



Connecting and leveraging VoIP islands

VoIP or IP networks were not meant to exist on an island connected to the mainland via the PSTN. The beauty and benefit of an IP network over traditional PSTN networks is that they can bypass the complexity and limits of the PSTN and connect directly to other, more efficient and technically superior networks – IP networks. Yet so many organizations continue to create VoIP islands within their networks, tragically hindering the benefits and value of a true peer-to-peer VoIP network.

Bringing together data, voice and multimedia services over an IP network from end to end translates to cost savings, improved quality, functions and network features. There are, however, challenges to skirting the PSTN altogether. In this series, you'll learn about the pitfalls of VoIP islands; the challenges associated with moving away from partial or total reliance on a PSTN; and ultimately how to get the most from your IP network.

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VoIP Islands – How did we get here?

This section is the first of a three-part series on the topic of “VoIP islands.” This series will focus on what the term means, how VoIP islands came into being and their implications for enterprise networks. Moving beyond this focus, the second segment will address the topic of how these islands can be connected and what this means for enterprises. Finally, the third article will examine the business case for bridging these islands, along with ROI scenarios that enterprises are achieving today.

To answer the question “how did we get here?” we must start with the initial transition from legacy telephony to IP telephony that began early in this decade. The concept of VoIP islands arose from the adoption of IP PBXs -- in either hybrid or all-IP form -- over TDM-based PBXs. Within the enterprise environment, typically the LAN, IP PBXs provided comparable functionality to legacy systems but with a lower price tag. This proposition was particularly attractive to midsized businesses or branch offices, which could not previously justify the capital expense of a legacy PBX but wanted more features than their existing key systems could provide.

This may have been a good idea within the enterprise, but each IP PBX deployment was essentially an island in that there was no practical way for them to connect directly to one another. The reason for this is quite simple -- at the time, IP PBXs were voice-centric systems, and vendors were concerned only with connecting them to the PSTN and not other IP PBXs. Telecom vendors were still using proprietary technologies and deployed various protocols to enable this connectivity -- primarily H.323, but also MGCP and H.248.

This was sufficient for enterprises because the vast majority of telecom networks were PSTN, so voice traffic needed to be converted to/from VoIP and TDM via a media gateway at the network edge. As a result, voice traffic may have been packetized inside the enterprise, but outside it was TDM, and the by-product was VoIP islands. It should be made clear that this outcome was for the convenience of the telecom vendor and not by the enterprise's design.

At the time, VoIP was not mature enough to displace TDM, so the path of least resistance was to use VoIP only inside the LAN and use the tried-and-true PSTN for as much of the transport as possible. Unfortunately, this kept the cost of telecom service -- especially trunking -- fairly high, but this was not the vendors' problem, and as long as the PBX was a voice-only system, they could still provide an attractive entree for enterprises to adopt IP telephony. In this scenario, enterprises could get PBX-caliber functionality at lower cost and maintain the reliability of PSTN service. The trade-off was having these islands of VoIP.

All of this changed with the advent of SIP (Session Initiation Protocol). While SIP has become the de facto standard for real-time IP communications, it was slow to gain acceptance and was initially deployed mainly for telephony. SIP is fundamentally different from the protocols cited earlier, as they were developed to facilitate the connection of IP telephony to the PSTN. After all, the PSTN will be with us for years to come, so the need for this is very real. In most cases, this conversion takes place in the enterprise's media gateway using these protocols, and everyone is happy. The enterprise gets more features for less money, the vendor sells more IP PBXs and media gateways, and the service provider maintains the status quo with high-margin POTS.

This model works well for everyday telephony, but with SIP, so much more is possible, and that is where VoIP islands become problematic. VoIP islands may advance the IP revolution by a few steps, but they offer only a Telecom 1.0-type solution, in that all enterprises are getting is a replication of PBX service at a lower cost. The real value that comes from SIP is to enable a broader vision of IP communications within which telephony is just one mode. IP PBXs can touch on this in a limited way, but with SIP, enterprise networks can deliver a much richer environment to end users, allowing us to seamlessly mix voice, data, chat, IM, video and so on.

Convergence is the term most often used here, whereby voice and data are combined onto a single IP network. This lays the foundation for a Telecom 2.0 evolution, where the role of protocols is not to connect IP PBXs to the PSTN, but rather to other IP networks. Clearly, this is not in the interest of incumbent telecoms, nor is it ideal for telecom vendors. On the other hand, this is good news for telecoms with IP-based networks, vendors building products around SIP and, of course, enterprises that see how SIP can help them leverage far more ROI from their IT budgets.

In the next part of this series, I'll explore these ideas further and explain why linking these islands will be better, not worse, for everyone here.

