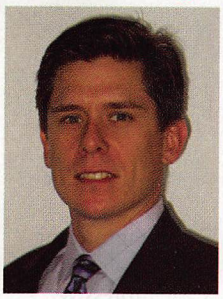

By Hunter Newby

# SS7: S-S-See You Later

Say goodbye, not only to the circuit-switched minute, but also to the legacy transportation methods of the underlying signaling network, and say hello to IP-enabled telco databases, such as LNP, CNAM, LIDB, 411, 911, 8xx, and others, via a nationally distributed Ethernet fabric. By marrying the best of the packet world and the ever important legacy call data, this new combination is sure to effect positive changes in the engineering and bottom lines of many networks.

Signaling has always been near-synonymous with the data that was being retrieved, because there was only one way it was ever really delivered—via Signaling Systems 7. The idea for a top-level signaling network was first introduced after World War II to handle an increasing demand for telephone service. SS7 was defined by the ITU (with versions dating back to 1976) to provide a set of rules on how disparate networks would communicate with each other to send and receive data via dedicated transport to telecom carrier switches from the database managers. In some instances, the database managers were carriers themselves, but others are stand-alone database operators. The key is that the data, or information about the calls, was not the call itself and it was meant to operate on a separate network from its creation.

The databases house a variety of information about callers—their numbers, their location, and more—that is essential to smoothly running a telephone "system" of disparate pieces. The system of pieces only works when there is a central repository of information in order for the call to be properly routed. This also is necessary for the proper deployment of emergency procedures. There are other uses as well, such as caller ID, which subsequently enables call-blocking, call screening, and other functions. SS7 is actually broken out into layers, which are very similar to the 7 layers of the OSI model. In a sense, they have been parallel worlds until now. Technically, SS7 is defined as a protocol, but it can probably be better explained as a guideline for how to interconnect various database elements.

There are many SS7 database providers, including SNET DG and VeriSign, which collectively own a major share of the market. But what neither of them has is a nationwide transport network to deliver these services in any way other than over the legacy DDS 56k and PRI networks consisting of A (Access), B (Bridge), C (Cross-Over), D (Diagonal), E (Extended), and F (Fully Associated) links. These links are how the databases actually interconnect and, for the most part, are controlled by the RBOCs and AT&T because they have the largest copper plants in the country. None of the users of the signaling networks have been able to take advantage of the benefits IP can bring to the databases, since the underlying access networks have been strictly TDM—until now.

The Voice Peering Fabric (VPF) is a distributed Layer 2 Ethernet switch fabric specifically built to carry voice calls. Since it is a distributed peering fabric, it has nodes in many major cities via the dominant carrier hotel facilities there, all of which are interconnected. This makes it an excellent distribution network for not only the voice call as VoIP, but also the necessary call set-up functions of SS7 databases via IP across the Ethernet WAN. The benefits of such a system are in both operational cost reduction and operational efficiency. The VPF follows the OSI model rather than the SS7 model, but the data being transferred remains the same.

Legacy DDS circuits for SS7 are expensive when overall cost per bit and the number of links needed per switch is factored in. In most cases, a single voice switch takes one or two SS7 links, but it is not uncommon to see four links per switch. The reasons range from diversity and redundancy to different services from different providers. Considering that the SS7 link is usually only 56k and the average price per month is around $1,500, the cost can add up quickly. If the SS7 link is a PRI DS1, the overall capacity for signaling only increases to 1.544 mbps, but the cost can increase substantially.

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There is no doubt that the data accessed via SS7 is critical, so there is no chance of eliminating the need for it and, given the legacy architecture of SS7, not much chance of eliminating the TDM loop between the switch and the database—if the switch and the database keep speaking the same old language in between. Recently, SNET DG and VeriSign became the first two telco database managers to enable IP access to their data for look-ups. This solved half of the problem. By IP-enabling access to the data, they can speak (and be spoken to) in the most universally applied programming language in the world. That left the small issue of how to actually get the database connected to the

switches, which is where the "Fabric" part of the VPF comes in.

With Ethernet switching nodes in most of the major carrier hotels in the United States, the VPF is essentially a neutral, packet-based, Layer 2 edge network at a PoP near you. This makes it very economical for carriers to reach and plays right in to the model of Ethernet-enabling metro and regional dark fiber and wavelengths. Since the VPF is an existing, non-public Internet, IP distribution network SNET DG and VeriSign decided to use it to act as a delivery network for their database services. They interconnect their IP-enabled databases to the VPF and the carriers and other members of the VPF can establish VLAN's to the database providers across the Fabric from any VPF node. With the monthly cost of a 10meg VPF port at $1,500, there is much more bit per buck to utilize than a 56k DDS for the same price. In addition, the legacy DDS network call set-up time ranges in the 100s of milliseconds, whereas the Ethernet environment exponentially improves that time to the 10s of milliseconds.

The combination of these two steps—IP-enabling the data and a distributed Ethernet network—has started a much-needed reshaping of the networking landscape of voice communications. With IP everywhere, nearly all information has the potential to be interoperable, but without the network, that capability is of little use. The public Internet was a good starting point and a nice model to follow, but today it is quite possible, and more practical, to create application-specific Internets that have specific users with precisely defined rules. This brings the level of comfort and reliability that major carriers and, ultimately enterprises, demand. There is a great deal of promise surrounding VoIP Peering and its potential to improve the way networks interconnect and people and devices communicate. The migration of SS7 functions to an IP-based delivery method is an integral component of that potential success.

For a complete overview of the SS7 Layers and definitions of terms check out www.ss7.com. IT

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## Acronyms Defined

**CNAM** — Caller Name
**DDS** — Digital Data Service
**ITU** — International Telecommunications Union
**LIDB** — Line Information Database
**LNP** — Local Number Portability
**OSI** — Open System Interconnection
**PRI** — Primary Rate Interface
**SNET DG** — Southern New England Telephone Design Group
**SS7** — Signaling Systems 7
**TDM** — Time Division Multiplexing
**VPF** — Voice Peering Fabric