The National Regulatory Research Institute

STATE AND FEDERAL NUMBER PORTABILITY POLICIES

Raymond Lawton, Ph.D.
Associate Director

Nancy Zearfoss
Graduate Research Associate

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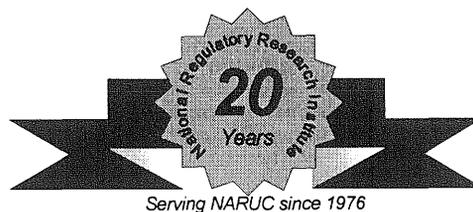
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Executive Summary

Achievement of sustainable competition at the local level depends upon a number of necessary and interwoven regulatory policies, one of the most of important of which is number portability. This report describes how states have implemented number portability, identifies the constraints contained in the FCC interconnection order, and presents the alternative short-term and long-term number portability approaches considered or accepted by state and federal regulatory commissions.

The report finds that

- All states that have chosen a permanent number portability approach have chosen the Location Routing Number (LRN) approach;

- Temporary number portability approaches most frequently chosen are Direct Inward Dialing (DID) and Remote Call Forwarding (RCF);

- The FCC, in its interconnection order, notes its preference for LRN and regional data bases, while allowing a state to institute its own number portability system as long as it complies with nine identified criteria; and

- Several states have worked individually or in concert to develop portability approaches, organizational delivery systems, and in-state consensus-building task forces intended to implement a competitively neutral local number portability system.

Because of the deadlines specified in the FCC order, states that have not already developed and implemented a number portability policy can benefit by adopting (in whole or in part) the portability findings and organizational delivery systems employed or contemplated in states such as Maryland, Illinois, Georgia, Colorado, New York, and California.

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Introduction

State and federal regulatory commissions have generally taken the position that, in order to facilitate the development of and sustainability of competitive local telecommunications markets, all consumers must have number portability.[1] In order to facilitate competition at the local exchange level, the transition from one service provider to another should be as costless to the consumer as possible. Accordingly, it is necessary to make it possible for customers of one service provider to switch to another provider without having to change telephone numbers.

New federal rules give states considerable flexibility on number portability plans. Generally, those states that have adopted a long-term numbering portability approach have chosen AT&T's Location Routing Number (LRN) system. Interim solutions include a variety of approaches, the most frequent being Remote Call Forwarding (RCF) and Direct Inward Dialing (DID). Some states have decided to administer their own number portability. Some LECs have tended to prefer the Query On Demand (QOD) approach, recently rejected by the FCC.

This paper summarizes current state and federal approaches to number portability. It is intended to aid state regulatory commissions in their review of proposed interconnection agreements under the Telecommunications Act of 1996 and in developing a state portability policy. The report also summarizes the most recent, official NARUC policy statement on number portability, state number portability approaches and trials, interim number portability approaches in various interconnection agreements, and the portability implementation schedule.

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[1] This report is an expansion of an earlier report: Raymond Lawton, Stella Rubia, and Nancy Zearfoss, *Current State Number Portability Policies* (Columbus, Ohio: The National Regulatory Research Institute, September 1996).

There are three types of portability recognized as being necessary, although only one, service provider portability, is the focus of current discussions. The types are:

- Service provider portability - Ability to change provider without changing telephone number

- Location portability - Ability to change locations without changing number

- Service portability - Ability to change type of service (such as POTS to ISDN) without changing number

In the short term, states are working on a wireline service provider number portability solution. Long term, states will explore expansion to wireless, location and service portability.

NARUC Number Portability Resolution

At its July 1996 summer meeting the NARUC Executive Committee endorsed a number portability resolution prepared by the NARUC Communications Committee.[2] The resolution responded, in part, to the FCC request for comments regarding number portability cost recovery mechanisms. The NARUC resolution said that:

1. Recovery of shared industry number portability costs should come from all telecommunications carriers, interexchange carriers, and commercial mobile radio service providers, consistent with the 1996 Act,

2. For each carrier subject to separations, those shared industry costs recovered from that carrier, any carrier-specific number portability costs, and any carrier-specific non-number portability-specific costs, should be allocated between interstate and intrastate jurisdictions using established separations procedures,

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[2] Number Portability Resolution, Adopted August 5, 1996, *NARUC Bulletin*, no. 32, August 5, 1996, 3.

