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Jack Burton
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SIP Peering

Is a Cable Operator an Island? Until now, the answer, at least as it pertained to VoIP, was yes!

When Cable started offering VoIP services a few years ago, the “IP” part of “VoIP” was limited to the Operator’s own network. Voice was converted into packets at the eMTA (Embedded Multimedia Terminal Adapter) and, at a nearby headend, converted back into standard TDM (Time Domain Multiplexed) voice at the Trunking Gateway. Calls traversed the Public Switched Telephone Network as if they originated from a standard Class 5 TDM switch.

The conversion to packet-based transmission for the major providers of long-distance networks is virtually complete. Currently, new providers with IP-only infrastructures abound. How do we connect to these next-generation networks, and to each other? SIP trunks. SIP trunks are IP peering connections where the media stays in packet form and the signaling is via Session Initiation Protocol (SIP). Because the media stays in packet form, there is no additional transcoding loss or latency. SIP trunks cannot only connect voice calls, as with TDM networks, but also other types of media. Two examples would be Video and Instant Messaging. In addition, the number of voice channels is limited only by the bandwidth of the transmission facility and not by the fixed number of channels per DS1 or DS3 circuit.

To use SIP trunking, providers must interconnect physically, and point their SIP Proxies or Border Elements at one another. This technique is applicable to both paid termination services, and free termination between service providers. Fortunately, many MSOs are already peered with one another for Internet traffic. These facilities may be augmented where required to support peering for new traffic modes.

Once the physical connectivity between the Peers is established, the Session Border Controller (SBC) configuration can begin. An SBC is a multi-function device that sits on the border of the core network. It provides security functions, normally associated with a firewall; protocol correction and translations, normally associated with a SIP Proxy; bandwidth management functions; accounting functions; and even law-enforcement access. SBC Configuration involves testing, tweaking, and re-testing until your switch and the Peer’s switch are able to converse on a first-name basis.

The next challenge of peering is deciding which calls to send to the Peer. Before SIP trunks were involved, traffic would route out TDM trunks based on some simple decisions: Is the number in my switch? If so, handle the call internally. Is the number local? Send it to the Local Exchange Carrier (LEC). Is it Long Distance? Send it to an Inter-Exchange Carrier (IXC).

Today, routing decisions cannot be determined by looking at the dialed digits without additional information. The Local Number Portability (LNP) database, administered by Neustar, updates constantly as customers move from one carrier to another. LNP data is authoritative for number ownership; MSO allocations of numbers from a partner carrier appear to belong to the partner, not the MSO. As VoIP operators add more switches to their networks, even on-net routing decisions may become complex.

Signaling System 7-based databases (such as LNP) are capable of directing calls to SIP trunks as well as TDM ones, however the cost and complexity of doing so leads many VoIP providers to seek an alternative query method. ENUM (Electronic Numbering) is a protocol for querying a database with a phone number, and in return receiving information on where to send the call using DNS (Internet Directory Number Service) hardware and software. Information is under control of the ENUM database owner, and updated to account for borrowed numbers. The criteria for route selection can include new parameters, such as the measured quality of the link between the peers.

Use of ENUM for routing information can help drive the cost of completing a call closer and closer to zero – which is what we desire in a world of flat-rate service packages. As peering develops, VoIP islands will move closer together - - an archipelago?