WHITEPAPER

Lucent Technologies
Remote Access Business Unit

SS7 Solution for Internet Access

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1.0 Introduction

According to recent research projections, today 38 million people regularly access the Internet. The same research predicts a compound Internet user growth rate of 62.4 percent between 1994 and 2000. The number of Internet service providers (ISPs) has grown as well. Today more than 4,000 ISPs provide dial-up modem and integrated services digital network (ISDN) remote access for Internet connectivity.

For the foreseeable future, the majority of these modem and ISDN users who access the Internet will continue to access the Internet through the Public Switched Telephone Network (PSTN). The rapid increase in dial-up Internet access has driven traffic volumes, call holding times, and telephone network congestion to new heights and thus created a heavy burden on the existing PSTN infrastructure. To accommodate this increase in Internet-based traffic, many incumbent local exchange carriers (ILECs) and competitive local exchange carriers (CLECs) are faced with either adding or upgrading expensive voice-based circuit switching infrastructure, or with finding alternative ways to off-load Internet traffic from the PSTN.

One solution for data off-load can be implemented through the use of a post-switch architecture that relies on the existing System Signaling version 7 (SS7) and intelligent network (IN) capabilities, a new type of SS7 gateway and an enhanced remote access server.

This document outlines the requirements for such a solution. It builds on the strengths of the Lucent Remote Access Business Unit's PortMaster® platform; with over 1,000,000 ports deployed in service providers networks worldwide and Lucent

Technologies core expertise in SS7, reliability and the delivery of Telco class products.

2.0 Existing Dial-up Internet Access

Today, when a dial-up user attempts to connect to the Internet, Central Office (CO) switches are either connected directly to each other via inter-office trunks, or through Tandem switches.
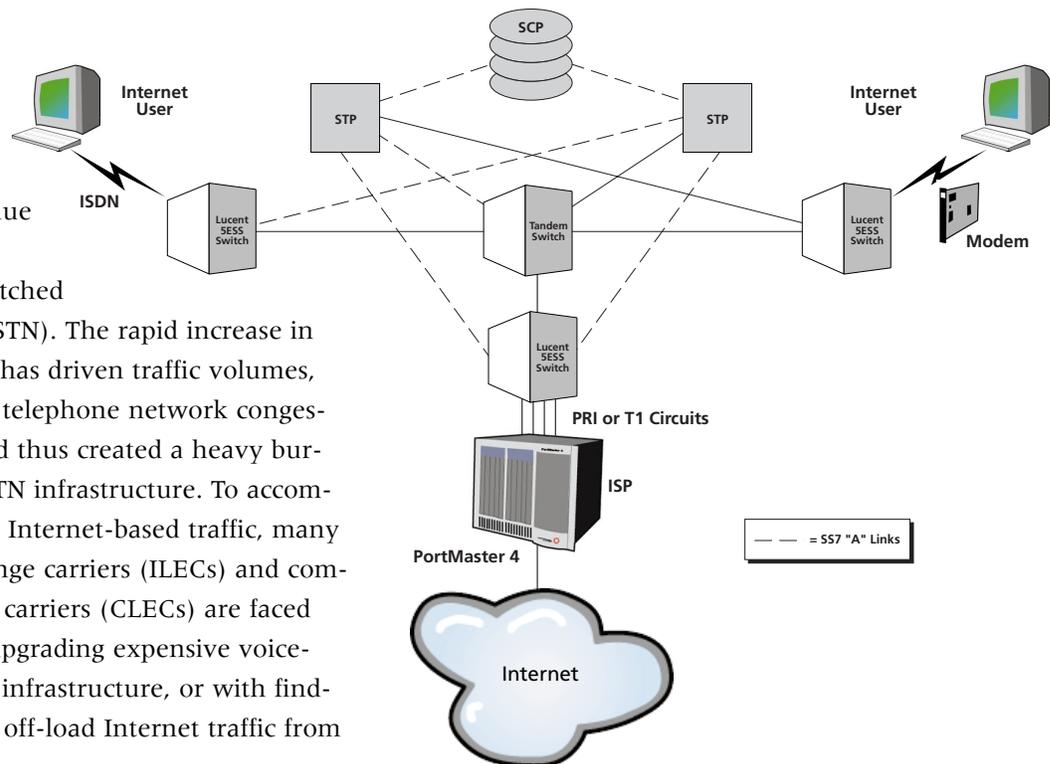
Figure 1: Typical SS7 Network

As figure 1 shows, dial-in calls from Internet users go through the originating CO switches and are ultimately terminated on the ISP network via multi-line hunt groups or ISDN primary rate interface (PRI) circuits. As a result, every time an Internet user calls an ISP, two lines on each CO switch are occupied for the entire duration of the call. Unfortunately, these existing CO voice switches were only designed for a call-holding time of three minutes, not the 40 minute average call-holding time of a typical Internet data call. When you couple the much

longer call-holding time of Internet calls with the increase in the number of Internet users dialing into the voice network, it is easy to see how more congestion is created and telephone companies are required to find new ways of relieving congestion.

3.0 The Lucent Technologies SS7 Solution

The Lucent Technologies SS7 solution for relieving today's telephone network congestion is through the use of an SS7 gateway called the PacketStar™ Connection Gateway (PCG), an enhanced remote access concentrator called the PortMaster 4 Integrated Access Concentrator, and RADIUS CMS (connection-management software). In this solution, an Internet call intended for an ISP is routed from originating CO switch to a port directly connected to a PortMaster 4 unit. The PortMaster 4 then routes the call to the ISP's network via a separate Internet protocol (IP), Frame Relay, or asynchronous transfer mode (ATM) backbone network. The PCG enables the PortMaster 4 to accept the signaling required for call establishment and termination.

