WHERE HAVE ALL THE NUMBERS GONE? (SECOND EDITION)

Rescuing the North American Numbering Plan from Mismanagement and Premature Exhaust

The Ad Hoc Telecommunications Users Committee

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Preface | WHERE HAVE ALL THE NUMBERS GONE? RESCUING THE NORTH AMERICAN NUMBERING PLAN

In 1998, Economics and Technology, Inc. released *Where Have All the Numbers Gone?* — presenting ETI's comprehensive assessment of the adverse consumer impact of telephone number mismanagement, and a detailed discussion of options for improving the utilization of valuable numbering resources. At stake in the 1990s was the preservation of individual area codes and the related desire to avoid the costly and disruptive introduction of new ones. In seeking to avoid multiple new area codes, state public utility commissions and state consumer advocates have been taking the lead in pursuing alternative routes that entail optimizing the assignment and distribution of numbers to carriers, only to have their efforts frustrated by FCC inaction.

Now, two years later, rather than abating, the numbering crisis has escalated. Each day that the problem goes unaddressed makes it all the more difficult to resolve. Delay in dealing with this critically important issue has now caused the stakes to be raised to encompass the future of the entire North American Numbering Plan (NANP) itself. The Industry Numbering Committee and the North American Numbering Council, and perhaps soon the FCC as well, are all seriously discussing various options for expanding the existing 10-digit dialing pattern to include either 11 or 12 digits, a transformation that could cost the US economy as much as $150-billion or more. Suddenly, the potential exhaust of the nation's numbering resources is overshadowing states' individual efforts to avoid seemingly endless demands for new area codes.

Like the original version, this revision of our earlier report was prepared for the Ad Hoc Telecommunications Users Committee, and is similar in its objective: we demonstrate that it will be possible to adopt measures that are far less costly and disruptive for consumers and for the nation as a whole than the industry's proposed solutions. The NANP exhaust is not inevitable and is certainly undesirable. Timely, deliberate, and collaborative action by the FCC, public utility commissions, consumer advocates, and the telecommunications industry is essential in order to preserve the NANP as we now know it. This report was prepared under the overall direction of Dr. Lee L. Selwyn, president, and Susan M. Baldwin, senior vice president at ETI. Contributing to this work were Douglas S. Williams, senior consultant, and Sarah C. Bosley, consultant at ETI.

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Executive Summary

WHERE HAVE ALL THE NUMBERS GONE? RESCUING THE NORTH AMERICAN NUMBERING PLAN

During the late 1990s, the national area code crisis escalated to a new level, with the depletion of numbering resources threatening the future of the entire North American Numbering Plan (NANP). Meanwhile, the seemingly endless succession of new area codes throughout the country imposed substantial cost and inconvenience for consumers and, in response, federal and state regulators began with increased urgency to investigate ways to extend the lives of area codes. At the federal level, in 1998, the Federal Communications Commission invited state public utility commissions and consumer advocates to join federal regulators and the telecommunications industry in the national debate on telephone numbering by forming the Numbering Resource Optimization Working Group (NRO-WG), a national advisory group established to identify and to analyze ways to optimize the use of telephone numbers. Based in part upon the work of the NRO-WG, the FCC sought comment in its Numbering Resource Optimization Docket CC 99-200 on ways to improve the nation's use of numbers and, eventually, in March 2000, issued a comprehensive order that, among other things, mandated nationwide thousands-block pooling and further delineated federal and state responsibilities for telephone number management.

Unfortunately, in the 18 months between the FCC's September 1998 release of its "Pennsylvania Numbering Order" — which required states to seek delegated interim authority in order to pursue numbering optimization measures — and the March, 2000 issuance of its "Numbering Order and Further Notice," states were confronted with numerous area code exhaust situations with scant latitude to develop and adopt creative number conservation solutions. This lack of effective number conservation has raised the specter of NANP exhaust — running out of area codes available for assignment — within the current decade. NANP exhaust would require that one or more additional digits be added to the existing 10-digit dialing format, a move that would cost the US economy as much as $150-billion or more. Although progress has been slow and the learning curve apparently steep, it is still possible to avoid the exhaust of the NANP. But time is fast running out, and continued delay and inaction on the part of regulators can no longer be tolerated.

The numbering resource problem ultimately boils down to the extreme fragmentation of central office code (NXX) assignments that results from the extraordinarily large number of geographically minute rate centers in most Numbering Plan Areas (NPAs). The highly granular rating area structure was created nearly a century ago at a time when distance between the calling and called parties was a major component of the total cost of a telephone call. Today's telephone network architecture has all but eliminated distance as a cost driver — in fact, the major interexchange carriers have all adopted distance-insensitive "postalized" pricing of their interstate long distance services. At the intraLATA level, however, incumbent local exchange carriers persist in maintaining arbitrary and archaic distinctions between local and toll calling and, in many cases, still retain distance-based pricing of toll calls. *There would be no need for the large number*

of extremely small rating areas but for the purpose of supporting these ILEC pricing practices, and their continuation in the face of the $150-billion-plus price tag for NANP digit expansion should not be condoned. The nation's numbering crisis can be solved — and NANP expansion can be permanently avoided — by consolidating the large number of small rate centers in each LATA into a small number of large rate centers, or possibly even a single LATA-wide rating area that would eradicate the distinction between "local" and "intraLATA toll" calling. ILECs have resisted rate center consolidation solely to protect their pecuniary interest in maintaining their intraLATA toll revenue stream, despite the fact that toll rate treatment of intraLATA calling can no longer be justified on the basis of cost. Whatever the merits of local/toll distinctions and distance-based pricing may have been in the past, they must now be reevaluated in light of the enormous economic cost, in the form of NANP expansion, that retention of these pricing devices will entail. Rate center consolidation is a measure that is available to state regulators and is one that has expressly not been preempted by the FCC. States should move quickly to develop aggressive rate center consolidation plans that will permit them to avoid further area code relief within existing NPAs and, in so doing, avoid NANP expansion at the national level.

Table of Contents

WHERE HAVE ALL THE NUMBERS GONE? RESCUING THE NORTH AMERICAN NUMBERING PLAN

Tables

Figures

Appendices

1 INTRODUCTION

The nation's numbering crisis continues to escalate, due primarily to regulatory inaction and industry intransigence

The telecommunications events of the 1990s suggest that new numbering plan area codes (NPA codes) are an inevitable consequence of competition in local telecommunications markets. Between 1984 and 1994, only twenty-one new area codes were added to the North American Numbering Plan (NANP).[1] In the five-year period from 1995 through 1999, 119 area codes were added.[2] There are currently more than 25 area codes assigned to the state of California alone,[3] up from 13 in 1994.

Although about thirty-four states have experienced the disruptions and costs associated with area code changes since 1995, this pattern need not and should not continue.[4] The deployment of local number portability in incumbent local exchange carrier (ILEC) switches in 1998,[5] the completion of detailed industry guidelines on thousands-block number pooling in 1999,[6] and the participation by many ILECs in telephone number pooling trials starting in 1998 and continuing through the present[7] are some of the many reasons that the nation can avoid area code and NANP exhaust.

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1. Industry Analysis Division, Common Carrier Bureau, Federal Communications Commission, *Trends in Telephone Service*, March 2000 (Trends in Telephone Service), at Table 21.1. Please refer to Appendix 2 for an explanation of the North American Numbering Plan and key numbering terms.

2. *Id*.

3. North American Numbering Plan Administrator, *NPA Relief Activities Since 1995*, Assignments as of May 1, 2000, at http://www.nanpa.com/number_resource_info/assignments.html.

4. *Id*.

5. In the Matter of Telephone Number Portability, CC Docket No. 95-116, *First Report and Order and Further Notice of Proposed Rulemaking*, 11 FCC Rcd 8352 (1996), at para. 3.

6. "Industry Numbering Committee (INC) Thousand Block (NXX-X) Pooling Administration Guidelines," INC 99-0127-023, updated April 14, 2000.

7. *See* discussion in Chapter 5.

Evolution of Numbering in the United States

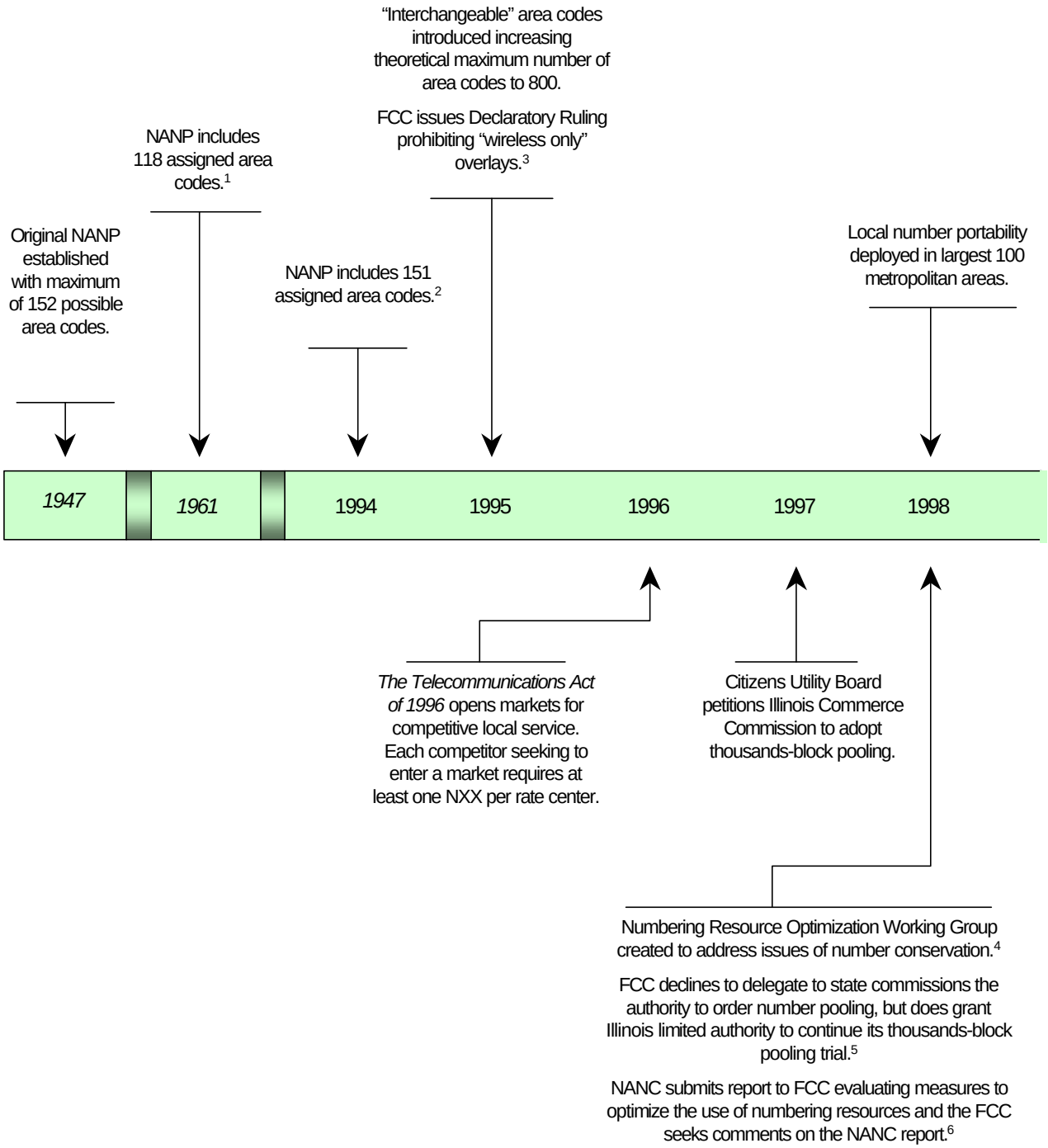
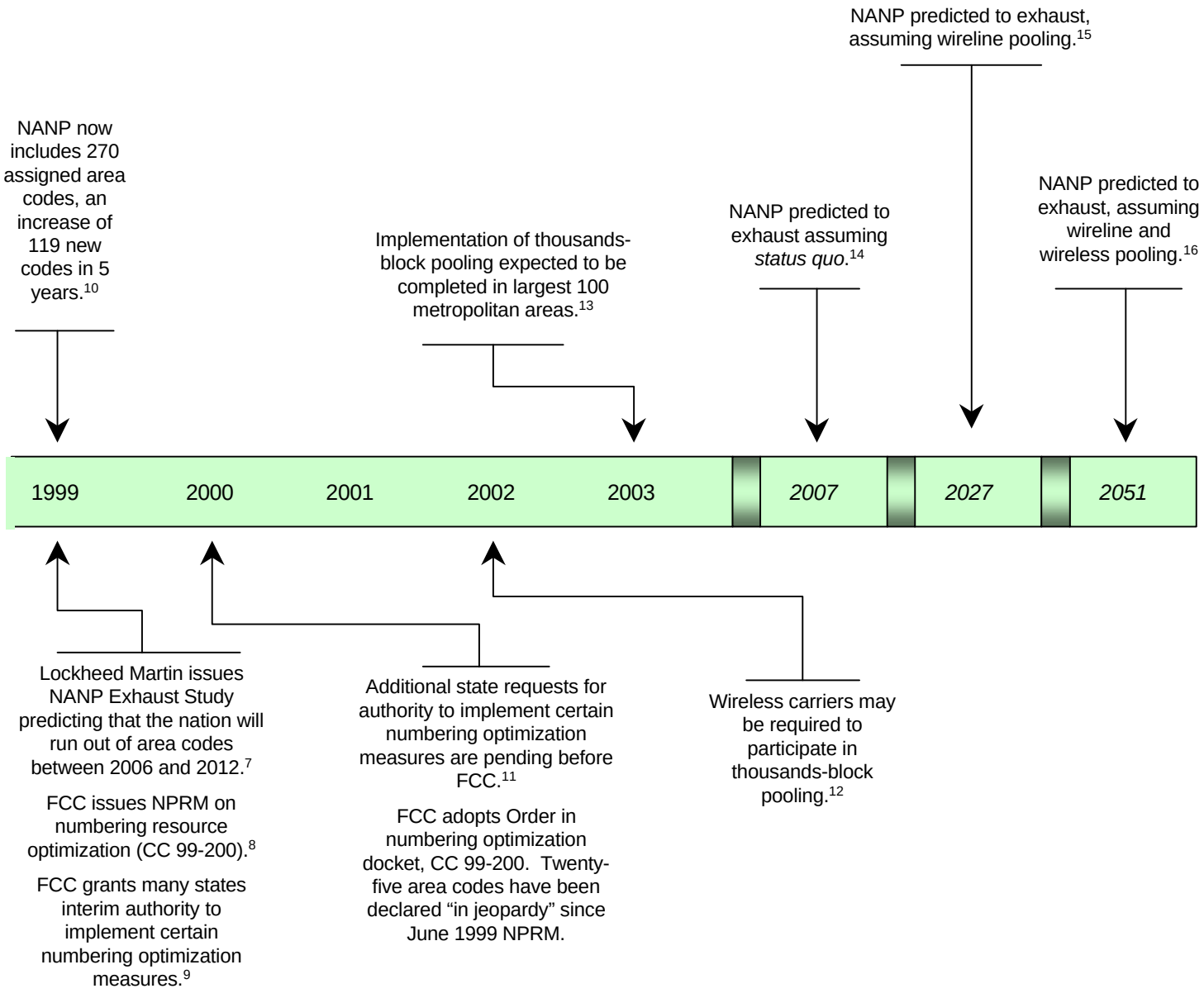


Figure 1.1. The evolution of numbering in the United States. For footnotes in timeline, see Appendix 1.


NANP predicted to exhaust, assuming wireline pooling.[15]
NANP now includes 270 assigned area codes, an increase of 119 new codes in 5 years.[10]
Implementation of thousands-block pooling expected to be completed in largest 100 metropolitan areas.[13]
NANP predicted to exhaust assuming *status quo*.[14]
NANP predicted to exhaust, assuming wireline and wireless pooling.[16]
1999
2000
2001
2002
2003
2007
2027
2051
Lockheed Martin issues NANP Exhaust Study predicting that the nation will run out of area codes between 2006 and 2012.[7]
FCC issues NPRM on numbering resource optimization (CC 99-200).[8]
FCC grants many states interim authority to implement certain numbering optimization measures.[9]
Additional state requests for authority to implement certain numbering optimization measures are pending before FCC.[11]
FCC adopts Order in numbering optimization docket, CC 99-200. Twenty-five area codes have been declared "in jeopardy" since June 1999 NPRM.
Wireless carriers may be required to participate in thousands-block pooling.[12]

If ignored, the numbering crisis will create unnecessary costs and disruptions for consumers nationwide as new area codes are introduced and dialing patterns are modified. Additionally, without national measures, the entire NANP is at risk — industry projections now suggest that we may run out of new area codes as early as 2007. The FCC has estimated that the exhaust of the NANP would cost the US economy as much as $150-billion or more.[8] Instead, with the use of proven technology and collaborative efforts among consumer advocates, state and federal regulators, and the telecommunications industry, the lives of most area codes and of the NANP can be prolonged indefinitely. The national numbering crisis has been evolving over many years, most notably during the 1990s. As Figure 1.1 shows, the future of the NANP is difficult to predict and ultimately will depend heavily upon the degree to which the telecommunications industry adopts numbering optimization measures.

