



The SBC Buyer's Guide

What Every Enterprise Should
Know Before Buying an SBC

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Introduction

If your enterprise wants to reduce up to 75% of its current telephony costs, it can do that by implementing VoIP and SIP trunking services—but you'll first need a session border controller (SBC) to do those things. SBCs help enterprises secure SIP trunking services at their network border and provide a more seamless flow of SIP-based media for UC deployments. According to Infonetics, the enterprise SBC market will grow over 40% to more than \$218 million in 2012, and another 40% in 2013 (Infonetics Research, "Enterprise Session Border Controllers: Annual Worldwide and Regional Market Size and Forecasts," April 18, 2011).

Today, there are more than a dozen different enterprise SBC vendors, all of whom claim their products provide the requisite security and session control for enterprise SIP communications. Yet all SBCs are not created equal. Enterprises must carefully weigh factors such as real-world session performance (versus performance in a lab using carefully controlled sessions), robustness of features, resiliency, scalability and customization before choosing an SBC for their network.

This Buyer's Guide is designed to help enterprises evaluate an SBC appropriate for their business and distinguish an average SBC from one that delivers superior performance and features. It will also help to identify results to be expected once an SBC is installed and how enterprises can source or purchase an SBC.

Shopping for an SBC

The Basics

There are several things that an SBC should do—and do well—in order to help enterprises reduce communications costs and deliver new, revenue-generating services. These can be broken down into seven basic categories:

- Security, or How well does it ensure privacy, negotiate firewalls and protect the network from Internet-based attacks?
- Session Performance, or How many voice/video calls can it handle?
- Policy and Call Routing, or How does it help control network users and network traffic?
- SIP Interoperability, or How well does it "play" with the rest of the hardware and software in the network?
- Media Transcoding, or How efficiently does it translate different types of media?
- DTMF/Fax Interworking, or Will the SBC support legacy call center solutions and technologies?
- Scalability, or What happens when more horsepower is needed?
- We'll address each category in more detail below.

Security

The primary role of an SBC is to protect the enterprise network from Internet-based attacks and to ensure the security and flow of SIP sessions as they traverse between secure and non-secure points. Internet-based attacks can occur for a variety of reasons and from a variety of sources, and can significantly impact enterprise productivity and revenue. Some attacks are designed to bring a network down, such as a denial-of-service attack that floods a network with fake requests, which can prevent call centers from receiving calls and result in lost sales. Other attacks are designed to steal confidential information, either by accessing the network under a false identity or by eavesdropping on private communications. Still a third type of attack seeks to steal long-distance service by illegally logging onto the network, an attack known as toll fraud.

In addition to protecting the network, SBCs can protect communications from prying eyes as they travel non-secure channels by using media and signaling encryption. Encryption is especially important for businesses that handle confidential customer information, such as healthcare agencies and financial companies. In some cases, existing enterprise security measures, such as Network Address Translation (NAT) firewalls, require that SBCs provide secure workarounds to allow SIP sessions to pass through; this is known as NAT traversal and is an important requirement for SBCs, as many enterprises use NAT firewalls to protect both office-based and remote IP devices in their wider network. Enterprises should therefore look for SBCs that are built around these best practices:

