ATIS-0300063

INITIAL REPORT TO THE NORTH AMERICAN NUMBERING COUNCIL (NANC) ON NUMBER POOLING

The INC agreed that no further work on the Initial Report was warranted. This was due to work already taking place under other INC issues (e.g., 164, 177, 222, 243). The Initial Report accurately reflected industry thinking at the time of issuance and still stands as a snapshot view (Issue 171 Resolution Statement).

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The Industry Numbering Committee (INC) provides an open forum to address and resolve industry-wide issues associated with planning, administration, allocation, assignment and use of North American Numbering Plan (NANP) numbering resources within the NANP area.

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1.0 INTRODUCTION

This report defines, describes, and analyzes the number administration and assignment process known as number pooling. The report identifies the attributes or parameters associated with pooling, discusses the principles, assumptions, and constraints under which pooling can potentially be provided, develops specific alternatives for the implementation of pooling, and describes the impact of number pooling on network architecture, number assignment and administration processes. In addition, the report assesses the practicality of pooling with respect to certain criteria and identifies criteria for the characterization of the pooling alternatives, uses those criteria to assess the alternatives, explains how the transition from the current (central office based) number assignment process to pooling could potentially take place, and offers recommendations and conclusions relative to the use of pooling.

The report was compiled under the leadership of the Industry Numbering Committee (INC), which operates as part of the Carrier Liaison Committee (CLC) of the Alliance for Telecommunications Industry Solutions (ATIS). This industry effort was directed in part by the North American Numbering Council (NANC), a federal advisory committee for the FCC, and included participation of the two NANC Working Groups: the North American Numbering Plan Administration (NANPA) Working Group and the Local Number Portability Administration (LNPA) Working Group.

2.0 DEFINITION OF POOLING

Pooling of geographic numbers in a local number portability environment is a number administration and assignment process which allocates numbering resources to a shared reservoir associated with a designated geographic area.

Initially, the designated geographic area is limited to an existing rate center within a geographic Numbering Plan Area (NPA) with possible future expansion to beyond the rate center.[1] The numbering resource in the shared reservoir would be available, potentially, in blocks of numbers or on an individual telephone number basis for assignment to competing service providers participating in local number portability for the purpose of providing services to customers in that area.

3.0 BACKGROUND - THE CONCEPT OF POOLING

The concept of number pooling as an alternative to the current number administration and assignment processes has generated considerable interest as a potential means for the more efficient utilization of numbering resources.

[1] A rate center, as used here, denotes the smallest geographic area used to distinguish rate boundaries.

The concept of pooling is mentioned in the Carrier Liaison Committee Industry Carriers Compatibility Forum (CLC ICCF) Routing and Rating Workshop (ICCF Report on Rating and Routing in a Competitive Local Environment - ICCF96-1220-016 - Issued 12/20/96) which suggested that pooling be investigated as an alternative to the various techniques that were evaluated in the ICCF report. Subsequent to this report various pooling type approaches have been suggested by different industry participants. These include the NXX-X/LRN and the pooling of unassigned numbers.

The potential need for and the anticipated advantages of number pooling are described below.

3.1 THE POTENTIAL NEED FOR NUMBER POOLING

The onset of local exchange competition, and in particular the need that under current call rating mechanisms all local exchange carriers require a central office code per rate center, has resulted in the increased incidence of central office code exhaust and the associated need for NPA relief. This situation is compounded by the increasing demand for telephone numbers, fueled by the demand for second lines for both residential and business applications, as well as the use of fax machines, modems, and wireless services. The resulting demand has, in many areas, created a shortage of central office (NXX) codes even if there remains a significant quantity of unassigned line numbers. An alternative to the current number assignment practice which assigns service providers a full central office code (i.e., a block of 10,000 numbers) could offer relief from this condition.

3.2 ANTICIPATED ADVANTAGES OF NUMBER POOLING

Number pooling may promote number conservation and is therefore potentially advantageous. Specifically, the assignment of numbers to service providers in finer granularity than blocks of 10,000 – that is, for example, in blocks of 1000 or by individual telephone number—could afford improved utilization of numbering resources. Further, a, pool of numbers, if available to all providers serving a defined area, need only be large enough to accommodate the collective needs of those providers. Within a pooled environment the total number of NXX codes assigned should be fewer than if a full NXX code were assigned to each service provider, and the numbering resources should last for a longer period of time.

In addition to providing improved number utilization, number pooling may enhance local service competition by reducing the incentive for customers to select a service provider based solely on the ability of that provider to offer a specific telephone number.

3.3 ACCOMMODATION OF NUMBER POOLING

The potential advantages associated with number pooling cannot be realized without the necessary network, operations, and administrative modifications required to implement the pooling process. The time, effort, and cost associated with these modifications must be recognized and weighed against the potential benefits to be derived before a decision to develop and implement pooling in any one particular geographic area can be made. It is further recognized, however, that specific regulatory directives may demand the implementation of pooling regardless of the perceived cost/benefit considerations.

3.4 APPLICABILITY OF NUMBER POOLING

Although pooling may be considered generally beneficial, its implementation may not prove to be desirable in all areas. The understanding that number pooling will enhance the efficiency of number utilization, and therefore delay the need for area code relief is based upon the belief that current number assignment practices (the assignment of full NXXs per rate center) are inherently inefficient because some NXXs may never achieve optimum utilization levels. There is no doubt that in many, if not most areas, this is indeed the case. It may be, however, that in some environments, perhaps specifically in those which are densely populated and where there is a large demand for communications services, number utilization is quite high and the level of unused numbers within central office codes assigned to any service provider in that area is quite small. In such areas, the benefit provided by number pooling may not be significant. Accordingly, the implementation of pooling may need to be area specific, with deployment only in those areas where the benefit of increased utilization and delayed exhaust exceeds some yet to be determined threshold.

3.5 THE CURRENT USE OF NUMBER POOLING

Individual telephone number pooling is currently used only for the toll free (800/888) numbering resources. Toll free numbers reside in the 800/888 Service Management System (SMS) and are available to all SMS users (i.e., toll free service providers). Users interface with the SMS database system, via either a manual or mechanized process, to interrogate the system to identify spare and reserved numbers for their subscribers. Because the toll free numbering resources are non-geographic, the area of pooling covers most of the NANP area and all numbers are available for service in all areas. Pooling of geographic numbers would demand the definition of areas of pooling and constrain the assignment of given geographic numbers to designated areas.

4.0 THE ATTRIBUTES OF POOLING

The attributes of pooling describe key characteristics or parameters from which different pooling alternatives can be derived. The attributes defined here include level, scope, applicable numbering resources, and the type of number inventory.

4.1 LEVEL

The level of pooling refers to the granularity with which numbers are assigned and/or allocated to the service provider. Pooling might be implemented by provisioning blocks of numbers in quantities smaller than the block of 10,000 numbers offered under the current CO Code Assignment Guidelines. Quantities that might be considered include 1000s blocks or 100s blocks. It is assumed that block assignments will provide numbers in sequential order. That is, a service provider who is assigned the "2000s" block within a given NXX code would receive the numbers 2000 through 2999.

Pooling may also provide service providers the capability to request the assignment and/or allocation of numbers at the individual telephone number t level. With this level of pooling, service providers would be able to request one or more numbers at a time. Individual telephone number pooling, although oriented to the random selection of numbers, could support the assignment of a group of sequential numbers if available.

4.2 SCOPE

The scope of pooling defines the geographic area within which the pooling of numbers is supported. Initially, the area of pooling is confined to within a rate center. This will permit current wireline call rating mechanisms to be maintained. Limiting pooling to within a rate center would maintain the current association of telephone numbers – specifically, the NXX code – with a known, given geographic area (i.e., rate center).

It is possible, however, that an area of pooling could extend beyond a single rate center. In general, increasing the area of pooling offers the ability to serve more end user customers with the numbering resources within the pool and could potentially increase number utilization. Implementation of pooling beyond a rate center boundary would require additional capabilities to properly rate the call, specifically the capability associated with the implementation of number portability out of the rate center. With pooling out of the rate center, additional questions regarding the absolute extent of the area of pooling must be addressed. The area of pooling could extend beyond a rate center but still be within an NPA boundary; or the area of pooling could conceivably comprise an entire state. It is not contemplated that the area of pooling would extend beyond a state boundary.

4.3 NUMBERING RESOURCES SUBJECT TO POOLING

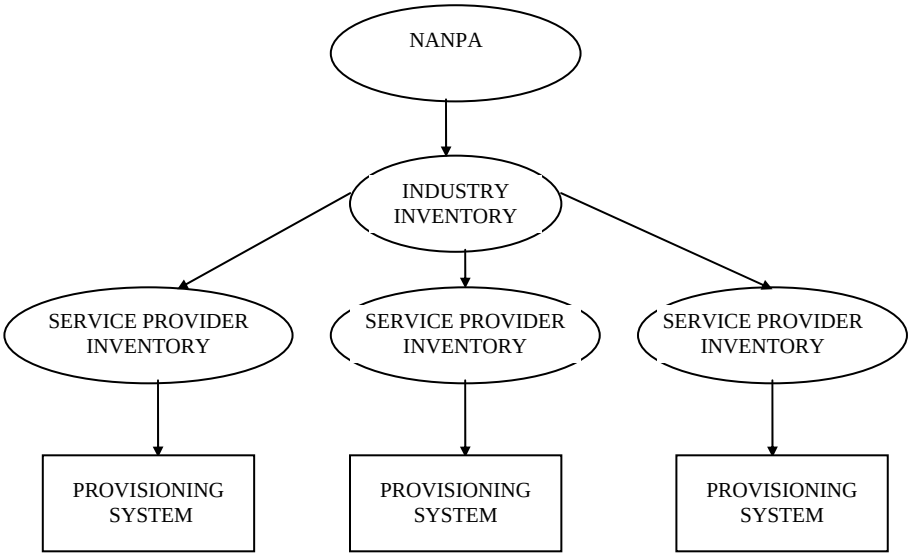
The initial establishment of a numbering pool could include only growth numbers -- that is, numbers in unassigned NXX codes; or, it could include embedded numbers (subject to the possibility of a threshold, yet to be determined) -- that is, numbers from NXX codes previously assigned to a given service provider; or both. For example, if pooling were implemented with 1000s block assignments, the pool would be populated with all 1000s blocks from unassigned NXX codes. However, it is certainly feasible

that the pool could also contain 1000s blocks from NXXs allocated to service providers but in which there were no end user assignments. It is also possible that even those 1000s blocks within an NXX code allocated to a given service provider which have a minimal number of end user assignments (yet to be determined) could be allocated to another service provider.