Sound numbering policy is consistent with the promotion of competition

Several principles and goals should guide the design of numbering policy:

- Numbering policy should promote competitive neutrality.
  - Telecommunications carriers seeking to enter local markets and to compete with incumbent LECs require telephone numbers in order to serve customers.
  - Customers will likely view any new area code as inferior to the existing area codes.
  - ILECs have access to a large inventory of telephone numbers associated with the original area codes and thus enjoy a substantial competitive edge when states require that new area codes be implemented as "overlays."
  - If a new overlay area code is necessary, new entrants, i.e., competitive local exchange carriers (CLECs), will be harmed because they will be relying disproportionately on telephone numbers in the new, "inferior" area code.
  - Extending the lives of existing area codes achieves the goal of competitive neutrality.
- Numbering policy should minimize total societal costs.
  - The industry planning process currently fails to consider the impact of numbering decisions on consumers because, typically, the industry does not invite consumer representatives to participate until very late in the process.
  - The planning process and formulation of numbering policy should include representatives of consumer interests in the initial stages and throughout the process.
  - The consequence of excluding consumers from the process will be the imposition of new area codes or an entirely new NANP which will create substantial costs for consumers.
  - The cost of undergoing area code changes and a NANP expansion is a "deadweight loss" to the US economy overall. Consumers bear the substantial cost of changing their telephone numbers with negligible offsetting benefit.

8. In the Matter of Numbering Resource Optimization, CC Docket No. 99-200, *Notice of Proposed Rulemaking*, 14 FCC Rcd 10322 (1999), released June 2, 1999 (*Numbering Notice*), at para. 34, citing North American Numbering Council Meeting Minutes, February 17-18, 1999. Exhaust of the NANP is discussed in greater detail in Chapter 3.

- The development of numbering policy is a responsibility that state and federal regulators share.
  - The FCC should provide states with the tools and authority necessary to develop numbering policy that is consistent with national policy while also reflecting their unique needs.
  - The FCC should establish clear and effective leadership to avoid a senseless and costly numbering crisis.

2 WHY IS THERE A SHORTAGE OF TELEPHONE NUMBERS AND AREA CODES?

There are plenty of telephone numbers, but they're not in the right places

Many factors have contributed to the growing demand for, and exhaust of, available telephone numbers. Reports in the popular press frequently blame the growth of modems, fax machines, and cellular phones for the number exhaust problem. However, upon closer analysis, even these seemingly voracious demands for telephone numbers by the ultimate end users do not come close to accounting for the apparent shortage. The explanation lies in the structure and architecture of the NANP itself, and in the manner in which numbering resources are assigned and managed. Since there are already some 235 area codes assigned in the United States alone with a combined effective capacity of over 1.8-billion assignable numbers (that allows for more than six telephone numbers for every adult and child living in the US today),[9] it would not seem as if there really is any shortage of numbers at all!

Fragmentation

So why does there *appear* to be a drought when we would seem to be awash in numbers? The answer lies in the extreme *fragmentation* of the numbering plan. With certain limited exceptions, virtually all NANP telephone numbers possess *geographic* attributes. Under the architecture of the North American Numbering Plan, the highest geographic level — the numbering plan area — covers a relatively large territory that in some cases embraces an entire state.[10] The next level in the geographic hierarchy is the exchange, followed by the central office. Each of these levels covers progressively smaller geographic areas, with the geographic scope of an individual NXX code usually limited to the area served by a single central office switch.[11] NXX codes that are not assigned within an NPA, or numbers that are not assigned within an individual NXX code, are generally not assignable elsewhere. Thus, a state such as Wyoming has a relatively small population such that

9. There were 235 area codes assigned in the United States as of March 2000. Trends in Telephone Service, at Table 21.1; The Census Bureau's Population Division estimated that the population of the United States reached 274,337,000 in March 2000.

10. By convention, the geographic scope of any single area code is limited to one state or Canadian province (with the exception of Nova Scotia and Prince Edward Island, which share the 902 NPA).

11. NXX codes are also referred to as central office codes.

only 349 out of the roughly 770 possible NXX codes are in use.[12] The remaining 421 NXX codes in that NPA — representing roughly 4.2-million potential telephone numbers — become "stranded" because they are not otherwise assignable. Similarly, if an NXX code is assigned to a central office switch that serves, for example, only 1,000 lines, the remaining 9,000 numbers are also unavailable for assignment in other locations. As the quantity of such geographic units at each NANP level increases and as their relative sizes shrink, the incidence of unusable stranded numbers rises. While there are only 235 NPAs assigned in the US today, there are some 10,000 telephone exchanges containing about 35,000 individual ILEC switching entities, and new CLEC switches are being introduced with growing frequency. Since the assignment of numbers must (under existing practice) be fragmented across these 35,000-plus local switches, the quantity of unusable, stranded numbers has become quite large.

The functions of telephone numbers in the public switched network: rating and routing

The basic architecture of the NANP serves to exacerbate the problem of fragmentation. The architecture is designed to directly support two historical primary functions of telephone numbers in the public switched network — *routing* and *rating*. Calls are *routed* to the central office switch serving the called party on the basis of the area code and (with certain exceptions) the 3-digit NXX code.[13] The last four digits of the telephone number constitute the "logical address" within the switch that identifies the individual customer's telephone line. In the case of geographically fixed services (such as the wireline services offered by local telephone companies), central office NXX codes are typically assigned for call *rating* purposes to "exchanges," each of which is defined administratively as a "rate center" or "rating area" by the service provider. Multiple central office NXX codes may be assigned to the same switch, and one or more switches may be included within the same exchange. Sometimes a single switching entity serves customers in more than one exchange.[14] When that occurs, it is necessary for rating purposes to assign at least one separate NXX code to that switch for each exchange or rating area that the switch serves. While this basic structure has been in place for more than half a century, this fundamental (albeit latent) defect in the architecture and design of the NANP and the public switched network that it supports was not a major focus of concern until the introduction of new services and the arrival of new carriers became a frequent occurrence.

Unlike wireline services that are geographically *fixed* in place, most wireless services are inherently *mobile* in nature and do not confront the same geographic rating/routing structure that has been created for wireline telephony. However, because wireless (e.g., cellular) switches have been integrated into the public (wireline) switched network, they have, up to now, been required to possess wireline-type rating and routing attributes. The imposition of this requirement on wireless services, coupled with the fundamental architectural limitations of the NANP, has served to exacerbate the overall fragmentation of the nation's numbering resources.

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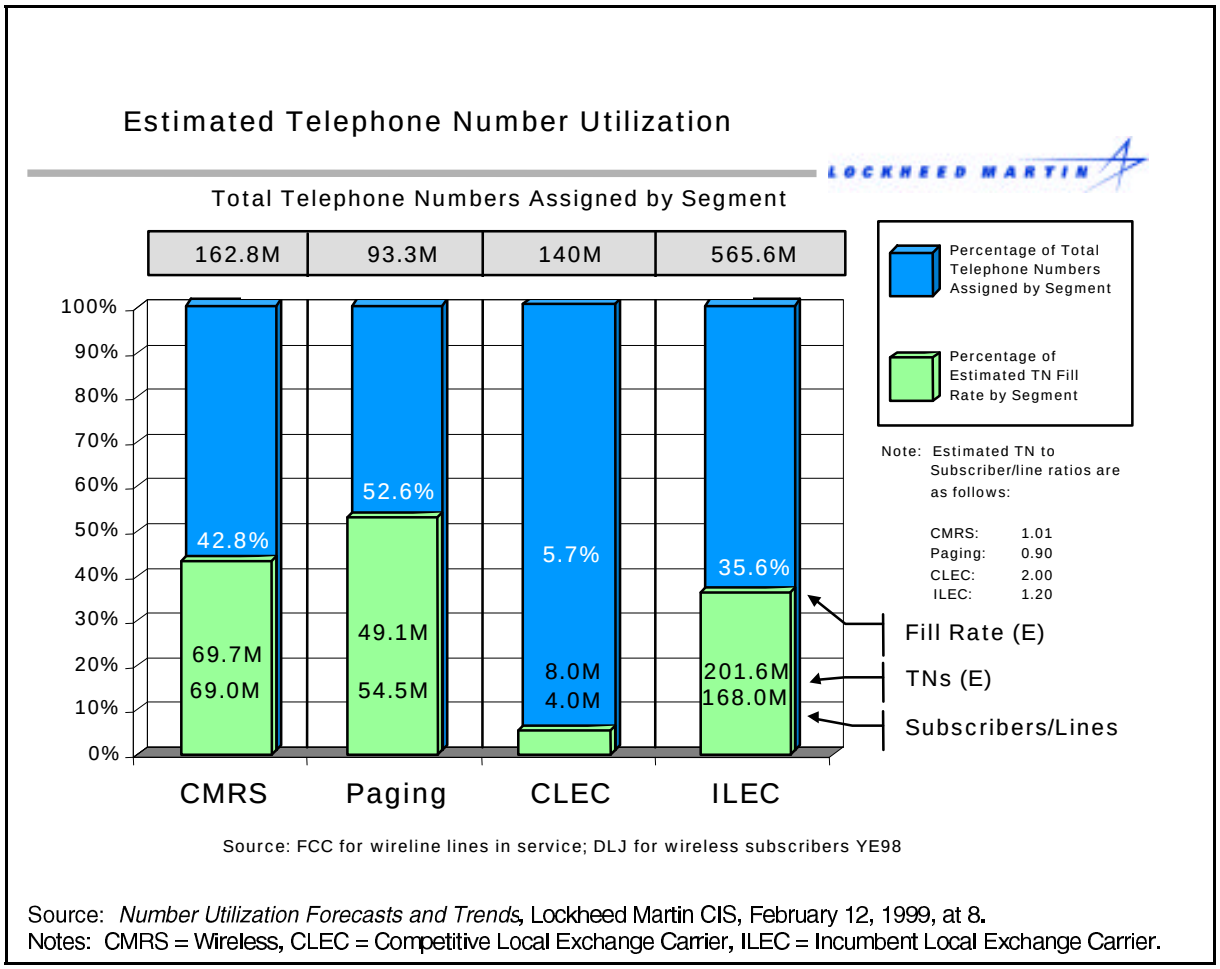
12. North American Numbering Plan Administrator, *Central Office Code Assignments*, http://www.nanpa.com.

13. The *Local Exchange Routing Guide* (LERG) provides the correspondence between 6-digit NPA-NXX codes and the physical switching entity in which that code resides. Under certain circumstances, the LERG permits routing for a given NPA-NXX to more than one central office switch, although the practice is not widespread at this time. However, as we discuss below, with permanent Local Number Portability (LNP), this type of routing will become the norm, rather than the exception.

14. This can occur, for example, when two exchanges are physically consolidated into a single central office but which otherwise retain their separate geographic identity for call rating purposes.

"Stranded" telephone numbers and evolving network technology and architecture

The requirement that not less than one full NXX code (consisting of 10,000 numbers) be assigned for each switch/rating area combination means that many more numbers must be earmarked for exclusive use by specific carriers in specific areas than are actually required by the carriers' customers. A number that is assigned to a carrier but that is not needed to satisfy that carrier's demand becomes "stranded;" i.e., it *will not* be used by the carrier to which it has been assigned, and it *cannot* be made available for use anywhere else or by anyone else. Such stranded numbers are, in effect, wasted. If, for example, a particular community with 1,000 residential and business telephones is defined as an exchange for rating purposes, then at least one full NXX code must be assigned to that community even though 90% of the 10,000-number capacity of that NXX code will not be used. If the same switch serves, say, five separate communities, each of which has 1,000 telephone numbers and is defined for rating purposes as a unique exchange, a total of 50,000 telephone numbers will have been reserved for these five exchanges, 45,000 of which are stranded and not assignable there or anywhere else. This type of condition is not uncommon, and helps to explain why the pace of number assignments and the frequency of exhaust conditions exceed actual growth in demand for the underlying services. Figure 2.1, as prepared by Lockheed Martin CIS, corroborates this assertion: in every industry segment, numbers assigned to carriers greatly exceed numbers assigned to end users.



Source: *Number Utilization Forecasts and Trends*, Lockheed Martin CIS, February 12, 1999, at 8.
Notes: CMRS = Wireless, CLEC = Competitive Local Exchange Carrier, ILEC = Incumbent Local Exchange Carrier.

Figure 2.1. Estimated telephone number utilization by industry segment.

Where multiple exchanges are served by the same physical switching entity, the *routing* function can be fully satisfied by assigning the same NXX code(s) to the entire group of communities. However, this would not be possible as long as those communities are to be treated for *rating* purposes as separate exchanges. The existence of five separate exchanges for five small towns is more than likely an historical artifact and is no longer required to fill a needed function. Each of these communities likely was at some point in the past served by its own central office switch. Calls between the separate switches involved interoffice transport and may have been (and may still be) treated for rating purposes as toll calls. But dramatic changes both in switching and transport technology over the past decade have produced fundamental and widespread changes in traditional telephone network architectures. Fiber optics and digital carrier systems have all but eliminated *distance* as a significant cost driver which, when coupled with the economies of scale that are present in large digital electronic central office switches, makes it far more efficient to serve multiple small communities out of one relatively large switching entity. Incumbent local telephone companies have been pursuing such "switch consolidations" for a number of years, and the process is still ongoing. For example, Bell Atlantic-Maine's 133 exchanges are presently served by 15 host switches (supported by 133 remotes) and 13 smaller switches.[15] New CLECs are acquiring large-scale switches from which they will serve a geographic area embracing many individual ILEC exchanges.

The *sole* rationale for retaining extreme granularity in rating areas has been so that *prices* for individual calls could be tied in some manner to *distance*. In so doing, "local" calls could be easily distinguished from "toll" calls, and toll calls could be priced in some relation to the distance involved. While distance may have been an important cost driver in the past, this is no longer the case. Advances in fiber optics and digital electronics have reduced network transport costs by more than three orders-of-magnitude over the past two decades. In fact, the distance-sensitive cost per minute of network transport varies by well under a penny as between the shortest distance calls (such as to an adjacent exchange) and coast-to-coast connections. Prices charged for long distance calls have come to reflect this new cost reality. In 1966, for example, a 3-minute coast-to-coast daytime call was priced at $2.00, some twenty times the $0.10 charge for a three-minute 10-mile interstate daytime call.[16] Long distance carriers including AT&T, WorldCom and Sprint, among others, have been offering pricing plans to their residential and business customers in which distance has been eliminated altogether as a pricing element, and now even under the undiscounted AT&T tariff prices that have been in effect since November 8, 1997, the price ratio for the maximum-to-minimum distance calls has dropped to unity.[17] The proliferation of such distance-insensitive "postalized" pricing plans virtually eliminates the call rating function of numbering,[18] and almost certainly eliminates altogether any need to maintain the kind of granularity and fragmentation that presently exists.

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15. 2000 LERG (1999 data).

16. In the matter of Alternative Regulatory Frameworks for Local Exchange Carriers, California PUC I.87-11-033, Implementation and Rate Design Phase, *Supplemental Testimony and Exhibit of Lee L. Selwyn*, April 24, 1992, at 11.

17. *See*, for example, AT&T's Seven Sense Plan (AT&T FCC Tariff No. 27, original page 4-74) which offers a postalized $0.07 per minute dial station rate with a monthly recurring charge of $4.95. Currently, the undiscounted daytime rate for domestic Message Telecommunications Service (MTS) is $0.28 per minute for all rate mileage bands (AT&T Communications, Tariff F.C.C. No. 27, 7th revised Page 24-2, Effective: July 1, 1999). This rate was first tariffed November 8, 1997. Prior to that date, a three-minute 10-mile call was priced at $0.78 versus $0.87 for a three-minute coast-to-coast call. (AT&T Communications, Tariff F.C.C. No. 27, 6th revised Page 24-2, Effective: November 4, 1997).

18. Rather than being based on distance, rate distinctions today are based primarily upon the *category* of call, e.g., local, intraLATA toll, interLATA intrastate toll, interstate toll, and international. The extreme granularity required for a distance-based pricing system becomes unnecessary under current pricing conditions.

New carrier demands for numbers

While the presence of "stranded" telephone numbers has, up to now, been primarily confined to relatively small rural and suburban exchanges, the introduction of facilities-based local exchange service competition has brought this condition into urban and larger suburban areas as well. This is because each new carrier requires numbers in each rating area in which it plans to offer service. Where a large number of relatively small individual rating areas are involved, the CLECs' needs for numbering resources can be massive. Consider, for example, the Boston metropolitan area where four area codes now occupy a region that had been served by only one as recently as 1988.[19] The Boston Metropolitan Exchange Area includes communities within roughly 12 miles of downtown Boston, an area with a total population of about 3.25-million.[20] The Boston Metropolitan Exchange Area boundaries were last defined in approximately 1909[21] and include some 47 separate rating areas. Nine of these are located within the City of Boston proper; the remaining 38 serve 53 suburban municipalities.