- DoS/DDoS Prevention – Denial-of-service (DoS) and distributed denial-of-service (DDoS) attacks can take down an enterprise network for minutes or hours by flooding the network with requests. (If you're wondering what the distinction is, a DoS attack is usually one device generating thousands of these requests, while a DDoS attack involves thousands of devices generating a single request.) An SBC, therefore, must be able to identify DoS and DDoS attacks through a mix of end point recognition (e.g., is the request coming from a known attacker?) and pattern analysis (are thousands of devices sending an identical request?).
- Topology Hiding – An SBC should act as a wall that protects the identity of phones, computers and other IP devices behind it. This practice, known as topology hiding, prevents attackers from targeting and/or exploiting a specific device that has an IP address (e.g., an IP-enabled phone or PBX) in order to illegally access voicemail or other services.
- Rogue RTP Protection – RTP stands for Real-Time Transport Protocol, the protocol that is responsible for delivering real-time media like voice and video. In the case of toll fraud, unauthorized (or Rogue) RTP communications enter the network illegally. An SBC should include provisions to detect and block Rogue RTP media streams.
- Media Encryption – Encryption refers to cryptography: a system of using complex digital "keys" to lock and unlock information. Media encryption, therefore, refers to locking the media itself (i.e., voice, video or data) so that prying eyes cannot eavesdrop on private communications. The standard form of media encryption in the world of SIP is called the Secure Real-Time Transport Protocol (or SRTP).

- Signaling Encryption – In addition to media encryption, signaling encryption is recommended to authenticate the end points in any SIP-based communication. There are two accepted signaling encryption standards in SIP: TLS (Transport Layer Security) and IPsec (IP Security). Because some industry standards require different signaling encryption methods (e.g., IPv6 recommends IPsec), it's best to have an SBC that offers both encryption methods.
- NAT Traversal – A NAT firewall “hides” the IP address of end points (phones, PCs, etc.) behind it, which presents a challenge during SIP sessions because it prevents end points beyond the firewall from establishing a direct connection with an end point inside the firewall. As a workaround, SBCs can create a secure pinhole in the firewall by “re-pinging” the NAT-protected end point every few seconds; this allows the two end points to keep a consistent connection for the duration of the SIP session.

SBC Security Feature	Benefit to Enterprises
DoS/DDoS Prevention	Blocks attackers from taking down the network
Topology Hiding	“Hides” IP devices in the network from attackers
Rogue RTP Protection	Prevents thieves from stealing long-distance service
Media Encryption	Keeps private communications private
Signaling Encryption	Ensures only authorized users send/receive communications
NAT Traversal	Enables SIP sessions with NAT-protected devices

Session Performance

In SIP parlance, an exchange of media (e.g., voice or video) between two end points is called a session. Session performance refers to the number of concurrent sessions that an SBC can support at one time. Since the ratio of users to sessions is usually higher than 1:1 (call centers being a notable exception), an enterprise with 1,000 employees might be well served by an SBC that supports 350 concurrent sessions; that would allow for the possibility that one of every three employees would be engaged in a voice or video call at the same time.

Unfortunately, not all SBC vendors are forthcoming about how they measure their SBC's performance. Many use simple SIP sessions as the basis for their calculations in order to inflate their numbers. For example, an SBC that can support 20,000 concurrent SIP sessions may only support 10,000 concurrent sessions when encryption is enabled on both sides of the communication, and 5,000 concurrent sessions when encryption and media transcoding are required. In order to select an SBC with adequate real-world performance, enterprises should look for an SBC that offers:

Call Routing/Policy Management

SBCs are not only responsible for intercepting SIP sessions at the network border—they also select the optimal route to deliver that signaling and media to its final destination. This selection process, referred to as call routing, is one of many policies that the SBC enforces in order to ensure the smooth and efficient flow of traffic in your enterprise network. That efficiency results in significant savings for enterprises, both

- High session performance when features such as encryption and media transcoding are turned on
- Unimpacted performance during a DoS attack or overload conditions
- Rapid end point re-registration following a power outage
- 99.999% reliability or higher
- Hardware redundancy for seamless disaster recovery

by avoiding toll costs through intra-network routing and through a process known as least cost routing (LCR). An SBC uses LCR calculations to decide which routing path will cost enterprises the least amount of money, such as selecting the lowest cost carrier for long-distance calls based on the time-of-day, call destination and other factors. While most SBCs will perform some level of call routing, many provide only basic routing options. Obviously, the more routing options an SBC supports, the more opportunities the enterprise has to both save money and ensure better quality of service by selecting the routes with the least delay, lowest price, highest quality, etc. This is especially so in the case of a centralized dial plan, which stores call routing information for all enterprise PBXs in an SBC, and eliminates costly PBX provisioning services.

