

BandTel's Global Number Services: True Local Number Portability, True Local Access Competition

Peter Sandstrom, Chief Technology Officer, BandTel - Jan. 2, 2009

Business Telephone Numbers with No Geographic Ties

The world of telecommunications has changed dramatically during the past decade, requiring businesses to reexamine how we view our communications services. Because of the emergence of high quality voice over Internet (VoIP) services that are equal or superior to traditional telephone company services, the intransigence of a local telephone number is no longer as clear cut. This article will describe the historical background and how business telephone lines were delivered, and then illustrate how "Global Number Portability"[™] (GNP[™]) is the new reality.

A Brief History of Telephony

In 1996, the U.S. Federal Communications Commission (FCC) mandated that local telephone services be available from alternate competitive local exchange carriers (CLECs) in addition to the traditional Public Switched Telephone System (PSTN). This was known as "The Telecommunications Act of 1996 (<http://www.fcc.gov/telecom.html>)". One hundred years of local telephone service monopolies – whether from the former Bell Operating Companies (BOCs) or independent local exchange carriers – had failed to bring innovation and lower costs that might be better provided via a true competitive environment.

Competition at the local level was expected to change everything. It was going to deliver innovation, choice and competitive pricing. Fast forward to today and we see that, for the most part, the Telecommunications Act of 1996 has failed to deliver on its promises. Failure has occurred both politically and technically. The entrenched local telephone companies were not willingly going to surrender their territories, and the underlying telephony technology – largely Time Division Multiplexing (TDM) systems – was expensive to deploy and be maintained by new, start-up CLECs.

In the end, the era of the CLEC failed to materialize en mass as it was simply too costly and too hard-wired to a specific geographic location, to make a viable and sustainable business case for most CLECs.

Local number portability (LNP) was also an outgrowth of the Telecommunications Act of 1996 but was limited by geographical constraints. It was "local." You could only port your local direct inward dialing (DID) number if you had the following:

1. **A Local CLEC** - you needed a local CLEC in your neighborhood (rate center) that could serve you on as a client.
2. **You stayed put** - you could not move your office or enterprise to another geographical location. You could only port your numbers to the same local hard-wired rate center.

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Despite the promise of LNP, inherent obstacles prevented it from providing the mobility that businesses and consumers had anticipated. So, in the end, most of the time the only alternative was “change the number” as painful as that is for an enterprise with an established published telephone listing.

Sometimes, however, innovation catches up with public policy. At about the same time the 1996 Telecom Act, a new technology called VoIP (Voice over Internet Protocol) was emerging. The technology allowed voice to be transported over packet- based networks. In so doing, dedicated point-to-point circuits were no longer required as in the past. Voice streams destined for many different locations could ride over the same transport facilities in a stateless manner and share the transport facility.

Enter the Internet

From its beginning in the 90's, VoIP quickly grew, and evolved from a hobbyist curiosity to what is now a full-fledged industry, handling voice traffic over IP networks on a very large scale. This blossoming of VoIP owed nothing to the Act of 1996. In fact, it flourished in spite of the Act, which was trying to promote and extend nearly obsolete TDM technology.

One of the reasons for this quick early VoIP adoption was price. IP networks are inherently easier to manage than TDM networks, so there is a built-in cost benefit. More importantly, the greatest promise from VoIP is the potential for new features that are not available from traditional TDM networks.

Telecom Without Borders

One of these “new capabilities” afforded via VoIP is the realization of the promise regarding local number portability – real local number portability without the artificial constraints imposed by the old world of telephony. In this case, inbound DID calls to a customer connected via VoIP are still transferred through a traditional TDM rate center. However, once the call passes through that rate center, the call passes through a TDM/IP point of demarcation, and moves into the IP realm. The call can then be transported to any signaling endpoint location on that IP network, anywhere on the planet, with virtually no restrictions. In so doing, the geographical limitations are removed and the call in that IP domain achieves Global Number Portability (GNP) capabilities as characterized by BandTel.