A CLEC seeking to provide service to all addressable customers in the greater Boston area would require a presence in all of these communities. Initially, at least, all customers would likely be served out of the same CLEC switching facility. Under existing number assignment practices and policies, however, each CLEC desiring to serve all of the Metropolitan Boston exchanges would require no less than 47 distinct NXX codes, representing a potential capacity of close to one-half million 7-digit telephone numbers.[22] Multiplying those quantities of exchanges by 10,000 numbers per NXX code, and multiplying that product by however many CLECs choose to enter the market[23] shows how quickly numbers will become committed and non-assignable for other purposes.

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19. In addition, the Massachusetts Department of Telecommunications and Energy has recently ordered the implementation of four new "overlay" area codes in eastern Massachusetts by May 1, 2001. Petition of Lockheed Martin IMS, the North American Numbering Plan Administrator, for area code relief for the 508, 617, 781 and 978 area codes in Eastern Massachusetts, Massachusetts D.T.E. 99-11 and Proceeding by the Department of Telecommunications and Energy to conduct mandatory thousands-block number pooling trials pursuant to the authority delegated by the Federal Communications Commission *In the Matter of Massachusetts Department of Telecommunications and Energy's Petition for Waiver of Section 52.19 to Implement Various Area Code Conservation Methods in the 508, 617, 781, and 978 Area Codes*, CC Docket No. 96-98, FCC 99-246, NSD File No. L-99-19 (September 15, 1999), Massachusetts DTE 99-99, *Order*, April 25, 2000 (*Massachusetts Area Code Order*).

20. The Census Bureau population estimate for the Boston Primary Metropolitan Statistical Area (PMSA) was 3,289,096 for the year 1998. Population Estimates Program, Population Division, US Census Bureau, at http://www.census.gov:80/population/estimates/metro-city/ma98-03b.txt, internet release date: December 17, 1999.

21. Investigation by the Department on its Own Motion as to the Propriety of the Rates and Charges Filed by the New England Telephone and Telegraph Company on October 4, 1980, Massachusetts DPU 411, *Direct Testimony and Exhibit of Lee L. Selwyn*, December 15, 1980, at 199.

22. 47 x 10,000 = 470,000

23. As of mid-1999 there were 12 certificated facilities-based CLECs holding codes in Massachusetts. Federal Communications Commission, Industry Analysis Division, *Local Competition: August 1999*, Table 4.1: Local Service Competitors Holding Numbering Codes.

This problem is not restricted to eastern Massachusetts; rather, it is happening across the country, and the problem will become even more acute as the number and market coverage of CLECs proliferates. For example, prior to November 1989, the entire Chicago metropolitan area was included within the 312 NPA; today the region has been carved up into five area codes. Los Angeles County, once served solely by the 213 NPA, is now served by six area codes. In fact, today there are 25 area codes (operational and assigned) in all of California, more than two-and-a-half times the 10 codes extant at the 1984 break-up of the former Bell System.[24] Table 2.1 demonstrates the pervasiveness of NPA growth from 1961 to 2000 all across the country. In the 33 years between 1961 and 1994, only 31 area codes were added. In contrast, in the five years between 1994 and 1999, 119 area codes were added.

Table 2.1

NANP Area Code Assignments

Year	Total Assigned Area Codes	U.S. Area Codes
1961	118	104
1994	151	133
1999	270	228

Sources: FCC, CCB Trends in Telephone Service, Table 21.1, March 2000 and Lockheed Martin's Number Utilization Study, at 6.

There is no shortage of telephone numbers

While the various sources of demand for NXX codes identified here — fragmentation and associated "stranding" of unused numbers and NXX codes, growth of new carriers and services, and extreme granularity in the geographic definition of local rating areas — are the primary causes of NPA exhaust, national numbering resource management policies have up to now focused almost exclusively upon creating an additional *supply* of numbers rather than upon addressing and more effectively managing the sources of *demand*. In effect, those responsible for numbering resource management have been operating as if the supply of numbers is limitless and the creation of additional supply is costless. As we demonstrate below, these assumptions are patently false. Effective numbering resource management must address number demand and implement processes and practices that reduce and eliminate altogether the need to create new NPAs, as failure to do so will invariably require the costly expansion of the NANP. In the following sections of this report, we demonstrate that such measures are technically feasible, are effective in limiting the need to constantly create new number supply, and are clearly and unambiguously in the public interest.

24. North American Numbering Plan Administrator, *Geographic NPAs in Service Sorted by Location*, Assignments as of May 1, 2000, at http://www.nanpa.com/area_codes/geographic_location.html.

3 THE POTENTIAL EXHAUST OF THE ENTIRE NANP RAISES THE STAKES OF THE NUMBERING CRISIS

Expansion of the NANP is a costly undertaking that is, in fact, entirely avoidable

Today, when a state encounters a numbering problem in a particular area code, the preferred industry solution is to simply introduce a new area code either through a geographic split of the affected region or through an overlay of a new area code on top of the area served by the existing code. However, as noted earlier, there are a limited number of three-digit area codes that can be designated within the ten-digit NANP, and thus the "solution" of simply introducing new area codes when needed cannot be sustained in the long term. According to the North American Numbering Plan Administrator, based on historic demand for area codes and central office codes, the entire NANP is predicted to exhaust sometime between 2006 and 2012.[25]

Exhaust of the NANP was unthinkable 15 years ago or, for that matter, even five years ago when the number of potential three-digit area codes was increased from 160 to 800.[26] Nonetheless, the growth in demand for central office codes and the associated need for additional area codes throughout the United States has presented the industry (indeed, the *nation*) with two choices: (1) expand the NANP from its current ten-digit format to eleven or even twelve digits, and incur all the necessary economic and societal costs; or (2) optimize numbering resources in an effort to prevent the ten-digit NANP from reaching the point of exhaust. NANP exhaust is relevant to all actors because if the national numbering problem is not remedied, it will necessitate the addition of a digit to the current numbering plan, and *all states, carriers, and end users will be required to adopt this new numbering method*. The issue of preserving area codes would be moot.

On December 10, 1999, the Industry Numbering Committee (INC) delivered the "INC Interim NANP Expansion Report" to the North American Numbering Council. This report outlines the five options for NANP

25. North American Numbering Plan Administrator Lockheed Martin CIS, *North American Numbering Plan Exhaust Study*, April 22, 1999 (Numbering Plan Exhaust Study), at 2-1. The use of historical data could serve to provide an overly optimistic exhaust date for the NANP, as the analysis may fail to properly account for the recent growth in demand for central office codes and the associated need for additional area codes.

26. Interchangeable NPAs were adopted in a relief plan in 1962 and implemented January 1, 1995. This removed the restriction that limited the second digit in NPA codes to either zero or one. *See*, In the Matter of the Administration of the North American Numbering Plan, *Notice of Inquiry*, 7 FCC Rcd 6837 (1992).

expansion currently under consideration by the INC.[27] Each of these options assumes lifting the ban on using 0 or 1 as the first digit in the central office code, and assumes approval of the INC Uniform Dialing Plan, which would introduce ten-digit dialing on a national basis and remove the current use of the prefix 1.[28]

The options currently under consideration by the INC are:

Option 1A: Creation of an eleven-digit number by adding a fourth digit (0-9) to the end of the area code field; e.g., the current number 202-987-1234 becomes 202<u>1</u>-987-1234.

Option 1B: Creation of twelve-digit number by adding a fourth digit (0-9) to the end of the area code field and to the end of the Central Office Code field; e.g., 202-987-1234 becomes 202<u>1</u>-987<u>7</u>-1234.

Option 2A: Creation of an eleven-digit number by adding a fourth digit (2-9) to the beginning of the area code field; e.g., 202-987-1234 becomes <u>2</u>202-987-1234.

Option 3A: Creation of an eleven-digit number by adding a single-digit (2-9) "National Destination Code" before the area code field; e.g., 202-987-1234 becomes <u>4</u>-202-987-1234.[29]

Option 4A: Creation an eleven-digit number by adding a digit (0-9) into the second position of the area code field; e.g., 202-987-1234 becomes 2<u>9</u>02-987-1234.[30]

As it exists today, the NANP provides for a theoretical limit of 6.4-billion dialable numbers.[31] Shifting to eleven-digit telephone numbers would increase that limit to as many as 80-billion.[32] Increasing the NANP to twelve digits would result in as many as 800-billion dialable telephone numbers.[33] Although these NANP expansion plans would clearly satisfy future demand for numbering resources, the fact that the INC is apparently conceding the necessity of NANP expansion reflects an overly pessimistic attitude, and one that should be opposed.

Preservation of the existing 10-digit NANP

NANP exhaust is far from a foregone conclusion. Based upon the most recent utilization information available, of the 6.4-billion dialable telephone numbers encompassed within the ten-digit NANP, only about

27. As of year-end 1999, the INC had considered twenty-seven NANP expansion options. INC Interim NANP Expansion Report, December 10, 1999 (INC Report), at 1. Appendix A of the INC Report provides a list of all options eliminated from current consideration.

28. INC Report, at 6.

29. Option 3A differs from Option 2A in that Option 3A still requires the first number in the area code to be between 2 and 9, whereas Option 2A allows that number to be between 0 and 9.

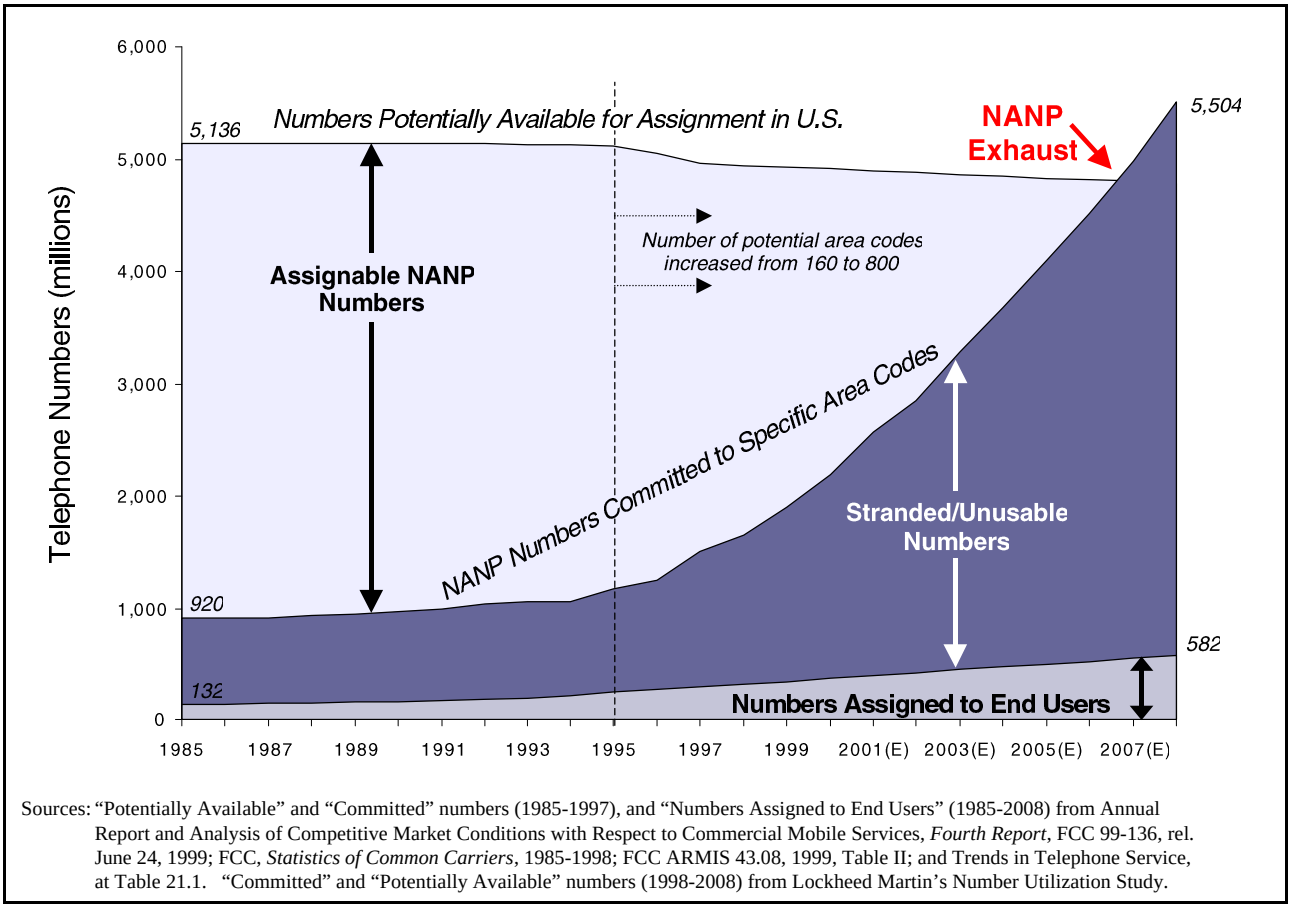
30. See INC Report, at 7-22, for further description of the transition plans, advantages, disadvantages, dependencies and prerequisites of the five options.

31. 800 x 800 x 10,000 = 6.4-billion. INC Report, at 7.

32. Options 1A, 2A and 4A provide for 80-billion numbers. Option 3A provides for 64-billion numbers. INC Report, at 7, 13, 16, and 20.

33. Option 1B. INC Report, at 10.

329-million numbers were assigned for use by end users in 1999,[34] representing an effective utilization rate of about 5%.[35] This low utilization rate clearly indicates that it is *carrier* demand, as opposed to end user demand, that is driving the consumption of telephone numbers and triggering the crisis of NANP exhaust.[36] In fact, as Figure 3.1 shows, at the point that the NANP is projected to exhaust (i.e. there are no more area codes to assign), only a small percentage of the total *telephone numbers* will be assigned and in use.



Sources: "Potentially Available" and "Committed" numbers (1985-1997), and "Numbers Assigned to End Users" (1985-2008) from Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Fourth Report*, FCC 99-136, rel. June 24, 1999; FCC, *Statistics of Common Carriers*, 1985-1998; FCC ARMIS 43.08, 1999, Table II; and Trends in Telephone Service, at Table 21.1. "Committed" and "Potentially Available" numbers (1998-2008) from Lockheed Martin's Number Utilization Study.

Figure 3.1. The reluctance of the FCC to pursue aggressive number conservation results in massive quantity of stranded/unusable telephone numbers. (US numbers only)

34. Lockheed Martin CIS, *Number Utilization Forecast and Trends*, February 12, 1999 (Number Utilization Study), at 8 (Figure 2.1 in this report). Lockheed identifies 202-million ILEC numbers in use, 8-million CLEC numbers in use, 70-million CMRS numbers in use, and 49-million paging numbers is use. Lockheed Martin CIS was the NANP Administrator through November 30, 1999, at which point CIS split from Lockheed Martin and renamed itself NeuStar, Inc., the name under which it operates as the NANP Administrator today.

35. 329-million ÷ 6.4-billion = 0.05, or 5%.

36. A common misconception is that increased consumer demand for wireless phones, modem lines and fax machines is to blame for the recent run on telephone numbers. Instead, the cause is the manner in which numbers are assigned (i.e., in blocks of 10,000) to the growing number of competitive carriers that are entering the market for local, wireless and data services.

The low utilization rate of available telephone numbers highlights the inefficient manner in which numbers are requested and distributed to carriers. Yet, when examining NANP exhaust, low utilization actually constitutes "good news" regarding the ability to preserve the NANP in its current form. Although number assignment inefficiencies exist today, low telephone number utilization rates demonstrate that timely action taken by the appropriate parties can prolong the life of the NANP, perhaps indefinitely.

Financial considerations provide a strong argument for NANP preservation. In February, 1999, Lockheed Martin CIS, as the North American Numbering Plan Administrator (NANPA), issued its "Number Utilization Forecast and Trends" study, which has brought into sharp focus the economic and societal consequences of continued inaction in solving the numbering problem. As the FCC has acknowledged, "[a]lthough the time frame for NANP exhaust cannot be determined with precision, the NANPA developed two models that predict the NANP will be exhausted in the 2006 to 2012 time frame."[37] The FCC notes that "preliminary estimates of the total costs (telecommunications industry and societal combined)" of expanding the NANP range from $50- to $150-billion.[38]

The imposition of such costs would be far reaching: telecommunications carriers would require network and switch re-engineering; PBX equipment, cellular phones and automatic dialing devices (e.g., alarm monitoring services, point-of-sale terminals) would require reprogramming; and end users would need to be educated on interim and permanent changes in dialing protocols. Some equipment might not sustain a change to its digit-handling capacity, thus requiring replacement. Moreover, virtually every business, government and institutional computer system and database that includes telephone numbers would need to be modified. In addition to the software modification costs, hundreds of thousands of individual data bases, large and small, would need to be revised to reflect the new expanded eleven- or twelve-digit telephone numbers. It is not hard to imagine that the expansion of the ten-digit NANP would engender social and economic disruptions and costs on a scale that rivals, and may even exceed, those attributed to the "Y2K" computer bug.