3. The FCC should develop the broadest policy guidelines possible to ensure that number portability cost recovery occurs on a competitively neutral basis while allowing states maximum flexibility in the recovery of intrastate number portability costs, and

4. The NARUC General Counsel is authorized to take any action necessary in the FCC number portability proceeding.

The NARUC resolution also opposed national or regional pooling or averaging of specific carrier costs, on the grounds that these policies would reduce carrier incentives to act in the most economically efficient manner. The NARUC resolution, because it is focused on the FCC, only addressed interjurisdictional cost recovery through separations.

In addition to this official policy statement, the NARUC Staff Subcommittee on Communications released a report in February 1996, entitled *Local Competition Work Group Summary Report*, that examined number portability from a state regulatory perspective.[3] The number portability principle identified in the report states that:

> The FCC should develop broad national guidelines for number portability. If number portability is intra NPA or area code, then it resides in the state jurisdiction only. However, the FCC and states should work cooperatively to resolve interstate differences if they develop.
>
> Regulators should take steps to ensure that any number portability solution benefits all industry players equally. It is essential that the development and operation of a number portability database not be assigned to the incumbent local exchange provider. The database should be developed and operated by a neutral administrator.[4]

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[3] *NARUC Staff Subcommittee on Communications Local Competition Work Group Summary Report* (Washington, D.C.: The National Association of Regulatory Utility Commissioners, February 1996).

[4] Ibid., 26-31.

FCC Number Portability Rules

The principles enunciated by NARUC have largely been adopted and guidelines are in effect that states must follow. While the trend seems to be toward the LRN approach, the FCC did not mandate it in its order on number portability.[5] Instead, minimum performance criteria were established. Any state-number portability plan must:

1. Support existing network services, features, and capabilities;

2. Efficiently use numbering resources;

3. Not require end users to change their telecommunications numbers;

4. Not require telecommunications carriers to rely on databases, other network facilities, or services provided by other telecommunications carriers in order to route calls to their proper termination point;

5. Not result in unreasonable degradation in service quality or network reliability when implemented;

6. Not result in any degradation of service quality or network reliability when customers switch carriers;

7. Not result in a carrier having a proprietary interest;

8. Be able to accommodate location and service portability in the future; and

9. Have no significant impact outside the areas where number portability is deployed .

Essentially the application of this approach means that a state can have its own number portability plan, as long as it fits within these criteria. One portability method specifically identified by the FCC as failing to meet the nine criteria is Query on

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[5] Federal Communications Commission, *Number Portability First Order and Future Notice of Proposed Rulemaking* (Order 96-286, CC Docket No. 95-116) June 27, 1996, 26-33.

Response (QOR) because of the forced reliance on the incumbent LEC's network: QOR is identified by the FCC as violating criterion four.[6]

In Order 96-286 the FCC explicitly recognizes state administration of portability, while clearly indicating FCC preference for the North American Numbering Council (NANC) to be an administrator.[7] The FCC has directed the Chief of its Common Carrier Bureau to issue a public notice that identifies the administrator chosen by the NANC and the proposed location of regional databases. A state will have 60 days to notify the FCC and NANC that it does not wish to participate in the NANC regional database. A carrier could challenge the state's decision to have its own number portability administrator, but would not prevail unless portability deployment was delayed, or excessive costs were incurred by the carrier, or if any of the nine criteria were violated.

In part because of the mid-1997 number portability deployment schedules of several states and the assurance of several vendors of their ability to provide equipment, the FCC has concluded that a "date certain" is needed in order to be in compliance with the requirements of the 1996 Act. As shown in Table 1, The FCC requires that the local exchange carriers operating in the 100 largest Metropolitan Statistical Areas (MSAs) offer long-term service provider number portability commencing October 1, 1997, and concluding December 31, 1998.

Nationally, there is a timing problem in the FCC schedule because the Illinois field trial of LRN--which the FCC is relying on to determine the operational suitability of the LRN method--is not scheduled to end until August 31, 1997. Within 30 days of the completion of the field trial (September 30) an evaluation of the Illinois test results is due at the FCC offices. LECs have the obligation to have a long-term portability method in place in several MSAs by December 1997 without necessarily knowing if the leading approach, LRN, is fully workable. After December 31, 1998, the FCC requires

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[6] Ibid., 30.

