PRI. Your phone system will be able to provide analog ports to connect fax machines, etc. With Integrated Access circuits, depending on the provider, you may still need traditional telephone lines in addition to the circuit.
- 3) Features you will need – businesses typically order caller ID and call forwarding
- 4) Rotary/Hunt – be sure to tell your carrier to put the telephone lines in rotary, so if one line is busy, the next call goes to your next telephone line
- 5) DIDs – when ordering DIDs, be sure to consider how many extensions you have, and if you are using desktop faxing, how many people need a personal fax account. You may also want to order DIDs for specific tenants, departments, ad campaigns or help lines.
- 6) Calling patterns – knowing who you call and how often will help you get a customized solution for your business, including prepaying for bundled minutes, low rates to specific countries, and low rates for inbound toll free calls



SIP Trunks

SIP Trunks, also called IP Trunks, send calls over an existing data circuit, such as DSL, cable or T1. These calls borrow some of your internet bandwidth to send phone calls to and from your office. They are priced per call, and not per line or circuit, but have the ability to use DIDs like a PRI. This is often the least expensive way to get dialtone and can be installed quickly – since the carrier is just assigning you an IP address, sometimes you can get new numbers the same day, or even get to try out the service for free for a limited amount of time. Quality can be great or terrible, depending on your network, provider and internet access. Since the calls are being sent over the internet, if you lose connection to the internet in your office, you will also lose your calls, so many customers keep a couple of traditional lines for backup with IP Trunks. Some telephone systems are not compatible with SIP trunks without a gateway, so be sure to ask.

There are four main ingredients for a successful SIP trunk implementation are:

- 1) **Good internet connection:** DSL, cable modem, and satellite internet are not ideal, because the bandwidth fluctuates throughout the day. T1, DS3, and fiber connections are best.
- 2) **SIP-aware firewall:** Firewalls even a couple of years old are going to try and block SIP traffic, so you need to make sure that you have a firewall that is recommended by your carrier
- 3) **VLAN tagging and speed:** Within your network, you need to have routers and switches that can create virtual networks, called VLANs, so that phone calls are given priority over other types of data, and your network needs to be fast enough to handle the increased load placed on it by voice traffic.
- 4) **SIP-enabled phone system or SIP Gateway:** Just because your phone system is old does not mean that you can't use SIP trunks. Gateways are available that convert SIP into telephone lines and T1s, so that we can trick a telephone system into thinking it is using older technology. However, you need line and circuit cards plus a Gateway, whereas a new telephone system with native SIP capabilities let you simply plug your phone system into your network.

SIP Trunks sounds like a lot of trouble.

In the hands of a trained professional, the installation and configuration is really not that bad. Often the benefits and reduced costs can offset the investment in new hardware.



Other VoIP Trunks

MagicJack, Vonage, Cable phone service, and Lingo are voice over IP solutions designed originally for the residential market. They have three great advantages:

- 1) **Analog handoff** – these services are designed to convert VoIP into analog, meaning you can plug your Vonage router into the internet on one end and your phone system on the other end. Your phone system will think it is using a traditional telephone line
- 2) **Cheap and Easy** – these services are inexpensive to order, and can be provisioned very quickly. Typically you order the box / jack / router and set everything up online
- 3) **Can use asymmetric internet** – these services will work with DSL and cable internet, although your mileage will vary based on the carrier and your connection quality

Of course, there are certain tradeoffs you may have to make

- 1) **Number Portability** – some services do not let you keep your telephone number when you cancel the service, which is a problem
- 2) **Echo** – echo is an inherent problem with conversion of IP to analog, because a device somewhere needs to convert data packets into a signal your ear can understand, and this causes a delay that results in what we hear as echo. With phone systems, there are sophisticated echo-cancellation devices that can correct for this internally, but with inexpensive VoIP trunks, the echo is occurring on the carrier end and can not be corrected for by the phone system.
- 3) **Unpredictable Quality** – While SIP trunks are marginally worse than traditional telephone lines and PRI, VoIP trunk quality will fluctuate with your internet connection.

Our recommendation for VoIP trunks is that they should not replace your telephone lines completely. You should at a minimum keep some traditional telephone lines for inbound calls and for your advertised numbers, and use your telephone system to route outbound calls to the VoIP trunks. We always recommend that you test out a line before you replace all of your services.