Whatever the costs of NANP expansion would be, they would constitute a "deadweight loss" to the US economy in that, despite the huge commitment of capital and human resources, the effort would do nothing to increase the nation's productivity or GNP. Indeed, the diversion of economic and human resources to this fundamentally *nonproductive* undertaking and away from the ongoing expansion of the country's stock of capital could well plunge the nation into recession, particularly if the NANP expansion occurs at the wrong stage of a business cycle.

The costs and disruptions associated with area code exhaust and NANP expansion are so massive that virtually any measure that avoids this result will be preferable. The critical need for *immediate* action on the part of the FCC and state regulators cannot be overemphasized because continuation of the protracted delay that has plagued this issue for most of the last decade will only serve to eliminate what might otherwise be effective and efficient solutions. Deliberate and unambiguous regulatory intervention by state public utility commissions and by the FCC is essential in order to avoid NANP exhaust and cease any further squandering of numbering resources. NANP exhaust is not yet a *fait accompli.* In fact, adding new digits to the NANP should be "off the table" as an unthinkable outcome of US numbering resource policy. However, if the numbering crisis is left unresolved, NANP exhaust may soon become inevitable and irreversible.

37. *Numbering Notice*, at para. 32, citing Number Utilization Study, at 17.

38. *Id.*, at para. 34, citing North American Numbering Council Meeting Minutes, Feb. 17-18, 1999.

4 TRADITIONAL APPROACHES TO AREA CODE RELIEF

The broad societal costs of area code "relief" are rarely considered

The traditional method of "area code relief," the telephone industry's solution to the "shortage" of telephone numbers, has always been simply to create new ones. This "brute force" approach — like buying a new car that comes with a full tank of gas each time the tank in the old one is empty — is costly to all concerned and serves only to defer, rather than to *solve*, the number exhaust problem. Since January 1995, roughly one-billion "new" telephone numbers have been created out of thin air using this technique.[39] But creating new telephone numbers is neither easy nor inexpensive. Implementation of an area code split involves complex programming of routing and translation tables and data bases in central office switches both within the affected area as well as throughout the NANP. Incumbent LECs have estimated their costs for implementing an area code split at around $3-million each.[40] Extrapolating this amount to the 130 new US area codes that have been or that are now being cut into service since 1995, US telcos will have spent in the range of $390-million on what are at best stop-gap measures. Additional costs are also imposed upon other local, long distance and wireless carriers in the affected area and elsewhere, because call routing and rating tables must be revised in local and toll switches throughout the public network.[41]

These direct telephone industry costs and impacts are, however, only the tip of the iceberg. Regrettably, most regulatory decisions affecting area codes and number relief have largely ignored or lightly dismissed costs incurred by *users* of the public telephone network. These costs are anything but insignificant:

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39. Between January 1995 and April 2000, a total of 130 new area codes were placed in service or were assigned and in the process of being implemented in the US alone. Each new code represents roughly 7.7-million "new" telephone numbers. *See* Trends in Telephone Service, at Table 21.1.

40. In its 1996 annual tariff filing, Illinois Bell sought an exogenous change, or "Z" factor adjustment, to its price cap formula in order to recover the expenses of $6-million related to implementing two area code splits in Chicago in 1995. *See* Illinois Bell Telephone Company: Annual Rate Filing for Noncompetitive Services Under an Alternative Form of Regulation, ICC Docket No. 96-0172, 1996 Ill. PUC Lexis 324, at *4.

41. Cellular carriers face the additional costs and effort to reprogram customers' cellular phones with the new area code, a condition that has prompted many to seek and to obtain "grandfathering" status, effectively exempting them from the kind of number changes that are forced upon all other users.

- Businesses are required to reprint stationery, signage, and advertising materials, and may often feel compelled to initiate costly mailings to their customers informing them of the number change.
- Because telephone numbers — and area codes in particular — convey geographic information, an area code split can result in the loss of a community's geographic identity. For example, when the major population center and its suburbs share the same area code, the proximate location of, for example, a suburban business with its principal city can be readily identified. When that suburban community is placed in a different area code — and as the total number of area codes increases overall — the geographic linkage is broken. In such cases, some businesses may feel compelled for business reasons to pay for foreign exchange and/or remote call forwarding service so as to retain their "local presence" in the geographic markets in which they operate.
- Businesses also risk permanent loss of customers when a caller using the "old" number is no longer directed (via an intercept) to the "new" number or, worse, reaches the party to whom the "old" number has now been reassigned. Unless the customer makes a special effort to locate the correct number, the loss of business will be permanent.
- Alarm monitoring companies are required to reprogram dialing devices located on their patrons' premises, a costly task that often requires site visits by a technician to each affected customer. Reprogramming may be required both under a geographic split (where the patron and the central station are assigned to different NPAs) or under a general overlay (where a change from 7- to 10-/11-digit dialing is required for all calls). Moreover, the failure of an alarm service provider to complete this task within the time frame allowed under the "permissive" dialing period can result in alarms not being correctly routed and emergency assistance not being provided.
- Business PBX users may be required to incur reprogramming fees to accommodate new area codes in toll restriction and route selection tables. They may also be required to purchase additional hardware and, in some cases, must actually replace older systems that cannot accommodate the additional codes or new dialing protocols.
- Government agencies, and in particular those charged with public safety responsibility, may be required to advertise number changes or otherwise communicate with citizens to advise them of new dialing requirements. Once the permissive dialing period ends, difficulties encountered in reaching an agency or bureau may engender other costs and public safety risks.
- Users of point-of-sale terminals and other devices that automatically dial pre-programmed telephone numbers will be required to individually reprogram some units.
- Customer (in the case of businesses) and citizen (in the case of government agencies) data bases must be revised to reflect the changed telephone numbers. In many cases, these revisions must be done individually and manually, particularly if the revision does not take place *en masse* at the moment of the area code split. This problem is particularly costly where multiple area code changes affecting the same area have taken place, and/or where the nature of the customer/citizen data base would not ordinarily involve frequent interaction with the individual subjects.[42]

42. Companies that perform marketing research offer a case in point: An article in *The Wall Street Journal* (January 22, 1998, at 1) noted that the proliferation of area codes increases the risk of flawed research. It further reported that Survey Sampling, Inc. warns its clients that the fast pace of area code changes means telephone lists have a shorter shelf life and that "[s]tudies won't represent an entire market if area codes are missed and old numbers are treated as nonworking telephones."

The enormity of these costs has never been quantified, but the lack of a specific dollar figure does not diminish their overall magnitude. Consider, for example, the matter of revising data bases. Under the conservative assumption that, on average, about one million residential telephone numbers are changed each time an area code is split, then since 1995 nearly 130-million numbers have been changed.[43] Assuming, again conservatively, that the average household appears in ten commercial or government data bases and that the cost of manually revising each such entry is $2, more than $2.6-billion will have been spent on this one activity alone.

Overlays

Overlay area codes are a less frequently used relief option, but are becoming more common, particularly where a region has been previously split one or more times. The new area code is placed on top of the same geographic area as the original code. In the case of an overlay, existing customers retain their existing telephone numbers. However, when people move within or to the area, or order an additional telephone line, they will be assigned a telephone number from the overlay area code. Customers in the geographic region must dial ten or eleven digits in all cases, even when calling a person within the same area code.

The use of overlays instead of splits, incidentally, actually exacerbates, rather than minimizes, the reprogramming problem for alarm companies because all calls to the alarm monitoring central station — even where the subscriber and the central station have the same area code — will now require 10- or 11-digit dialing. In most cases, reprogramming of the dialing units requires a premises visit by an alarm company technician. Assuming, conservatively, a cost of $50 for each such visit, alarm service providers and their subscribers will bear a large expense in time and money to accommodate the "stop-gap" solution of creating new area codes that the telephone industry persists in pursuing. And this expense does not include the societal costs, in terms of loss of life and property, of alarms that are not correctly routed because the reprogramming was not completed in time.

Loss of geographic identity

Most geographic split plans have attempted to minimize the overall business user impact by allowing the principal business center of the preexisting NPA (e.g., the Chicago "Loop," downtown Boston, center city Philadelphia, downtown Los Angeles, Manhattan, Miami, Cleveland, San Francisco, Seattle) to retain the "old" area code, subjecting suburban areas and smaller cities to an area code change. The effect of this "solution" is to spread the costs and burdens disproportionately (and, some would argue, unfairly) to businesses and residents outside of the principal population center, rather than to pursue a more efficient, permanent overall approach.

Geographic Splits

Many new area codes take the form of a geographic split whereby a previously defined area code is split into two or more non-overlapping regions. A portion of the residents of the original area code retain that area code while the remaining area and its residents are assigned one or more new area codes. Those individuals and businesses assigned the new area code(s) must change their telephone numbers (though usually just the area code portion of the telephone number).

Indeed, because of this policy of "protecting" the principal population center, customers in other areas have in some cases been subjected to a succession of area code changes as the new NPAs themselves reached

43. There were only 115,221,421 residential wireline phones in service at the end of 1999. While some communities have not had to undergo area code splits, many communities have undergone multiple splits. Until recently, most area code changes have been splits. According to the Illinois Commerce Commission only seven overlay codes have occurred *See* http://www.icc.state.il.us/icc/tc/achistory.asp

exhaust. Several suburban communities in the Los Angeles, Miami/South Florida, and northern New Jersey areas have been shifted into their third area code in the span of a decade while the prime downtown business centers have escaped all of these number changes. Residents of the Chicago and Boston suburbs are set to soon be assigned to a fourth area code.

In fact, the precise location of a new NPA boundary is almost always highly controversial precisely because of the strong geographic identity that the public attaches to an area code. Telephone numbers convey geographic information about the communities to which they are assigned. Area codes, in particular, are frequently recognized with the city or state to which each applies, and as the number of area codes proliferates, the retention of such geographic identification becomes more difficult. Moreover, since central office serving areas rarely correspond with recognized political boundaries, communities are sometimes divided between the newly-created NPAs. When that occurs, it may be necessary for calls placed across the boundary to be dialed on a 10- or 11-digit basis, and the municipality will no longer possess a unique area code identity when called from outside of the local area.[44]

It should be noted that strict adherence to ILEC serving area boundaries may also impose competitive disadvantages upon CLECs. For example, will CLECs in a municipality that is divided between two NPAs be required to respect the NPA boundary that was drawn based upon the *ILEC's* central office and outside plant deployment? If so, the CLEC may require more NXX codes than would otherwise be necessary, and would almost certainly confront administrative costs and burdens. On the other hand, if the CLEC uses the same NPA-NXX to serve its customers throughout the municipality irrespective of their specific location, in some cases CLEC customers would be assigned different area codes than their next-door neighbor who continues to take service from the incumbent.

44. Area code boundaries, when first drawn in the late 1940s, respected state and (in the case of Canada) provincial boundaries, and in many cases respected county or other political subdivision boundaries within a state. *This was true even though specific central offices sometimes served customers on both sides of a state line or other area code boundary*. Early area code splits attempted, where possible, to respect this objective, but some of the more recent ones have not. For example, when the 212 New York City NPA was split in the mid-1980s, the boundary (at that time) was the East River (Manhattan and the Bronx remained in 212, while Brooklyn, Queens and Staten Island were shifted to 718). As a result of good planning, it became possible for New York Telephone to shift the Bronx out of 212 and into 718 without implementing an additional New York City geographic NPA when the 212 area needed relief in 1991. Similarly, when Ameritech determined to remove the Chicago suburbs from the 312 NPA in 1989, it set the 312/708 NPA boundary at the Chicago City Limits. However, the boundary line created by Ameritech for the 1997 216/440 split in the Cleveland area bisected some 13 municipalities, prompting several to pursue legal action to stop or modify the company's plan. At a minimum, when an area code must be split, the new boundary should, where feasible, be drawn so as to coincide, to the greatest possible extent, with easily recognizable lines of demarcation.

5 SOLUTIONS FOR OPTIMIZING NUMBERING RESOURCE UTILIZATION

There are a number of effective measures that can increase the utilization of existing numbering resources, thereby curtailing the demand for additional area codes

The principal alternative to the continual creation of new area codes and telephone numbers is to improve the manner in which the *existing* stock of numbers is utilized, an effort which is reflected in the FCC's recent order in its numbering optimization proceeding[45] and in various state proceedings. The major causes of number exhaust are:

- Carriers continue to be assigned full NXX codes regardless of need.
- An unnecessarily large number of individual rating areas have been maintained.
- Carriers have not been held accountable for inefficient number utilization.
- The FCC has restricted the use of technology-specific overlays.

The availability of solutions other than the creation of new area codes is not new; some of these measures have been available for many years. However, optimization measures have only recently been adopted. The FCC's numbering optimization proceeding (CC Docket 99-200) has addressed a broad range of issues. In its March 31, 2000 Order and Further Notice of Proposed Rulemaking, the FCC adopted several important measures, left many issues for further consideration, and abandoned others.

The solution to the number exhaust problem is to find ways to share individual 10,000-number NXX codes among several carriers operating within the same rating area, and/or among several different rating areas, and to place mobile services, whose respective requirements for rating and routing are fundamentally different from the needs of the geographically fixed services, into entirely separate area codes. Consequently, each and all of the following specific policy initiatives should be pursued:

45. In the Matter of Numbering Resource Optimization, *Report and Order and Further Notice of Proposed Rulemaking*, CC Docket No. 99-200, Released March 31, 2000 (*Numbering Order and Further Notice*).

- *Number pooling*. The implementation of permanent Local Number Portability (LNP) in the various Metropolitan Statistical Areas (MSAs), as required by the FCC,[46] permits number assignment practices that should virtually eliminate the need for separate NXX codes for each carrier operating within a given rating area. NXX codes can be efficiently shared among multiple providers by "pooling" the stock of numbers within the full code until actually needed by individual carriers. In theory, numbers could be assigned individually as needed.

- *Rate center consolidation.* It is widely recognized and understood that the extreme granularity with which individual rating areas are defined is one of the largest causes of the demand for additional NXX codes. Fundamental changes should be made in the granularity with which individual rating areas (exchanges or rate centers) are presently defined.

- *Number utilization reporting, audits, and penalties*. Currently, carriers requesting NXX code assignments are not required to provide utilization forecasts at all when the request is for the initial code in a particular rating area,[47] and are made to "certify" forecasts of code utilization levels within a specified time period where the request is for one or more additional codes.[48] However, carriers are rarely if ever subjected to after-the-fact audits of their number forecasts or ultimate utilization. Code assignment practices need to be revised and refined so as to reclaim unused numbering resources and to prevent hoarding practices.

- *Use of separate area codes for "fixed" and "mobile" services.* The use of a wireless- or mobile-only overlay, an approach adopted by the New York Public Service Commission in 1991,[49] was vehemently opposed by cellular and paging carriers when its use in the Chicago suburbs was proposed by Ameritech in 1994, and has now been foreclosed by an FCC Declaratory Ruling.[50] Yet the effectiveness of this solution in extending the life of geographic NPAs has been amply demonstrated.

These policy initiatives individually and collectively provide a permanent, long term solution that, if adopted in their entirety, should be fully capable of eliminating entirely the need for additional *geographic* area codes for the foreseeable future. Rate center consolidation will permit the same NXX codes to be shared among what are at present separate rating areas. Number pooling will permit NXX codes to be shared among multiple local carriers serving the same rating areas. Promulgation of industry-wide number assignment and number block utilization standards, enforced by audits and penalties, will minimize hoarding. And placement of mobile services into separate, mobile-only NPAs will work to protect the geographic identity of NPAs. All of these measures are technically feasible, economically efficient, and together provides a permanent, long term

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46. LNP was implemented, per an FCC order, in all of the largest 100 Metropolitan Statistical Areas (MSAs) by December 31, 1998. Currently, carriers outside those MSAs must implement LNP within six months of a request by a competing carrier. In the Matter of Telephone Number Portability, CC Docket No. 95-116, *First Report and Order and Further Notice of Proposed Rulemaking*, 11 FCC Rcd 8352 (1996), at para. 3.

47. Industry Numbering Committee (INC) 95-0407-008, *Central Office Code Assignment Guidelines*, revised April 11, 2000.

48. *Id*., at 9-10.

49. Proceeding on Motion of the Commission pursuant to Section 97(2) of the Public Service Law concerning the supply of telephone numbers available to New York Telephone Company in New York City, New York PSC Case 90-C-0347, *Order Approving Stipulation*, Issued and Effective January 7, 1991.

50. In the Matter of Proposed 708 Relief Plan and 630 Numbering Plan Area Code by Ameritech-Illinois, IAD File No. *Declaratory Ruling and Order*, 10 FCC Rcd 4596 (1995).

numbering resource management strategy that best protects the needs and concerns of carriers, customers and the nation as a whole. The demands of special interests should not be permitted to derail efforts at permanently resolving what most would agree is today an untenable situation. In the March 31, 2000 Order and Further Notice, the FCC adopted policies that address these concerns and recommendations. However, movement on these issues may have come too late and many issues remain unresolved.