[7] Ibid., 50-51.

PERMANENT NUMBER PORTABILITY IMPLEMENTATION SCHEDULE

Implementation must be completed by the carriers in the 100 largest metropolitan statistical areas during the periods specified below.

Oct. 1997-Dec. 1997		Jan. 1998-March 1998		April 1998-June 1998		July 1998-Sept. 1998		Oct. 1998-Dec. 1998	
Chicago, IL	3	Detroit, MI	6	Indianapolis, IN	34	Grand Rapids, MI	56	Toledo, OH	81
Philadelphia, PA	4	Akron, OH	20	Milwaukee, WI	35	Dayton, OH	61	Youngstown, OH	85
Atlanta, GA	8	Washington, DC	5	Columbus, OH	38	Cleveland, OH	73	Ann Arbor, MI	95
New York, NY	2	Baltimore, MD	18	Pittsburgh, PA	19	Gary, IN	80	Fort Wayne, IN	100
Los Angeles, CA	1	Miami, FL	24	Newark, NJ	25	Bergen, NJ	42	Scranton, PA	78
Houston, TX	7	Fort Lauderdale, FL	39	Norfolk, VA	32	Middlesex, NJ	52	Allentown, PA	82
Minneapolis, MN	12	Orlando, FL	40	New Orleans, LA	41	Monmouth, NJ	54	Harrisburg, PA	83
		Cincinnati, OH	30	Charlotte, NC	43	Richmond, VA	63	Jersey City, NJ	88
		Tampa, FL	23	Greensboro, NC	48	Memphis, TN	53	Wilmington, DE	89
		Boston, MA	9	Nashville, TN	51	Louisville, KY	57	Greenville, SC	67
		Riverside, CA	10	Las Vegas, NV	50	Jacksonville, FL	58	Knoxville, KY	79
		San Diego, CA	14	Nassau, NY	13	Raleigh, NC	59	Baton Rouge, LA	87
		Dallas, TX	11	Buffalo, NY	44	West Palm Beach, FL	62	Charleston, SC	92
		St. Louis, MO	16	Orange Co., CA	15	Birmingham, AL	66	Sarasota, FL	93
		Phoenix, AZ	17	Oakland, CA	21	Honolulu, HI	65	Mobile, AL	96
		Seattle, WA	22	San Francisco, CA	29	Providence, RI	47	Columbia, SC	98
				Rochester, NY	49	Albany, NY	64	Tulsa, OK	70
				Kansas City, KS	28	San Jose, CA	31	Syracuse, NY	69
				Fort Worth, TX	33	Sacramento, CA	36	Springfield, MA	86
				Hartford, CT	46	Fresno, CA	68	Ventura, CA	72
				Denver, CO	26	San Antonio, TX	37	Bakersfield, CA	84
				Portland, OR	27	Oklahoma City, OK	55	Stockton, CA	94
						Austin, TX	60	Vallejo, CA	99
						Salt Lake, City, UT	45	El Paso, TX	74
						Tucson, AZ	71	Little Rock, AR	90
								Wichita, KS	97
								New Haven, CT	91
								Omaha, NE	75
								Albuquerque, NM	76
								Tacoma, WA	77

Source: FCC, *Number Portability Order,* Appendix F.

that each LEC make long-term portability available in smaller MSAs within six months of a request by another telecommunications carrier. For exempted rural telephone carriers (those having less than two percent of the country's installed subscriber lines) the schedule was left unresolved in the number portability proceeding.

The FCC's Chief of its Common Carrier Bureau has monitoring responsibilities, authority to direct carriers to take necessary compliance actions, and authority to waive or stay any of the dates in the implementation schedule for a period not to exceed nine months: no later than September 1, 1999.

Number Portability Methods

Of the proposed solutions to service provider portability, there are two generally recognized methods: those employing a database and those not employing a database.

Methods That Do Not Use a Database

Methods of providing number portability that do not employ a database are generally considered interim measures. While these methods suffer from certain limitations that make them unsuitable for long-term portability, they are available right now and can be used by most LECs. Two of these methods are RCF and DID.

