

SIP Trunking

Get Online with the Future of Voice Service Delivery

There is little doubt that SIP (Session Initiation Protocol) Trunking is the future of voice services delivery. Aging POTS systems, copper cable and TDM switches are rapidly being phased out as they deteriorate and are made obsolete by VoIP technology. Just as fiber-based service is increasingly being installed instead of copper cable where possible and economical, SIP Trunking is replacing traditional analog service. Number portability, cloud-based capabilities and cost-effectiveness make it a far more attractive option for voice services in many situations. However, it is important to be aware of the limitations and caveats associated with SIP Trunking that may not be readily apparent until you have done your due diligence. Potential concerns range from voice quality, latency and congestion to equipment compatibility and carrier issues. SIP Trunking is an excellent telecom solution if you know how to leverage the advantages and navigate the pitfalls.

What is SIP Trunking?

To be concise, SIP (Session Initiation Protocol) Trunking is an Internet-based version of POTS telephone service. It uses VoIP (voice over IP) to connect a business to the PSTN (public switched telephone network). Rather than relying on traditional TDM analog voice transmission, it employs much more powerful digital technology.

A key feature of SIP Trunking is that it uses cloud-based “soft switches,” like Metaswitch and BroadSoft, which reside on the carrier’s servers and are accessed via the Internet or private IP network. This eliminates the need for the older technology of carrier-grade phone switches that reside in the carrier’s central office, like the Lucent 5E and DMS 100. These devices are bulky, less efficient, much slower and limited in capabilities. In addition, they are physical pieces of equipment that are prone to deterioration over time, unlike digital soft switches.

SIP Trunking is also a single conduit for voice, data and multimedia that allows multiple signal types to travel over the same pipeline for more efficient use of resources. In addition, SIP Trunking can utilize fiber-based connections rather than copper, which has an array of benefits (refer to Grudi Associates’ article: [See the Light with Fiber-Based Telecom](#)).

SIP Trunking Features

The flexibility of IP connections enables SIP Trunking to offer a lengthy list of attractive features to most businesses. Every item is not necessarily available to every company, due to local capabilities and other limitations; however the overall service usually can enhance capabilities, add flexibility and reduce cost for many companies. Included are:

- PRI features of local phone service – businesses can access the same functionality as traditional PRI service:



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- Caller ID
- Direct Inward Dialing (DID) Numbers
- Dynamic Call Routing
- Concurrent Call Sessions – simultaneous inbound and outbound
- Numbers can usually be ported out of rate centers
- Numbers can easily be temporarily or permanently rerouted by the business to any other number on a real-time basis without having to call the carrier and wait in a long customer service queue
- Automatic Failover – Preprogrammed number rerouting can be arranged to automatically route calls in the event of an outage
- Accessible through any available Internet connection with adequate bandwidth and a static IP
- Auto-backup can occur for any standard line
- Scalable without additional hardware beyond an IP phone system
- Available over dedicated private IP network connections or public (best effort) Internet connections

Keep in mind that there are a few exceptions, which will be covered later.

SIP TRUNKING KEY BENEFITS

When evaluating whether to move to SIP Trunking, companies should consider these key benefits:

Number Portability – Utilizing SIP Trunking, with cloud-based soft switches, eliminates carrier restrictions that prevent porting of numbers to other

exchanges and rate centers. This offers extensive flexibility in routing calls to virtually any phone in any place without long distance charges (see limitation below), which increases efficiency, enhances capabilities and reduces costs. Just a few examples include:

- After hours customer service calls can be routed to different regions where staff members are still in the office.
- Calls can be easily routed to other phones (including cell numbers) in any place when someone is away from their desk, ensuring that issues are immediately handled.
- Customers can reach a company or individual by calling a local number even if they are across the country. This can build a local presence for little cost.
- When staff members are transferred, permanently or temporarily, they can keep their numbers, eliminating the time and confusion of notifying contacts.
- When outages and emergencies occur in one facility, numbers can seamlessly be ported to unaffected locations.

Management Flexibility – SIP Trunking makes real-time management of phone numbers extremely easy. A web-based portal enables businesses to instantly change where a number rings.

Single Voice & Data Connection – Voice and data can be simultaneously carried on the same Internet or private IP network connection, which adds efficiency,



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access capabilities and economy. It is important to be aware that high call traffic and inadequate bandwidth can compromise quality of service.

Fast, Economical Scalability – As business needs change, it is much faster, easier and more economical to scale up a SIP Trunking connection than PRI service. For example, to upgrade PRI service from beyond the 23 channel connection, an additional 23-channel connection must be physically run from the central office to the business and a new PRI card probably has to be installed in the phone system. This typically takes 45-60 days and can cost thousands of dollars. To do a comparable upgrade of a SIP Trunking connection, no new lines have to be run (if the Internet or private IP network connection has enough bandwidth), no new hardware is required and no carrier service personnel ever need to visit the premises. It can all be done remotely by the carrier, typically within 2-3 days for a fraction of the cost.

Multi-Site Connectivity – Because the soft switches and connections occur in the cloud, not through different telephone closets, all of a business's phones can connect through 4-digit dialing – whether they are in the same building or across the country (with minimal exceptions). A worker in Pennsylvania can even see if another in Seattle is on the phone, just as if they were in the office next door.