Thousands-block pooling will improve the use of telephone numbering resources

Telephone numbers are often squandered under the existing method of assignment in increments of ten-thousand. By contrast, thousands-block pooling permits several carriers to share one NXX code: blocks of 1,000 sequential telephone numbers within the same NXX code are given to different service providers within the same rate center. The local routing number method used with local number portability can be used to route calls of customers who have numbers that have been assigned from a pool. Pooling allows the supply of telephone numbers to more closely match the anticipated demand for telephone numbers.

Thousands-block pooling is a proven technology with widespread industry and regulatory support. The telecommunications industry has successfully deployed thousands-block pooling in several jurisdictions throughout the country and generally supports the widespread deployment of this numbering optimization measure. For the most part, those commenting in the FCC's proceeding on numbering resource optimization agreed that "thousands-block pooling architecture could make more efficient use of NXX codes already allocated and those awaiting allocation."[51] Mandatory thousands-block pooling is currently being utilized in California's 310 NPA (Pacific Bell territory); New York's 716 NPA, New Hampshire's 603 NPA, Maine's 207 NPA (Bell Atlantic territory); and five NPAs in Illinois (Ameritech territory). Recent state utility commission orders have set dates for mandatory pooling in 12 additional NPAs in New York; two additional NPAs in California; Texas' 512 NPA (SBC territory); and three NPAs in Florida (Bell South territory).[52]

Number pooling has proven to be effective in prolonging the life of an NPA. The Illinois thousands-block number pooling plan, which has been in place in the Chicago metropolitan area since June 1998, has helped to prolong the life of the 847 NPA by at least two years. As of May, 2000, residents in the 847 NPA had not yet been assigned numbers from the new overlay code. Based on these results, the FCC has observed that "thousands-block number pooling can extend the life of an NPA in a manner in which the benefits exceed the carrier-specific costs which carriers must incur to enable them to receive pooled numbers."[53] According to a study completed in 1999, the NANP is anticipated to exhaust in 2007. However, if pooling is implemented solely by wireline carriers, the NANP exhaust date is extended to 2027. If all wireline and wireless service providers participate in thousands-block pooling, it is anticipated that the NANP would not exhaust until 2051.[54]

Although pooling is a reasonable way to improve the utilization of scarce NXX codes, state public utility commissions have thus far been obligated to individually petition the FCC for authority to require carriers to implement this critically important numbering optimization measure. In March 2000, the FCC adopted thousands-block pooling as a "mandatory nationwide numbering resource optimization strategy."[55] The FCC found that pooling was an "essential" part of any solution to the numbering crisis and determined that all LNP-capable carriers would be required to participate in a pooling rollout that includes those NPAs located in the

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51. *Numbering Notice*, at para. 138.

52. Neustar, *The State Scene*, March/April 2000.

53. *Numbering Order and Further Notice*, at para. 123.

54. Number Utilization Study, at 21.

55. *Numbering Order and Further Notice*, at para. 122.

largest 100 metropolitan areas.[56] However, states must still petition the FCC to implement pooling in the meantime and all states are not included in the rollout as it only includes the top 100 metropolitan areas.[57]

Unfortunately, the FCC has chosen to support a pooling framework that should be considered "too little, too late." The "roll out," or implementation, is both too slow and too limited in geographic scope and carrier participation. The FCC chose to adopt a staggered rollout, whereby three NPAs in each NPAC region will begin pooling each quarter.[58] This decision was based on claims that a faster rollout would place an overwhelming administrative burden on the pooling administrator and that carriers would need the time to upgrade their networks. However, the FCC also noted that pooling standards and technical issues related to pooling have already, for the most part, been resolved.[59] This is evidenced by the broad range of carriers and states that have already adopted and implemented thousands-block pooling. The implementation of pooling will be delayed even longer because the FCC has chosen to open up the selection of a pooling administrator to a competitive bidding process. Furthermore, it is anticipated that the first set of NPAs will not start pooling until nine months *after* the pooling administrator has been selected.[60] Based on these estimates, it will be *at least* three years before pooling is implemented in all of the largest 100 metropolitan areas.[61]

There is no reason to limit the implementation of pooling to the largest 100 metropolitan areas or to LNP-capable carriers. The FCC refuses to require LNP implementation solely for the purposes of thousands-block pooling. The shortsightedness of focusing only on the largest metropolitan areas is obvious when one notes that while 28% of NPAs in the largest metropolitan areas are in jeopardy, 24% of NPAs in the rest of the country are also in jeopardy.[62] Furthermore, the largest metropolitan areas only represent 54% of all NPAs, so other areas do, in fact, account for a large portion of NPAs in jeopardy, not to mention those that may soon be in jeopardy. Similarly, excluding covered CMRS carriers from participation in pooling efforts until November 2002, when they are LNP-capable, is not necessary or advisable.[63] Type I interconnection agreements do enable CMRS carriers to obtain numbers in smaller blocks. Although not "true pooling systems," these arrangements could be used in the interim to allow CMRS carriers to participate in optimization efforts. While CMRS carriers might not be able to contribute to the pool, growth codes could be distributed in smaller blocks, thus lengthening the time to exhaust in a particular NPA.

The sooner the industry deploys thousands-block pooling and the more carriers that participate, the more effective the measure will be in avoiding new area codes and thus NANP exhaust. The passage of time has and

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56. *Id.*, at para. 125.

57. *See* discussion in Chapter 7 regarding state authority over numbering optimization issues for a full analysis of a state's options in implementing thousands-block pooling.

58. There are seven NPAC regions in the United States.

59. *Numbering Order and Further Notice*, at para. 126.

60. *Id.*, at para 156.

61. Given the fact that requirements for the pooling administrator are to be completed by July 1, 2000, the pooling administrator will most likely not be selected until December, 2000. Assuming the rollout begins nine months after selection, as estimated by the FCC, the rollout would be complete in June, 2003. This is based on the fact that 21 NPAs will begin pooling each quarter and that there are approximately 170 NPAs in the largest 100 metropolitan areas. (*Numbering Order and Further Notice*, at para. 127.) Some of these 170 NPAs will be ineligible for various reasons, but states may also petition to have an NPA added to the schedule.

62. *Id.*, at para 127.

63. *Id.*, at para. 134.

will only serve to undermine the effectiveness of thousands-block pooling. Until thousands-block pooling begins, the NANP Administrator will necessarily continue to assign numbers in 10,000 blocks, which will contribute to area code exhaust. The nation cannot afford this inefficiency. Clearly, the sooner that pooling is implemented, the more effective the country's thousands-block pooling program will be.

The FCC is correct in ordering the industry to immediately practice "thousands-block preservation"

In anticipation of the start of thousands-block pooling, the FCC has ordered carriers to first assign all numbers in a thousand-block before opening another thousand-block for assignment. This requirement may be bypassed if a carrier cannot meet a genuine consumer request with numbers from the current thousand-block. The FCC has noted that this policy will prevent contamination of further thousands-blocks before pooling begins as well as improving "carrier efficiency in utilizing numbering resources, regardless of whether pooling is implemented."[64]

In order to implement thousands-block pooling, "blocks" composed of one thousand sequential numbers must exist.[65] Each NXX code includes ten "thousands-blocks": 0000 through 0999; 1000 through 1999; 2000 through 2999; up to 9000 through 9999. Thousands-block preservation (referred to in some jurisdictions as "virtual pooling" or "sequential number assignment") ensures that carriers do not assign telephone numbers throughout the NXX code, but rather use numbers within a given block of one thousand numbers before assigning numbers in a different block. Thousands-block preservation is a useful precursor to thousands-block pooling because it prevents the random "contamination" of numbers within a given NXX code. Although number pooling — which enables multiple carriers to assign numbers from the same NXX — may require some time to implement, thousands-block preservation can occur immediately. Numbers need not be assigned sequentially *within* a block, but rather carriers should substantially fill one block before going on to assign numbers from another block of one thousand numbers.

64. *Id.*, at para. 245.

65. Blocks that have been "lightly contaminated" (i.e., some small percentage of numbers within the block have already been assigned) may also be eligible for pooling. The FCC has adopted a 10% "contamination level" providing for the donation of all thousands-blocks with a contamination level of less than 10% to the pool. (*Numbering Order and Further Notice*, at para. 191.)

Thousands-Block Pooling — The Illinois Experience

Many consumers in the Chicago suburbs have been through several rounds of area code changes since 1989. The 312 area code, which was created in 1947, and which originally served all of Chicago and the surrounding suburbs, was split in 1989 between the city of Chicago (312) and the suburbs of Chicago (708). An order by the Illinois Commerce Commission in 1995 split the 708 area code into three suburban area codes (630, 708, and 847), adding two new area codes to the Chicago metropolitan area. In an order issued later in 1995, the Illinois Commerce Commission ordered a split of the 312 area code (312 and 773), establishing the fourth new area code within a seven-year period.

In May 1997, the Illinois Commerce Commission received notice of the impending exhaust of the 847 NPA. At the same time, the Citizens Utility Board petitioned the Illinois Commerce Commission to implement thousands-block pooling in order to prolong the life of the 847 area code. In May 1998, the Illinois Commerce Commission ordered carriers to participate in a mandatory thousands-block pooling trial and pooling began in June. An all-services overlay for the 847 was adopted as a "back-up" plan. The decision to impose an all-services overlay was directly related to the Illinois Commerce Commission's decision to use number pooling (and related measures) to extend the life of the existing 847 area code.

The FCC delegated authority to the Illinois Commerce Commission to continue its mandatory number pooling trials in September 1998, but the FCC declined to delegate this authority to any other states. The FCC argued that national standards would be forthcoming and that other states should delay pooling trials until that time.[1] Since then, the FCC has followed a policy of individually granting authority for pooling trials only after a state has petitioned for, and interested parties have commented on, such authority. This policy is seemingly in contrast to FCC observations that "[a]lthough the Illinois Commission had an NPA relief plan in place in the 847 NPA to relieve what it had forecast to be imminent exhaust, through number conservation measures, including thousands-block pooling, it has forestalled the need for area code relief."[2] The Illinois thousand-block number pooling plan, combined with the mandatory return of thousands-blocks with 10% or less fill rate, has irrefutably prolonged the life of the 847 NPA. So far, the life of the 847 NPA has been extended two years. According to the Cook County State's Attorney's Office, the Illinois plan "has met with great success in staving off exhaust of the 847 NPA" and "no party has disputed the success of the Illinois Plan in the 847 NPA."[3] The "back-up" overlay has yet to be implemented.

Source: Unless otherwise noted, this information can be found on the Illinois Commerce Commission website at http://www.icc.state.il.us/icc/tc/achistory.asp.

1. *Pennsylvania Numbering Order*, at paras. 27, 30.
2. In the Matter of Massachusetts Department of Telecommunications and Energy's Petition for Waiver of Section 52.19 to Implement Various Area Code Conservation Methods in the 508, 617, 781, and 978 Area Codes, CC Docket No. 96-96, *Order,* 14 FCC Rcd 17447 (1999), at footnote 36.
3. In the Matter of Numbering Resource Optimization, CC Docket No, 99-200, *Reply Comments of the Cook County State's Attorney's Office,* August 31, 1999, at 2-3.

Delaying the in-depth examination of individual telephone number pooling will simply postpone its potential role in preventing NANP exhaust

In its *Order and Further Notice*, the FCC declined to adopt individual telephone number pooling and unassigned number porting because they are "not yet sufficiently developed," and because of concerns over the impact of these techniques on the carriers' systems.[66] The FCC also declined to delegate authority to the states on this issue, and instead opted to solicit recommendations from interested parties by January 1, 2001.[67]

Under individual telephone number (ITN) pooling, carriers would receive telephone numbers one at a time, not unlike the way in which they receive '800' numbers from a shared inventory. Contrary to the FCC's

66. *Id.*, at para. 230.

67. *Id.*, at para. 231.

decision to delay examination of this issue, the absence of comprehensive technical standards and administrative guidelines simply underscores the importance of starting the process of developing ITN pooling expertise within the industry.

The implementation of thousands-block pooling should not hinder moving forward on the implementation of ITN pooling. Indeed, both forms of pooling are needed in order to alleviate the current numbering crisis. Thousands-block pooling is less effective, and will prove less successful at significantly prolonging the life of the NANP. The FCC should immediately open a proceeding specifically on ITN, to determine how it can be implemented in a timely manner.

The FCC has adopted new policies that will hold carriers accountable for their use of numbering resources

Concerned about the prospect of impending number shortages, some carriers have themselves contributed to the situation by requesting more numbers than they may actually require to meet current demands, permitting them to amass large inventories of numbers that are then not available for use by others. However, because of the lack of accountability, regulators have been frustrated in their efforts to identify, let alone prevent, these practices. Existing number assignment guidelines require minimal "certifications" by the requesting carrier that NXX codes being requested will be utilized. These "certifications" are rarely if ever subject to audit or *ex post* examination, and in any event carriers are not subject to any penalties for mis-forecasting their demand and numbering resource needs. Thus, carriers have had no incentive to be accurate in their demand forecasts, and in fact have had a strong incentive to exaggerate their needs so as to assure themselves an adequate supply of numbers.

Until recently, industry guidelines regarding numbering resources have been *voluntary*, and there has been no mechanism to ensure that carriers have been complying, nor have there been any sanctions should carriers fail to return unused codes. The FCC has noted that "there has been some hesitancy on the part of the NANPA to initiate reclamation," of numbering codes.[68] Nonetheless, code reclamation has occurred. For example, in Massachusetts, two carriers voluntarily returned 224 NXX codes that they no longer needed.[69] During a hearing in an area code proceeding in Iowa, the Iowa Utilities Board was able to reclaim 10 NXX codes that were not being used by the carrier assigned these numbers.[70] However, until now, these incidents have been rare. In its *Order and Further Notice*, the FCC granted authority to the states to determine whether code holders have activated NXXs assigned to them within the time frames specified in the CO Code Assignment Guidelines, and to direct the NANP Administrator to reclaim NXX codes.[71]

One of the primary objectives of the FCC in its numbering optimization proceeding has been to "promote more efficient allocation and use of NANP resources by tying a carrier's ability to obtain numbering resources more closely to its actual need for numbers to serve its customers."[72] To achieve this objective, the FCC has adopted new, mandatory utilization data reporting requirements to be followed by all carriers that receive numbering resources. Carriers will be required to submit detailed utilization data semi-annually to the NANP

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68. *Numbering Order and Further Notice*, at para. 232.

69. "Plan to Add Area Codes Might Be Put on Hold," *The Boston Globe*, May 5, 1999, A1.

70. Ten NXX codes were reclaimed from US West. Re: Iowa Utilities Board Petition for Delegation of Additional Authority and Request for Limited Waiver, FCC CC Docket No. 96-68, NSD File No. L-99-96, DA 99-2770, *Initial Comments of the Iowa Utilities Board*, January 7, 2000, at 6.

71. *See* discussion in Chapter 7.

72. *Numbering Order and Further Notice*, at para. 5.

administrator. Non-pooling carriers will report at the NPA level, and pooling carriers will report at the rate center level.[73] The FCC established uniform definitions to be used in carrier reports and established a clear outline of the data to be provided. However, the FCC has maintained that consumer advocates and the public will not have access to this data.[74] This may impede the open discussion of optimization measures during state proceedings if consumer groups do not have access to utilization data.

The NANP administrator has been directed by the FCC to withhold numbering resources from those carriers who fail to comply with reporting requirements.[75] Furthermore, the "burden is on the carrier" to provide verification of a need for numbering resources.[76] Carriers must provide proof that they are authorized to provide service in a particular area and are able to do so within 60 days in order to receive initial numbering resources. As noted above, codes can be reclaimed if a carrier does not provide service within this time frame. While the FCC has adopted a nationwide utilization threshold that carriers must meet before receiving growth codes, it has failed to adopt a specific threshold and is still seeking comments on this issue.[77]

The FCC action will raise the stakes of noncompliance for carriers and should provide the incentive for carriers to utilize numbering resources more efficiently. However, the FCC should still move forward on auditing proposals, so as to remove any incentive that may exist for carriers to provide inaccurate forecast data. The FCC has indicated that it will address the matter of audits in subsequent orders in the numbering optimization proceeding.[78]

Rate center consolidation may be the only truly effective number conservation measure that is capable of actually solving the numbering resource crisis

A particularly promising strategy for long-term numbering resource conservation is rate center consolidation, i.e., the combining of many rate centers into a small number of larger rating areas. Rate center boundaries were first drawn nearly a century ago, at a time when distance between the calling and called parties was a major driver of the total cost of the call. Today, distance is for all intents and purposes no longer a cost-causative element; this condition is reflected in the decision by all of the major long distance carriers to abandon distance-based pricing in their interstate toll rate structures. Despite the fact that there are no technical differences between intraLATA calls rated as "local" and those that are subject to "toll" pricing treatment, the distinction between "local" and "toll" remains solidly rooted in the pricing structure of many incumbent LECs. Preserving and supporting this uneconomic pricing structure is the last remaining use for rating purposes of the extremely granular rate center structure that is present throughout the United States.[79]

The existence of fewer rate centers allows carriers to use fewer NXX codes when entering a market to provide service. The FCC has acknowledged the substantial benefits afforded by rate center consolidation.