RCF redirects calls to telephone numbers that have been transferred by essentially placing a second telephone call to the new network location. DID routes the second call over a dedicated facility to the new service provider's switch, instead of translating the dialed number to a new number. The problems with choosing either one of these methods as a long-term solution are:[8]

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[8] FCC, *Number Portability Order*, Appendix E, 6.

1. They contribute to area code exhaustion by using two ten-digit numbers.

2. They do not support several custom calling features, such as caller ID, and may degrade transmission quality because they place a second call to reach the called party.

3. They can only handle a limited number of calls to customers of the same competing service provider at one time.

4. They may result in longer set-up time.

5. They require the use of the incumbent local exchange carrier (LEC) network for call routing.

6. They may enable incumbents to access competitors' proprietary information.

7. They may result in more complicated resolution of customer complaints.

8. The potential for call blocking may be increased.

9. They may impose substantial costs upon new entrants.

The FCC has stated in its order that while these measures should be used as part of the transition to encouraging competition at the local exchange, they do not provide a long-term solution that is in the public interest.[9]

Methods That Use a Database

Several methods have been proposed by industry participants, all of which are dependent on Intelligent Networks or Advanced Intelligent Networks.[10] Intelligent Networks refer to a call processing architecture in which a centralized database performs some aspect of call setup. Databases supporting Intelligent Network services

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[9] Ibid., 116.

[10] The technical information summarized here is found in Appendix E Description of Number Portability Methods in FCC Number Portability Rule and Order 96-286, June 27, 1996.

are built to support a specific call processing application. Advanced Intelligent Network describes a specific model of Intelligent Networks developed by Bellcore in which the database is a general purpose platform capable of supporting multiple call processing services.

In general, the number portability models differ along two dimensions: how many "numbers" are used and the extent of the involvement of the incumbent provider assigned the originally called number. Some number portability approaches require the assignment of two complete sets of numbers to all customers, whereas others (like LRN) do not. Some require the dialed call to go to the original incumbent provider before determining the final provider to which the call should be routed, whereas LRN and other approaches have the originating carrier determine the final routing. It appears that state and federal regulatory commissions generally favor LRN because it does not contribute to number exhaustion and does not rely on the incumbent LEC originally assigned the number. Each of the major long-term database number portability approaches is described in more detail below.

In choosing a long-term number portability method there are two basic choices, each having significant variations. In figure 1, three generic long-term portability methods are shown. The first figure presents a general diagram with all possible paths. There are two general portability methods: LRN and methods that rely on the original incumbent LEC. Under the LRN approach, the originating LEC asks a database first if the dialed number is still assigned to the original called party and uses the updated number supplied by the database (if needed) to make the call. The generic incumbent approach has the originating LEC use the original dialed number. With that number, the LEC would query the database (there are several variations here) and would complete the call by transferring it to another provider if the subscriber had switched providers. The LRN approach is favored because it minimizes the contact (and the resulting costs associated with connecting) with the customer's old provider.