Policy enforcement impacts many other aspects of SIP communications, including security, user preferences and network load balancing. For example, policy and routing decisions can help ensure the responsiveness and availability of contact center resources by balancing call loads during peak usage periods, such as between Noon and 1:00 PM. Most SBCs enforce these policies at the local level; in other words, each SBC maintains its own set of unique policies for the subscribers it serves. While this local policy management model is fine for small networks, it presents a problem for networks with multiple SBCs: how to manage multiple policies on multiple SBCs. Provisioning policies for every SBC is a time-consuming process and one that historically creates problems as subscriber information changes, requiring updates to every SBC. For this reason, some SBC vendors have implemented a centralized policy management model that allows enterprises to maintain a centralized policy database that is provisioned once and automatically updated locally on every SBC in the network. This method saves time, saves on device maintenance and reduces the provisioning errors created by multiple manual provisioning of network touchpoints.

SIP Interoperability

A key role of an SBC is to mediate SIP communications between different devices. While SIP is an industry-standard protocol, and industry standards are designed to ensure consistency across implementations, the reality is that SIP is not consistently implemented the same by hardware and software vendors. The problem lies with the way the SIP guidelines were written, allowing individual vendors to decide how best to implement SIP through suggestions rather than hard rules. As a result, an SBC from Vendor A and an SBC from Vendor B may “speak” SIP differently, requiring some translation (known as SIP normalization) to ensure that signaling instructions are properly communicated. And it’s not just SBCs that have their own dialects of SIP; private branch exchanges (PBXs), automatic call distributors (ACDs) and interactive voice response (IVR) systems are other examples where SIP normalization may be required.

In order to simplify SIP communications (and ensure that enterprises can continue to use their existing PBXs, ACDs and other investments to keep costs down), an SBC should ensure interoperability between SIP and other signaling protocols. Enterprises should, therefore, look for the following interoperability features from an SBC:

- SIP normalization and SIP message manipulation (SMM) tools that allow enterprises to rapidly modify SIP headers for seamless communications between networks
- Adherence to industry SIP standards where possible, such as SIPconnect for SIP trunking implementations and SIP Forum for IP Multimedia Subsystem (IMS) implementations
- Extensive interoperability testing with third-party PBXs, IP phones and other devices
- IPv4-IPv6 interoperability
- Interworking between SIP, SIP-I/T and H.323 (legacy) protocols

Media Transcoding

Different kinds of telecommunications networks—for example, fixed-line and mobile networks—use different codecs (coder/decoders) to convert voice signals for digital transmission. (These different codecs are the reason why voices on your cell phone and your home phone sound different.) Codecs may consume a lot of bandwidth to deliver a better quality sound, or use less bandwidth to provide faster transmission. Some, but not all, SBCs have the ability to translate between these different codecs, a process known as media transcoding. Transcoding has two advantages for enterprise networks: it can reduce the network bandwidth that a call consumes by temporarily translating a high-bandwidth codec into a lower bandwidth codec, and it can improve voice or video quality by translating communications into a codec that the end user device natively supports. This latter advantage is especially important as more enterprises move to high-definition (HD) voice, which often requires transcoding but in return delivers a measurably better experience for call center customers.

So how much bandwidth can transcoding save you? As the chart below illustrates, transcoding from G.711 to G.729, for example, could reduce bandwidth consumption in your network by more than 60%.