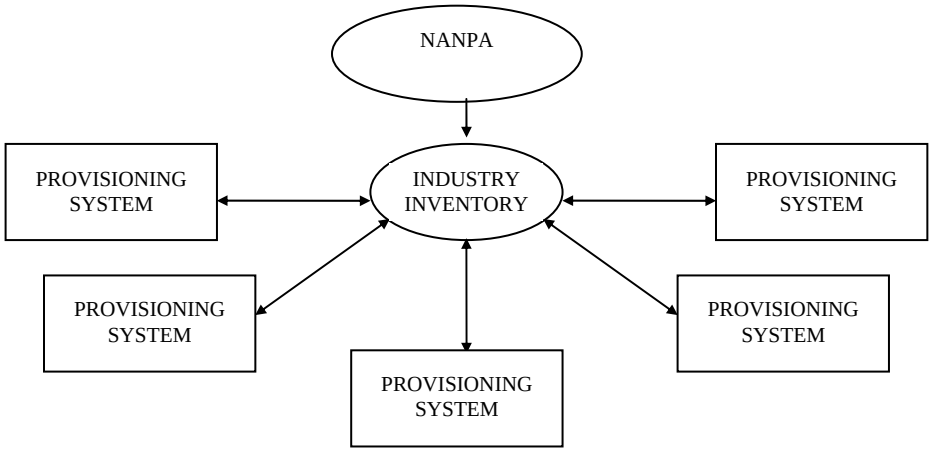
If individual telephone number pooling were implemented, similar considerations relative to growth and embedded numbers would have to be addressed. The establishment of the industry inventory pool would no doubt contain numbers from unassigned NXX codes but could also include numbers from allocated NXXs.

4.4 NUMBER INVENTORY

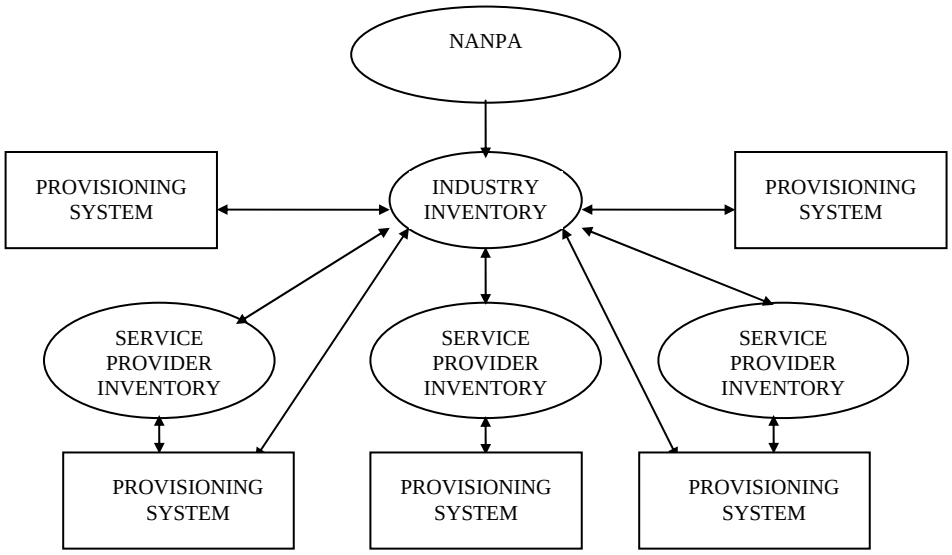
Numbers assigned to a given service provider can be placed in an inventory maintained by that service provider (Service Provider Inventory) and subsequently assigned from that inventory to end users. This is what is done today after an NXX code is assigned to a service provider. A pictorial representation of number pooling with the use of service provider inventories is shown below.



Alternatively, it is possible that a service provider would not maintain its own inventory but use only an industry inventory, which the service provider would access to search for and obtain assignments based upon specific end user requests for service. The use of an industry inventory is represented below.



Scenarios for number pooling will therefore be classified as supporting a *service provider inventory* of numbers or an *industry inventory* of numbers, or a combination of both. The figure below represents a pooled environment where assignments could be populated in service provider inventories or service provider provisioning systems might interact directly with the industry pool.



Numbers can be made available to a given service provider using either a batch process or a real time/interactive process. A batch assignment is associated with a specific request for resources based upon a service provider forecast, and the allocation of those resources to a service provider for subsequent assignment to subscribers. The real time process implies the assignment of numbers based upon a specific subscriber need and the immediate assignment of the resource to the subscriber.

The use of a service provider inventory could be associated with either a batch or real time assignment mechanism. A number pooling scenario which allocates numbers by 1000s blocks would support a batch process through which the 1000s block is provided to the service provider's inventory, from which future subscriber assignments can be made. Real time assignments could also be made from the pool to a service provider's inventory to satisfy the demand of a given subscriber, either for an individual number or a block of numbers. Alternatively, a scenario which does not include service provider inventories, but relies on the use of an industry inventory, would only be associated with real time assignments.

5.0 GENERAL AREAS OF IMPACT

Number pooling represents a major change in number assignment and administration. Its impact, however, extends beyond these areas and requires modifications to network infrastructure, changes in operations support systems, and variations in call processing, including call routing and rating.

5.1 ROUTING

Historical network routing mechanisms are based upon the understanding that geographic numbers are assigned on a central office (NXX) basis and associated with a specific switch, and the recognition that the network address to which the call must be routed is embedded in the first six digits (NPA-NXX) of the called number. The use of number pooling eliminates this association of NXX to end office and demands an alternative routing mechanism for call completion. Such a mechanism is provided with the infrastructure associated with Location Routing Number (LRN) Local Number Portability (LNP). Accordingly, and most importantly, any implementation of pooling can only be supported if permanent LRN LNP is available.[2] The current implementation of this capability will only support pooling within the rate center.

Similarly, non-call associated signaling messages associated with database (e.g., LIDB or HLR) queries, or the processing of certain CLASS services, are traditionally routed using six digit analysis of a designated telephone number. Again, number pooling breaks the association of NPA-NXX with the required destination and demands more granular analysis and (global title) translations. The mechanisms available with LRN LNP also provide this capability.

5.2 RATING

Today call rating is derived from the geographic information embedded in the calling and called party numbers, specifically the first six digits of those numbers (the NPA-NXX). The use of number pooling supports these rating mechanisms assuming that the area of pooling -- that is, the area in which numbers are assigned and shared among different service providers -- is consistent with the established rate center boundaries, and that the NPA-NXX(s) assigned to the pool uniquely identify the rate center in which subscribers assigned numbers reside.[3]

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[2] Although switch based seven digit analysis and translation can conceivably be supported in many switches and could, therefore, be used to route calls in some pooled number environments, it is the consensus of the industry that this capability as administratively burdensome and inefficient in its use of switch memory. Therefore, seven digit analysis is not a practical routing alternative using the mechanisms of LNP.

[3] The assignment of numbers to subscribers who reside in the rate center to which a given NPA-NXX is assigned is a wireline service provider paradigm. It should be recognized that wireless service providers typically are not constrained to this assignment procedure and may assign numbers to their subscribers

If an area of pooling is defined that extends beyond existing rate center boundaries and numbers from a given NPA-NXX can be assigned over multiple rate centers, an alternative to the current call rating mechanisms would be required to accommodate changes to billing structures. This mechanism, which is not now available, may associate rating information with a given 10 digit number (i.e., the subscriber), perhaps through the use of a separate, additional location parameter. This location information may be provided in call detail records and used in downstream rating processes.

5.3 THE REQUIRED INFRASTRUCTURE

The use of number pooling will require the development and deployment of the necessary network infrastructure. Specific architectural issues include whether the number administration database will be used simply as a repository of number assignments or will function on an immediate basis, allowing service providers to search for and reserve numbers as a result of a specific customer request.

In addition, it appears that routing requirements demand close coordination between the number assignment process and the Service Management System (SMS) associated with LRN LNP. Accordingly, this may require a link between the number administration database and the LNP SMS. Upon the allocation of numbering resources within the number administration database, or perhaps later when a specific subscriber assignment is made, a record associating the assigned number with the appropriate service provider, along with routing information necessary to direct any calls dialed with that number to the designated central office switch, would be transmitted to the LNP SMS. Information in the LNP SMS would be downloaded to the network routing databases (SCPs) and thereby made available for call processing.

Finally, it is recognized that the architecture associated with pooling is directly related to the process flows which will be used in the number assignment process. These process flows will be dependent on the specific implementation of the number administration database and the possible use of service provider inventories. Specific number pooling architecture proposals and their associated number assignment process flows are described in Section 7.0.

5.4 ADMINISTRATION

As is the case with all number administration processes, number pooling will require the oversight of an administrator to establish the pool, allocate the resources from the pool, monitor the utilization of the pool, determine the rate of growth, determine its projected exhaust, and plan for its relief in accordance with industry guidelines. It is expected that

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from a given NPA-NXX even if those subscribers reside outside the rate center with which the NPA-NXX is associated.

a neutral third party will perform this function. Administration of the resources will be subject to regulatory oversight. A detailed description of number administration in a pooled environment is given in Section 10.0.

