VeriSign®

IP Network Solutions

Outsourcing the Softswitch Functionality

Where it all comes together.™

Contents

+ Introduction

The purpose of this paper is to discuss and explore the issues, challenges, and solutions of implementing IP technology within a telecommunication carrier's network. This paper will focus on a distributed ownership infrastructure model where the softswitch is outsourced to a third party.

+ IP Infrastructure Service Provider Issues

Managing operational costs is a top priority for service providers. The introduction of next-generation technology provides an opportunity for carriers and resellers to reduce costs while deploying highly scalable networks. However, there are still many challenges with the new IP infrastructure, such as the ability to interoperate with the Public Switch Telephone Network (PSTN) and to access the functions and features provided by Signaling System 7 (SS7) protocol. Even though the cost of next-generation devices, such as softswitches, is less than that of traditional CLASS switches, many carriers are reluctant to expend the capital outlay required, or do not have the experience to administer the equipment.

Access to the PSTN and SS7 Network

As service providers turn to next-generation/IP technology for providing services such as Voice over IP (VoIP), Toll by pass (terminating long distance calls using an IP network), or Internet Offload (diverting dial-up Internet sessions from a traditional CLASS switch), they still need interoperability between IP networks and the PSTN for call setup via SS7 protocol. Non-facilities-based service providers (those who do not own a switch) may access the PSTN, and hence the subscriber, via Primary Rate Interface (PRIs) or basic subscriber loops. A much more cost-effective means of access to the PSTN and SS7 networks is via Intermachine Trunks (IMTs), however the service provider must be facilities-based, meaning they own a switch/softswitch. The primary components of the softswitch are the Media Gateway Controller (MGC) and the Signaling Gateway (SG) that provide the interface to the PSTN's SS7 network and manages the call state. Throughout the remainder of this document, we will use the term "softswitch" to address the MGC and SG functionality. The softswitch works in conjunction with an enhanced router that serves as the PSTN access traffic interconnection device.

Ownership of Softswitch/Operational Requirements

As indicated above, use of IMTs enables the service provider access to the PSTN and the SS7 network in a cost-effective manner, however consideration must be given to the capital outlay and ongoing operational costs of owning and operating a softswitch. These devices can range from per-port charges of $200 to $400 for smaller deployments to $1 million to $2 million in upfront capital for larger deployments. The service provider must also consider the resources and experience required to administer, maintain, and monitor their own softswitch. One alternative to ownership is a distributed ownership model that allows the service provider to outsource the softswitch functionality and administration to a third party.

+ Distributed Infrastructure Model—Outsourcing the Softswitch Functionality

In the distributed ownership infrastructure model, the service provider takes responsibility for a portion of their network infrastructure, while outsourcing certain components that may be cost-prohibitive to own and maintain or that require expertise not resident in-house. This model is ideal for the service provider or reseller not positioned to own and administer a softswitch. It allows for the use of IMTs—resulting in immediate savings—without the expense and hassles of owning all network elements. It eliminates or minimizes the need for capital expenditures and allows for quicker start-up. In a distributed ownership model, the third party provides the expertise to administer, maintain, and support the softswitch, thereby reducing resources otherwise required by the service provider. Additionally, it reduces the risks of stranded investments associated with ownership of equipment in an industry with rapidly changing technology.

+ Distributed Infrastructure Architecture

The Media Gateway Controller (MGC)

The Media Gateway Controller (MGC) is the call-control logic. It provides termination requests and performs call set-up and call control on the Media Gateway. In a distributed model, this component is outsourced to a third-party provider.

The Signaling Gateway (SG)

The Signaling Gateway (SG) provides the SS7-to-IP-to-SS7 protocol conversion and is the interface between the MGC and the PSTN. This device would also be outsourced to a third-party provider in the distributed model. (As mentioned earlier, the combined functionality of the MGC and the SG make up the softswitch.)

The Media Gateway (MG)

The Media Gateway (MG) is the transport plane of the IP network architecture. It is the network element inserted between the voice (PSTN) and IP networks to perform the voice processing functions for translations between the voice world and the IP world. In a distributed model, the service provider owns and operates this network element.

+ Practical Applications Using Outsourced Softswitch Functionality

As discussed earlier, service providers are turning to IP infrastructures to provide practical services to customers while reducing operational costs. These services can be provided efficiently and cost-effectively using outsourced softswitch functionality. VeriSign Telecommunication Services is providing such services today (Mediated Softswitch Services—http://www.verisign.com/telecom/products/network/ MSS/ index.html) by connecting service providers to an open-architecture softswitch deployed within their nationwide SS7 network. Service providers connected to the VeriSign softswitch have access to the PSTN while benefiting from the features and functionality of the combined technologies of SS7 and the next-generation softswitch. Following is a discussion of some of these practical applications, how they benefit the service provider, and how they are implemented in a distributed ownership infrastructure model.