Linking VoIP islands – the value of SIP trunking

Section one of this series provided the background on VoIP islands and why they serve the interests of vendors and service providers better than those of the enterprises investing in IP. With SIP now being the standard for IP telephony, the opportunities really open up to bridge those islands and allow enterprises to get the full value from their IT investment.

This section focuses on how these islands can be connected and how -- with that -- enterprises can think beyond the voice-centric nature of their IP PBX and embrace the broader multimedia communications environment enabled by SIP. For enterprises that see their IP PBX only as a silo to provide telephony, VoIP islands are not really problematic; but for those who want the benefit of a more integrated communications solution, SIP trunking is the best path to follow.

SIP trunking has emerged in 2009 to help enterprises adopt convergence technologies and services. Enterprises are recognizing not only how these capabilities can make their business more efficient and their employees more productive but also how they can drive down the cost of communications.

Briefly, SIP trunking serves as a substitute for PRIs to provide connectivity, but over IP instead of the PSTN. SIP trunks are less expensive than T1s, and enterprises need fewer of them. In addition to saving money on trunking, telephony costs are reduced in many areas, most notably long-distance and toll charges. Another important benefit of SIP trunking is that it creates a direct IP connection between the IP PBX and the service provider, eliminating the need for a costly media gateway. Voice traffic enters and leaves the enterprise network as IP, and no TDM-IP conversion is required inside the network.

When service providers have this direct IP connection with the IP PBX, voice quality and reliability is on a par with TDM, and the benefits shift in favor of the enterprise. The onus of converting traffic now falls on the service provider because the conversion occurs in its network, and the enterprise gets the all-IP foundation upon which it can really start to take advantage of convergence-based communications.

This sounds almost too easy, but there are challenges involved with SIP trunking, not just within an enterprise network but in linking to other IP networks. The first is that IP networks and IP PBXs still need an intermediary device to be connected. Media gateways are not built for IP-to-IP, which is why they can be dispensed with here. The primary issue with IP-to-IP is network address translation (NAT) traversal, and the best solution is to deploy a SIP-aware firewall.

Conventional firewalls are very effective at managing data traffic -- but not voice, which is a real-time mode of communication. This is what a SIP-aware firewall does, effectively playing the role of a media gateway and allowing a clear IP connection between the carrier network and the IP PBX. The good news is that these firewalls are far less costly than media gateways, so economics should not be an impediment to adoption of SIP trunking. The best-known vendor of SIP-aware firewalls is Ingate, which -- along with others in this space -- is doing good work to educate the market about the value of SIP trunking.

On a broader scale, the SIP forum plays a vital industry-based role, not just to make SIP trunking work but ultimately to make it possible for VoIP islands to be connected. Even though SIP is a standards-based protocol, interoperability issues exist, although not to the extent found with legacy protocols. To address this, the forum leads various initiatives, most notably SIPconnect and SIPit.

The SIPconnect initiative is the forum's most important work, as it serves to develop interoperability guidelines between service providers and IP PBX vendors. The SIP Forum has recently added a certification program, SIPconnect Compliant, which serves as a seal of approval for those who successfully demonstrate interoperability. On a more granular level, the SIPit events are closed interoperability sessions where members can test with one another in a controlled environment.

Taken together, these activities make the SIP Forum central for linking islands of VoIP. They establish best practices for interoperability and strive to make SIP as plug-and-play as possible. This makes it easier, faster and less expensive not only to deploy SIP trunking with almost any IP PBX vendor but also to link the islands, which requires vendor-to-vendor interoperability. With all the major IP PBX vendors participating in the SIP Forum, the groundwork is now in place to make VoIP islands a thing of the past.

Show me the money – the ROI for SIP trunking

In the final segment of this series, I want to address the pressing question of the payoff for SIP trunking. When enterprises first decide to deploy IP telephony, they begin the process of moving away from the PSTN. There is some financial benefit, but little else changes, and with the resulting islands of VoIP, enterprises have limited ability to get beyond the Telco 1.0 scenario outlined in my first section.

SIP trunking is the next step along the path to Telco 2.0, as it allows enterprises to get beyond the voice-centric nature of IP PBXs and presents additional cost-saving scenarios. With the dependency on the PSTN reduced – and in some cases eliminated – VoIP islands can be bridged, and enterprises will gain far greater control over getting the most from their IT investment.