Generic Components of Signaling and Call Paths for Local Number Portability

Service Control Point SCP

Signal Transfer Point STP

Originating Switch

Customer's Provider

LRN Routing

SCP

①

Originating Switch

②

Customer's New Provider

Old Provider

Generic Incumbent Routing

SCP

②

Old Provider

①

③

Originating Switch

③

Customer's New Provider
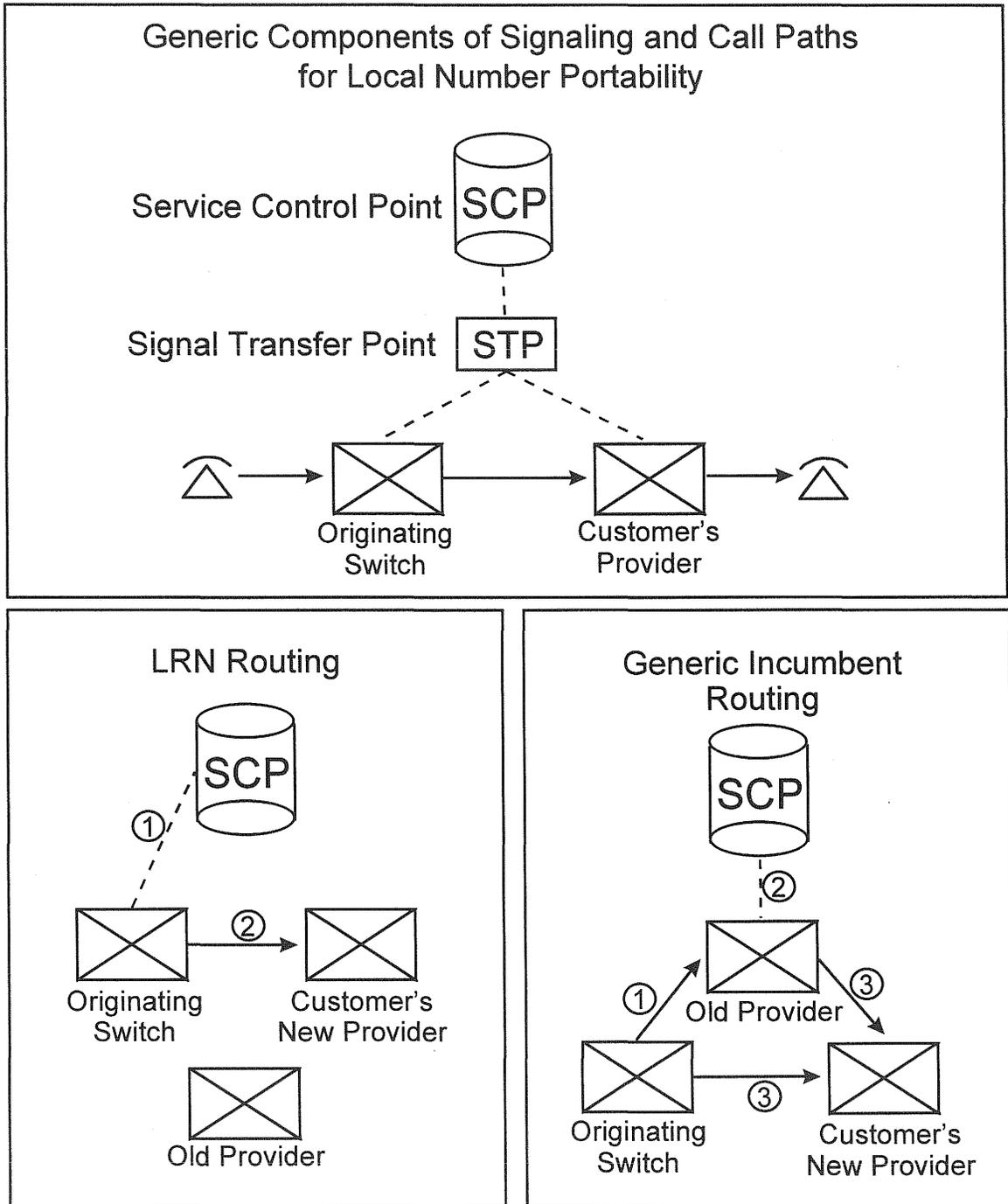
Figure 1. Generic portability routing approaches.
Source: Adapted from Goeff Waldau Local Number Portability Symposium, Dulles Airport Marriott, September 12, 1996.

Location Routing Number (LRN)

The model currently most popular is the LRN method proposed by AT&T. This model has been chosen by task forces in Colorado, Florida, Georgia, Illinois, Maryland, and New York. Using this method, a unique 10-digit telephone number, the LRN, is assigned to each switch in a defined geographic area. The number serves as a network address. Carriers routing calls to customers that have transferred their telephone number from one carrier to another perform a database query to obtain the LRN that corresponds to the dialed number. This database query is performed for all calls to switches from which at least one number has been "ported" (transferred from one carrier's switch to another carrier's switch, which enables a customer to retain his or her number when transferring from one carrier to another).

LRN supports custom local area signaling service (CLASS), emergency services, and operator and directory services, but may result in some post-dial delay. LRN can support location and service as well as service provider portability and can also support wireless-wireline and wireless-wireless service provider portability.