In the case of BandTel, once the call is in the IP domain, it is routed to BandTel's ENUM routing Server™. It is then forwarded across the BandTel network and terminated wherever the customer's dial-plan dictates. This can be anywhere! The VoIP service can even move any time to anywhere and BandTel will enable the calls to follow the client VoIP service in real time, often times automatically with no human intervention.

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BandTel calls this concept "Global Number Portability"™ or GNP™. Once in the IP domain, BandTel can deliver a DID or 800 called number to any location our customer wishes. If the customer wants to change to a different geographical location, it requires little or no configuration on their part, and is generally instantaneous.

The ability to free telephony from its geographical ties is quite significant and is one of the key factors that will enable future mass migration away from TDM networks to packet networks for voice and other telephony applications.

Understanding the Technology

So how does this all work? What makes it possible for VoIP to be free of specific geographic restrictions where as TDM networks dictate a physical location for a termination point?

In a packet network, the Internet address location for termination of the voice media is embedded in the packets that are being transported. There is a delivery address paired with each snippet of voice being transported inside that IP packet. This has significant ramifications, and offers major advantages over traditional TDM.

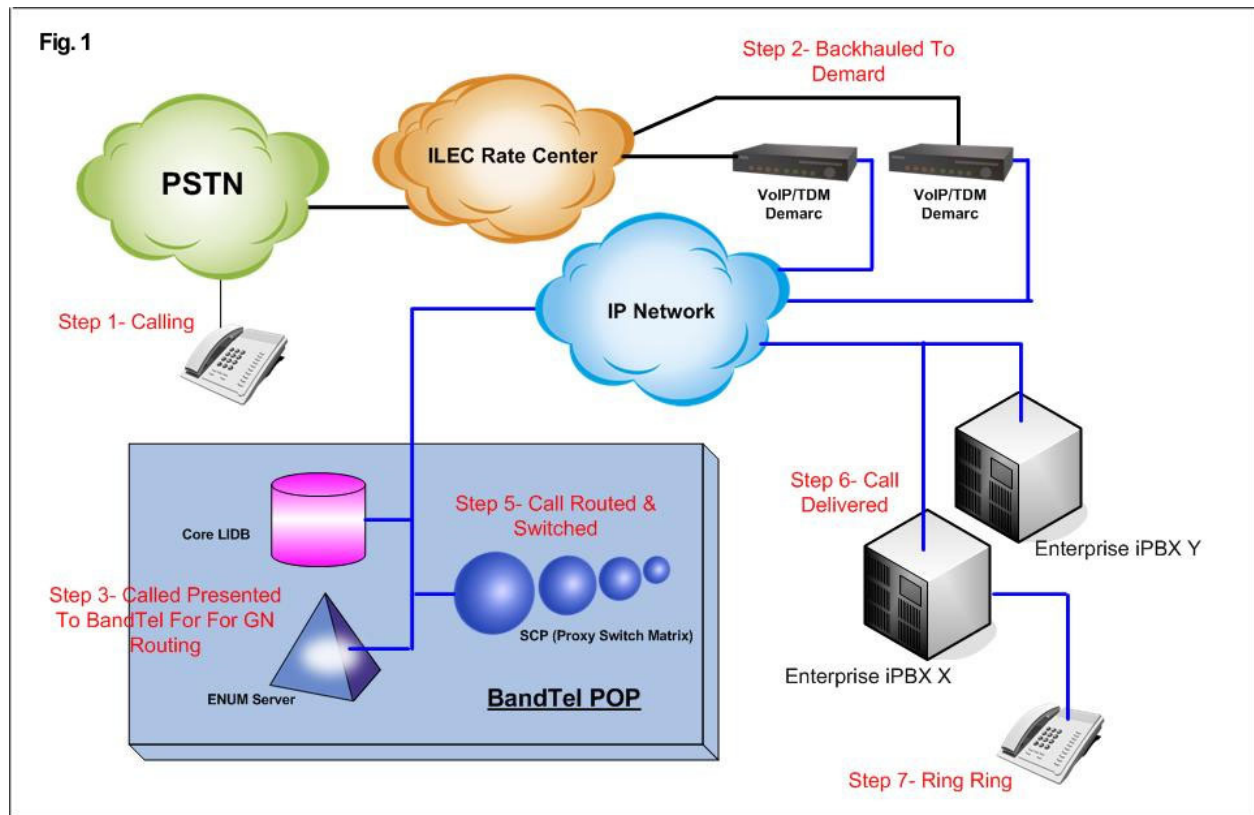
With TDM, there is no address associated with the Pulse Code Modulation (PCM) voice payload. Therefore, the call path (circuit) must be established before the call actually begins transporting media. To do this, every switching point along the path of that call must execute a complex set of state-based software instructions to set up that circuit through its switching fabric.