Codec	Voice Payload (Bytes)	Packets Per Second	Estimated Bandwidth	Actual Bandwidth*
G.711	160	50	87.2 kbps	95.2 kbps
G.722	160	50	87.2 kbps	95.2 kbps
G.723.1	20	33.3	20.8 kbps	26.1 kbps
G.726	60	50	47.2 kbps	55.2 kbps
G.728	60	33.3	31.5 kbps	36.8 kbps
G.729	20	50	31.2 kbps	39.2 kbps
iLBC	38	33.3	28.8 kbps	30.9 kbps

*Actual Bandwidth = [Voice Payload + 58 bytes (headers) + 20 bytes (other MAC frame elements)] x Packets Per Second

There are three ways that SBCs can address transcoding: 1) Handing it off to an external transcoder; 2) Buying a third-party transcoding solution and packaging it into their SBC; and 3) Building a customized transcoding solution into the SBC. The third approach offers the most benefits to enterprises because it typically results in faster encoding/transcoding speeds, lower costs and more flexibility.

When looking at an SBC with media transcoding, enterprises should ask the following questions:

- How long has the vendor supported media transcoding in their SBCs?
- What media codecs are supported?
- Do they own their DSP intellectual property?
- Does the SBC draw CPU cycles from other processes when it performs transcoding?
- Is the media transcoding solution easily customizable or a generic OEM solution with very limited customization and flexibility?

DTMF/Fax Interworking

Dual-tone multi frequency (DTMF, also known as “touch-tone”) and fax services may be older technologies, but they show no sign of disappearing completely from enterprise communications systems. In fact, some enterprises have spent years (and millions of dollars) perfecting their Interactive Voice Response (IVR) and auto call attendant solutions—many of which rely on DTMF services—and aren’t about to replace those with newer SIP-based systems. That’s why it’s very important that an SBC support legacy technologies like DTMF and both PSTN- (T.30) and IP-based (T.38) fax transmission through robust protocol interworking and the accurate extraction of DTMF signals from both signaling and media packets.

If your enterprise relies on these legacy technologies to do business, ask your SBC vendor these questions:

- How accurately can they extract DTMF tones from in-band (i.e., signaling-based) communications?
- How accurately can they extract DTMF tones from out-of-band (i.e., media-based) communications?
- Do they support fax transmission/relay between IP-to-IP networks, IP-to-PSTN networks and PSTN-to-IP networks?
- How long have they supported DTMF and fax relay interworking in their solutions?

Scalability

SIP communications traffic will continue to rise as more enterprises adopt a Bring Your Own Device (BYOD) strategy that introduces more SIP-based smartphones and tablets into the network ecosystem. What this means is that the SBC you buy today needs to be able to handle the growing traffic needs of tomorrow, and it must scale cost-effectively. Fortunately for enterprises, there are many SBCs that offer a wide range of session scalability, from several hundred sessions to several thousand. Pricing for those sessions, however, can vary greatly.

When comparing the cost of an SBC now and later, be careful that you don’t get caught in an apples-and oranges-comparison. Weigh all your cost factors together including:

- Cost per session
- Cost per media transcoded session
- Cost per encrypted session
- Licensing cost for call routing/policy engines
- Installation and deployment costs
- Annual maintenance and support costs

Feature Comparisons: A Look at the Top Three SBCs

Now that we’ve identified what features are most important in an SBC, let’s see how the top three SBCs in the large enterprise class (16,000-64,000 sessions) market stack up. The chart below gives a feature-by-feature comparison of the SBC 5200 and the other two leading enterprises SBCs on the market today.

What Can The Top 3 SBC Vendors Do For Your Enterprise?

	Sonus SBC 5200	Leading Brand A	Leading Brand C
SIP interoperability	✓	✓	✓
IPv4/IPv6 interop	✓	✓	✓
High performance under attack	✓	X	X
Built-in media transcoding	✓	✓	✓
High session scalability	✓	✓	X
High-Performance Encryption	✓	X	X
Rapid Deployment	✓	✓	✓

How They Stack Up

As you can see, all of the top three SBCs on the market deliver robust features. There are, however, some distinguishing characteristics that separate the Sonus SBC 5200 from the competition. In the interest of fairness let's just say the Sonus SBC 5200 is different than other SBCs. How? Let us count the ways:

#1. Built-in, customized media transcoding firmware

Sonus Networks has a rich history in media transcoding dating back to our industry-leading media gateways. We were the first company to introduce built-in media transcoding in our SBCs and, today, we're the industry's only SBC company that builds their own media transcoding firmware. Only recently have other SBC vendors followed our lead by addressing transcoding needs, and their lateness to the market shows in their complete reliance on generic, third-party transcoding firmware. Why is built-in, customizable transcoding important? Because it processes transcoding faster and allows enterprise to quickly address new codecs—key advantages when you consider that media transcoding needs are poised to grow exponentially with the explosion of tablets and multimedia mobile devices. Sonus' media transcoding firmware also allows our SBCs to deliver more accurate dual-tone multi-frequency (DTMF) interworking for legacy enterprise systems such as Interactive Voice Response (IVR) systems, auto call attendants and fax machines.

#2. Centralized policy management

Here again, Sonus was the first to market with centralized policy management. Most SBC vendors feature local policy because they make boxes, not networks. At Sonus Networks, we see the big picture, and centralized policy management is simply a better approach for big networks. Why? Because it reduces provisioning time, reduces provisioning costs and reduces provisioning errors. It also plays a key role in centralized session management, something that Sonus offers with its Sonus Harmony session management solution.

#3. Better performance in the real world

Published performance numbers can be misleading, since many vendors inflate their SBC's performance by basing it on simple, controlled SIP sessions. Which is fine if you're planning on deploying the SBC in a test lab. But in the real world, SIP sessions are anything but simple, and often require encryption and transcoding: features that can drain an SBC's performance. How much? Let's see how the SBC 5200 stacks up against the leading SBC's performance claims.

Feature	Leading Brand A	SBC 5200
Max Sessions "Naked"	32,000	64,000
Sessions with SRTP and TLS encryption turned on	15,000	64,000
Sessions with transcoding turned on	7,200	17,200

#4. Better performance under pressure

Any SBC will perform well under ideal conditions. But how does it perform during heavy workloads? Power outages? Overload conditions? DDoS attacks? The SBC 5200 performs extremely well under adverse conditions, as verified by Miercom, a third-party testing lab. In an independent study, Miercom tested the SBC 5200 under attack conditions and found that the SBC's CPU and memory "were rarely stressed, indicating to us that this architecture has plenty of processing horsepower to spare."

Miercom Performance Verified

Miercom Test	Sonus SBC 5200
Registration Avalanche - registration rate	256,000 IADs in 16 minutes (64K NATTED)
CPU utilization (baseline load)	34.40% (3,000 simultaneous calls)
CPU utilization (during attack storm)	38.39%
Concurrent calls	64,000

Options for Sourcing a Session Border Controller

Direct vs Indirect

Several options exist for enterprises to source and deploy an SBC. If your enterprise has a large in-house support capability that can manage CPE (customer-premises equipment), you can opt to purchase an SBC solution directly from the vendor.

Alternatively, you can choose to buy indirectly through one of the vendor’s resellers. In the traditional indirect model, the reseller purchases the equipment from the vendor, resells it to the enterprise, installs the equipment on the enterprise premise and maintains the equipment (either remotely and/or with on-site resident engineers) under an annual service contract.

Over the past few years, enterprises have turned to resellers to take on more of the support services so that the enterprise can focus on their core business without the need for a large in-house support staff. In this managed services model, the MSP (Managed Service Provider) offers an SBC-based SIP trunking service for which the enterprise pays a monthly fee. Typically, the components of a managed service are procurement, staging and configuration, on-site installation, and ongoing monitoring and maintenance. The offer is based on an SBC platform, which the MSP has previously tested for interoperability. In the managed service model, the equipment resides on the customer premise.