Carrier Portability Code (CPC)

This is a method developed by MCI, DSC Communications, Nortel, Tandem Computers and Siemens Stronberg-Carlson. It operates similarly to LRN . Under carrier portability code, each local service provider within a given area would be assigned a three-digit carrier portability code. The database serving that area would contain all the telephone numbers that have been transferred from one carrier to another and their corresponding codes. A carrier querying a database for purposes of routing a call to a customer that has transferred his or her telephone number would know from the NXX code of the dialed number, which identifies the central office switch to which the telephone number had been assigned, that the number may have been transferred to another local service provider. The carrier would query a database serving that area, which would return to the carrier a three-digit carrier portability code

corresponding to the service provider serving the dialed number. The carrier would then route the call according to the carrier portability code and the dialed NXX code.

This method is seen by many in the industry as an "interim" database solution because it uses two numbering plan areas (NPAs) or area codes, effectively removing one area code from the available pool. It is also not clear how operator services, such as busy line verification, collect calls, calling card calls and third-party billing, would be handled under this method. Using this method would require that the software be modified in each network switch located in the NPA in which this system is used. It would also require modification to the Local Exchange Routing Guide (LERG) on the same NPA-basis so that the LERG contains routing data based on carrier portability codes.

Local Area Number Portability (LANP)

This is a method developed by Stratus Computer and US Intelco which uses two "domains" of 1-digit numbers to route telephone calls to customers that have transferred their numbers to new carriers or new geographic locations. Specifically, this method assigns a ten-digit customer number address to each end user; this is the number that callers would dial to place telephone calls to the particular end user. It also assigns each customer a 10-digit network node address that identifies where in the telephone network to reach the particular end user. Both the customer number address and network node address are stored in routing databases so that carriers can determine from the dialed telephone number where in the network to reach the called party.

The California task force indicates that this method does not result in post-dial delay or require changes in the wireless networks; this method also supports service provider, service and unrestricted location portability.[11] In addition, the called number can be disassociated from the switches and reassigned. However, this method may

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[11] California Public Utilities Commission, *Local Number Portability Task Force Report*, 15.

impact emergency services as the information displayed will initially be the network node address rather than the customer number address. Some states have concluded that this system too complicated to implement and, thus, not viable for a long-term number portability solution.

Non-Geographic Number Method (NGN)

GTE has proposed this method, which uses a database but is fundamentally different from the other methods discussed. NGN would provide service provider and location portability to end users by assigning them a non-geographic telephone number and a geographic number that indicates the customer's physical location and the service central office. If the customer moves or changes local service providers, the geographic number (but not the non-geographic number) changes, in a manner similar to 800 service. When the non-geographic number is dialed, the non-geographic number is translated into the geographic number through a database query and the call is routed based on the geographic number.

A database dip is only required for calls to ported numbers, emergency and operator and directory service are not affected, and this method supports all three types of portability. But this approach strains number resources, requires a nationwide cut-over, and requires an initial change of telephone numbers to obtain portability.

Query on Release (QOR)

Pacific Bell and NYNEX have proposed a triggering mechanism which operates in conjunction with the same addressing scheme utilized in AT&T's LRN method. This method has the call go to the switch that the dialed number was originally assigned, called the release switch. If the dialed number has been transferred to another carrier's switch, the previous switch in the call path queries the database to obtain routing information. Because the switch that redirects the call also performs the query, it eliminates the need for the carrier to which the number was originally assigned to provide routing information.

Release to Pivot (RTP)

This method differs from Query on Release in that when a number has been ported from the release switch, the release switch - rather than the previous switch in the call path - returns the address information necessary for routing the call and releases the call back to a previous switch, the "pivot" switch. The pivot switch uses the address information to reroute the call to the new switch. The information regarding where to route the telephone call, if the number has been transferred, may be contained either in the release switch or an external database.

While Release to Pivot does not exhaust numbers, nor interfere with emergency, operator or directory services, it may increase call setup time and post-dial delay. Some parties believe it is not appropriate as a long-term solution because of its reliance on the incumbent LEC's network, the potential for post-dial delay, and its inefficient use of signaling links.

State Approaches to Number Portability

Most states that have adopted a long-term approach have chosen the LRN, a database method proposed by AT&T. Two non-database methods, RCF and Flexible DID, have been adopted as interim approaches.