In addressing ROI, this section discusses the most common scenarios where businesses are currently deploying SIP trunking. Before outlining these scenarios, I must explain that cost savings come from several areas, such as:

Trunking

Aside from being more expensive, PRIs are sold in fixed increments, which often results in having to buy more channels than are needed. T1s have 23 channels available for voice and cannot be bought on a fractional basis. As such, a business requiring 30 channels must pay for 46 channels, which is really more beneficial to the telecom. SIP trunking works on a different model and is dependent on bandwidth availability, which can easily be added to suit the needs of the business. Furthermore, since voice is not bandwidth-intensive, SIP trunking can scale at relatively little extra cost. Even when using the high-quality G.711 codec, voice requires only 80 Kbps of bandwidth.

Telephone services

There are more savings to be had here beyond free domestic long-distance calls and less expensive international long-distance calls. Not only does SIP trunking enable more features than legacy telephony, but many calling features that are charged a la carte by telecoms are included at no cost with VoIP -- voicemail or conferencing, for instance. The same holds for FCC and regulatory fees, which are not applied to VoIP. Some of the new features enabled by SIP trunking, such as presence and click-to-call, represent free calling alternatives that could reduce the need for DIDs or toll-free numbers. On a more basic level, IP telephony eliminates the need for MACs (moves, adds and changes) – a constant expense, especially where staff turnover is high.

Hardware

As discussed in the second article, SIP trunking eliminates the need for costly media gateways. These must be replaced by SIP-aware firewalls, which are substantially less expensive. Businesses using IP PBXs have already saved money by choosing this solution over a legacy PBX. Those who do not have SIP-enabled phones are also in a position to save money with SIP trunking because they do not necessarily need to buy a full-scale IP PBX. By having an all-IP environment, businesses can choose from a broad and growing range of PBX-caliber solutions that require only relatively inexpensive SIP-enabled handsets.

Centralization

This benefit applies to multi-site businesses, which traditionally require separate phone systems at each location, as well as physical trunks to connect them over the PSTN. With SIP trunking, physical trunks are not required – all that is needed is a broadband connection. Branch offices can be virtually linked over the public Internet and tied into head office, which is the only location that needs a standalone telephony system.

Network convergence

The trend for converging voice and data onto a single network was noted earlier and is another area of cost savings that becomes more pronounced with SIP trunking. End-to-end IP optimizes the benefits of network convergence and ensures Quality of Service (QoS), both of which translate into a multitude of savings for capex as well as opex. Taking these factors into account, the overall cost savings associated with SIP trunking can be substantial. The following are general rules-of-thumb drawn from the industry for three basic scenarios.

1. *Medium-to-large businesses.* These will typically have multiple locations and will do a fair amount of international calling. They are also likely to have a call center operation. Businesses in this scenario can save 50% to 60% on communications costs, and achieving an ROI in 12 months or less is feasible.

2. *Small-to-medium businesses.* This scenario will have fewer remote sites, so the magnitude of savings will be on a smaller scale, and there will be less need for centralization. Long-distance usage will also be less, especially for international calling. Typically, however, they will be migrating from a legacy PBX, so there will be notable savings on the hardware. The rule of thumb for these businesses is an ongoing savings in the range of 25% to 40%, with an ROI of 18 to 24 months.

3. *Small businesses.* The low end of the SMB market offers the weakest ROI story, but given the sheer number of businesses in this segment, it is too large to ignore. These businesses are usually single-site operations, low in tech savvy and high in price sensitivity. While many of the cost-saving benefits discussed herein will be of limited relevance, SMBs will be receptive to offerings like SIP trunking if they reduce costs in areas that are easy to understand. As such, SIP trunking and VoIP can readily find a home in this market, even if the benefit is primarily reducing long-distance charges. This does not translate into a meaningful ROI, but in this economy, even showing a small degree of savings – 10% to 15% -- can be sufficient to win small companies' business.

About the author: Jon Arnold is Principal of J Arnold & Associates, an independent telecom analyst and marketing consultancy with a focus on IP communications. Previously, he was the VoIP Program Leader at Frost & Sullivan, where he was responsible for managing their subscription service for Global VoIP Equipment Markets. In March 2008, Jon -- along with fellow consultant Marc Robins -- launched IP Communications Insights, an industry portal designed to provide a broader voice for independent analysis and showcase their combined research, consulting and reporting services. In May 2008, Blogged.com ranked Jon's widely-read Analyst 2.0 Blog as #1 among all Telecom blogs, VoIP Now included his blog on their Top 100 Telecom blogs and in July 2008, Guy Kawasaki's Alltop portal included Jon's blog in their group of top VoIP blogs. Jon writes a bi-monthly column -- Service Provider Views -- for TMC, and is a Gerson Lehrman Group Leader, where his advice is regularly sought out by the finance and investment community. He also serves on the Editorial Advisory Board of Business Trends Quarterly.

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