Business Continuity protection for SIP trunking service

An Allstream White Paper
The value of SIP trunking

The high rates of SIP trunking adoption that we have witnessed in the last couple of years represent a major development in telecommunications, both in terms of technology and of the business benefits expected from the enterprise communications infrastructure.

From a technological perspective, SIP trunking extends the VoIP (aka IP Telephony) network beyond the boundaries of the enterprise and to the service provider’s network, allowing corporations to eliminate much of the cost and complexity of their interface to the Public Switched Telephone Network (PSTN). This includes most of the expensive gateway equipment and the monthly T1/PRI fees associated with them. In effect, this leads to a convergence of the enterprise voice connectivity onto its data connection.

The resulting converged network can deliver significant benefits to a business. In addition to the cost savings, having a SIP based infrastructure means better scalability and improved agility when there is a need to respond to changing business conditions. It also means having an easy path to adopting new productivity enhancing unified communications applications and having the ability to establish a telephone presence in geographical areas where your organization has no physical presence.

The issue of business continuity

Just as with other services or technologies, the issue of business continuity is very relevant in a SIP trunking context. When you upgrade your network to SIP trunking, you would want to ensure that your voice communications network would be protected in the case of a major disruption. We have observed that disruptions manifest themselves quite often and in many places. Natural disasters, like earthquakes or floods and social upheavals, have repeatedly proven that they can cause serious damage to people and businesses alike.

What therefore are the best practices to ensure that an organization that relies on SIP trunking connectivity for voice communications can continue to communicate if SIP trunks are affected by outages or disasters?

This document will examine a few of the most likely scenarios in which the functionality of SIP trunks can be disrupted and will review several effective ways to maintain business continuity in those situations. It will highlight, in that context, the important role of the service provider and will also provide information about the resiliency features offered by Allstream to business customers subscribing to their IP Trunking service.
SIP trunking protection scenarios

The diagram in fig. 1 below illustrates a typical SIP trunking based enterprise communications network in which a number of important business continuity aspects have been taken into consideration. It provides a good environment for discussing a few methods for protecting organizations against SIP trunking connectivity outages.

The enterprise depicted in the diagram operates one headquarters and two branch locations. Its main connection to the PSTN is through SIP trunks that connect to a service provider’s network (MPLS or Internet based) which provides Wide Area Network (WAN) connectivity for all three enterprise locations.

![Diagram of SIP trunking protection](image)

**Figure 1 – business continuity protection for a SIP trunking based enterprise network**

**Protection in case of inaccessibility of a service provider voice gateway**

As shown in the diagram, on the provider side, the SIP trunks typically connect to the primary voice gateway implemented through the deployment of a session border controller (SBC). If, for whatever reason, the primary voice gateway becomes inaccessible, SIP traffic is rerouted to the backup voice gateway, also implemented through an SBC. The service provider will typically place the backup SBC in a different geographical area and will work with the customer to ensure that fail over to the backup SBC and fail back to the primary SBC takes place automatically.

**Protection in case of loss of IP connectivity at the headquarters**

In the diagram, the enterprise headquarters is connected to the service provider network through a 10MBps Ethernet connection. If the connection to the headquarters fails, the SIP trunks are engineered to terminate using the backup SIP trunk connection to the IP PBX at location B.
The PBX at location B will then control all voice communications for locations B and C. At the headquarters, the enterprise can still connect to the service provider through a backup PRI connection. Some SIP applications at that location (e.g. IM, conferencing with other locations) will not be supported but voice connectivity will be maintained.

When a backup PRI is not available, other strategies to provide redundancy for the SIP trunks may be employed. In this case, the SIP trunking connectivity may be protected, together with other data applications, through the availability of a secondary WAN access connection. To ensure maximum diversity, the secondary WAN connection should use a different access technology (wireless, DSL, Internet) and in some cases a different service provider.

**Protection in case of total loss of IP connectivity at a branch location**

Location C in fig. 1 does not have an on premise PBX. During normal operations all SIP terminals (phones included) are registered with the IP PBX at the headquarters and rely on that system for call routing and processing. If the WAN connection at location C fails, a survivable gateway device that interfaces between SIP terminals and the WAN can act as a mini-PBX to register local SIP terminals and to process local calls. The connection to the PSTN is maintained through an FXO line that is connected to the survivable gateway.