5.5 ADMINISTRATIVE AND ASSIGNMENT GUIDELINES

Guidelines will be required to describe the specific methods and procedures through which numbers will be assigned in a number pooling environment. The manner in which numbers are allocated, reserved, aged, or designated spare must be determined. Further, limitations on the quantity of numbers that may be reserved at any one time by a given service provider must be considered. Definitions and practices related to number assignment in a pooled environment are provided in Section 8.0.

5.6 OPERATIONS SUPPORT SYSTEMS

Operations Support Systems (OSSs), especially those associated with service provisioning, will be directly impacted by the implementation and use of number pooling. Systems which provision new services for customers are typically based upon the availability of numbering resources within a central office code (block of 10,000 numbers) and will have to be modified and, in some cases, possibly replaced to accommodate number pooling. Other OSSs used for maintenance and repair are similarly configured and may also require modification. It is recognized that some of the necessary modifications may have been made to accommodate LNP. The extent that additional changes may be needed to support number pooling is described in Section 9.0. It is also recognized that in some cases new system(s) may need to be developed and deployed to accommodate number pooling.

5.7 CAPACITY

Number pooling will increase the quantity of numbers treated as ported numbers. This increases the storage requirements for LNP databases and billing systems, and increases SSP real-time processing and 10-digit Global Title Translations (GTT). Additional details concerning SCP capacity are provided in Section 7.2.4.3.

6.0 PRINCIPLES, ASSUMPTIONS AND CONSTRAINTS

The following principles, assumptions, and constraints form the framework from which number pooling can be implemented in a fair and equitable manner that does not disadvantage any LNP capable local service provider from competing in the pooling area.

6.1 PRINCIPLES

Number pooling shall be implemented under the following principles. It is recognized that considerations involving the recovery of costs associated with the development and implementation of number pooling, as well as the consideration of the initial and subsequent economic effects on all impacted entities are very important. Any solution should not preclude the development of appropriate cost recovery mechanisms. However, such considerations are not included in these principles.

6.1.1 Number Pooling Availability Principle

Number pooling can only be implemented in locations where local number portability has been implemented. Specifically, number pooling will only be implemented where LRN LNP is available.

6.1.2 Reciprocity Principle

Carriers obtaining numbers from the pool shall be obligated to contribute their eligible numbers to the pool.

The introduction of number pooling should not disadvantage any industry segment to a degree greater than any other.

6.1.3 Participation Principle

Service providers offering local number portability in accordance with the Telecommunications Act of 1996, and as ordered by FCC Report and Order CC Docket No. 95-116, shall also participate in number pooling where number pooling is implemented. Service providers offering local number portability are also encouraged to participate in number pooling development, deployment and associated administrative functions.

6.1.4 Non-participation Principle

Service providers should not be required to participate in number pooling before they are required to offer local number portability. Number pooling should not preclude such service providers from obtaining non-pooled geographic numbering resources.

6.1.5 Equal Availability Principle

Numbering resources in the industry inventory pool shall be equally available and allocated to service providers in a fair and non-discriminatory manner.

6.1.6 Architectural Flexibility Principle

The architecture selected for the support of number pooling should allow service providers reasonable flexibility in the manner in which they interface with the systems supporting number pooling.

6.1.7 Customer Transparency Principle

The mechanism by which pooling is provided should be transparent to the customer regardless of the number of times a customer changes service providers.

6.1.8 Technical Equity Principle

The technical characteristics of existing interconnection arrangements with non-participating networks should not be fundamentally changed as a result of number pooling.

6.1.9 Network Reliability Principle

The pooling of numbers shall not degrade network reliability nor negatively impact network performance.

6.1.10 LNP Impact Principle

The implementation of any number pooling mechanism or methodology will not impact the functionality of, or schedule for, LNP as ordered by the FCC. In particular, schedules for LNP implementation should not be advanced in any way to support number pooling.

6.1.11 Uniform Interface Principle

The number pooling architecture selected shall support interoperability such that service providers will interface with a number pool and obtain numbers for their use uniformly nationwide.

6.2 ASSUMPTIONS AND CONSTRAINTS

- Number pooling will not be implemented until a neutral number pooling administrator is in place and able to perform the number administration function.

- Number pooling will not be industry segment specific. Although there may be additional considerations unique to particular segments of the industry, number pooling must be available to all carriers.

- Initially, each number pooling area will be constrained to within a rate center boundary. This does not presume that the use of number pooling will ultimately be limited to existing rate center boundaries.

- The current wireline call rating paradigm, in which call rating for wireline carriers is based upon the rate centers associated with the calling and called party, will be maintained.

- Implementation of number pooling will be subject to applicable local, state and federal regulatory requirements.

7.0 FUNCTIONAL CONSIDERATIONS

A number pooling environment must support several basic functions/processes necessary for number assignment and administration. These include the administration of the number pool, the interaction of that pool with the LNP SMS, and, in general, accommodation of the "life cycle" of the numbering resources, from the initial availability of numbers within the pool, through their assignment, activation, disconnection and return (snapback). Architectural considerations and related process flows necessary for the support of these functions are described for the two distinct forms of pooling – block pooling and individual telephone number pooling.

7.1 FUNCTIONS REQUIRED IN A NUMBER POOLING ENVIRONMENT

The functions of 1) industry inventory administration, 2) LNP administration, 3) CO code administration, and 4) service provider inventory administration are described in the following sections. These descriptions and the associated process flows are functional and present a basis for architectural considerations. However, within this

Section, no attempt is made to identify the specific system (e.g., database) where these functions may reside.

7.1.1 Industry Inventory Administration

The industry inventory pool is the reservoir of numbers from which service providers will be allocated numbers. This pool will be overseen by an administrator whose responsibilities will include the establishment of the pool and the ongoing assurance that number allocation is made consistent with industry guidelines so that the industry inventory pool contains sufficient resources to satisfy industry needs.

7.1.2 LNP Administration

LNP, as previously stated, is a requirement for the implementation of number pooling. Because the mechanisms associated with LNP will be used to route pooled numbers, the LNP SMS must be directly involved in the pooling process. The manner in which information is transmitted from the industry inventory pool to the LNP SMS is a key item in the pooling process and is discussed further in Section 7.2.4. The LNP SMS will be overseen by the Number Portability Administration Center (NPAC) and its Administrator.

7.1.3 CO Code Administration

CO code administration, in some form, will continue to be necessary with number pooling. The CO code administrator, upon request of the pool administrator, will make available additional CO codes for the pool. The CO code administrator will also continue to be responsible for the tracking of CO code usage, the forecast of CO code exhaust, and the planning for NPA relief. Finally, there may be service providers who, because of technical or other considerations (e.g., lack of LNP capability, pooling may not be required in a specific area), will not participate in pooling and will continue to be assigned full CO codes for their numbering needs. These service providers will likely continue to interface with the CO code administrator.

7.1.4 Service Provider Inventory Administration

A service provider may be required to maintain or have access to a service provider inventory of numbers from which it will make assignments to its subscribers as necessary.[4] This service provider inventory of numbers will be supplied from the industry inventory consistent with the prescribed pooling arrangement and industry assignment guidelines. Each service provider will be responsible for the administration of its own inventory.

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[4] Although it is likely that most service providers will maintain their own inventory of numbers, it is possible that a service provider may choose to employ the services of another service provider, or perhaps a third party database provider, for the maintenance of its inventory of numbers.

7.1.5 Additional Required Functional Capabilities

The infrastructure deployed to support pooling, regardless of whether the implementation provides for block or line level pooling, must accommodate the following needs:

- the ability to query the industry inventory pool to determine what resources are available for allocation
- the ability of the pool administrator to obtain information relevant to the utilization of the allocated resources in service provider inventories for auditing and/or reclamation purposes
- the availability within the industry inventory pool of information regarding all assignable resources as well as whether those resources have been allocated, and to whom
- the availability within service provider inventories of specific information regarding the status of individual telephone numbers (e.g., spare, working, reserved, intercepted, etc.)

7.2 ARCHITECTURE AND PROCESS FLOWS - BLOCK POOLING

The key parameters of block pooling are described. They include the characteristics of the pool, the manner in which assignments are made from the pool, the industry documentation required, the provision of information to the NPAC/SMS, and the treatment of disconnected numbers.

7.2.1 Characteristics of the Industry Inventory Pool

Within a block pooling environment the industry inventory pool of numbering resources will provide blocks of numbers (e.g., 1000s blocks) for allocation to eligible service providers. The pool will provide these numbering resources for use in a specific geographic area – the area of pooling – initially to be associated with a rate center. Accordingly, service providers which are allocated numbers from a given industry inventory pool will assign those numbers to subscribers who reside in or choose to obtain service in the area of pooling.[5]

Blocks of numbers may be allocated to the industry inventory pool from CO codes not assigned to any service provider. In addition, blocks of numbers may be allocated to the pool from CO codes assigned to service providers but in which there exist no subscribers within six months of the assignment. It is also possible that blocks from CO codes assigned to a given service provider which contain a minimal number of

[5] As previously described, wireless providers may provide their subscribers number assignments associated with a given rate center even if those subscribers reside outside that rate center.

subscriber assignments might also be placed in the industry inventory pool. These "contaminated" blocks could be assigned to a service provider other than the service provider assigned the CO code with calls to the existing subscribers properly routed through use of the mechanisms of LRN LNP. Specific guidelines (e.g., % fill) to determine the eligibility and the exceptions of a given block for placement in the industry inventory pool will have to be developed.

7.2.2 Assignments from the Industry Inventory Pool

A service provider will request an assignment from a given industry inventory pool consistent with its needs for numbering resources in the area of pooling and the industry assignment guidelines. These guidelines will describe the parameters under which such a request can be made and could include, for example, the percent utilization of the service provider's current inventory of numbers, or the months remaining before that inventory exhausts.

Assignments of blocks of numbers will likely be made using a procedure through which a service provider will request the block assignment based upon its forecasted need. Upon assignment, the block will be populated in the service provider's inventory for assignment to individual subscribers.

