

IT Manager's Guide to Converged Networks Through SIP Trunking

An Allstream White Paper

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Introduction

The convergence between voice and data networks in the modern business communication environment started almost a decade ago. At that time, the first enterprise grade VoIP systems were making their appearance on the market. Increased adoption of VoIP is a trend that continues today with more and more organizations taking advantage of the many benefits brought by that type of convergence. By deploying an IP PBX and possibly IP phones, businesses can integrate their internal voice and data traffic on a single network infrastructure, reduce cost, reduce complexity and, at the same time adopt new applications or business processes.

In recent years, the convergence trend has spread out to include the external communication links of an enterprise network. SIP Trunking (or IP Trunking as Allstream calls its product) is a method of connecting an internal telephony system to the outside world through data links using SIP (Session Initiation Protocol). The result is that voice traffic is now passed in and out of the enterprise on the same IP infrastructure as data, as opposed to the traditional PSTN connections such as analog, BRI or PRI links.

Moreover, an organization operating at multiple sites can consolidate all voice and data connectivity in one central location and connect through SIP trunks from that location to a Service Provider.

SIP Network Architecture

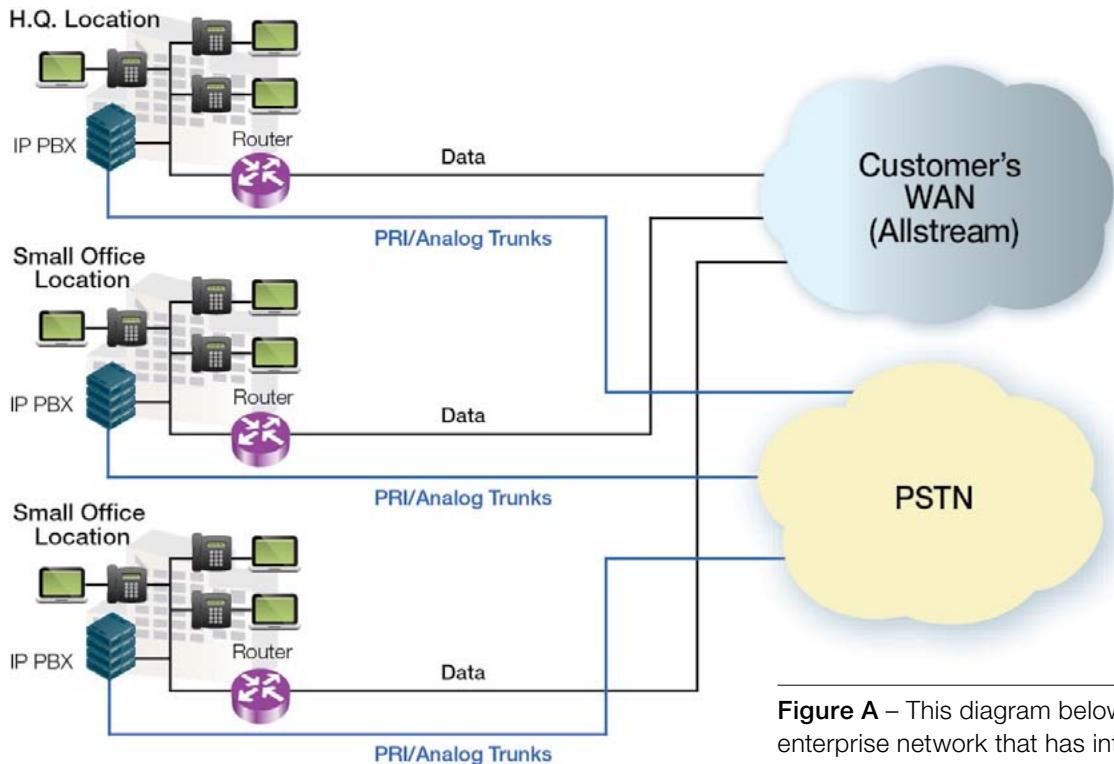


Figure A – This diagram below shows a multi-site enterprise network that has introduced IP PBX but has not yet applied convergence to its external connections.