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73. *Id.*, at para. 68.

74. The FCC did rule that the state utility commissions will have access to the data, but that state commissions are obligated to take the appropriate measures to keep such data confidential. *Id.*, at para. 81.

75. *Id.*, at para. 84.

76. *Id.*, at para. 97.

77. *Id.*, at paras. 115 and 248.

78. *Id.*, at para. 9.

79. Those carriers that may have already abandoned distance-based pricing of intraLATA toll calls have eliminated the need for granular rating areas already.

Chapter 6 contains a detailed discussion as to why rate center consolidation may well be the single most important means of preserving numbering resources and avoiding exhaust of the NANP.

The FCC should revisit its position regarding technology- or service-specific "overlay" area codes

A technology- or service-specific overlay is a method of area code relief whereby an overlay code is established for use by only certain types of service providers. Although mobile services do not create the same degree of extreme fragmentation of numbering resources that is typical of geographically fixed services, the attempt to satisfy the mobile services' voracious demand for numbers out of the geographically fixed, highly fragmented NPAs has been the "straw that broke the camel's back" on the nation's numbering system. The FCC should revisit and modify its 1995 Declaratory Ruling to permit states to adopt *mobile* overlay area code relief solutions. So far, the FCC has refused to do so.

In an attempt to insulate fixed services from the growth of mobile services, the New York PSC in 1991 adopted a "wireless overlay" plan as part of a comprehensive settlement of the 1989 212 area code relief proceeding.[80] By assigning mobile services to the new 917 NPA, New York was able to avoid additional area code splits/overlays far longer than most other large cities, many of which are considerably *smaller* than New York. Manhattan, an area with an unparalleled quantity of telephones, faxes, cellular phones, pagers, modems *and* competitive carriers, was able to refrain from introducing an additional area code in the 212 region until July, 1999, when the new 646 Manhattan overlay code was fully implemented. The experience in New York *proves* the fundamental validity of a mobile-specific NPA and should be pursued elsewhere.

In a 1995 Declaratory Ruling, the FCC prohibited wireless overlays because it found that such overlay plans would be unreasonably discriminatory and would unduly inhibit competition.[81] The FCC later expanded its ruling to encompass all service- and technology-specific overlays.[82] In its most recent numbering optimization order, the FCC declined to address the issue of technology-specific overlays and stated that "in the interim, our existing rules and policies with respect to these optimization measures (including the prohibition of technology-specific overlays) remain in effect."[83] The FCC should lift or modify the restriction on these methods of area code relief, and allow states to consider implementing technology- or service-specific overlay codes within the guidelines established by the FCC.

Proposals to "charge" carriers for telephone numbers should be dismissed as unworkable, unfair and ineffective in preserving the NANP

The concept of implementing a number-pricing plan as a numbering optimization measure has been addressed by the FCC in its Numbering Resource Optimization docket.[84] Few commenters see any merit in the

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80. Proceeding on Motion of the Commission pursuant to Section 97(2) of the Public Service Law concerning the supply of telephone numbers available to New York Telephone Company in New York City, New York PSC Case 90-C-0347, *Order Approving Stipulation*, Issued and Effective January 7, 1991.

81. Proposed 708 Relief Plan and 630 Numbering Plan Area Code by Ameritech-Illinois, *Declaratory Ruling and Order*, 10 FCC Rcd 4596 (1995).

82. Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, CC Docket No. 96-98, *Second Report and Order and Memorandum Opinion and Order*, 11 FCC Rcd 19518 (1996).

83. *Numbering Order and Further Notice*, at para. 9, footnote omitted.

84. *Numbering Order and Further Notice*, at paras. 250-251.

FCC's proposal, and for good reason. At the heart of implementing a number-pricing plan is the determination of the actual price of a number, yet the FCC has made no attempt at justifying how this would be accomplished. A price set too low will fail to send the necessary economic signals to carriers to affect the efficiency with which numbers are allocated. On the other hand, a price set too high will create an artificial barrier to entry to new carriers, who must be assured of access to adequate numbering resources in order to ensure competitive alternatives to the incumbent. And the Commission has entirely sidestepped the potential for "desirable" numbers to command potentially high premium prices if left to the marketplace.

Even if a market-based number allocation system were to be implemented, there is no guarantee, or even any evidence cited by the Commission, that efficiencies in number consumption would result. As discussed in more detail in Chapter 6, ILEC-defined rate center structures force all wireline carriers to obtain at least one NXX code in each and every rate center in which service is to be offered, forcing entrants to request more numbers than they actually need, even under thousands-block assignment rules. The FCC has declined to aggressively pursue rate center consolidation as a means of preserving numbers; as such, it would be both unfair and inefficient to permit ILECs to retain archaic rate center arrangements while at the same time forcing entrants to pay for quantities of numbers they would not otherwise require.

There are many other problems with market-based number allocation: a pricing plan for numbers raises property rights issues, which could quickly become confounded in an environment that supports local number portability. In order to affect the assignment of all numbers going forward, a pricing plan must not only encompass newly assigned numbers, but also the existing inventory of numbers currently held by carriers, which would be no easy (nor inexpensive) task. Finally, the anticipated result of charging carriers for numbers would be that carriers will ultimately seek to recoup these costs through charges to end users, largely eliminating any efficiency incentives that might otherwise exist. The potential pitfalls surrounding the implementation of a pricing scheme for numbers should prompt the FCC to abandon this as a number conservation measure, and focus instead upon methods of numbering resource optimization that offer far greater promise of success.

The benefits of preserving the nation's inventory of area codes greatly outweigh the costs of implementing numbering optimization measures

Implementing numbering optimization measures is neither painless nor costless. Nonetheless, the substantial societal benefits associated with preserving existing area codes and the existing NANP greatly outweigh the difficulties and costs. Telephone numbers are a public resource that merit far better management practices than currently exist. Recent FCC action has generally supported the adoption of optimization measures, but the FCC has not moved as fast or as far as is necessary in order to preserve the NANP.

As the FCC has observed, "the benefits of numbering optimization could result in substantial cost savings to society."[85] While awaiting further FCC decisions on numbering optimization or state requests for delegated authority, the industry can voluntarily move forward to implement measures that will prolong the life of the NANP. Consumer advocates, state regulators, the industry, and other appropriate interest groups should begin immediately to explore ways to extend the life of the nation's area codes and NANP.

85. *Id.*, at footnote 12.

6 RATE CENTER CONSOLIDATION

Rate center consolidation would eliminate the need to expand the NANP and would provide a permanent, long-term solution to the nation's numbering crisis

As discussed briefly in Chapter 5, rate center consolidation is a number conservation measure whereby the numerous and extremely granular rating areas that were established nearly a century ago for the purpose of determining the price of the call are combined into a small number of much larger rate centers. Non-incumbent wireline carriers desiring to provide service to a specific market area require numbering resources in each and every rate center in the area they wish to serve. With the influx of competitive carriers, such a system puts substantial pressure on available numbering resources. Under the existing method of utilizing telephone numbers for *rating* purposes, a given NPA-NXX code may only be assigned to a single rating area; the more rating areas in an NPA, the more NXX codes that must be assigned. Thus, while thousands-block (or even individual number) pooling may produce some benefit, absent a substantial reduction in the quantity of rate centers, NXX codes will continue to be used up as new carriers and new services come into existence.

Once implemented, rate center consolidation can have an immediate and profound effect in reducing the demand for numbers by new entrants. By reducing the number of rating areas within an NPA, new entrants have the capability to serve all customers in a specified region with fewer blocks of numbers. The 515 NPA in central Iowa,[86] as shown in Figure 6.1, has 329 rate centers. A new entrant seeking to address all possible customers in this area would require a block of numbers in each of these rating areas. Absent a plan for number pooling, that equates to 329 NXX codes, or 3.29-million telephone numbers (more than one-third of an entire NPA) regardless of the quantity of customers served by the carrier. *Any* notable reduction in the number of rate centers in central Iowa (or anywhere else) for that matter, will materially alleviate the pressure on the NPA.[87]

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86. "Central Iowa" refers to the current 515 NPA (which encompasses Des Moines). This NPA is due to undergo a geographic split with permissive dialing and mandatory dialing beginning July 9th and December 3rd, 2000, respectively. Area Code 515 Relief Plan, State of Iowa Department of Commerce Utilities Board Docket No. SPU-99-22, *Order on Requests for Reconsideration*, Issued March 30, 2000.

87. The large presence of independent telecommunications carriers in Iowa may raise some questions as to how to combine rate centers across a multi-carrier footprint. While this problem can also be solved, rate center consolidation could easily be implemented for the major incumbent carriers (i.e., US West and GTE), carriers that together serve 56% of the total 329 NPA 515 rating areas, and are located in more populous areas where competition is most likely to occur.

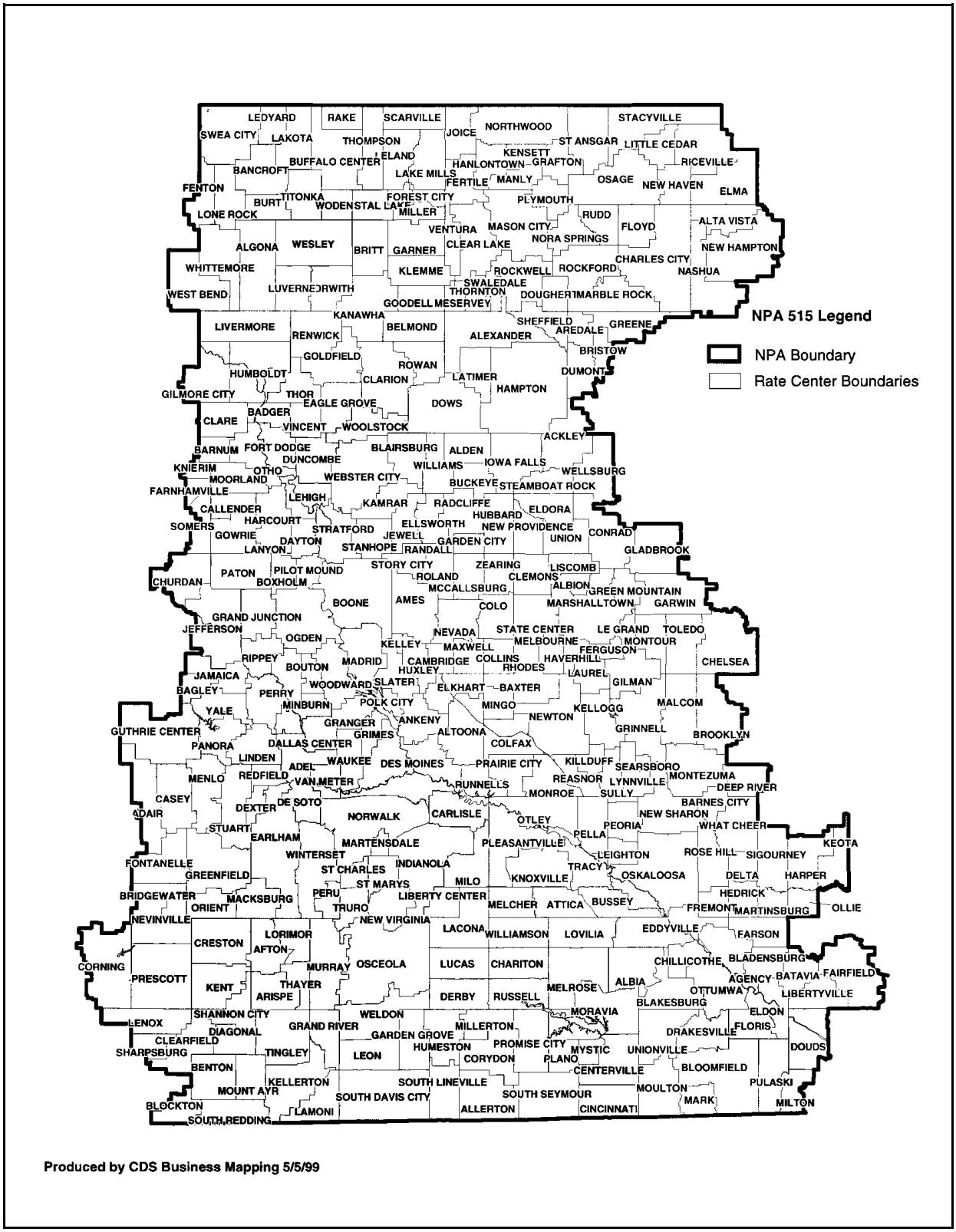

Figure 6.1. Extremely granular rating areas comprise the 515 NPA.

The strong relationship between highly granular rate center structures and area code exhaust is underscored by the situation in Manhattan in New York City. Manhattan is probably the most telecommunications-intensive area in the world, and likely has more intensive local telephone competition than anywhere else in the nation. Yet Manhattan has enjoyed a highly stable numbering situation for a very long time. The 212 area code (together with a wireless overlay using the 917 area code) remained in place for Manhattan from 1991 through 1999, only recently to be supplemented by the overlay of the new 646 area code. Unlike the situation in many NPAs, there is only one rate center in all of Manhattan, so the relatively limited stock of numbers was still capable of accommodating the needs of many new CLECs before the area code reached exhaust.

The FCC has recognized the strong link between rate center consolidation and efficiency, noting that this number conservation method can be successful in "reducing the demand for NXX codes, improving number utilization, and prolonging the life of an area code."[88] Furthermore, the FCC states that "[i]n areas where there are contiguous rate centers with identical calling areas and identical exchange rates, rate center consolidation may be fairly easy and painless to implement."[89]

Rate center consolidation is typically opposed by incumbent LECs intent on preserving anachronistic local/toll rate distinctions and distance-based pricing of intraLATA toll calling

In today's world, the distance between the called and calling party has been virtually eliminated as a cost driver. Access to and use of the Internet (which might someday provide an alternative to the public switched telephone network for handling voice telephone calls) is typically provided on a flat-rate basis, i.e., without either per-minute or distance-based charging. Interstate long distance rates are already "postalized" — i.e., they no longer include a distance element. Yet despite the trend toward eliminating distance from the cost and rate equation, incumbent local exchange carriers persist in retaining a distance element both in distinguishing between "local" and "toll" calls and for rating "toll" calls within their LATAs. It is precisely the existence of a multitude of rate centers that permits the ILECs to establish relatively small toll-free local calling areas and to maintain distance-based pricing for short-distance toll calls. At a time when the industry is moving toward cost-based pricing in all other areas, there can be no excuse for the retention of these archaic distance-based pricing distinctions. Indeed, the ILECs' ability to maintain these pricing practices is attributable entirely to the utter lack of effective competition in the local and intraLATA telecommunications markets.

In general, rate center consolidation would be accomplished through a revenue-neutral rate change in which revenues formerly obtained from intraLATA toll would be shifted to local rate treatment. Table 6.1 provides illustrative state-by-state estimates of the increase in local rates that would be required for a revenue-neutral rate center consolidation plan where *all* intraLATA toll was eliminated, i.e., where the entire LATA was recast as a single LATA-wide rate center. The actual per-line rate impact would likely be somewhat less than the amounts shown on the table, since the ILEC would avoid the administrative costs of intraLATA toll measurement and billing if all toll calling were eliminated. Monthly local rate increases would be modest in most states, and consumers would benefit by the substantial enlargement of their local calling areas. While there are ample bases for eliminating these distance-based local/toll rate distinctions in their own right, the interaction between their retention and the impending exhaust of the NANP cannot be overlooked or lightly dismissed. In fact, if rate centers within individual LATAs were eliminated altogether, it would be no exaggeration to state that the nation's numbering crisis would thereupon evaporate!

88. *Numbering Notice*, at para 113, footnotes omitted.

89. *Id*.