The pool administrator will make the block assignment based upon certification by the service provider that its request is consistent with the assignment guidelines. On an ongoing basis the pool administrator will monitor the supply of numbering resources within the pool to assure an adequate supply of numbers for the participants within the pool. If that supply is not adequate, the pool administrator will request from the CO code administrator that additional resources (i.e., a new CO code) be made available to the pool. The CO code Administrator will supply a new CO code for use in the pool consistent with industry administrative guidelines.

7.2.3 Industry Documentation

Currently, CO code assignments are documented in the Local Exchange Routing Guide (LERG) where the information is available to the industry for routing purposes.[6] LERG assignment on a CO code basis will continue to be necessary in a pooled environment. A LERG designated CO code assignee will provide default routing if routing information is unavailable or inaccessible from an LNP routing database.[7]

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[6] NPA-NXX assignment information is also documented in NECA FCC Tariff No. 4.

[7] Modifications are currently being considered which would support the association within the LERG of less than a full NXX code (e.g., a range of numbers such as a 1000s block) with a given service provider. Although the availability of this more detailed information is welcome, the need to accommodate default routing continues to demand the designation of a single (default) service provider for each NPA-NXX.

The Pooling Administrator will select the LERG Assignee for newly assigned CO Codes in accordance with the industry pooling administration guidelines. The LERG Assignee should be a qualified code applicant providing service in the rate center to which the NXX is assigned.

7.2.4 Provision of Information to the NPAC/SMS

The use of block level pooling raises the issue of the manner in which information related to a block assignment will be provided to the NPAC/SMS. As previously discussed, the provision of the assignment in the NPAC/SMS is essential for accurate call routing. Two potential methods have been identified for the transfer of this information. The first method would, immediately upon the assignment, place all numbers within the block into the NPAC/SMS thereby creating a record for each line number to associate that number with an LRN. Alternatively, information relative to each line number might be provided to the NPAC/SMS only when a line number was assigned to a subscriber. The former arrangement has been identified as “pre-porting”; the latter as “port on demand”. Not surprisingly, each method has characteristics that might be viewed as either advantages or disadvantages. The characteristics of the methods are described below.

7.2.4.1 Characteristics of Pre-Porting

The following is a list of characteristics associated with pre-porting:

a) porting performed once upon block assignment (if service provider maintains only a single switch in the area of pooling);
b) vacant treatment and billing/fraud obligation associated with block holder;
c) no porting delay on assignment; numbers already ported into network;
d) numbers within pooled blocks can be administered in the same manner as those within resident (DEFINE) NXXs;
e) eliminates a concern for potential overload of NPAC transaction capacity; and
f) requires larger LNP databases; potential capacity concerns.

7.2.4.2 Characteristics of Port on Demand

The following is a list of characteristics associated with port on demand:

a) uses smaller LNP database (only numbers assigned to subscribers are ported);
b) vacant numbers are default routed to code holder, not the block holder;
c) must use LNP porting process upon each subscriber assignment; adds potential complexity and delay;
d) presents risk that numbers in block allocated to a given service provider could (inappropriately) be used by the code holder; and
e) ambiguity of billing and fraud obligations (LIDB validation).

7.2.4.3 SCP Capacity Concerns

Arrangements have been proposed to minimize concerns associated with database capacity (that is, the need to accommodate the added number of records that would be stored in LNP SCPs as a result of number pooling). These arrangements suggest that a range or block of numbers allocated to a given service provider need not be represented in databases as individual records, but could instead be identified as a single record.

Two specific proposals have been offered. The first would provide separate tables for storing both individual (ported) numbers and sequential ranges. The second proposal incorporates an algorithm change which would be implemented as part of the query process to perform a second search after the initial query associated with a single number did not locate a specific record. Although it is generally agreed that both arrangements have merit, it is also understood that because of differences in provisioning requirements the two alternatives could not co-exist in the same area.

The first proposal suggests that an LNP query would be routed through two database tables: one in which a record represents a single ported number, and one in which the record represents an entire range of numbers. The first table is actually an exception table, containing only those numbers that cannot be represented in a range. Such numbers would include those ported for service provider portability purposes only (i.e., not ported for pooling) or numbers that have been ported away from the range holder. With this arrangement the query would first initiate a search of the exception table – the table that contains records of individual number – and, if the appropriate record was not found, initiate a search of the range table. Implementation of this arrangement would likely require modifications to the current NPAC interface.

The second proposal suggests a change in the manner in which the range is identified and submitted to the NPAC SMS. Specifically, the range record would be encoded in an entry that maintains the format of a single number record, but uses unique digits to identify the record as representing a range of numbers. Importantly, it appears that this

method could only be used to accommodate the allocation of a 1000s block. The associated query process would require an initial search of the LNP database and, if a record for the individual telephone number were not found, specific digit reformatting of the queried number would also be required. This reformatting would place the number in the unique format of the range record and a second search of the database would be initiated. No change in the NPAC interface is required with this arrangement.

7.2.4.4 Proposed Target Implementation

The INC recommends a target implementation no later than the first half 1999 for thousands block number pooling which does not require the exclusive use of either pre-port or port-on-demand. Subject to further industry analysis to determine technical feasibility, the INC recommends an implementation procedure which would provide carriers the flexibility to activate their allocated numbers (i.e., 1000s blocks) consistent with their needs. Numbers could be activated (i.e., records placed in the LNP/SMS) immediately upon allocation, only when assigned to subscribers, or anytime in between.

The target implementation requires significant development effort, not all of which has been completely identified. Further examination of this proposal should be undertaken by the LNPA Working Group. The areas of development identified to date are listed below.

1. Modification to NPAC/SMS which permits activation of pooled number records in the SMS and associated downloads to LNP SCPs within a 15 minute interval; and development of a pooled number indicator.

2. Modifications to Service Provider OSSs which permits the mechanized provisioning and TN administration for 1000s blocks

3. Modifications to Service Provider Switches and Switch Administration to permit the automation of the translations activities required for vacant number treatment of pooled numbers

4. SMSs, SCPs, NPAC and associated interfaces require modification to permit the representation of a range of numbers in the SMS and SCPs, rather that the exclusive use of individual records, i.e., Efficient Data Representation.

The timeframe for the development associated with these capabilities is presently unknown, but the capabilities are required no later than 2Q99 to meet CMRS needs.

If the NANC endorses this INC recommendation, the NANC should immediately direct the LNPA Working Group to undertake a detailed analysis of the specific requirements to support the target implementation.

Prior to the availability of all the capabilities to support the target implementation, number pooling might be implemented in specific areas with some, but not all of the above features.

The timeframes depicted below are based on the October 1997 vendor responses to the Illinois Commerce Commission analysis regarding number pooling in the 847 NPA. The analysis assumed pre-port, 1000 block pooling with snapback to the block holder. These timeframes are based on limited vendor input and should only be considered as preliminary estimates which are subject to change.

Based on current understanding, early implementation of number pooling would be constrained as follows:

Implementation prior to mid 1998
1. Service Providers activate “as needed” (see definition below) pursuant to industry guidelines.
2. Manual processes needed by some service providers
3. Service Provider concerns due to potential 3 day interval (delay) for activation (porting)
4. Service Provider/Vendor SCP capacity limitations

Implementation mid 1998 - end 1998
1. Service Providers activate “as needed” pursuant to industry guidelines
2. Potential mechanized capabilities used for provisioning, TN administration
3. NPAC/SMS development permits 15 minute activation
4. SCP capacity limitations continue

Implementation no later than first half 1999 (target implementation)
1. Efficient data representation developed; SCP capacity limitations are potentially resolved
2. Service Providers activate at their discretion

7.2.4.5 Definition of Activation “As Needed”

Activation ”as needed” is a number administration process which would permit a service provider to immediately activate a portion of the numbers within its allocated thousands blocks subject to limitations defined in yet to be developed industry guidelines. That is, a carrier might be constrained to activate, for example, only the amount of numbers within its allocated thousands blocks that a service provider requires to satisfy its forecasted needs for the near term, e.g., one month. This process could mitigate some SCP capacity concerns while still providing carriers with an inventory of numbers from which subscribers could be assigned numbers without a three day delay. Until efficient data representation is available, it should be recognized that control mechanisms should be implemented by service providers to monitor their

own SCP capacity utilization to ensure adequate capacity for both number portability and number pooling.

7.2.5 Treatment Upon Disconnect

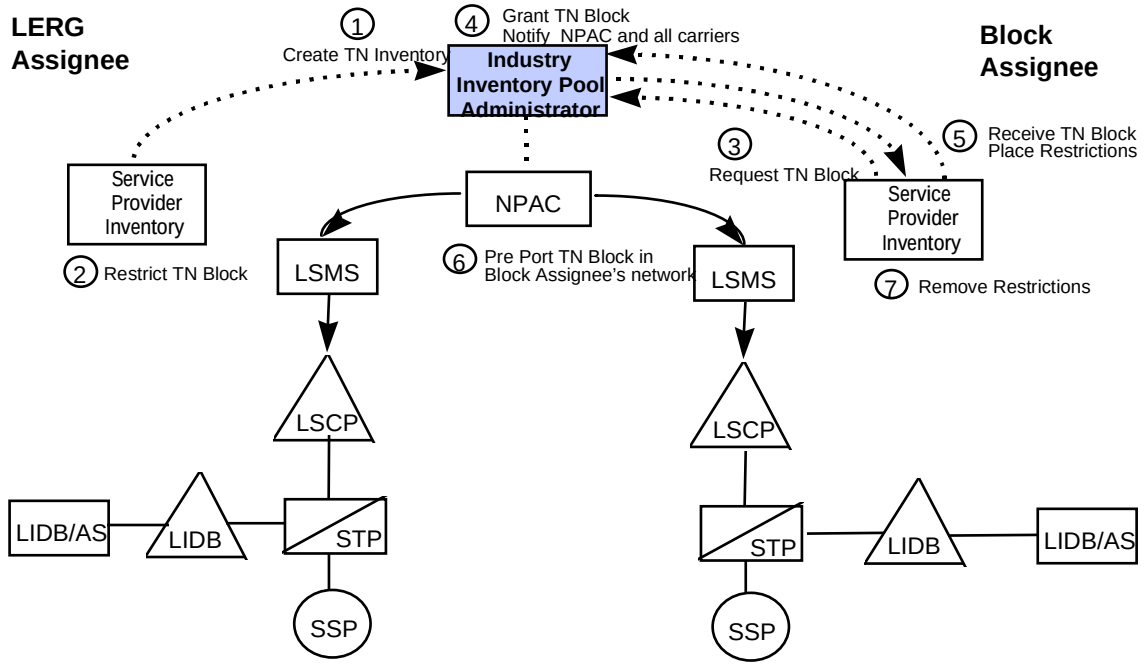
Within a block pooling environment, careful attention must be given to the manner in which numbers are administered upon disconnect. Of particular concern is whether a number, when disconnected, should be returned (or snapped back) to the block holder, the code holder (i.e., the LERG assignee), the industry inventory pool, or remain with the disconnecting service provider.