Long Distance Cost – A key benefit of SIP Trunking is that it typically has far lower long distance charges. VoIP service uses the Internet or private IP network to connect long distance calls, avoiding many carrier

fees. SIP Trunking providers' rate plans usually do charge for long distance, but it is often much less.

Backup & Business Continuity – SIP Trunking's cloud-based technology makes it possible and economical to instantaneously – and automatically – route calls to numbers in different facilities in the event of a catastrophic event or failure of service at a business location. This seamless backup provides business continuity for customers and staff. Whether a business uses SIP Trunking or traditional service, an optimal backup system should address true route diversity between the carrier's central office and the facility.

Route Diversity – SIP Trunking can be delivered over any public Internet or private IP network connection with adequate bandwidth. Multiple connections can provide different routes to achieve redundancy.

SIP TRUNKING LIMITATIONS

All of the benefits of SIP Trunking make it an attractive alternative for many businesses, but there are very important limitations and conditions that must be considered:

Quality of Service – Because SIP Trunking can be delivered using VoIP across the public Internet, there may be quality issues related to bandwidth and traffic congestion, from latency and ambient noise to echoes, jitter and post dial delay. While data transmissions can be forgiving for minor data loss, voice has little tolerance for interruption of packet flow. For maximum quality, a dedicated IP connection is best,



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though SIP Trunking can also be accessed by “Best Effort” delivery (see below). If guaranteed Quality of Service is required, a dedicated private IP connection should be specified in the planning and provision of SIP Trunking.

Reliability – While the reliability of SIP Trunking is excellent by most standards, it does not quite reach the 99.999% up time of traditional TDM service. The advanced, constantly progressing technology associated with VoIP delivery inherently has more issues than well-established, far simpler POTS systems.

Applications – Due to the somewhat lower reliability of SIP Trunking and its complex technology, there are some applications for which it is not recommended at this time. Specifically, alarms, FAX machines and postage meters may be better accommodated by traditional service. Also, for optimal reliability, redundant backup systems using different methods of deliver are best.

Equipment Interoperability – One of the biggest challenges with SIP Trunking is making sure that the

equipment provisioned is compatible with the carrier(s) that provide the service. Carriers will often state which phone systems they support, such as Cisco, Avaya, ShorTel, Allworx, etc. Make sure to verify your equipment is “certified” by your carrier before proceeding with installation.

Local Network Assessment – When installing SIP Trunking with a VoIP system, it is important to make sure the business’s existing local (internal) network has sufficient capacity to support IP telephony requirements. These can differ from data-only networks.

SIP TRUNKING BEST PRACTICES

When considering the implementation of SIP Trunking, the following issues should be addressed:

Delivery – There are two approaches to SIP Trunking delivery: Dedicated Delivery and Best Effort Delivery (BYOB – Bring Your Own Bandwidth). Dedicated Delivery utilizes a private IP connection, so the traffic never goes across the public Internet. Best Effort Delivery uses public Internet connections, like DSL and cable. Here is a brief comparison:

Consideration	Dedicated Delivery	Best Effort Delivery
Method	Private IP Connection	Public Internet
Recommended Uses	Enterprises, High Traffic	Small Offices, Low Traffic
QoS	Guaranteed QoS & CoS	Periodic Degraded Quality
Simultaneous Call Capacity	High	Limited
Service Level Agreement	Robust	Limited or None
Security	Very High, Not Public	Vulnerable to Internet Users
Cost	Higher Cost, Higher Q	Most Economical



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As is often the case, there is a tradeoff between quality and cost. Opting for Best Effort Delivery will save money, but quality and voice service will be vulnerable to high Internet traffic. Dedicated Delivery can provide guaranteed Quality of Service, but it will cost more. Designing and provisioning the right SIP Trunking system for the business is imperative. This is an area where it is well worth it to get outside, professional assistance.

Implementation – When moving to SIP Trunking, there are some key implementation considerations:

- Timing – consider SIP Trunking anytime, but especially when upgrading a phone system or moving to a new location.
- Availability – is service available in the areas where the company does business; are all the desired features and capabilities available?
- Bandwidth – enough to support business needs, without overspending.
- Handsets & Phone System – ensure they support the service being provisioned.
- Setup – plan number porting, automatic backups and other features,
- Carrier – traditional carriers (possibly more costly) or new competitors (lower cost, but possibly less dependable).
- Negotiation – getting the best rates and services for various carriers.
- Multiple Internet Connections – when using public Internet, provision two connections (one for voice and one for data) to optimize traffic flow and quality.

SUMMARY

The entire telecom industry is in the midst of a technology revolution, powered in large part by the Internet's ever-increasing capabilities and efficiencies. SIP Trunking is one piece of the puzzle, but an important one for businesses. Utilizing cloud-based technology and VoIP systems can provide high-value benefits that go right to the bottom line. SIP Trunking has its limitations, which must be thoroughly understood to avoid big pitfalls. It is important to do the background work first, or to retain the assistance of a well-qualified telecom expert, before making the transition. Begin now and get connected with the future.

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