Table 6.1

Average per Line Local Rate Increase that Would Result from the Elimination of all IntraLATA Toll Calling

State	Annual IntraLATA Toll Revenue[1]	Switched Access Lines	Monthly Revenue per Access Line	State	Annual IntraLATA Toll Revenue[1]	Switched Access Lines	Monthly Revenue per Access Line
Arizona	$36,000,000	2,758,619	$1.09	Indiana	$159,000,000	3,400,340	$3.90
Nevada	$16,000,000	1,220,341	$1.09	Oregon	$94,000,000	1,943,250	$4.03
Minnesota	$39,000,000	2,291,560	$1.42	Iowa	$72,000,000	1,375,007	$4.36
Georgia	$78,000,000	4,386,449	$1.48	Utah	$60,000,000	1,105,479	$4.52
New York	$230,000,000	12,317,912	$1.56	Washington	$198,000,000	3,489,191	$4.73
Florida	$206,000,000	10,781,047	$1.59	Rhode Island	$38,000,000	658,581	$4.81
Hawaii	$14,000,000	724,851	$1.61	Wisconsin	$160,000,000	2,631,035	$5.07
Virginia	$89,000,000	4,591,784	$1.62	Missouri	$201,000,000	3,226,569	$5.19
Delaware	$11,000,000	565,706	$1.62	Mississippi	$83,000,000	1,266,368	$5.46
Maryland	$73,000,000	3,728,363	$1.63	California	$1,501,000,000	22,485,133	$5.56
Louisiana	$46,000,000	2,315,246	$1.66	Kansas	$95,000,000	1,372,899	$5.77
North Carolina	$95,000,000	4,380,721	$1.81	Montana	$27,000,000	367,290	$6.13
Illinois	$219,000,000	7,781,293	$2.35	Wyoming	$18,000,000	244,820	$6.13
Kentucky	$56,000,000	1,947,289	$2.40	New Jersey	$520,000,000	6,653,656	$6.51
Ohio	$211,000,000	6,502,088	$2.70	Connecticut	$191,000,000	2,366,006	$6.73
Alabama	$72,000,000	2,195,439	$2.73	Massachusetts	$363,000,000	4,485,040	$6.74
Texas	$387,000,000	11,799,583	$2.73	Oklahoma	$142,000,000	1,753,063	$6.75
Tennessee	$96,000,000	2,899,322	$2.76	South Dakota	$24,000,000	278,951	$7.17
South Carolina	$71,000,000	1,657,636	$3.57	Vermont	$29,000,000	336,610	$7.18
Colorado	$117,000,000	2,678,468	$3.64	New Hampshire	$71,000,000	781,406	$7.57
West Virginia	$37,000,000	826,822	$3.73	Arkansas	$100,000,000	1,058,588	$7.87
Nebraska	$42,000,000	933,733	$3.75	North Dakota	$27,000,000	255,839	$8.79
Pennsylvania	$363,000,000	7,913,473	$3.82	Michigan	$773,000,000	6,065,172	$10.62
New Mexico	$41,000,000	890,722	$3.84	Maine	$129,000,000	683,556	$15.73
Idaho	$31,000,000	665,698	$3.88	***Total***	*$2,676,000,000*	*98,754,165*	*$3.87*

Sources: Federal Communications Commission, Common Carrier Bureau, *Statistics of Communications Common Carriers,* December 3, 1999, Table 2.4: Switched Access Lines by Type of Technology for Reporting Local Exchange Carriers as of December 31, 1998; FCC, Industry Analysis Division, *State-by-State Telephone Revenue and Universal Service Data*, January 2000, Table 2.13: Local Exchange Carrier (LEC) Intrastate Toll Revenue: 1998.

[1] Rounded to nearest one-million.

If the industry trend is to remove mileage from the price of a call, and rate center consolidation offers the ability to significantly reduce the quantity of NXX codes assigned to carriers, why is rate center consolidation not wholeheartedly embraced by regulators and carriers alike? As a consequence of decreasing the number of rating areas in a region, the local calling area of all affected exchanges must necessarily be increased. Enlarging the local calling area produces a corresponding reduction in the volume of intraLATA toll calling, thereby eroding ILEC revenues and potentially blocking interexchange carriers from providing intraLATA calling services in competition with the ILEC. Moreover, because intraLATA toll calls are typically priced at large multiples of their underlying cost — making intraLATA toll one of the most profitable of all ILEC offerings — ILECs are extremely resistant to any measure that would require them to forego this profitable source of revenue. It is essential that regulators come to recognize the interrelationship between ILEC efforts to preserve their intraLATA toll revenue stream and the ultimate exhaust of the NANP: clearly, if a direct consequence of preservation of distance-based intraLATA pricing is the $150-billion hit on the US economy to pay for NANP expansion, any remaining justification for retaining these archaic pricing devices quickly disappears.

A prime example of ILEC efforts to block rate center consolidation can be found in the recent efforts in Massachusetts. Offering unsupported excuses, such as the lengthy time required to "study" and implement a rate center consolidation plan, Bell Atlantic succeeded in delaying the progress of a rate center consolidation proceeding to the point where the creation of four new overlay NPAs became the only available option. So now the Eastern Massachusetts LATA, with a population smaller than Manhattan's, will have eight NPAs providing a total capacity of some 64-million telephone numbers, or about a dozen for every adult and child residing in this area.[90] One need look no further than this case for a demonstration of the outright vacancy of existing numbering resource allocation practices.

Rate center consolidation has been pursued or is being considered by many states

The FCC has encouraged states to implement rate center consolidation because of its potential to decrease the future need for new area codes.[91] Various states have or are in the process of examining rate center consolidation. In April 1998, the Colorado Public Utilities Commission ordered that the 43 rate centers contained in the 303 area code be reduced to 16. In this order, the Colorado Commission concluded that by consolidating rate centers, competitive local exchange carriers would need fewer NXX codes to provide local service, and thus it would reduce the demand for NXX codes, improve number utilization, and prolong the life of the area code serving the Denver metropolitan area.[92] The Public Utility Commission of Texas ordered that 20 rate centers in Fort Worth be consolidated to nine rate centers and that 29 rate centers in San Antonio be consolidated into one rate center.[93] The Connecticut Department of Public Utility Control (DPUC) in February 1998 ordered that rate centers be reduced from 115 to 86. In September 1999, the DPUC noted that by "reducing the number of rate centers, the availability of NXX codes and telephone numbers associated with those codes was increased."[94]

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90. The Department of Telecommunications and Energy (DTE) opened Docket No. 98-38 in 1998 to examine number optimization measures for eastern Massachusetts, and in June of that year, the Attorney General set forth a possible plan for rate center consolidation. Technical sessions were held in February, 1999, and on March 19, 1999, the Attorney General proposed two plans for rate center consolidation, which included a detailed revenue-neutral rate analysis and calculation of revised monthly rates for all residential customer classes. Primarily concerned with the revenue impact such a plan would have, Bell Atlantic undertook a "Feasibility Analysis" of the Attorney General's rate center consolidation plans, which was completed in October, 1999. Not surprisingly, the results of the Bell Atlantic study were not significantly different from the proposal set forth by the Attorney General seven months earlier; however, the delay generated by Bell Atlantic was extensive enough to force the DTE to abandon rate center consolidation and instead order the implementation of four new overlay area codes in eastern Massachusetts. Rate Center Consolidation, MA DTE Docket No. 98-38; *Massachusetts Area Code Order*.

91. Petition for Declaratory Ruling and Request for Expedited Action on the July 15, 1997 Order of the Pennsylvania Public Utility Commission Regarding Area Codes 412, 610, 215, and 717, *Memorandum Opinion and Order and Order on Reconsideration*, 13 FCC Rcd 19009 (1998) (*Pennsylvania Numbering Order)*, at para. 29; *Numbering Notice*, at para. 117.

92. Rate Center Consolidation within the 303 Area Code, Creation of a Single Local Calling Area Defined as All Territory Within the 303 Area Code, Decision and Order, State of Colorado Public Utilities Commission Docket No. 97M-548T, *Decision No. C98-439*, April 29, 1998.

93. Number Conservation Measures in Texas, Public Utility Commission of Texas, Project No. 18438, *Order No. 5*, July 10, 1998, at 2.

94. DPUC Review of Management of Telephone Numbering Resources in Connecticut, Connecticut Department of Public Utility Control, Docket No. 96-11-10 RE1, *Decision*, September 22, 1999, at 31.

Also, despite the recent order implementing four new overlay area codes, Massachusetts continues to investigate the potential for rate center consolidation as a numbering optimization measure.[95] The Iowa Utilities Board recently declined to adopt a three-way geographic split because it may impede rate center consolidation efforts.[96] The Board has plans to open a proceeding to study rate center consolidation as well as other optimization efforts.[97]

Overall, state regulators should consider the long-term development of the telecommunications industry and the changes that have arisen in usage-based pricing as part of their overall numbering resource planning efforts. States should therefore aggressively pursue rate center consolidation as the only truly permanent means to effectively conserve valuable numbering resources, regardless of industry efforts to the contrary.

95. *Massachusetts Area Code Order*, at 19.

96. Area Code 515 Relief Plan, State of Iowa Department of Commerce Utilities Board Docket No. SPU-99-22, *Order Approving Geographic Split to Provide Numbering Plan Relief for the 515 Area Code*, Issued February 24, 2000, at 12.

97. *Id.*, at 21.

7 THE FCC/PUC DUAL RESPONSIBILITY FOR EFFECTIVE NUMBERING POLICY

The FCC has delegated responsibility for area code relief to the states, yet has prohibited state regulators from pursuing a number of particularly effective number conservation measures

Section 251(e)(1) of the Telecommunications Act of 1996 grants the FCC complete authority over numbering issues in the United States. This statute also allows the FCC to delegate to state public utility commissions (PUCs) any portion of this jurisdiction, provided that those state commissions perform their delegated functions in a manner that: (1) facilitates entry into the telecommunications market by making numbering resources available on a timely basis; (2) does not favor or disfavor any specific telecommunications industry segment; and (3) does not favor or disfavor any specific telecommunications technology.[98] In that capacity, the FCC has broadly delegated to state commissions the authority to initiate and to adopt area code relief.[99]

During the late 1990s, states broadened their examination of numbering matters to include not only the assessment of the more "traditional" concerns (e.g., drawing boundaries for area code splits and balancing the advantages and disadvantages of splits and overlays) but also an evaluation of the *cause and possible prevention of* seemingly incessant waves of new area codes. By 1997, some states had begun to take matters into their own hands by investigating and directing measures such as thousands-block pooling. Confronting substantial public outcry over the costs and inconvenience of area code relief, numerous state jurisdictions initiated regulatory proceedings in order to determine ways to prolong the lives of their area codes. Illinois, in particular, gained national recognition as a result of its pioneering efforts in numbering optimization. The Illinois Commerce Commission ordered thousands-block pooling in May 1998,[100] an effort that was underway before the FCC

98. 47 C.F.R. § 52.9(a)(1)-(3).

99. Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, *Second Report and Order and Memorandum Opinion and Order*, CC Docket No. 96-98, 11 FCC Rcd 19518 (1996) (*Local Competition Second Report and Order*), *vacated in part*, California v. FCC, 124 F.3d 934 (8th Cir. 1997) (vacating dialing parity rules as applied to intraLATA telecommunications and finding challenge to cost recovery methodology for numbering administration not ripe for review), *rev'd* AT&T v. Iowa Utils. Bd., 199 S. Ct. 721 (1999).

100. Citizens Utility Board Petition to Implement a form of telephone number conservation known as pooling within the 312, 773, 847, 630 and 708 area codes and Illinois Bell Telephone Company Petition for Approval of an NPA Relief Plan for the 847 NPA, Illinois Commerce Commission, Docket Nos. 97-0192 and 97-0211 (consol.), *Order*, May 6, 1998.

abruptly disallowed state-mandated numbering optimization efforts (other than rate center consolidation).[101] As Chapter 6 describes, other states, such as Colorado, Connecticut, Texas, and Minnesota, consolidated rate centers to minimize the demand for scarce NXX codes.

However, the FCC's decision in September 1998 to prohibit states from mandating numbering optimization measures caused much of this state-initiated progress to grind to a halt, and replaced it with a cumbersome process whereby the FCC would authorize such efforts only on an interim, state-by-state basis,[102] with each such authorization requiring many months to obtain. In that Order, the FCC informed states that, absent delegated authority, they were prohibited from implementing numbering optimization measures, with the notable exception of rate center consolidation. The time-consuming process for obtaining the requisite delegated federal authorization caused headway on numbering optimization efforts to slow down noticeably during a critical 18-month period. As a result, numerous states depleted their NXX codes due to continuing inefficient numbering utilization.[103] In stark contrast with the experience in Illinois, where the Illinois Commerce Commission was able to extend the life of the 847 NPA by two years through thousands-block pooling and related measures,[104] when the FCC issued its March 2000 decision finally mandating nationwide pooling, more than a quarter of the NPAs in the largest 100 MSAs, and approximately a quarter of the area codes outside the largest 100 MSAs were in jeopardy.[105]

Although the FCC has been granting most, if not all, requests by state PUCs for interim delegated authority, precious time has been lost as states have filed petitions with the FCC, and then been forced to wait on the sidelines while the FCC reviewed their requests for numbering optimization authority, and then received only interim, limited authority. Even more time has been lost in those states in which the PUCs have deferred entirely to the FCC, awaiting the FCC's decision in CC Docket 99-200. The FCC's delineation of federal and state responsibilities in the area of numbering management is an important component of its March 2000 *Numbering Order and Further Notice*, and this chapter describes the major areas where the FCC has delegated numbering optimization authority to states.

As Table 7.1 shows, by the time that it had issued its March 2000 order, the FCC had granted twelve states interim authority to implement numbering optimization measures and was reviewing the requests of fourteen others.

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101. Although it prohibited the initiation of similar efforts in other states, the FCC explicitly grandfathered the number pooling efforts in Illinois. *Pennsylvania Numbering Order*, at paras 30-31. In its recent order, the FCC acknowledged Illinois' significant success in extending the life of the 847 NPA by 24 months from the original projected exhaust date. *Numbering Order and Further Notice*, at para. 8.

102. *Pennsylvania Numbering Order*.

103. The 18-month period began with the issuance of the FCC's *Pennsylvania Numbering Order* in September 1998 and ended with the issuance of the recent *Numbering Order and Further Notice* in March 2000.

104. *Numbering Order and Further Notice*, at para. 123.

105. *Id.*, at para. 127.

Table 7.1

States with Delegated Authority to Optimize Numbering Resources

State	Filing Date	Date FCC Granted Authority
Arizona	December, 1999	pending as of 6/1/2000
California	April and November, 1999	September, 1999 and pending
Colorado	January, 1999	pending as of 6/1/200
Connecticut	July, 1999	November, 1999
Florida	April, 1999	September, 1999
Georgia	November, 1999	pending as of 6/1/2000
Illinois	Not Applicable (NA)	September, 1998
Indiana	October, 1999	pending as of 6/1/2000
Iowa	November, 1999	pending as of 6/1/2000
Kentucky	January, 2000	pending as of 6/1/2000
Maine	March, 1999	September, 1999
Massachusetts	February, 1999	September, 1999
Missouri	November, 1999	pending as of 6/1/2000
Nebraska	September, 1999	pending as of 6/1/2000
New Hampshire	September, 1999	November, 1999
New York	February, 1999	September, 1999
North Carolina	November, 1999	pending as of 6/1/2000
Ohio	September, 1999	November, 1999
Oregon	March, 2000	pending as of 6/1/2000
Pennsylvania	NA and December, 1999	September, 1999 and pending
Tennessee	November, 1999	pending as of 6/1/2000
Texas	July, 1999	November, 1999
Utah	October, 1999	pending as of 6/1/2000
Virginia	November, 1999	pending as of 6/1/2000
Washington	December, 1999	pending as of 6/1/2000
Wisconsin	August, 1999	November, 1999

Sources: *NANPA Numbering News,* December, 1999/January 2000; *The State Scene,* March/April 2000; Federal Communications Commission Electronic Comment Filing System.

The FCC's recent *Order and Further Notice* recognizes the value of state involvement in resolving the numbering crisis

In its recent *Order and Further Notice*, the FCC acknowledges the valuable role that states can play in addressing numbering matters, but continues to require such efforts to conform with national standards.[106] The FCC acknowledges (and addresses) states' need for access to better data on numbering utilization; allows states to continue interim number pooling trials; and delegates code reclamation activities to state commissions. The FCC retains, however, the vast majority of numbering optimization authority and, as Chapter 5 describes, the FCC has set forth national numbering policy intended to improve utilization of numbering resources, thus minimizing the need for states to introduce yet more area codes.

106. *Numbering Order and Further Notice*, at para. 3. The FCC stated:

> ...we recognize the integral role state commissions play in our numbering resource optimization policies and we will continue to rely on them to implement timely area code relief and other measures for which we have delegated additional authority to them, such as reclamation of unused numbering resources.

Id., at para. 8.

The FCC has given states limited authority to pursue numbering optimization measures with two caveats:

- States may not use number conservation measures as a substitute for timely area code relief; and
- States' numbering efforts must conform with and ultimately are superseded by decisions in the FCC's Docket CC 99-200.

Numbering Order and Further Notice, at para.7.

States will have access to more reliable and comprehensive data on number utilization

The recent FCC Order provides states with more comprehensive and consistent data on number utilization to facilitate regulatory decision making:

> We will require carriers to report five categories of numbers: assigned, intermediate, reserved, aging, and administrative. ... We believe that the additional detail provided by reporting on these major uses of numbers will improve the accuracy of the NANPA's projections. ... *Similarly, the states, which are responsible for area code relief, will benefit from having this specific data to use in monitoring carrier requests for numbering resources*.[107]

Specifically, the FCC's recent order requires reports to be submitted semi-annually, and also allows states to decide to decrease the required frequency of these reports to annual filings. The recent order also requires these reports to be submitted in an electronic format.[108]

Level of detail of number utilization reports

The FCC established the level of granularity of the information that carriers must report.

Geographic scope:
- For historical utilization data, data must be reported at the NPA level.
- For forecast data, non-pooling carriers must report their forecast data at the NPA level and pooling carriers must report their forecast data at the rate center level.

NXX vs. Thousands-Block Level:
- Rural telephone companies, as defined in the 1996 Act, must report their utilization data at the NXX level.
- All other carriers must report their utilization data at the thousands-block level.