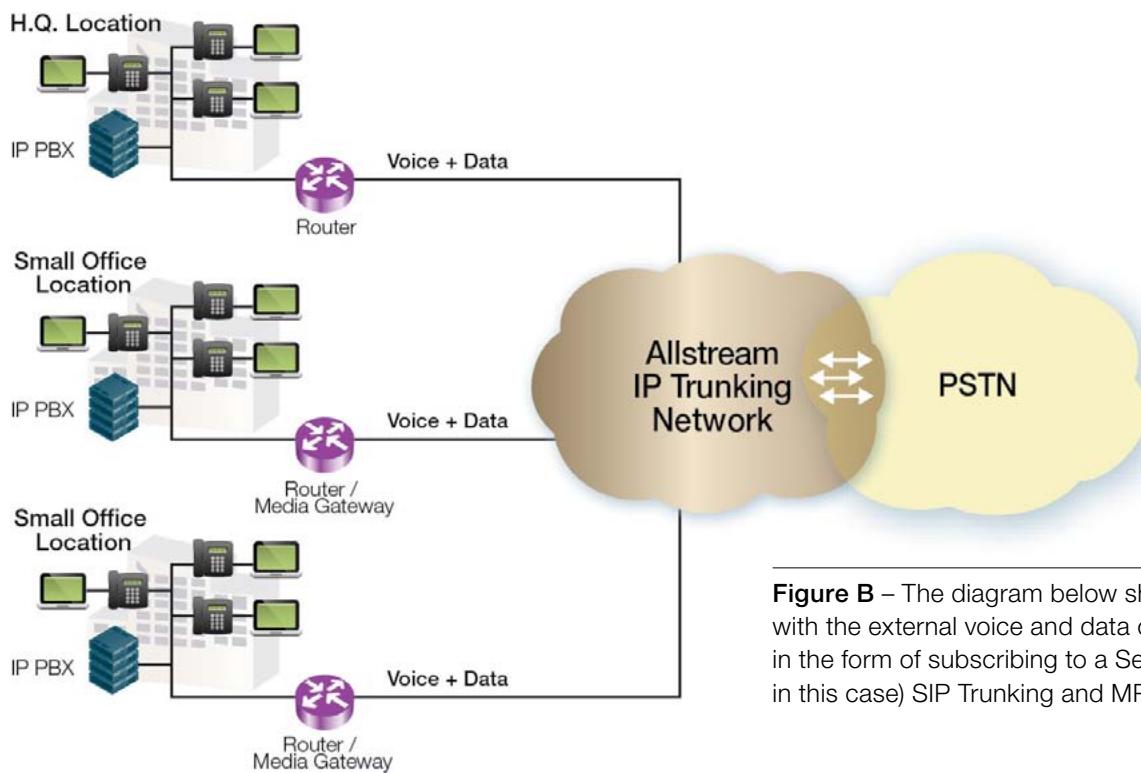


Figure B – The diagram below shows the same network with the external voice and data connections converged in the form of subscribing to a Service Provider (Allstream in this case) SIP Trunking and MPLS IP VPN service.

Benefits

The benefits of such SIP Trunking-based convergence can be truly dramatic. Here are only the most compelling gains:

- Savings of up 40% in communication expense due to the elimination of expensive PRI links and gateways that interface between the internal IP PBXs and PSTN links.
- All expensive trunk management and support is concentrated at the central location bringing extra savings and simplicity.
- Improved business continuity provisions by using the extra capacity of the data network in support of voice communications.
- Simple and inexpensive procedures to grow or downscale the network. SIP trunks can be added one channel at the time while traditional PRIs only in multiples of 23.
- Enhanced global presence through the ability to adopt phone numbers with area codes corresponding to any geographical location.
- Availability of SIP Trunking service and infrastructure facilitates deployment of productivity enhancing Unified Communications and Cloud Computing applications.

Challenges

To successfully bring those benefits to the organization, an IT or network manager has to consider several aspects that may significantly impact the adoption of SIP trunking.

1. Network readiness

Is the organization's data network ready to handle the increased traffic? Does it have the required bandwidth capacity? Now that the voice traffic will use the same links as the business applications data, the data "pipes" connected to the outside world will have to be reevaluated and, if necessary, augmented accordingly.

Fortunately, current data access technologies, in particular MPLS IP VPN, enable a cost effective and scalable solution to this type of problem. Subscribing to more MPLS capacity from a provider is easy and the cost is quite small when compared to the financial savings brought by convergence through SIP Trunking.

2. SIP Trunking Service certification

SIP Trunking services from many providers are not always certified with the most popular enterprise PBX systems. Not taking this aspect into account can lead to serious incompatibilities and/or limitations in functionality.

Service providers usually provide lists of certified PBXs, so it should be easy for a network manager to make sure that the organization's PBX is on the list. If unsure, it is a good idea to arrange for a compatibility test before signing up for the service.

3. PBX Interoperability

Organizations that operate more than one business location can benefit greatly from implementing SIP Trunking and consolidating all converged voice and data traffic in one main location. However, you need to make sure that the PBX systems at the various locations can communicate amongst themselves and ensure sufficient feature transparency between users connected to different PBXs.

The inter-PBX communication becomes easier if all PBXs support SIP connectivity on the trunk side or support QSIG a special protocol that facilitates feature transparency among PBXs. Most enterprise-grade PBXs today will have built in QSIG support.

4. Business Continuity

Since voice traffic in the SIP Trunking environment will be channeled on the data links, the availability of the data connection needs to be comparable to what the PSTN connection offered previously. This issue can be addressed by ensuring that the SLA offered by the service provider provides the desired high availability

5. Management and Demarcation

In the traditional PSTN connection model, the line of demarcation between the provider's network and the customer organization network is clear and easy to define. That clear demarcation becomes quite blurred in a SIP Trunking configuration. As a result there is a need from the beginning to agree on the responsibilities of both sides in regards to management, monitoring and troubleshooting the connection. Most organizations do not have the specialized personnel to perform all those tasks effectively in house.