According to the FCC's 1996 order on number portability, several states have established task forces to implement a long-term number portability method: Alabama, Arizona, California, Colorado, Connecticut, Florida, Georgia, Illinois, Indiana, Kansas, Maryland, Michigan, Minnesota, New York, Ohio, Oregon, Texas, Utah, Virginia, Washington, and Wyoming. State commissions which have adopted the recommendations of their staffs and task forces to implement LRN are Colorado, Georgia, Illinois, Maryland and New York.[12] In addition, the task force in Florida has recommended it. State commissions which have selected the LRN approach without

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[12] FCC, *Number Portability Order,* RM 8535, ¶ 21.

first establishing task forces are Indiana, Michigan, Ohio and Wisconsin. Parties to the FCC proceeding on number portability asserted that these states are utilizing the results of the Illinois task force's number portability efforts.[13]

States with implementation schedules include Colorado, Illinois, New York, and Georgia (mid-1997). Maryland reportedly expects implementation by third quarter of 1997. Ohio held a LRN workshop in September of 1996 to examine implementation issues. Michigan has ordered that implementation of long-term number portability in Michigan begin at the same time implementation begins in Illinois.

Illinois and Maryland task forces have examined deployment, cost recovery, billing, rating, and service management system (SMS) administration. Maryland, Colorado, and California have sent out (or are about to) requests for proposals for independent SMS administrators for their states.

While the Maryland and Colorado portability efforts are being led by a single state, the intent in actuality is to implement a regional effort.[14] The Illinois, Georgia, Maryland, New York, Colorado, and California commissions have been quite active and are encouraging the participation of interested parties. The 18-month lead time that these commissions have over the NANC--which met for the first time October 1, 1996-- strongly suggests that the state portability models are more likely to be of direct help in meeting the FCC number portability deadlines.

The initial meeting of the NANC was attended by all 32 voting members or their authorized representative. NANC Chairman Alan Hasselwander, appointed by FCC Chairman Reed Hundt, presented a proposal to put out a public notice seeking members for the various working groups which will address the major issues facing this Council. The most immediate concerns reportedly were making recommendations for a numbering administrator for the NANC and specifying the administrator's functions.

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[13] Ibid.

[14] Letter from Maryland Public Service Commission Chairman H. Russell Frisby, Jr. to Pennsylvania Public Utility Commission Chairman John M .Quain, dated Sept. 25, 1996.

The group must then address the issues of designing a database for number portability. NANC has been asked to make its recommendations to the FCC by May 1, 1997 in order to facilitate the transition of the administration of NANC from Bell Core by July 1, 1997. This time frame is one reason several states have begun their own number portability analysis and implementation process, as the first standard metropolitan statistical areas have to have number portability in place by October 1997.

No states are reported to be using CPC which the FCC considers to be only an interim solution. Nor were any states reported to be using the LANP, NGN, QOR or RTP methods.

Two states have conducted number portability trials. In New York the LAPN method was to be tested in Rochester but was canceled. The CPC method was tested in Manhattan, but the NYDPS reportedly now views the CPC method as only an interim measure. The test is now focusing more on operational and administrative issues. Reportedly, MCI no longer views CPC as a viable long-term method.[15] In Washington the trial concerned LANP and, based upon the results, the Washington task force declined to adopt LANP.[16]

NARUC in its April 17, 1996, *Ex Parte* filing identified the states providing interim number portability through RCF or DID (or similar methods) as including Arizona, California, Connecticut, Florida, Georgia, Illinois, Indiana, Iowa, Louisiana, Maryland, Massachusetts, Michigan, New York, Ohio, Oklahoma, Oregon, Pennsylvania, Tennessee, Texas, Virginia, Washington, Wisconsin, and Wyoming.[17] Other states also considering interim arrangements are Alabama, North Carolina, and Minnesota.[18]

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[15] FCC, *Number Portability Order,* ¶ 23.

[16] Ibid., ¶ 24.

[17] NARUC April 17, 1996 *Ex Parte* Filing at 4, 29, 59, 72, 74, 77, 86, 100, 114, 118, 130, 135, 139; USTA *Ex Parte* Letter at 2, from Mary McDermott, to William Caton, FC, CC Docket No. 95-116, filed Mar. 25, 1996 (USTA March 25, 1996 *Ex Parte* Letter). See also Ameritech February 21, 1996 *Ex Parte* Filing at 23; Texas PUC Comments at 4.

[18] USTA Match 25, 1996 *Ex Parte* Letter at 2.