To support this new application, PortMaster 4 Integrated Access Concentrators can be co-located with the CO switches or centralized in one large remote point of presence (POP). The PortMaster 4 can support at least 672 ports (one DS3) in a single chassis. When the Internet user calls an ISP, the called number provides the information required to route the call to the appropriate PortMaster 4 port. The ISDN user parts (ISUPs) messages associated

with these calls are routed by the signal transfer points (STPs) to the PCG. The PCG and the PortMaster 4 participate like other switches in the network. Each PCG can manage up to 20 PortMaster 4 units or over 16,000 ports.

Figure 2 shows an overview of this solution.
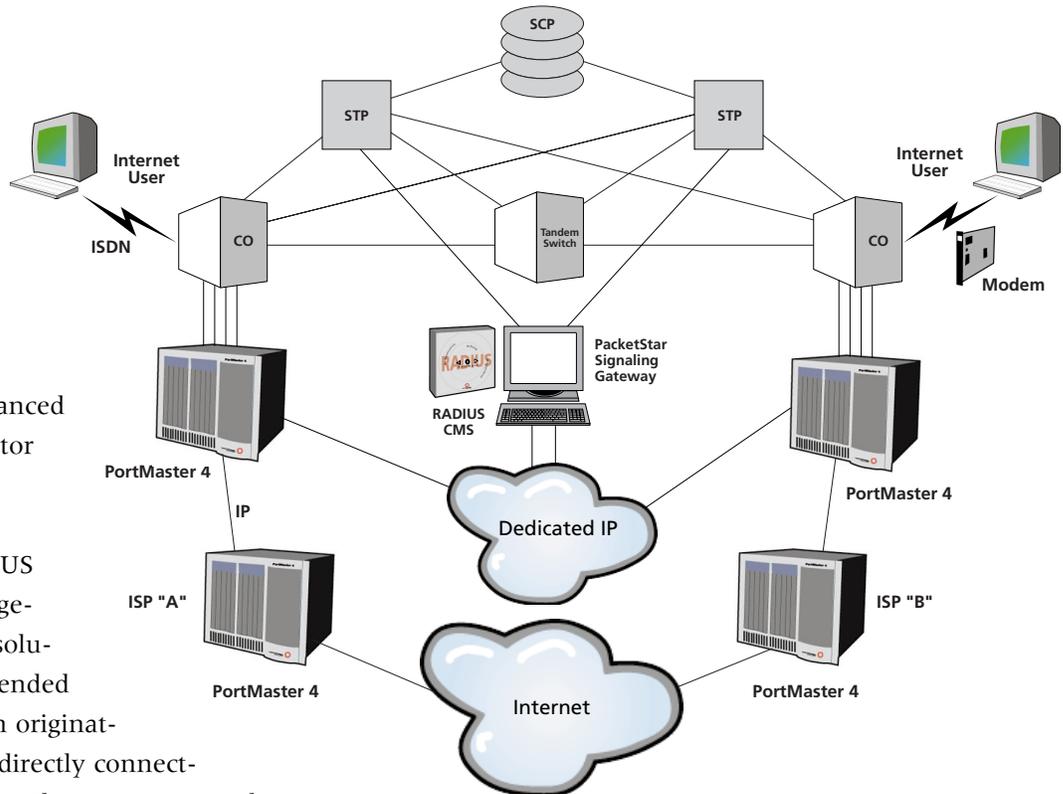
Figure 2: SS7 Data Bypass

4.0 Benefits of the Lucent Technologies SS7 Solution

The combination of the PCG, the PortMaster 4, and RADIUS CMS provides the robust solution carriers need. The benefits of these networking components include the following:

• Performance
• Large capacity
• Extremely high reliability
• Multi-level services
• Detailed reporting to generate revenue

The PCG is designed to provide controllable traffic isolation and ultra-high capacity. There is no real upper limit. The PCG can support 16,000 ports per complex, and multiple complexes appear as a single gateway.

Lucent Technologies will implement the SS7 solution in three phases, as follows:

Phase 1 will allow carriers to reduce congestion from the PSTN by off-loading Internet calls from the voice network. This permits a cost-effective alternative to upgrading central office switches and provides an efficient way to scale the network.

Phase 2 will enhance the SS7 solution by integrating Voice over Internet protocol IP (VoIP) services. This includes adding the H.323 stack and gatekeeper functions to enable one-step dialing and allow service providers to realize new revenue generating services.

Phase 3 will further enhance the SS7 solution by adding transaction capabilities application part (TCAP) advanced intelligence network (AIN) functions for alternate call routing and decision-based routing. This enhancement will increase call completion rates, and provide a more efficient use of remote access server hardware. Additionally, call routing decisions based on time-of-day will be made on a user-by-user basis. Or calls will be routed to less congested remote POPs.

The first release of the PCG will support SS7 and intelligent network (IN) capabilities for North America and will support the international marketplace in a future software release.

5.0 Conclusion

The convergence of data and voice is here. Lucent is committed to leading the SS7 data bypass technology marketplace and will draw on its extensive remote access and telephony experience, as well as on its Bell Labs' research capabilities, to deliver scalable and timely solutions to the market.

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