The next phase in the buying evolution is one in which the equipment resides “in the cloud” (servers owned by the Service Provider) vs. on the customer premise, and the Service Provider provides hosted services to multiple “tenants” via the Internet. Cloud services offer many benefits over a premise-based service including scalability, rapid deployment of software upgrades and greater efficiencies. (Cloud providers typically run their cloud servers at 75-90% utilization enabling cost-efficiencies to be passed on to their customers.)

Types of Resellers

There are several types of resellers that enterprises can choose from for sourcing an SBC/SIP trunking solution. As previously noted, these resellers are increasingly offering managed and hosted services.

- Service Providers (Carriers) – Carriers offer a bundled solution where they are responsible for both the SIP trunking services and the network transport that delivers the service. The carrier provisions SIP trunking over their own network infrastructure and can therefore offer comprehensive support and Service Level Agreements (SLAs) because the carrier can monitor and troubleshoot both the service and the access line.
- IT Service Providers/Application Service Providers – An ITSP/ASP develops custom applications that extend the functionality of the vendor’s gear. Many ITSP/ASPs have their own geographically based switching infrastructure with application servers. ITSP/ASPs are typically niche service providers that focus on certain voice and/or data applications. Examples of voice applications include call center solutions and video conferencing solutions.
- Value Added Resellers – The value-add services of a VAR are typically in the area of deployment services and professional services such as integration services, consulting and training. Some VARs may also bundle a software application into the vendor’s gear. More and more VARs are offering managed services.
- Systems Integrators – An SI specializes in combining hardware and software from multiple vendors into an integrated solution. They also specialize in developing custom applications. SIs are often large, global companies that work with large multi-national enterprise customers.
- Value Added Distributors – A VAD carries inventory of manufacturer products and only sells to the reseller community. VADs work to foster partnerships with resellers to help them be successful selling to end users by offering products and a variety of services and tools to differentiate themselves. VADs typically offer enhanced reseller support including access to online tools, marketing services, logistics, education, financial services (credit, leasing, etc.), customer service, technical resources and more.

Services Offered*	Service Providers	ITSPs/ASPs	Value Added Resellers	System Integrators	Value Added Distribution
SIP Trunking/ Own WAN Infrastructure	✓	Geographically Based	Resell	Resell	n/a
Stock Vendor Equipment	n/a	n/a	n/a	n/a	✓
Financing Options (credit, leasing etc.)	✓	n/a	varies	✓	✓
Training	✓	✓	✓	✓	✓
Consulting	✓	✓	✓	✓	✓
Integration Services	✓	✓	✓	✓	✓
Service Level Agreements (SLAs)	✓	✓	✓	✓	✓
Installation Services	✓	✓	✓	✓	✓
Maintenance (Onsite or Remote)	✓	✓	✓	✓	✓
24x7 Technical Support	✓	✓	✓	✓	✓
Warranty	✓	✓	✓	✓	✓

* Services vary by provider/reseller - ask for standard and add-on program information

Things to Consider When Sourcing an SBC

If an enterprise chooses to purchase an SBC directly from a vendor and manage it themselves, they should look at additional criteria beyond the box itself, such as:

- Interoperability with third-party solutions. Make sure to check the vendor's website for a list of technology/interoperability partners and ask for proof that the vendor has completed point-to-point interoperability testing between their products and third-party solutions. While SIP is an industry-standard protocol, various technology vendors interpret it differently.
- The vendor's professional services capabilities to not only install and configure the solution, but also to integrate management of the SBC with the enterprise's existing Unified Communications infrastructure.
- Ease of management.