The INC recommends that within a thousands block pooling environment, snapback to the block holder is the preferred scenario, but recognizes that early deployment of number pooling will generate situations where snapback to the code holder may occur.

7.2.6 Schematic Representation of Process Flows for Block Pooling

BLOCK POOLING - OVERVIEW

The following figure depicts the process flows associated with number assignment in a general block pooling environment.



1. Industry Inventory Pool Administrator creates and maintains inventory of NXX-X TN blocks from growth (and embedded) NXXs necessary to satisfy forecasted demand. LERG assignees need to be identified for new NXXs. (Under existing procedures this is a 66 day process).

2. If necessary, LERG Assignee restricts TN block from selection/assignment in their Service Provider Inventory System(s). (Note: LERG Assignee is still required to perform vacant number treatment for unallocated numbers.).

3. Service Provider requests a TN(s) block from the Industry Inventory Pool Administrator.

4. Industry Inventory Pool Administrator forwards TN(s) block to Service Provider. (Assumption: An agreed upon date is set as to when Service Provider controls TNs). Industry Inventory Pool Administrator notifies NPAC and all carriers of pending TN assignments.

5. Service Provider loads TN(s) block into their Service Provider Inventory System(s) and restricts selection/assignment until Service Provider specified agreed until it is activated in the network.

6. The Service Provider, after receipt of the allocation, forwards an LNP Local Service Request (LSR)[8] to the NPAC to begin the actual activation process. Existing confirmation and activation message flows will prevail.

7. Service Provider removes date restrictions from their Service Provider Inventory System(s) and allows selection/assignment on TN(s).

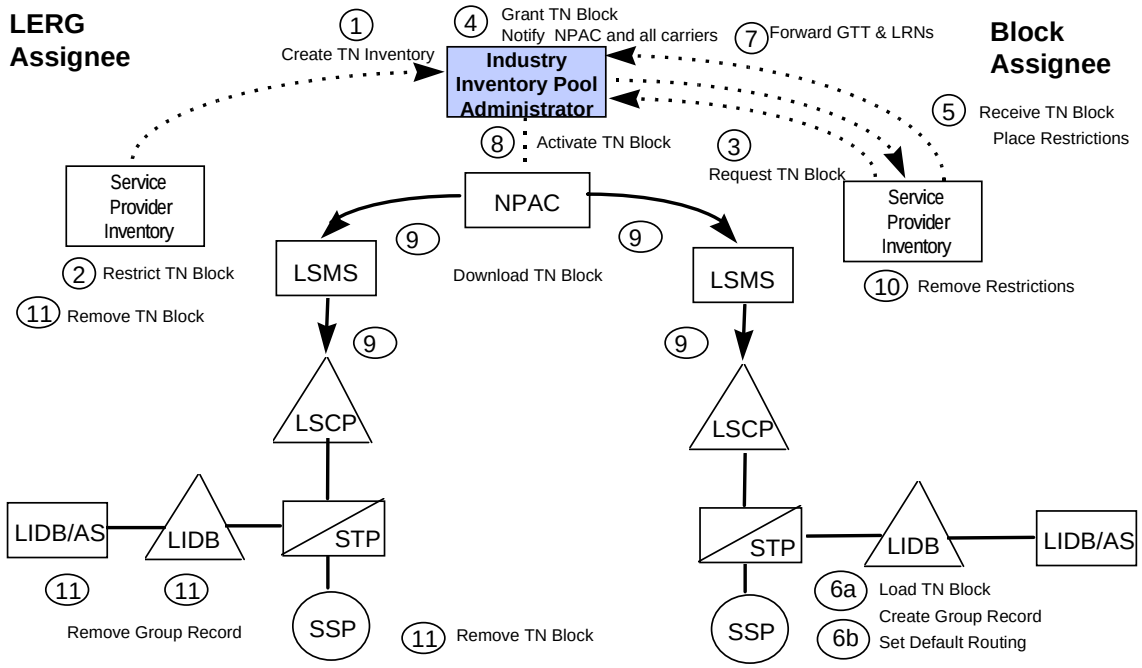
Additional Assumptions:

- NPAC must keep track of owner of TN block.

[8] This may require single or multiple orders dependent upon the methodology employed (Pre-porting or Porting On Demand.)

BLOCK POOLING - PRE-PORTING FLOW

The following figure depicts the process flows associated with number assignment in a block pooling, pre-porting environment.



1. Industry Inventory Pool Administrator creates and maintain inventory of NXX-X TN blocks from growth (and embedded) NXXs necessary to satisfy forecasted demand. LERG assignees need to be identified for new NXXs. (Under existing procedures this is a 66 day process).

2. If necessary, LERG Assignee restricts TN block from selection/assignment in their Service Provider Inventory System(s). (Note: LERG Assignee is still required to perform vacant number treatment for each unallocated NXX.).

3. Service Provider requests a TN block from the Industry Inventory Pool Administrator.

4. Industry Inventory Pool Administrator forwards TN block to Service Provider (now referred to as the Block Holder). (Assumption: An agreed upon date is set as to when Block Holder controls TNs). Industry Inventory Pool Administrator notifies NPAC and all carriers of pending TN block assignment to Block Holder. (This assumes the existing LERG assignment processes whereby all carriers are notified when an NXX is assigned).

5. Block Holder loads TN block into their Service Provider Inventory System(s) and restricts selection/assignment until Service Provider specified date.

6. Block Holder loads default routing data:

   a) loads TN block into SSP and creates group record in LIDB and LIDB/AS,
   b) loads default routing data in both STPs and SSPs and
   c) establishes vacant code announcements, etc. in the SSP.

7. Block Holder provides LSR with Global Title Translations (GTT) and LRN(s) to NPAC, who verifies block ownership and processes order.

8. Upon the Service Provider specified date, NPAC activates TN block by sending an LSR to the NPAC. (Currently this process requires 3 days.)

9. NPAC downloads TN block into SCPs via LSMSs.

10. Block Holder removes date restrictions from their Service Provider Inventory System(s) and allows selection/assignment from TN block. Numbers can be activated as quickly as the OSSs can accommodate new subscribers .

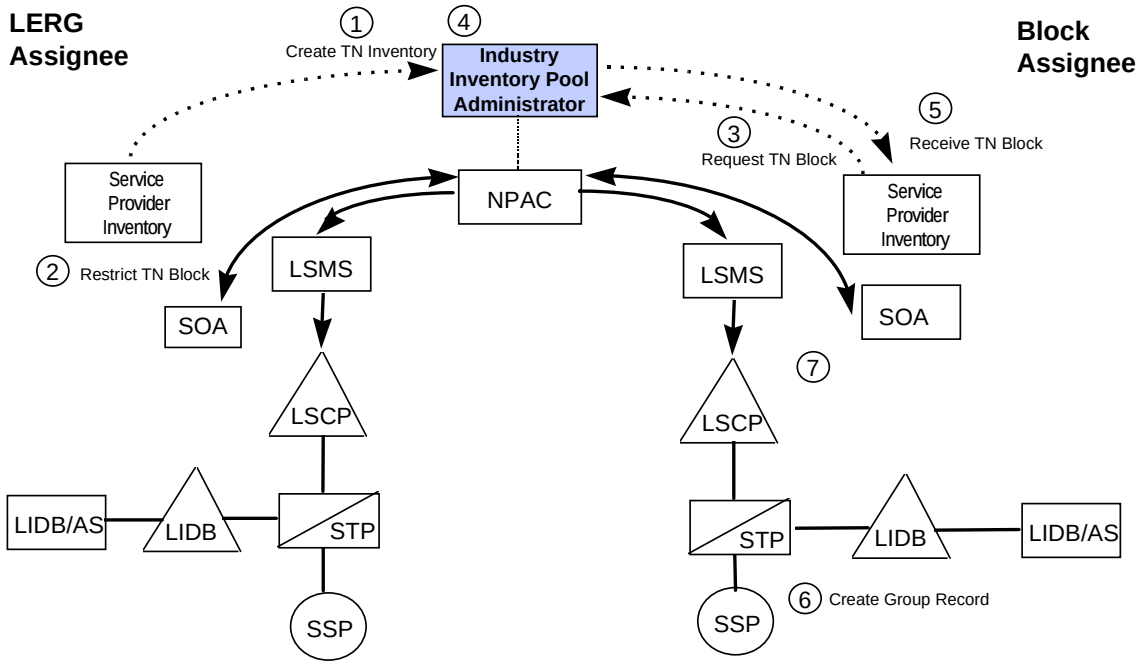
11. If necessary, LERG Assignee removes TN block from their Service Provider Inventory System(s) and TN block from their SSP. LERG Assignee removes group record from LIDB and LIDB/AS.

Additional Assumptions:

- NPAC must keep track of owner of TN block.
- Block Holder is responsible for vacant code treatment on non-working numbers.
- LERG Assignee is still required to perform vacant number treatment for each unallocated NXX block.

BLOCK POOLING - PORT ON DEMAND FLOW

The following figure depicts the process flows associated with number assignment in a block pooling, porting on demand environment.