Internet Offload Signaling

Many LECs (local exchange companies) and ISPs (Internet service providers) are carrying Internet traffic over Primary Rate Interface (PRI), or basic subscriber loops, to gain access to the PSTN and hence their ISP subscriber (*see Figure 1*). By connecting their Remote Access Server (RAS) to the outsourced softswitch, service providers make use of IMTs, thereby diverting traffic from PRIs and significantly reducing their access costs (*see Figure 2*).

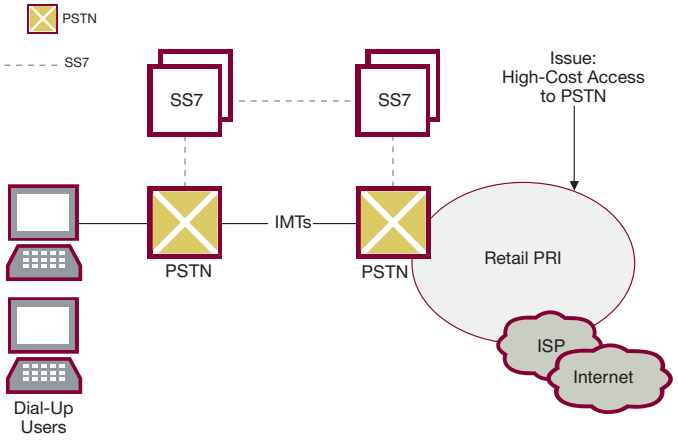

Figure 1

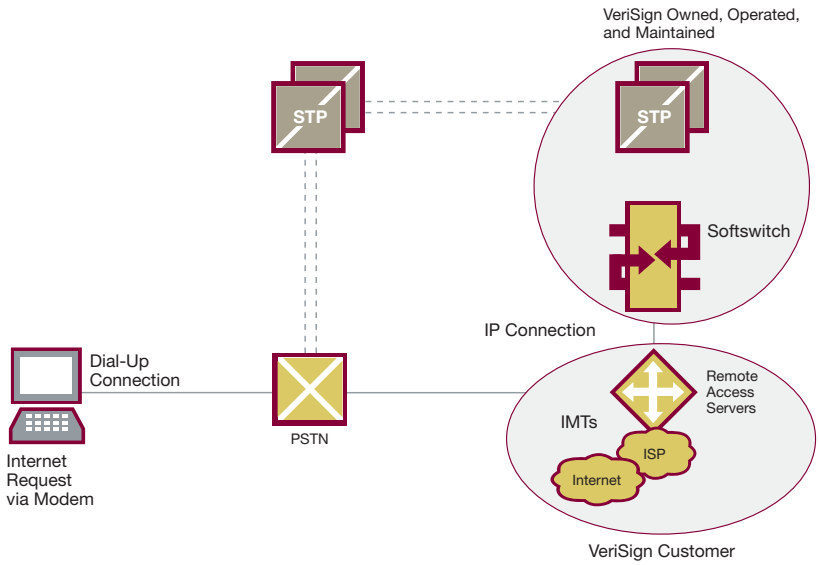

Figure 2

IMTS REDUCE ACCESS COST TO THE PSTN.

Additionally, facilities-based service providers hosting dial-up Internet sessions may be experiencing congestion of switch equipment that was designed for relatively short duration voice calls (average of three minutes), versus the lengthy sessions of an Internet call (average of 30+ minutes). This congestion may result in the need to augment the traditional switch with additional port capacity that can be very costly. By diverting or offloading the Internet traffic from the traditional switch to the outsourced softswitch, the service provider frees up the traditional switch to handle more profitable voice traffic.

Toll By pass

Toll by pass is the method of using an IP network to terminate domestic and international long distance traffic. Many Interexchange Carriers (IXCs) are turning to resellers or service providers of wholesale minutes with private IP networks to terminate these toll calls using the more cost-effective IP network backbone. This application not only reduces the operating costs for the IXC but also offers a new stream of revenue for resellers and service providers of IP networks. Similar to the application of Internet Offload Signaling above, the service provider only needs to connect their RAS or MG device to the outsourced softswitch (*see Figure 3*), to enable terminating traffic to bypass the PSTN and thereby reduce the cost of terminating the calls.