If sourcing SIP trunking through a reseller, the enterprise should check that the reseller is accredited to resell a vendor's brand by going to the vendor's website for a list of authorized/accredited channel partners. However, for the most part in the managed/hosted scenario, the enterprise does not know who the SBC vendor is; the enterprise trusts that the reseller has done the due diligence to bring the best SBC vendors into the reseller's portfolio. As a safeguard, the enterprise could ask the reseller these questions:

- Has the reseller done a complete series of interoperability testing on the vendor's SBC to ensure that the vendor's SBC works with the other network elements within the SIP trunking service?
- Does the reseller have a no-fee evaluation program so the enterprise can test the solution in their company lab, including assistance from the reseller to set up their test plan?
- What are the support terms/SLAs offered by the reseller?
- Does the reseller frequently attend manufacturer training sessions?
- Does the reseller have an SBC customer reference list?
- Does the reseller have Sales Engineers and other 24/7 support staff?
- Does the reseller offer financing options?
- What type of end-user training does the reseller offer? Does it include not only training on the product itself, but also training on the processes for post-sales support: How to access the reseller's technical assistance center, How to log a ticket, and How to submit a product change request?

The Buyer's Conclusion

Choosing a session border controller is more than an IT decision, it's a business decision. Today's enterprise SBC has evolved beyond the role of a security appliance to become a vital communications solution that enables higher quality voice and video, more flexibility to deliver multimedia applications to customers and employees, and cost efficiencies by dramatically reducing telecommunications fees and network management complexity. SBCs are fast becoming a requirement for enterprise communications, not only for what they can enable today (SIP trunking, SIP-based applications like Skype and videoconferencing, etc.) but for the cloud-based services they'll enable tomorrow. Thus, the SBC selection process is a critical one for enterprises, as it will impact their communications capabilities for years to come.

Although this Buyer's Guide has focused on large enterprise SBCs, many of the same criteria hold for mid-sized enterprise SBCs as well. In any case, enterprises should perform their own due diligence in selecting an SBC and weigh all of their options carefully. No one SBC is right for every enterprise, and some enterprises may find a mix of different SBC vendors, or different SBC models from the same vendor, provides the best solution.

Appendix A: Benefits of SIP Trunking

In the past, enterprises had one way to get high-quality voice services at a lower cost: by leasing PRI (Primary Rate Interface) lines from their service provider. With the advent of Voice over IP (VoIP), however, service providers began to offer SIP trunking services to their enterprise customers. SIP trunks have many advantages over PRI trunks:

- They deliver both voice (SIP) and data (IP) over a single trunk connection, which better utilizes the trunking bandwidth
- They enable enterprises to take advantage of new SIP-based applications like Skype
- Unlike PRI trunks, they don't require a dedicated trunk for every location
- They cost up to 25% less than PRI trunks per session

PRI Trunking vs. SIP Trunking

PRI Trunks	SIP Trunks
23 channels/sessions per trunk	Up to 10,000 sessions per trunk
\$57.60 per channel per month with 870 LD minutes*	\$41.40 per session per month with 870 off-network minutes*
Direct Inward Dialing, usually from local destinations only	Direct Inward Dialing available from long-distance destinations
Dedicated PRI connections for each branch/office	One SIP connection for the entire enterprise
Legacy media and signaling (TDM/ISUP)	Next-generation media and signaling (RTP/SIP)

* Data courtesy of Gartner, Inc. "How to Leverage SIP Trunks, Session Border Control and Session Management for Cost Savings and UC Deployment"

Appendix B: ROI Case Studies

SBCs are attracting the attention of many types of enterprises. In order to help illustrate how SBCs can help enterprises improve employee collaboration and customer service—and deliver a return on investment (ROI)—let's take a look at two case studies:

Case Study: A National Retail Chain

Company A is a national retail chain with more than 1,000 stores nationwide. The company decided to consolidate their voice and data network across two national data centers, using SIP as the foundation for their VoIP network. While the initial driver for the consolidation was to reduce operating expenses—in part by replacing expensive PRI trunks with less expensive SIP trunks—the company also viewed the network consolidation as an opportunity to improve their call center operations. In evaluating an SBC, the retailer looked for several key features:

- Security and encryption standards that would meet the regulatory requirements for financial and personal confidentiality
- Simplified SBC provisioning that could be easily replicated as SIP services are rolled out to new stores
- A centralized dial plan and routing system that connects callers to their local store
- Specialized tones and announcements that reassure callers as their call is being transferred to a local store or department

By moving to more cost-effective SIP trunking services, the company will save millions of dollars per year in leasing costs compared to more expensive PRI trunks. In addition, by directly routing calls to their local stores over their WAN rather than the public switched network, the company will substantially reduce their long-distance fees.