1. Industry Inventory Pool Administrator creates and maintain inventory of NXX-X TN blocks from growth (and embedded) NXXs necessary to satisfy forecasted demand. LERG assignees need to be identified for new NXXs. (Under existing procedures this is a 66 day process)

2. If necessary, LERG Assignee restricts TN block from selection/assignment in their Service Provider Inventory System(s). (Note: LERG Assignee is still required to perform vacant number treatment for each unallocated NXX.).

3. Service Provider requests a TN block from the Industry Inventory Pool Administrator.

4. Industry Inventory Pool Administrator forwards TN block to Service Provider (now referred to as the Block Holder). Industry Inventory Pool Administrator notifies NPAC and all carriers of TN block assignment to Block Holder. (This assumes the existing processes whereby all carriers are notified when an NXX is assigned).

5. Block Holder loads TN block into their Service Provider Inventory system.

6. Block Holder creates group record in LIDB and LIDB/AS:

   a) creates TN block into record in LIDB and LIDB/AS,
   b) opens allocated TN blocks in SSPs and
   c) assures that all unallocated numbers are given unallocated treatment.

7. As Customers in TN block request service, service provider must have a means of identifying that these numbers require LNP treatment . LNP flow for service activation starts by sending an LSR to the NPAC. (3 day process based on existing procedures):[9]

   a) Block Holder provides Global Title Translations (GTT) and LRN(s) to NPAC and
   b) NPAC downloads TN into SCPs via LSMSs using standard LNP flows.

Additional Assumptions:

- NPAC must keep track of owner of TN block.
- LERG Assignee is responsible for vacant number treatment.

7.3 ARCHITECTURE AND PROCESS FLOWS - INDIVIDUAL TELEPHONE NUMBER POOLING

7.3.1 Characteristics of the Industry Inventory Pool

Individual telephone number pooling places telephone numbers in an industry inventory pool and provides service providers participating in the pool the capability to request variable quantities of numbers consistent with industry assignment guidelines. The numbers within a given pool will be designated for allocation to service providers who choose to provide service to their subscribers from the rate center covered by the pool.

The source for telephone numbers placed in the industry inventory pool could be from unassigned CO codes. In addition, spare TNs from existing, assigned CO codes could also be designated for placement in the pool. Specific guidelines for selection of TNs from assigned CO codes for use in the pool will have to be determined.

[9] Proposals have been made to the industry that would reduce this interval.

7.3.2 Assignments from the Industry Inventory Pool

As with block pooling, requests by a service provider for assignments from an industry inventory pool will be made consistent with that service provider's needs and industry assignment guidelines.

Numbers might be obtained by the service provider using a process in which assignments are requested based upon a general forecasted need, and numbers allocated to the service provider's inventory for subsequent assignment to subscribers.

A service provider may also choose to interact with the industry inventory pool to obtain numbers specifically to meet the demands of given subscribers and to accommodate the need for the immediate or near term assignment of numbers to those subscribers. With this type interaction with the industry inventory a service provider might employ its own number inventory from which it makes its assignments to subscribers, or possibly use only the industry inventory (pool) with which it would establish an interface with its Operations Support Systems (OSSs) for service provisioning.

The use of individual telephone number pooling with direct interaction to an industry inventory pool would require specific assignment guidelines. This would discourage the misuse of the assignment process and minimize the possibility of number hoarding.

Finally, as with block pooling, the pool administrator will be responsible for tracking the supply of numbers in the pool, and assuring the supply of numbers is adequate for the participant's needs.

7.3.3 Industry Documentation

Designation of a service provider as the LERG assignee of a given CO code is again required. As with block pooling, such an assignment provides a destination for default routing, should routing information be unavailable from the LNP routing database. The method with which selection of the LERG assignee is made in an individual telephone number pooled environment must be determined.

7.3.4 Provision of Information to the NPAC/SMS

In theory, individual telephone number pooling presents the same choices for interaction from the industry inventory pool to the NPAC/SMS as those identified for block pooling. That is, numbers can be identified in the NPAC/SMS as ported immediately upon their assignment from the pool or only after they are activated (i.e., assigned by the service provider to a subscriber).

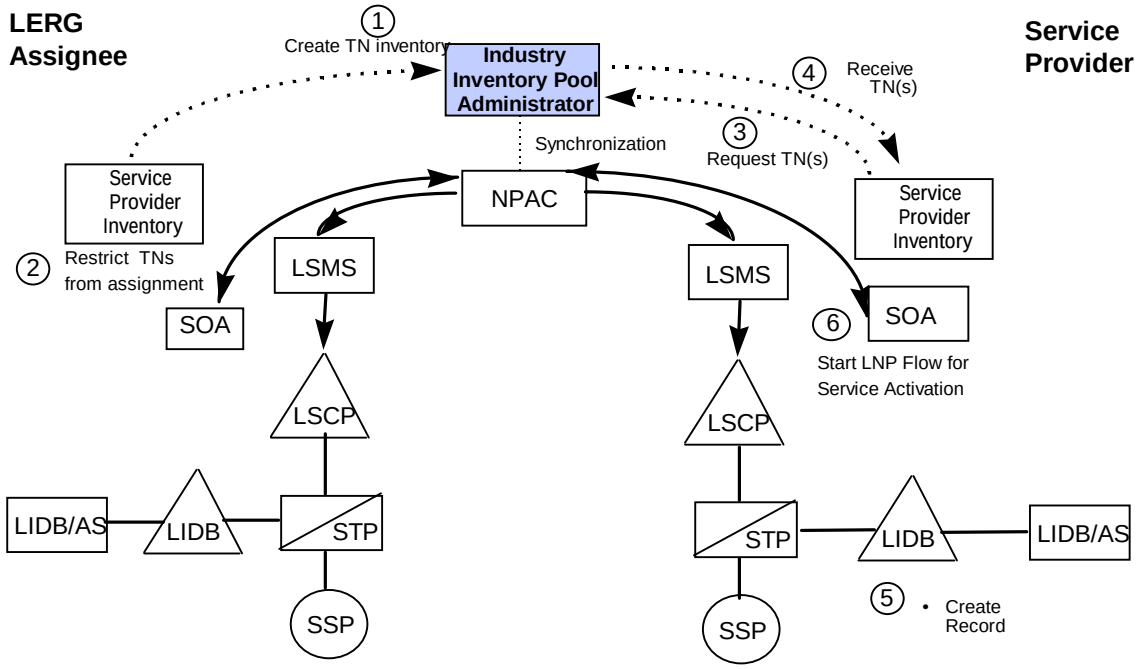
7.3.5 Treatment Upon Disconnect

Upon disconnect of a telephone number, the disconnecting service provider will age that number according to industry guidelines. Depending upon the pooling alternative that is chosen by the industry, the disconnected telephone number may be made available for reassignment via snapback to the industry inventory pool or by remaining with the disconnecting service provider.

7.3.6 Schematic Representation of Process Flows for Individual Telephone Number Pooling

INDIVIDUAL TN POOLING

The following figure depicts the process flows associated with number assignment in a Individual Telephone Number pooled environment.



1. Industry Inventory Pool Administrator creates and maintains inventory of TNs from growth (and embedded) NXXs necessary to satisfy forecasted demand. LERG assignees need to be identified for new NXXs. (Under existing procedures this is a 66 day process)

2. LERG Assignee(s) restricts all poolable TNs from assignment in their Service Provider Inventory System.

3. Service Provider requests a TN(s) for inventory replenishment or customer orders from the Industry Inventory Pool Administrator.

4. Service Provider receives a TN(s) from the Industry Inventory Pool Administrator .

5. Service Provider creates record in LIDB and LIDB/AS for TN.

6. LNP flow for service activation starts by sending an LSR to the NPAC based on standard LNP procedures. Current intervals for porting numbers is 3 days.

7. If necessary, LERG Assignee removes TN(s) from their Service Provider Inventory System(s) and TN(s) from their SSP. LERG Assignee removes group record from LIDB and LIDB/AS.

Additional Assumptions:

- Flow supports both single number and inventory TN replenishment.
- LERG Assignee responsible for vacant number treatment.
- Service Provider (ported TN) is responsible for aging treatment.
- Industry Inventory Pool Administrator identifies the TNs assigned to each service provider.
- Synchronization is required between Industry Inventory Pool Administrator and the Regional NPAC.

The Industry Inventory Pool Administrator will have the ability to provide TNs to service providers in real time and non-real time; single and batch. Line level pooling may cause group records to be eliminated from LIDB and LIDB/AS. If so, all information will be done at the line level.

8.0 NUMBER ASSIGNMENT

Number assignment refers to the process through which numbering resources are allocated to eligible service providers. Some aspects of the assignment/allocation process in a pooled environment will remain consistent with the guidelines currently in place for central office code assignment. For example, the criteria for assignment/allocation of resources will continue to be dependent upon a service provider's certification that:

- it is authorized to provide service in a given area,
- it will use the resources for assignment to its subscribers to terminate PSTN traffic at a switch or point of interconnection under its control, and
- it has a need (i.e., a forecast or specific customer request) for the resources.

Additionally, the assignment process in a pooled environment will include significant changes relative to the current procedures:

- First, the CO Code Assignment Guidelines must be modified to enable the pool administrator to obtain CO/NXX Codes for the Industry Inventory Pool

- Second, the increment of assignable resources will change from an NXX code (10,000 TNs) to the designated block or range of TNs.

- Third, total resources assignable at any one time will have to be prescribed; that is, whether there will be limits on the number of blocks, or the number of TNs that can be allocated at any one time.

- Fourth, the request process will need to be reviewed. It must be determined if the use of request forms, similar to those used today, will continue OR if having an industry inventory pool requires an electronic process to supplement or replace existing forms. It may also be necessary to review the time frames associated with assignment and determine if number pooling allows or requires those intervals to be modified.