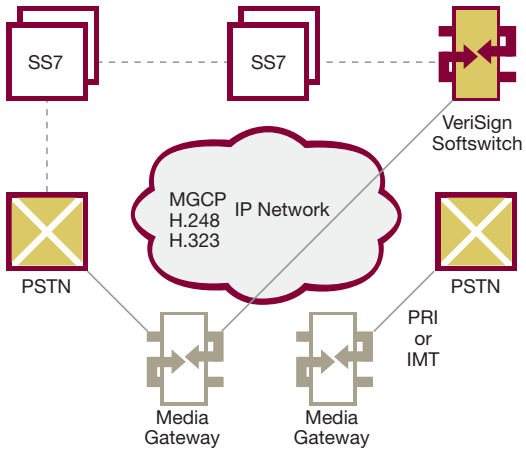

Figure 3

CONTROL AND ROUTING OF DOMESIC AND INTERNATIONAL LONG DISTANCE VOICE TRAFFIC OVER COST-SAVING IP NETWORKS.

Toll By pass Call Flow

1. The individual making a long distance call dials 1+, and the call is received by the local LEC's SSP or Central Office.
2. The switch receiving the call routes it via SS7 to the IXC that was chosen by the end-user customer.
3. The IXC receives the call and launches a call set-up request via the SS7 network to the reseller that will move the minutes to less expensive IP network.
4. The SS7 network makes the call set-up request: STP to the softswitch where it is converted to an IP protocol.
5. The softswitch sends a create connection message to the customer's MG, informing it that there is a call request on a specific trunk group from the IXC.
6. The MG sends an acknowledgement back to the softswitch to say that everything is okay and it is ready to accept the call.

VoIP Internetworking

The VoIP Internetworking applications provide the necessary standards-based interfaces to mediate between various packet and circuit-based protocols for delivery of enhanced services. As the migration from legacy hard-wired switches to the IP-based distributed switches continues, it is becoming apparent that mediation between IP-to-IP and IP-to-SS7 will be important functions. In some cases the protocol mediation will be between elements in the same network, but in most cases the mediation will be required to enable the IP-based network elements to communicate with the PSTN.

With the capability to seamlessly bridge H.323 networks to MGCP/SS7-based networks, SIP and H.248 service providers can build highly scalable networks while protecting their existing investments (*see Figure 4*). For carriers who do not have IP protocol networks, the Internetworking solution enables inter-carrier exchange with other carriers who do have an IP-based network.

Learn More:

For more information, please contact your VeriSign Account Manager, call our information center at 888.655.4636 or 1.912.527.4010, send an email to vcs-marketing@verisign.com, or visit www.verisign.com/telecom.

About VeriSign:

VeriSign, Inc. (Nasdaq: VRSN), delivers critical infrastructure services that make the Internet and telecommunications networks more intelligent, reliable, and secure. Every day VeriSign helps thousands of businesses and millions of consumers connect, communicate, and transact with confidence.

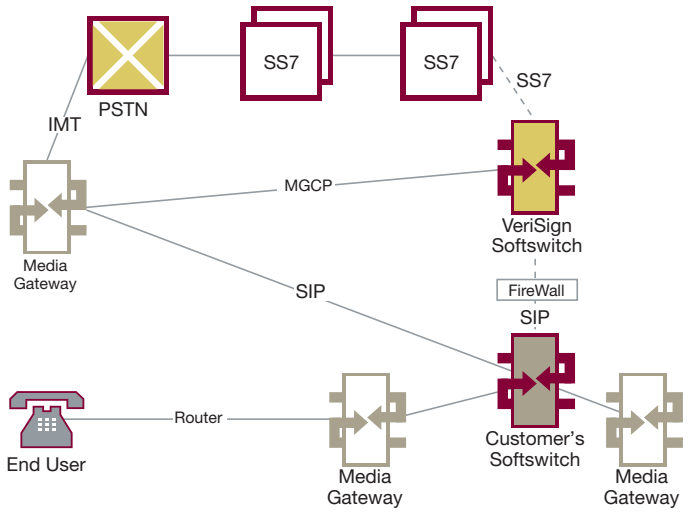

Figure 4

FLEXIBILITY–INTEGRATED VOICE AND DATA PROVIDES INTERFACE OF YOUR IP-BASED NETWORK ELEMENTS TO THE PSTN AND SS7 NETWORK.

+ Conclusion

Telecommunication and Internet service providers alike need to find the most efficient and cost-effective methods to provide services and manage their network infrastructures. Outsourcing control of signaling and network elements, as provided in the VeriSign suite of Mediated Softswitch Services, answers many of today's challenges while providing opportunities for migration to packet-based services.