Case Study: A National Bank, Post-Merger

In the case of business mergers and acquisitions, it's important to consider how companies will merge their communications networks. For a national bank, the blending of two separate data networks and two separate voice networks created a sizable logistics challenge. So the merged bank decided to consolidate its data and voice network into a single SIP network that would support the bank's future plans for a Unified Communications system. By implementing SBCs at the borders of both networks, the bank was able to solve the interoperability issues between different SIP and H.323 legacy devices so that both voice networks could work together seamlessly.

The new SBCs enabled the merged bank to extend SIP trunking services to both sets of regional branches and route calls seamlessly to local branches. In addition, the SIP-based infrastructure allowed the bank to implement its own audio-conferencing and videoconferencing solutions so employees from both banks could collaborate from their offices and their homes.

The bank will save millions of dollars by reducing their PRI trunking costs and the OPEX associated with maintaining two sets of networks. As an added benefit, the company is able to save substantial amounts of money each year on long-distance and audio-conferencing costs by moving to their own hosted, WAN-based solution.

Appendix C: An SBC Buyer's Checklist

Shopping for an SBC? Here are key questions to keep in mind when you're talking to an SBC salesperson or submitting a Request for Information (RFI) or Request for Proposal (RFP):

How does the SBC prevent against DoS and DDoS attacks? Does session performance diminish during an attempted attack?

1. What kind of media and signaling encryption does the SBC offer? What's the SBC's maximum session performance with media and signaling encryption turned on?
2. How does the SBC achieve NAT traversal?
3. Does the SBC offer built-in media transcoding? Which codecs are supported? What's the maximum session performance with transcoding turned on?
4. How quickly does the SBC re-register SIP end points after a power outage?
5. What kind of SIP Message Manipulation can you do with the SBC?
6. Does the SBC offer dual-stack support for IPv4 and IPv6 networks?
7. What SIP industry certifications has the SBC received?
8. Which third-party products (e.g., PBXs, SIP phones) have gone through interoperability testing with the SBC?
9. What signaling interworking is supported by the SBC (e.g., SIP-I/T, H.323, etc.)?
10. Does the SBC support fax interworking for IP (T.38) and legacy (T.30) networks?
11. Can the SBC ensure DTMF interoperability with legacy voice systems such as interactive voice systems (IVRs), auto call attendants and voicemail servers.
12. Which customers are using the SBC today?
13. Which SIP trunking service providers are using this SBC in their networks?
14. Can I centralize my call routing for all of my enterprise PBX systems on the SBC?
15. Does the SBC include a least cost routing solution?
16. Is the SBC available in a low session count configuration in case we decide to do a trial first?
17. How long has the company been making SBCs?
18. How long has the company been building their own media transcoding solutions?
19. Does the SBC provide seamless recovery in the event of a hardware or network failure?
20. Can I speak to a customer who's already using this SBC?

About Sonus Networks

Sonus enables and secures real-time communications so the world's leading service providers and enterprises can embrace the next generation of SIP and 4G/LTE solutions including, VoIP, video, instant messaging, and online collaboration. With customers in more than 50 countries and nearly two decades of experience, Sonus offers a complete portfolio of hardware-based and virtualized Session Border Controllers (SBCs), Diameter Signaling Controllers (DSCs), Cloud Exchange Networking Platform, policy/routing servers, and media and signaling gateways. For more information, visit www.sonus.net or call 1-855-GO-SONUS. Sonus is a registered trademark of Sonus Networks, Inc. All other company and product names may be trademarks of the respective companies with which they are associated.

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