Finally, the use of pooling demands that additional items be considered and included in assignment guidelines. These include criteria:

a) to keep the service provider inventory sufficiently maintained;
b) for assignment to customers needing a large block of consecutive TNs that are not currently in the service provider inventory;
c) for assignment for customers wanting TNs that are not in the service provider inventory;
d) for the assignment of vanity numbers;
e) for blocks of numbers that span across thousands blocks; and
f) to assist large end users that have difficulty using numbers within certain blocks, e.g., 0000 and 9000.

9.0 OPERATIONS/PROVISIONING

The implementation of number pooling will have significant impact on operations support systems of some service providers, particularly those OSSs which are used in the provisioning process. Typically, existing systems are based upon the availability of a full central office code (i.e., NPA-NXX) and will therefore require modification. In some cases, additional functionality is required. In other cases pooling causes an increase in the volume of system processing. The impact on OSSs varies depending on the pooling alternative recommended in this report and the service provider's systems.

9.1 THE INDUSTRY INVENTORY POOL

Number pooling will require the establishment of an industry inventory of numbering resources (i.e., the pool) and associated systems which will support the administrative functions of, for example, inquiry, number reservation, and assignment. This system or systems will need to support the combined volume of transactions forecast for all the service providers who interface with the industry inventory pool.

9.2 INDUSTRY INVENTORY POOL INTERFACE

Standard interfaces between the industry inventory pool and service provider inventories will be required. These interfaces will support the transactions and the transfer of information associated with the request and assignment of resources or information requests from the industry inventory to the service provider inventory pool.

9.3 SERVICE ORDER SUPPORT

For some service providers considerable interaction is required among the multiple OSSs which are involved with the provision of customer service. Such OSSs assign a specific telephone numbers to subscribers, and identify the services to be provided to customers, including the local calling area. To the extent that these OSSs must now interface with a new inventory of numbering resources, modifications may be necessary.

9.4 SERVICE ORDER MECHANIZATION

The generation of service orders, necessary for the provision of service, is a mechanized process which is currently based on the traditional association of a full central office code (NPA-NXX) to a given switch. Modifications are necessary to accommodate the allocation of less than full CO codes to service providers, the association of those numbers or blocks of numbers to a given rate center, and the possibility that those numbers will serve customers in multiple switches in that rate center.

9.5 TELEPHONE NUMBER SELECTION - CUSTOMER LOCATION IDENTIFICATION

TN selection is typically based upon customer location and the association of an NPA-NXX with a switch that serves that location. Number pooling will no longer support the association of a full NPA-NXX with a given location (switch) and will therefore require the modification of systems that perform TN selection.

9.6 TELEPHONE ADMINISTRATION/ASSIGNMENT

Systems which inventory working and spare office equipment and perform associated functions of load balancing are again based upon the assignment of a full CO code (NPA-NXX) to a given switch. Modifications to these systems will be required to reflect the assignment practices associated with a number pooling environment.

9.7 EMERGENCY ADMINISTRATION - SELECTIVE ROUTING

Routing and customer location information associated with emergency services (i.e., E911) is presently based upon NPA-NXX. It appears that additional modifications to E911 will not be required for pooling beyond what is needed for LNP. However, E911 configurations in a specific pooling area should be reviewed prior to pooling implementation to ensure that no E911 changes are necessary.

9.8 END USER BILLING - BILLING CYCLES

The “balancing” of end user billing cycles as well as the utilization of bill inserts associated with specific geographic areas (e.g., wire centers) are currently supported through the traditional association of NPA-NXX with a given switch. Number pooling requires modification to the OSSs which support these functions to accommodate the use of number pooling and the loss of the ability to associate NPA-NXX with a given switch.

9.9 SERVICE PROVIDER IDENTIFICATION

There are different OSSs that have used the NPA/NXX as a means to identify the associated service provider. This is particularly true for billing and collections, and impacts systems such as CMDS and LIDB. LNP breaks the tie that permitted identification of the entity providing the service by an examination of the associated NPA/NXX. Depending on the method selected pooling may exacerbate this problem. To resolve this other means will have to be found to perform identification of the service provider. This may advance the need for investment required to support changes to OSSs over and above those required to support LNP.

9.10 TRANSLATIONS SUPPORT

With the introduction of number pooling, switch translations required for call routing and associated with class of service, specialized routes, calls to presubscribed carriers (both interLATA and intraLATA toll) will no longer be established based upon NPA-NXX, but will instead be provisioned on a per line basis. The added complexity required by pooling may require modifications to the translations process and the OSSs which are used for this function.

9.11 POOL ADMINISTRATION

Currently service provider numbering resources are typically augmented with full CO codes. Because number resources will be allocated in smaller quantities, pooling is likely to require increased activity (i.e., additional transactions) to maintain their numbering resources and will therefore add some administrative burden to this process

9.12 GENERIC SERVICE PROVIDER SYSTEM IMPACTS

Some service providers, especially CMRS, have combined billing, provisioning and inventory systems. If a service provider with combined systems elects to obtain numbers only from the industry inventory pool or needs numbers to immediately satisfy a specific customer request, new interfaces and potentially new hardware would be needed to permit these systems to interface with external systems or to function individually.

10.0 NUMBER ADMINISTRATION

Number administration in a pooled environment is primarily concerned with the management of the number pool and the need to assure that resources are readily available, consistent with industry guidelines. The administrator must monitor the supply of numbers in the industry inventory pool, track the demand for numbers, and grow the pool as necessary. Administrative responsibilities extend beyond those of the industry inventory pool administrator and include those associated with the service provider, the NPAC, and the CO code administrator. Specific responsibilities of the pool administrator, along with other involved entities, are described in Sections 10.2 - 10.6.

10.1 BASIC ASSUMPTIONS

The administrative responsibilities and activities in a number pooling environment identified in this Section are based upon the following assumptions.

a) Multiple service providers may offer service in any given rate center.
b) Any switch based service provider operating within the specified geographic area is allowed to be involved in the pooling transition planning meetings.

c) A single administrator will oversee all the (rate center) pools within a given NPA. A pool administrator may oversee industry inventory pools for more than one NPA.
d) The CO Code Administrator will continue to perform CO Code administration functions.
e) The existing CO Code Guidelines will be used as a baseline for Pooling Administration Guidelines.
f) Within a given area of pooling, number pooling will be implemented per industry guidelines.
g) Growth (i.e., unassigned) codes will be assigned to the pool.
h) Embedded (i.e., assigned) codes may be used to populate the industry inventory pool subject to industry guidelines.
i) Growth CO Codes placed in the industry inventory pool will require the selection of a LERG assignee (selection method to be determined).
j) Service providers will obtain numbering resources from the industry inventory pool consistent with industry guidelines.
k) The industry inventory pool will be administered in such a way that it always contains numbering resources adequate to satisfy demand.
l) Pooling will be implemented in such a manner to permit timely activation of TNs to meet customer and service provider requirements.
m) Pooling will be implemented in a manner that will minimize the impact to existing internal service order processes currently used by service providers.
n) New service providers wishing to participate in an industry inventory pool after pooling is in operation will be provided an initial quantity of TNs to populate their inventory in accordance with industry guidelines.
o) The CO code activation process used to activate new CO codes in a pooling environment will be the same for all pooling alternatives.

10.2 THE POOL ADMINISTRATOR

It is assumed that the administrator of the industry inventory pool will be a neutral third party.

10.3 GENERAL RESPONSIBILITIES OF THE POOL ADMINISTRATOR

The pool administrator will:

a) maintain an internal secured database that will include all pooled number resources, the status of the resource (i.e., assigned, non-assigned), and if assigned, the identity of the service provider to which the resource is allocated;
b) maintain an industry database accessible by all service providers that will include all pooled number resources and the status of the resource (i.e., assigned, non-assigned);
c) process applications from service providers for numbering resources consistent with industry guidelines;
d) manage a reservation process for numbering resources in the industry inventory in accordance with industry guidelines;
e) receive and compile forecasts of demand from service providers for numbering resources within given rate centers;
f) analyze service provider forecasts to determine the numbering resources required to maintain the industry inventory pool;
g) assure the availability, based upon industry established criteria, of numbering resources within the industry inventory for a given rate center;
h) add to the resources in the industry inventory pool when necessary, by requesting additional CO codes from the CO code administrator, consistent with yet to be established process;
i) coordinate the transfer of information to the NPAC as necessary;
j) arrange for and/or perform audits of service provider utilization of assigned resources, as required; and
k) assume responsibility for the creation and distribution for any reports the industry deems needed or desirable.

10.4 GENERAL RESPONSIBILITIES OF THE SERVICE PROVIDER

The service provider will:

a) determine and request resources for a given rate center, consistent with industry guidelines;
b) provide to the pool administrator a forecast of its number resource requirements for a given rate center ;
c) maintain, at a minimum, a record of specific information regarding the status of individual telephone numbers (e.g. working, reserved, aging, etc.) within their inventory;
d) be capable, at a minimum, of supporting the following number administration functions: TN assignment , maintenance of the integrity of blocks of TNs, maintain all TN status', e.g., spare, working, aging, and reserved status, etc., of all TNs allocated to that service provider; and

e) provide snapback notification to the pooling administrator (if necessary) for non-ported disconnected telephone numbers.

10.5 GENERAL RESPONSIBILITIES OF THE NANPA/CO CODE ADMINISTRATOR

The NANPA/CO Code Administrator will:

a) perform those functions currently specified in industry guidelines (e.g., CO Code (NXX) Assignment Guidelines, NPA Relief Planning Guidelines, etc.) or as modified to accommodate number pooling.

10.6 GENERAL RESPONSIBILITIES OF THE NPAC

The NPAC will:

a) provide the pool administrator with any necessary information (e.g., SPI, LRN, Effective Date) of pooled numbering resources that are ported;
b) coordinate service provider requests and execute the pool administrator's authorizations to change the porting status of pooled resources;
c) interact with the pool administrator, as identified in industry guidelines; and
d) provide the notification of snapback for only ported disconnected telephone numbers.