Numbering Order and Further Notice, at paras. 68, 71.

107. *Id.*, at para. 60.

108. *Id.*, at paras. 67, 72.

The FCC has explicitly recognized that "numbering resource management is a cooperative effort between the Commission, states, and the NANPA."[109] The FCC determined that states have legitimate reasons for obtaining disaggregated, carrier-specific data, and that states will be better able to meet their area code relief obligations if they have access to utilization data: thus, the FCC granted states access to the semi-annual reported data, subject to confidentiality protections. The FCC, however, decided against delegating any separate authority to states for number reporting in order to maintain a national, uniform standard. The FCC recognized that occasionally a state may need to audit a specific carrier and thus obtain more granular data, stating, "our prohibition on state-ordered reporting does not apply in instances where states need to gather data for a specific purpose, as long as these data reporting requirements do not become [a] regularly scheduled state-level reporting requirement."[110]

Each carrier must submit forecast and utilization data on or before February 1, for the period ending on December 31, and on or before August 1, for the period ending on June 30 of each year. Carriers in NPAs where state commissions reduce the filing requirement to an annual reporting must provide data on August 1 of each year. Furthermore, all carriers must file their first report no later than August 1, 2000.[111] As an enforcement measure, the FCC ordered the NANPA to "withhold numbering resources from any US carrier that fails to provide its utilization and forecast information as mandated in this Report and Order until such information has been provided."[112]

States may continue thousands-block pooling trials provided that they conform with national standards by September 1, 2000

Mandatory, nation-wide pooling will not begin until nine months after a national administrator has been selected.[113] The FCC, however, decided to allow states to continue their pooling trials during this delay:

> To mitigate the impact on the NANP of this delay [associated with selection of a national pooling administrator] in our ability to commence national pooling, we will continue to permit states to implement individual pooling trials through individual requests for additional delegation of authority.[114]

Although states may continue their pooling trials, the FCC has required by September 1, 2000, all such trials are already underway must conform with the FCC-established national standards.[115] Any states that receive new delegations of authority to implement number pooling trials must conform from the outset with

109. *Id.*, at para. 75.

110. *Id.*, at para. 76.

111. *Id*., at para. 67.

112. *Id.*, at para. 84.

113. See discussion in Chapter 5.

114. *Numbering Order and Further Notice*, at para. 128.

115. *Id.*, at para. 169.

these uniform, national standards.[116] Also, concerning a related matter, states must conform any existing delegations of sequential numbering authority to the recently established FCC standards by January 1, 2001.[117]

Although the FCC will determine the rollout schedule for national mandatory thousands-block pooling, it has provided the following forms of flexibility for state participation:

- States will be allowed to "opt out" of the nationwide schedule on a temporary basis, provided that they inform the Pooling Administrator of their decision three months before the scheduled rollout.
- States that are outside of the top 100 MSAs may petition the FCC to implement pooling, and in considering such requests, the FCC will consider the availability of space created by other states' opting out and/or whether the Pooling Administrator can accommodate pooling implementation in addition to the 21 already scheduled for a given quarter. A petitioning state must demonstrate that: (1) an NPA in its state is in jeopardy; (2) the NPA has a remaining life span of at least one year; and (3) the majority of the wireline carriers serving the NPA are LNP-capable.
- State commissions may substitute the NPA that is included in the rollout schedule with an alternative NPA provided that the alternative NPA has a life span of at least one year and is within one of the top 100 MSAs.[118]

Furthermore, states may continue to petition for delegated thousands-block pooling authority pending the commencement of the national mandatory rollout. Unlike the national pooling which contemplates pooling on an NPA basis within the largest 100 MSAs, the interim delegated state trials will be granted only for a single MSA. State petitions must demonstrate that (1) an NPA in its state is in jeopardy; (2) the relevant NPA has a life span of at least one year; and (3) either the NPA is in one of the largest 100 MSAs or the majority of the wireline carriers in the NPA are LNP-capable.[119] Also, states that implement pooling on an interim trial basis must develop their own cost recovery systems for the joint and carrier-specific costs of the trials, and these systems will transition to the national cost-recovery plan when such plan becomes effective.[120]

In its discussion concerning the delegation of thousands-block pooling authority to states, the FCC reiterates its policy that "no carriers should be denied numbering resources simply because needed area code relief has not been implemented" and also that "a state commission does not have the authority to require LNP capability solely for the purpose of being able to participate in pooling."[121]

The FCC has authorized states to determine whether codes should be reclaimed

In its recent Order, the FCC granted state commissions the authority to investigate and to determine whether code holders have activated NXX codes within the FCC-established time frames, stating its belief that "state commissions may be able to resolve such issues more quickly and decisively than an industry consensus

116. *Id.*

117. *Id.*, at para. 246.

118. *Id.*, at paras. 163-165.

119. *Id.*, at para. 170.

120. *Id.*, at para. 171. The cost recovery of the national plan will occur solely on a federal basis, but the FCC has stated that costs "incurred by carriers to implement state-mandated thousands-block number pooling are intrastate costs and should be attributed solely to the state jurisdiction." *Id.*, at para. 197.

121. *Id.*, at para. 171.

process" and "[r]eclamation and reuse of unused NXX blocks is a numbering optimization measure that may be one of the quickest and easiest measures to implement."[122] In order to exercise this authority, states may request proof from carriers that they have activated codes and have commenced assignment of numbers. If a state commission determines that a code holder has not activated the code within the FCC-established time frame, NANPA must reclaim the code. If state commissions do not make decisions on code reclamation, however, the FCC can order the NANPA to be responsible for conducting reclamation, in consultation with the FCC. Similarly, states may direct the Pooling Administrator in state pooling trials and the national Pooling Administrator to reclaim inactivated or unused thousands-blocks. State commissions do not need to follow the procedures that are set forth in the CO Code Assignment Guidelines (which would refer the issue to the INC) provided that state commissions afford code holders the opportunity to explain the reasons for the delay in activating the codes.[123] The FCC further directed reclamation action to occur within 60 days of the expiration of the code holders' applicable activation deadline, instead of the substantially longer 18-month time frame set forth in the CO Code Assignment Guidelines.

Learning from history, the FCC and state PUCs should work swiftly and collaboratively to prevent further squandering of the NANP

The major evolution in federal and state numbering policy is the increased involvement by regulators to ensure that precious numbering resources are used wisely. Historically, the assignment and utilization of numbers were subject to voluntary industry guidelines, a process that worked reasonably well under monopoly conditions. Today there is simply no consensus on the vast majority of numbering issues, and furthermore, the process itself tends to be dominated by incumbent carriers, whose interests may not always coincide with that of new entrants and that of consumers. For this reason, the FCC's and states PUCs' active participation in resolving the numbering crisis is essential. The "consensus"-oriented approach leads to delay and to the neglect of controversial areas. The numbering crisis requires solutions that inevitably some will oppose, and if the FCC should await the development of a consensus on these numbering issues, valuable time will be lost.

The FCC and state PUCs should not simply defer to industry groups. Industry groups can offer valuable assistance, but if consumers await industry agreement on these highly contentious issues, the life of the NANP will be severely threatened. Were it simply a matter of figuring out technical and administrative matters, industry groups' dominance over the issue might not be so troubling, but because it is also a matter that pits incumbent interests against those of new entrants, it is unlikely that any meaningful and effective consensus will emerge in a timely manner. Public utility commissions and the FCC should lead the efforts, seeking industry input, but being willing to make difficult choices in order to reap the benefits of number optimization before it is too late for these measures to make a difference. As the FCC appropriately stated, "immediate and comprehensive action to make more efficient use of our numbering resources is imperative."[124]

122. *Id*., at para. 237.

123. *Id.*, at paras. 237-239.

124. *Id.*, at para. 6.

8 CONCLUSION

Federal and state regulators must act quickly and decisively if the existing 10-digit North American Numbering Plan is to be rescued

The management of the nation's telephone numbering resources is far too important to be left solely to the telecommunications industry itself, yet up until now regulators at both the federal and state levels have been deferring to industry positions rather than confronting the larger public interest issues. This may be changing, but not quickly enough. The FCC's recent *Numbering Order and Further Notice* goes a long way toward clarifying the Commission's views as to the scope of state PUC numbering initiatives, but still leaves the states' hands tied in many important areas. While (finally!) authorizing (limited) thousands-block number pooling, the FCC has adopted such a protracted roll-out schedule that it will all but neutralize the potential benefits. The Commission continues to exempt the wireless industry from participation, and declines to consider more aggressive number pooling approaches, such as Unassigned Number Portability (UNP) or Individual Telephone Number (ITN) pooling. And the Commission continues to express interest in the highly problematic idea of charging carriers for the use of telephone numbers. The NANP exhaust iceberg is fast approaching, yet the FCC seems preoccupied with rearranging the deck chairs.

The *Numbering Order and Further Notice* is a far cry from a definitive resolution of the nation's approach to numbering resource management or a solution to the escalating numbering crisis, because the Commission refuses to come to grips with the root cause of the problem. Its continuing examination of dubious prophylactic measures, such as "selling" numbers to carriers for a fee, would do little to extend the life of the NANP but will almost surely create far more problems than it will solve. As we have demonstrated here, the single most important cause of number exhaust, both within individual area codes and for the NANP overall, is the extreme fragmentation of numbering resources into an unnecessarily large quantity of geographically minute rating areas. To the extent that the only purpose that is served by this structure is to support the ILECs' ongoing ability to maintain local/toll rate distinctions and distance-based pricing of non-competitive intraLATA calling, the ultimate responsibility for number exhaust rests squarely with the ILECs. CLECs would not require anywhere near as many numbers or number blocks if the quantity of rating areas was reduced or if rating areas were eliminated altogether. If the consequences of this archaic method of pricing telephone service is the looming exhaust of the NANP, then policy efforts should be directed at changing the pricing system rather than figuring out ways to expand the number of digits.

The challenge that faces us now is to implement the multiple and proven numbering optimization measures in a timely and effective manner. At stake is the existence of the NANP as we have known it for more than fifty

years. The societal cost of squandering this valuable resource could be as high as $150-billion or more. The cost and effort associated with thousands-block number pooling (both by wireline and by wireless carriers), code reclamation, conducting audits of utilization, rate center consolidation, and individual telephone number pooling pale in comparison with the gargantuan price tag of adding one or two digits to every single US telephone number.

The costs of no action or slow action are substantial, and continued regulatory delay in resolving the nation's numbering crisis is, to put it starkly and simply, inexcusable. The FCC must reassess the wisdom of the drawn-out thousands-block pooling schedule it recently adopted and must also investigate, in an expedited manner, the feasibility of and potential for individual telephone number pooling. The Commission should reject as unworkable and ineffective proposals to "charge" for telephone number assignments, and should act to affirmatively encourage states to examine and implement aggressive rate center consolidation as the only permanent means for preserving the 10-digit NANP. Improving the management of the nation's numbering resources is essential, and demands collaboration and cooperation on the part of regulators, consumer advocates, and the telecommunications industry. The result will be well worth the effort, and failure should be considered unthinkable.

Appendix 1 TIMELINE SOURCES

1. FCC Industry Analysis Division, Common Carrier Bureau, *Trends in Telephone Service,* September 1999 (Trends in Telephone Service), at Table 21.1; Lockheed Martin CIS, *Number Utilization Forecast and Trends,* February 12, 1999 (Number Utilization Study), at 4.
2. *Id.*
3. In the Matter of Proposed 708 Relief Plan and 630 Numbering Plan Area Code by Ameritech-Illinois, CC Docket No. 95-19, *Declaratory Ruling and Order,* released January 23, 1995, 10 FCC Rcd 4596.
4. FCC Public Notice, DA 98-597, released March 27, 1998.
5. Petition for Declaratory Ruling and Request for Expedited Action on the July 15, 1997 Order of the Pennsylvania Utility Commission Regarding Area Codes 412, 610, 215 and 717, CC Docket No. 96-98, *Memorandum Opinion and Order and Order on Reconsideration,* 13 FCC Rcd 19009 (1998).
6. "Number Resource Optimization Working Group Modified Report to the North American Numbering Council on Number Optimization Methods," October 21, 1998.
7. Number Utilization Study, at 13. *See also,* Lockheed Martin CIS, *"North American Numbering Plan Exhaust Study,"* April 22, 1999, at 2.2.
8. In the Matter of Numbering Resource Optimization, CC Docket No. 99-200, *Notice of Proposed Rulemaking,* 14 FCC Rcd 10322 (1999).
9. *NANPA Numbering News,* December 1999/January 2000, available at http://www.nanpa.com.
10. Trends in Telephone Service, at Table 21.1; Number Utilization Study, at 4.
11. *NANPA Numbering News,* December 1999/January 2000.
12. In the Matter of Cellular Telecommunications Industry Association's Petition for Forbearance from Commercial Mobile Radio Services Number Portability Obligations and Telephone Number Portability, WT Docket No. 98-229, CC Docket No. 95-116, *Memorandum Opinion and Order,* 14 FCC Rcd. 3092, at para. 49 (1999); *Numbering Order and Further Notice,* at para 140.
13. *Numbering Order and Further Notice,* at paras. 143-168; *see also* Chapter 5, footnote 61.
14. Number Utilization Study, at 21.
15. *Id.*
16. *Id.*

Appendix 2 NUMBERING PRIMER

Central Office Code or NXX Code: The NXX code corresponds to the first three digits of a seven-digit telephone number. The NXX code routes calls to the central office. Each NXX code contains 10,000 telephone numbers.

Geographic Split: Most new area codes take the form of a geographic split whereby a previously defined area code is split into two or more non-overlapping regions. A portion of the residents of the original area code retain that area code while the remaining area and its residents are assigned one or more new area codes. Those individuals and businesses assigned the new area code(s) must change their telephone numbers (although usually just the area code portion of the telephone number).

Jeopardy: A jeopardy condition exists when the forecasted and/or actual demand for NXX code resources will exceed the known supply during the relief planning/implementation period.

North American Numbering Plan (NANP): The NANP uses the following format: NXX-NXX-XXXX, where N is a digit between 2 and 9, and X is a digit between 0 and 9. The first three digits in the NANP refer to the area code, or, more specifically, the "numbering plan area" (NPA) code. The next set of three digits is called the Central Office Code; it is sometimes referred to as the "NXX" code. The last four digits are referred to as the line code, which identifies the specific telephone line/customer. In addition to the United States (including Puerto Rico, the US Virgin Islands, Guam and the Commonwealth of the Northern Mariana Islands), other nations that use the NANP are Anguilla, Antigua & Barbuda, Bahamas, Barbados, Bermuda, British Virgin Islands, Canada, Cayman Islands, Dominica, Dominican Republic, Grenada, Jamaica, Montserrat, St. Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines, Trinidad & Tobago, and Turks & Caicos Islands.

***North American Numbering Council (NANC)*:** The NANC was established in 1995 by the FCC to adopt an administration protocol for the NANP and to advise the FCC and member governments on numbering issues. Its membership includes the telecommunications industry, consumer representatives, state representatives, and country representatives.

North American Numbering Plan Administrator (NANPA): The organization which is responsible for the administration of the NANP, including the assignment telephone numbers and area codes. The administrator also surveys carriers in order to project area code exhaust and to implement area code relief. The current administrator, Neustar, Inc., (formerly Lockheed Martin CIS), maintains a website with valuable numbering resource data and information at http://www.nanpa.com.

Appendix 2
Numbering Primer

Numbering Plan Area (NPA or Area Code): An NPA is the 3-digit code that occupies the first 3 digits in the 10-digit NANP format. NPAs may be either geographic or non-geographic. Geographic NPAs are NPAs which correspond to discrete geographic areas within the NANP Area. Non-geographic NPAs are NPAs that do not correspond to discrete geographic areas, but are instead assigned for services that do not adhere to specific geographic boundaries. A common form of a non-geographic code is the "800" NPA used for toll-free telecommunications services. The theoretical capacity of each NPA is 8-million 7-digit telephone numbers. A total of 800 NXX combinations are possible. The first digit ("N") can be between 2 and 9, whereas the second and third digits ("X") can be between 0 and 9. In practice, certain 3-digit "NXX" codes (roughly 30) in each Numbering Plan Area are considered nonassignable. These include the eight "N11" and eight "N00" codes, along with the specific 3-digit combinations that are also used as the home and adjacent area codes. Also, certain codes are reserved for testing or are excluded from assignment to respect other conventions and uses. Hence, the *effective* capacity of each area code is roughly 7.7-million telephone numbers.

Overlay: Overlay area codes are a less frequently used relief option, but are becoming more common, particularly where a region has been previously split one or more times. The new area code is placed on top of the same geographic area as the original code. In the case of an overlay existing customers retain their existing telephone numbers. However, when people move within or to the area, or order an additional line, they will be assigned a telephone number from the overlay area code. Customers in the geographic region must dial ten or eleven digits in all cases, even when calling a person within the same area code.

Rate Center: A rate center is a defined geographic area used to rate calls. The distance between one rate center and another is used to calculate the charges for same types of local and intraLATA telephone call.