The best solution is to engage with a provider that offers SIP Trunking packages that include management and monitoring. This ensures that the integrity and continuous operation of the network will be professionally maintained at all times.

6. Security

Introducing SIP Trunking can expose the enterprise phone system to IP-based attacks via the SIP trunk. To avoid such problems, it is recommended to install at the edge of the network a Session Border Controller (SBC). The SBC protects the network against Denial of Service (DoS) attacks and masks, from the outside world, the network's internal configuration. It also performs other important functions such as helping to mitigate Network Address Translation (NAT) problems and ensuring that each call is routed to its intended destination.

7. Geographical Availability

An organization seeking to implement SIP Trunking in a multi-site environment needs to make sure that SIP Trunking service is available in all geographical areas where its offices are located. Choosing a service provider that is national in scope and global in its reach is the best strategy to ensure that all offices will be equally served by the new service.

8. Signal Compression

The digitized voice signal traveling through data links can be compressed for the purpose of realizing maximum savings of the bandwidth required. G.729 is one of the most effective compressing algorithms available today. The uncompressed data encoding conforms to the G.711 standard. G.711 takes more bandwidths but it provides a better toll quality and is more compatible with special applications like FAX. When selecting a SIP Trunking provider, one needs to make sure that they offer both G.711 and G.729 encoding options.

9. Emergency 911 Services

Identifying the geographical location of a caller is more difficult with an IP call than in the old PSTN paradigm. As a result the provider needs to make special provisions for passing on a 911 call to the closest emergency service agencies. Selecting a provider who can properly direct 911 calls in both its geographical area and outside it is the best way to address this issue.

10. Training

Like any new service or technology adoption, smooth introduction of SIP Trunking depends on the availability of trained personnel to support the process. While a quality service provider can help install, manage and maintain the service, the network manager must ensure that the organization trains its personnel to fully understand the new technology and its impact on the rest of the network.

The list presented here contains the main aspects an IT or network manager must pay attention to as he or she implements SIP Trunking into a business network. There will certainly be other aspects that need consideration, aspects that are specific to a particular installation or set of requirements.

The central point to be emphasized again is that the benefits of converging voice and data through SIP Trunking far outweigh the possible challenges or expenses.

Guidance for ROI Calculations

A comprehensive ROI calculator is beyond the scope of this document. In particular, calculations of the “soft” benefits resulting from increased productivity, adoption of Unified Communications applications, simplified management, etc. are quite complex.

However, it is useful to mention here, in a simplified way, the essential elements that need to be examined when determining the dominant savings element: the impact of SIP Trunking on a company’s monthly communication bill.

As an example, a company still connecting its phone system to the external world through PSTN links needs to include in its ROI calculation:

- The total number of PRIs
- The monthly cost of a PRI
- The utilization rates of the PRI
- The number of monthly local minutes used
- The number of monthly LD minutes used
- The cost of a local minute
- The cost of an LD minute (average)
- The cost charged by the provider for each additional SIP Trunking channel
- The cost charged by the provider for units of extra data capacity (for example MPLS)
- The cost implications due to reduced number of IP-PBXes
- On-going operational cost reduction due to reduced man hours required for network management

Using those figures one can calculate:

- Current monthly communication cost (PSTN)
- The number of voice channels required
- The extra MPLS capacity required

Further calculations lead to:

- The monthly cost of SIP Trunking service
- The monthly cost of extra MPLS capacity required
- The future monthly communication cost (SIP Trunking + extra MPLS)

The difference between the current and the future monthly communication cost represents the net savings. Of course, a complete ROI calculation will have to also include, on the saving side, the removal of extra gateways and on the expense side the cost of the SBC (and possibly other items).

Once again a full-fledged ROI calculator is too complex task to be included in this document.

Conclusion

Data and Voice convergence through SIP Trunking is a networking solution that benefits enterprises by bringing them significant cost savings, flexibility, lower complexity, improved productivity and the opportunity of implementing advanced Unified Communications and Cloud based applications. Network and IT managers considering the adoption of this technology need to be aware of the challenges that are associated with a successful introduction of SIP Trunking in a business network environment.

All of those challenges can be addressed by widely available technologies and services. It is the achievable benefits that ultimately make the investment worthwhile.

About Allstream

Allstream is a leading national communications provider that works exclusively with businesses of all sizes.

An industry leader in delivering innovation, Allstream is focused on unifying and elevating all the ways that businesses connect and collaborate to serve customers, to drive workforce and partner productivity, and to get payback on networking and IT resources.

Headquartered in Toronto, Allstream leverages the entrepreneurial spirit and skills of 3,000 employees across Canada. Our portfolio features advanced capabilities including: network connectivity and infrastructure, managed network services, and unified communications solutions.

Our portfolio is provided across an extensive national broadband fibre optic network that spans some 30,000 km. We supply international connections through strategic partnerships and interconnection agreements.