As a result, the moment a standard telephone number is ported to a VoIP carrier, it is freed from location, and if ported to BandTel, realizes true Global Number Portability status.

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Let's look at a detailed example of how this happens. Referencing Figure 1, we see the following:



1. **Call being originated from the PSTN** - This call transits over the PSTN to its designated rate center.
2. **TDM/IP Demarc** - Once the call passes through the rate center, it is backhauled to a wholesale VoIP demarcation point and sent into the IP domain.
3. **Call Presented to BandTel** - From the demarc, the call is routed to BandTel's switching point of presence (POP).
4. **Call Analyzed and Routed** - At the BandTel POP, the call is analyzed and GNP routing logic is executed via the BandTel ENUM server.
5. **Call Routed to destination** - The BandTel "ENUM Server"™ forwards the call on to its final destination.
6. **Ring Ring** - The VoIP phone rings, is answered, the parties are connected, Real-Time Protocol (RTP) data flows, and talking begins.

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The Value to the Enterprise

With respect to the enterprise, the GNP concept offers major advantages on several fronts. First and foremost is of course removing the concept of "local" and replacing that with "global." The corporate IT manager is then free to point inbound DID and 800 telephone numbers to any VoIP telephony switching device in the enterprise and see results instantly. This allows total freedom of operations as it pertains to geographic location and relocation. There are no longer any "local" limitations. All terminations are globally portable and dynamically user defined.

Another application that results from BandTel's GNP is Global Number Translation (GNT™) This BandTel service allows an end user to order any DID or 800 number from any geographic market supported by BandTel, and have that number forwarded to any other number in the PSTN (e.g., 1+, 011+, or 800).

In that way, GNT™ allows an enterprise to establish a local presence in any market but then backhaul it to any PSTN termination point with no restrictions. Further, routing changes on the GNT setup can be made simply by submitting a request to BandTel support, and then seeing the translation change order filled and operational in a matter of hours.

Conclusions

VoIP technology, and specifically SIP with BandTel GNP services, is rendering fixed address-physical location ties of an end telephony station device unnecessary and irrelevant. In so doing, it solves major issues for enterprise telephony system deployments. This includes:

- o **Immediate On-Net cost savings** - GNP unifies the dispersed enterprise by leveraging the flexibility of IP, and thus allowing huge savings on interoffice communications.
- o **Relocation now trivial** - VoIP with GNP solves the enterprise dilemma of relocation and allocation of end station addressing, turning what was a totally fixed static model into one that is user definable, configurable, and totally dynamic.
- o **Enterprise scaling simplified** - GNP allows resizing of an enterprise to take place with little or no inconvenience or disruption of telephony services. Facilities can be added or removed and telephony needs scaled immediately to handle new enterprise footprints.
- o **Local competition realized** - GNP finally provides true competition for local access, irregardless of is the local exchange telephone company physically in the Enterprise's geographical market space.

If you'd like to explore BandTel GNP™ services further, please contact BandTel sales today at:

- o **1-949-640-9700** (GNP enabled) or **1-800-730-2870**
- o **sales@BandTel.com**