The Number Crunch: A TCG Solution

May 1996

TCG

Teleport Communications Group
One Teleport Drive
Staten Island, New York 10311-1004
INTRODUCTION

In the fall of 1995, testimony was presented to the California Public Utilities Commission (CPUC) regarding the question of whether new telecommunications competitors should be required to match existing LEC rate centers. This testimony demonstrated that such a requirement would lead to severe number exhaust problems and that a mitigating solution was needed to address the issue. Moreover, it is clear this is not a unique problem to California, since number exhaust problems also exist in other jurisdictions and are becoming extremely critical. The problem is more acute and pressing in California only because of the significant number of new local entrants and the imminent exhaust problems now faced by the state.

In February 1996, the CPUC ruled that new entrants do not have to match existing incumbent rate centers, thus serving to focus on the need for this type of solution. In the decision, the CPUC recognized the potential cost implications to new entrants for opening new NXX codes and the implications for the number exhaust problem if such matching were required. In an effort to address the issue, the CPUC directed industry participants in California to explore the details and implications of a proposal submitted by Teleport Communications Group (TCG) for a modification to Bellcore’s Terminating Point Master (TPM) file, allowing the assignment of NXX codes across more than one rate center.

While no solution is problem-free, the solution proposed by TCG will preserve scarce numbering resources and promote the development of facilities based competition and still support the objectives of the wholesale/resellers markets. This paper outlines the TCG solution.
BACKGROUND

As part of the hearings before the CPUC to establish local competition, the incumbent local exchange carriers, Pacific Bell and General Telephone of California, addressed the problem of number exhaust within California. Both companies described the California marketplace as consisting of almost 600 rate center areas, with more than 60 new entrants. The two LECs argued that if a new entrant wanted to conduct business in a particular rate center, it would have to obtain an NPA/NXX number block in that area in order to ensure accurate billing and prevent customer confusion regarding rates. The cost of such a requirement was estimated to be $380 million.

Cost was not the only problem, however; there also exists the significant problem of number exhaust. This number exhaust problem exists in California even without the advent of the new entrants and the establishment of local competition, but the opening of the local market raises the potential for even further exhaust. Moreover, even with the introduction of new NPAs, there is still the question of availability (within the required time frame) of sufficient numbering resources to allow for actual competition. The LECs predict number exhaust in every one of California’s 10 LATA’s before the turn of the century. If the new entrants cannot obtain telephone numbers, there can be no competition.

Accordingly, as part of the CPUC proceeding last fall, TCG submitted testimony proposing an interim solution that would mitigate the number exhaust problem while simultaneously allowing for matching of LEC rate centers. This interim solution was designed to conserve number resources until full number portability can be approved and implemented. The TCG solution, discussed in more detail below, involves the development of a subfile for Bellcore’s TPM update
process, which would allow a new entrant to use NXX codes more efficiently, across rate centers, while still allowing all carriers to rate calls properly for billing purposes.

As part of its ruling on rate centers, the CPUC ordered the Commission Advisory and Compliance Division (CACD) to hold a workshop on the TCG Solution in April. Based on the efforts of this workshop, Bellcore was requested to establish a Rough Order of Magnitude estimate for the design, development and implementation of this project. The request was made in mid-April; Bellcore provided a response on April 25.

At the same time as the California proceeding was in progress, the Industry Carrier Capability Forum (ICCF) formed Workshop 288 Rating/Routing to address this problem on a nationwide basis. The ICCF workshop also requested that Bellcore review the TCG solution and comment on its potential for implementation.

GENERAL DESCRIPTION OF TCG SOLUTION

The TCG solution proposes that the NXX codes ordered by a carrier and assigned by the CO code administrator may be assignable across multiple rate centers. This assignment is designed to be simple and adhere to a pre-defined logical set of constraints. For ease of administration, the following constraints and assumptions apply to this solution:

1. NXX codes are assigned to rate centers in 1000 number blocks;

2. Entire NXX codes are assigned at time of request;
3. Blocks of 1000 numbers are assigned as contiguous numbers (i.e. 0000 - 0999, 1000 - 4999, 5000 - 9999);

4. Entire NXX codes are to be assigned within a single NPA;

5. Entire NXX codes are to be assigned within a single 911 tandem serving area;

6. A logical grouping area is to be assigned an NXX code and shall utilize a default rate center;

7. A central creation and distribution organization is to be created to administer and implement the solution.

ARCHITECTURE DESCRIPTION FOR TCG SOLUTION

The general outline of the TCG solution requires the TPM file to be modified to allow the assignment of NXX codes in increments of 1000 number block, to be assigned to different existing rate centers. This will allow for the rating of calls to the appropriate V & H coordinates. Each billing company will modify its billing system to accomplish the following two major items:

1. When the TPM update file is received from Bellcore, the structure of the production TPM is altered to allow for a sub-segmentation of the NXX codes. The update records will allow the billing company to build a TPM file with the default rate
center assignment or to go to the more granular assignment, in 1000 number blocks, as required.

2. The billing company will modify its billing system/rating system to access the new TPM file to obtain the proper rate center assignment. This will allow for the proper rating of calls for those companies that require the exact rate center V & H designation.