**Protection against loss of power**

If electrical power is lost at location C, the survivable gateway can provide a “fail to wire” FXS interface that allows the connection of a basic telephone set. This phone set can then be used to make basic calls to the PSTN by using the FXO line.

In many cases the survivable gateway and the edge router are implemented on a single device allowing for a very simple deployment. Major communications systems vendors are offering many variations of this type of backup solution. For example, several Cisco edge routers include a combination of FXO and FXS interfaces together with basic call processing capabilities. This feature is known as Cisco Survivable Remote Site Telephony (SRST).

**The role of the service provider and the Allstream advantage**

The service provider plays a significant role in the implementation of any SIP trunking business continuity strategy. In addition to offering a wide range of high availability provisions, a quality SIP trunking service provider will assist in evaluating the organization’s continuity needs and choosing the right equipment and service options.

As the SIP trunking based architecture becomes operational, the service provider should be able to provide comprehensive logs and statistics that will help identify possible business continuity needs. Based on information gathered through constant monitoring, the provider would be in a position to offer solutions for improving the reliability of the SIP trunking connectivity.

Allstream IP Trunking was the first SIP trunking service introduced in Canada and it has maintained a reputation for excellence among business customers on a national scale. Our customers benefit from the most advanced and productive features supported by dedicated customer service and stringent service guarantees.

In terms of SIP trunking business continuity, Allstream helps customers with technical expertise and redundancy options that ensure high availability for the service. Allstream IP Trunking features that strengthen business continuity include:

**Two geographically diverse SIP trunking Voice Gateways, one in Toronto and one in Vancouver.** Customer routers can be provisioned with the IP addresses of both SBC’s at the voice gateways so they can switch traffic between the two links when necessary.

**Two access options, Allstream Business IP service (MPLS) and Allstream Internet service.** If the primary type of access has a temporary outage, customers can redirect traffic to the other access service.

**Ability to reroute the service to another customer location.** Allstream IP Trunking will sequentially attempt to connect with several customer locations in the order specified by the customer.
Carrier grade redundancy. Incorporated into all components of the service, including media gateways, session border controllers, soft switches and access network.

Overflow. Traffic from busy Allstream IP Trunking links can be re-directed to less busy trunks, helping customers minimize the number of failed calls and deal efficiently with peak traffic periods.

Network Assessment assistance. Allstream works with IP Trunking users to determine the optimal requirements for an effective set of business continuity provisions.

Stringent SLAs. Allstream’s Service Level Agreements are among the strongest available and underscore our commitment to reliability for all services.

Performance Monitoring. Allstream manages the service from the customer edge router all the way up to the PSTN. As a result, we are able to comprehensively monitor the performance of IP trunks and make recommendations for strengthening their resilience when necessary.

Conclusion

SIP trunking has proven to be a valuable technology and a productive business model. Organizations adopting the service will want to enjoy its benefits without interruptions or performance gaps. Designing and implementing effective business continuity provisions is the best way to achieve this objective. Allstream, a leading Canadian communications service provider, offers advanced, highly available SIP trunking solutions that allow business customers to communicate and collaborate more effectively while driving growth and productivity.
About Allstream

Allstream is the only national communications provider working exclusively with business customers. Our focus is helping you simplify IT operations to improve productivity, maximize performance and manage costs. Our IP solutions are delivered on a fully managed, fully secure national network and backed by our industry-leading commitment to customer service: The Allstream Service Guarantee. Driven by the expertise of our 2,500 employees across Canada, we operate a 30,000 km fibre-optic network combining advanced IP connectivity, digital switching, Ethernet-featured services, and the latest security technologies. Our portfolio includes the highest-capacity voice, data and Internet connections, unified communications, and managed services, all flexibly designed for the needs of large, mid-market and small businesses. We can help you compete more profitably by converging voice and data over a single, reliable, end-to-end infrastructure that delivers exceptional quality of service between metropolitan centres.