METHOD OF OPERATION
Database Requirements

The required database structure changes are in the resulting TPM created from the updates received from Bellcore. Each company will need to modify the database structure in their billing system to accommodate this new data. If a company chooses not to utilize the new data, the current TPM build process would need to be able to ignore the new records.

Call Rating

After the TPM update is received from Bellcore, an updated TPM must be built to conform to an individual company’s billing and rating systems specifications. Each company’s rating system must then be modified to recognize the new data that is required for the rating process. This can be as simple as recognizing the existence of the data and then accessing the data. From that point on, the rating process should progress as it does today.
KEY ISSUES RELATED TO TCG SOLUTION

Utilization of Number Resources

The ability to utilize a NXX number block across multiple rate centers could achieve a 10 times savings in the quantity of numbers required to begin serving customers in an area. This savings translates into a requirement for fewer numbers for new entrants that require numbers as they start business in new area. It can also be used, however, by the incumbent LECs as they begin to exhaust their current supply of numbers in each area.

Relationship to Number Portability

The TCG proposal does not substitute for service provider number portability (SPNP) in any way. Rather, it serves to reduce the use of new numbers, delaying NXX code exhaust within NPAs by allowing more efficient number assignment than current techniques. True SPNP, when available will allow additional number assignment efficiencies by supporting the continued use of existing number assignments across multiple CLEC, and ILEC, rather than requiring new number assignments when customers change carriers. In addition, the TCG proposal serves to support location portability to a limited extent, within NPAs.

IMPACTS OF TCG SOLUTION

911 Requirement

The TPM solution has established the constraint that the split assignments be restricted across 911 tandem areas. This was initially done for trunking efficiencies. However, if the restriction exists
that an NXX code cannot exist in multiple 911 tandems, then the design restriction is validated. This needs to be researched and resolved.

**Operator Services**

The impact on the operator services platforms should be divided into two areas:

Real Time Rating

Delayed Rating.

**Pay Phones**

Representative of the pay phone industry have expressed mixed reaction to the TPM solution. The implied expansion of NXX rating points may have substantial impact on the capacity of the phone to have storage and processing capacity to rate calls. However since the pay phone is a one-to-many, forward looking rating paradigm, this may be handled by a redefinition of the rating methodology that is followed. The combining of accessed rates across pre-defined areas may lessen the impact of this solution.

**Impacts on IXCs**

The IXC's rating strategy will determine the requirements for modifications to accommodate new TPM data. The IXC may choose to rate their call to a given area with less granularity then is defined by the current rate center.
Impacts on PBX Vendors for ARS Modifications

ARS support that is programmed within the PBX systems would have to be modified to take advantage of the new degree of granularity available with the multiple rate center assignments.

Expense of Systems Modifications

Each area that will require system support will require some modifications in addition to the modifications to the TPM support. In all cases, the cost to perform these modifications is incurred for number portability implementation. The implementation only changes the required time frame.

ADDITIONAL PROPOSAL

NXX-X Solution

AT&T offered an additional contribution to the California Rate Center Issues Workshop that suggests a different approach. Instead of dividing the NXX codes across multiple rate centers, AT&T proposes to assign the entire 10,000 number block to one rate center, but to assign 1000 number blocks to different providers. This gives relief to the legacy billing and rating systems but shifts the burden to the routing methodologies. The focus of the AT&T proposal is to remove the responsibility for the number exhaust solution from the billing system and place it on the switch translations. The AT&T proposal implies a choice, to misrate a call if there is a problem or an inability to complete a call because of the coordination of switch translations across multiple providers.
For further information contact:

Dennis McClure  
Director, Carrier Services  
Teleport Communications Group, Inc.  
One Teleport Drive  
Staten Island, NY 10311

Telephone: (718) 355-2757  
Fax: (718) 355-4431  
Internet: mclurd@tcg.com
TCG Issue Papers

Performance Standards Key To Interconnection
(April 1996)

Effect of Resale on Facilities-Based Competition in the Local Exchange Market
(November 1995)

Interconnection Compensation - The Critical Issue for Local Exchange Competition
(October 1995)

States at the Forefront in Making Local Telecommunications Competition Legal
(August 1995)

The Economics of Interconnection
By Gerald Brock  (April 1995)

Universal Service Assurance II: A Blueprint for Action  (November 1994)

CompLECS & Universal Service Assurance: How Competition Will Strengthen
Universal Telephone Service  (August 1994)

Whither the CAPs?  (June 1994)

The Unlevel Playing Field: Asymmetric Market Power Demands Asymmetric
Regulation  (March 1994)

Universal Service Assurance: A Concept for Fair Contribution and Equal Access to
the Subsidies  (December 1993)

The "Pot Bay": Phase II, Ameritech Takes a Step in the Right Direction
(November 1993)

Telco Fiber Fiascos: Will Accelerated Infrastructure Programs Be the Next Nuclear
Power Plant Debacles?  (July 1993)

The "Pot Bay": Several BOCs Attempt to Obstruct Interconnection...Again
(June 1993)

For free copies of any of the above issue papers, please call (718) 355-2295.