11.0 ALTERNATIVE ARRANGEMENTS FOR NUMBER POOLING

The following sections describe four alternatives which might be used to provide number pooling. The alternatives involve different levels of pooling and assume different types of number inventories with the allocation of numbering resources based upon a either a forecast of the exhaust of a service provider's inventory or that service provider's need to immediately satisfy a specific customer's needs. Two levels of pooling are described – block pooling and line level pooling. Although a single level of block pooling is identified – 1000s blocks – the architecture, process flows, and associated impacts should be the same for all practical levels of block pooling (e.g., 100s blocks) should they be considered. Specifically, the alternatives include one scenario which supports block pooling (Alternative 2) and three alternatives which consider line level or telephone number (TN) pooling. (Alternatives 1, 3 and 4)

11.1 Alternative 1

- Level - Individual Telephone Number (TN) with the capability to request variable quantities of numbers
- Inventory - Service Provider Inventory Optional (supports use of a service provider inventory, industry inventory pool, or both, at discretion of service provider) Allocation Mechanism - Supports assignment based upon a forecast of exhaust of resources within a SP's inventory or the capability to immediately satisfy a specific customer request.

This alternative would provide a service provider the flexibility to request telephone numbers on an individual basis or in multiple quantities. Assignable numbers would be resident in an industry inventory and would typically be obtained by a service provider upon request based upon forecasted demand or on an immediate basis to satisfy a specific customer request.

11.2 Alternative 2

- Level – 1000s block assignment only
- Inventory - Service provider inventory required
- Allocation Mechanism – Supports assignment based upon a forecast of exhaust of resources within a SP's inventory.

This alternative allocates numbering resources to service providers in blocks of 1000 sequential numbers, specifically in 1000s blocks defined by the range of line numbers from "X000" to "X999". Number allocation is based upon a forecast consistent with industry guidelines.

11.3 Alternative 3

- Level - Individual telephone number (TN) (with the capability to request variable quantities of numbers)
- Inventory - Service provider inventory required
- Allocation Mechanism - Supports assignment based upon a forecast of exhaust of resources within a SP's inventory

This alternative (as with Alternative 1) allows a service provider to request numbering resources either as a single number or in variable quantities. However, this arrangement would only support allocation based upon a service provider's forecast, and does not allow for the immediate allocation of numbers based upon a specific subscriber need. Assignment of numbers to subscribers would only be made by a service provider using numbers available in its own inventory.

11.4 Alternative 4

- Level - Individual telephone number (TN) with the capability to request variable quantities of numbers
- Inventory - Demands the use of an industry inventory only; does not allow for the use of a service provider inventory
- Allocation Mechanism - Supports immediate assignment based upon specific customer needs

This alternative also permits the allocation of resources as individual numbers or variable quantities of numbers. This arrangement, however, allows for an industry inventory only and the associated process of immediate assignment based upon specific customer need. Accordingly, with this arrangement, service providers will search for and obtain numbers through direct interaction with the industry inventory of numbering resources.

11.4.1 On The Viability of Alternative 4

Current number provisioning systems and service order processes rely on the interaction of a multitude of OSSs with a locally administered (service provider) inventory of numbers. Alternative 4 precludes the use of such an inventory and demands the sole availability of an industry inventory which would be directly involved in all number search and assignment activities associated with provisioning of subscriber services. The continued use of a service provider inventory affords a natural evolution from the existing environment and avoids the significant changes and potential burdens that would accompany its elimination.

The INC therefore concludes that service provider inventories must be available – at least as an option -- as a characteristic of all viable alternatives for number pooling. Alternative 4, which precludes the use of a service provider inventory, is therefore eliminated and will not be considered for further evaluation.

12.0 CRITERIA FOR ASSESSMENT OF ALTERNATIVES

The following criteria/characteristics are key to the study of the alternatives identified in Section 11.0. They are explained here and used in Section 13.0 to assess the alternatives.

12.1 IMPROVEMENT IN NUMBER UTILIZATION

The primary potential benefit of number pooling is an increase in the utilization of numbering resources and the associated delay in the possible need for NPA relief. Accordingly, each alternative should be evaluated based upon its ability to promote efficient use of numbers.

12.2 IMPACT ON INFRASTRUCTURE

As described in Sections 5 and 7, the deployment of number pooling demands changes within the infrastructure. The use of number administration databases, the need for service provider maintained number inventories, and the linkage to the LNP LSMS are examples of network additions/modifications that may be required. The extent of the effort associated with each alternative must therefore be considered.

12.3 IMPACT ON OPERATIONS

The impact of number pooling on operations, especially service provisioning, could be significant. Changes to OSSs associated with provisioning, as well as downstream processes such as billing/settlements, must be understood and included as part of any assessment of a given alternative.

12.4 IMPACT ON END USERS

End user concerns and needs must be considered with any implementation of number pooling. Specifically, the degree to which any number pooling scenario might contribute to customer confusion should be determined. Moreover, the ability to meet customer needs and specific requests for telephone number assignments such as the request of a business customer for a large, sequential block of numbers must be addressed and understood.

12.5 IMPACT ON NUMBER ASSIGNMENT

The number assignment process associated with each alternative described for number pooling must be described and understood. The process should be consistent with the Equal Availability Principle and, to the extent possible, be easy to implement and without undue complexity.

12.6 IMPACT ON ADMINISTRATION

The pool of numbers available for assignment within a given geographic area will be overseen by an administrator. The responsibilities of the pool administrator, which might include monitoring the utilization of the Industry Inventory Pool and planning for its growth, should be easily performed, thereby assuring the continued availability of

numbers. Any distinction among the alternatives relative to the ease of administration should be identified and used as a criterion for assessment.

The following is a list of suggested criteria to be used in evaluating the impact on the administration of the pooling alternatives:

1. Complexity of Administration Process

This criterion measures the overall complexity of the administrative functions and processes that make up the pooling option. These include:

- Forecast/Demand
- Application/Response
- Approval/Notification
- Jeopardy
- Transition to Pooling
- Audit Procedures
- Interdependencies

2. Record Keeping

Record keeping refers to the amount of information for each record and the quantity of records required to implement a given pooling arrangement. It may also address the quantity of code requests, necessary documentation, retention period, etc.

3. Size Of Industry Inventory Database

This criterion is a measure of the size of the required database necessary for a given pooling option. The size (e.g., quantity of entries in the database) reflects the necessary memory and hardware requirements that a given pooling option would require.

4. Security Considerations

This criterion measures the complexity of the security requirements for administration of the industry inventory database.

5. Impact On Industry Pooling Administration System Infrastructure / Architecture

This criterion measures the complexity of the pooling administration system infrastructure / architecture, (e.g., quantity of data links, number of interfaces, system performance measurement, etc.).

6. Impact on Service Provider Administration
This criterion measures the impact of the pooling alternatives on service providers' administrative requirements.

7. Ease of Implementation
This criterion evaluates the length of time and complexity involved with implementation of each pooling alternative.

8. Service Provider Impacts
This criterion evaluates the ease with which a service provider obtains the numbering resources required.

12.7 RELATIVE COST

The relative cost to develop and deploy any form of number pooling is a key factor in the assessment of any pooling alternative. The costs of interest are the differences that can be identified that might make the cost of one alternative more or less expensive than another. The relative costs will be those associated with estimated industry costs, as it is not expected that any individual service provider's cost be documented. It is recognized that cost associated with any alternative for pooling, in and of itself, may not be the overriding factor, but rather that cost must be considered in the ultimate assessment of choices for implementation.

12.8 TIME FOR AVAILABILITY

The timeframe for implementation for any alternative should be determined, with merit associated with those alternatives that can be deployed sooner rather than later.

13.0 EVALUATION OF ALTERNATIVES

Due to time constraints, the INC was unable to review Section 13. The text of this section can be found in Appendix A.

14.0 CONSIDERATIONS RELATED TO THE IMPLEMENTATION OF POOLING

As described in Section 3.4, the primary benefit provided by pooling is derived from the increased utilization of numbering resources that pooling can potentially provide. This benefit must be weighed against the effort and costs associated with the implementation of pooling, which involve deployment of the necessary modifications to network architecture, the changes mandated in administration and assignment processes, and the modifications required in operations support systems.
It is therefore necessary to assess the potential benefit of pooling specific to any jurisdiction in which it is being considered. Such an assessment should address the following questions:

- How long will pooling extend the life of the NPA?

- How many service providers cannot participate in pooling (i.e., they are not LNP capable) and therefore, will require full CO/NXX Codes which will not be available for the pool?

- How might pooling impact the infrastructure deployed to support LNP?

- How soon can pooling be deployed?

- Can pooling be implemented without significant negative impact to any particular industry segment?

Determination of the increase that pooling might provide to the life of the NPA is dependent upon the use of industry data which quantify the available resources and industry forecasts which identify the future demand for resources. A Lockheed Martin/Bellcore contribution (LNPA-60) to this workshop effort described such an assessment. The results of this type study are wholly reliant on data unique to the area for which they are performed, and cannot generally be extrapolated to other areas.

It does appear however that the benefit associated with pooling – that is, the ability to better utilize numbering resources and delay the need for NPA relief – is better realized if pooling is initiated "early in the life" of a given NPA, when there exist a large number of NXX codes still unassigned. It further appears that the implementation of pooling "late in the life" of an NPA, for example when the code is already in a jeopardy situation, is likely to provide relatively little delay in the need for NPA relief.

15.0 TRANSITION

Transition planning is necessary to permit the effective and efficient migration from the current central office code based number assignment and administration processes to those associated with a pooled environment. Key to this transition is the:

- identification of the pool administrator
- establishment of the industry inventory of numbering resources and the possible use of embedded as well as growth numbers to initially populate the industry inventory.
- development of assignment and administrative guidelines

15.1 RESOURCES FOR THE INDUSTRY INVENTORY POOL

Both newly assigned and embedded numbering resources will be considered for inclusion in the industry inventory pool subject to yet to be developed industry

guidelines. These guidelines should include, but not be limited to, criteria for the initial establishment of the pool, its ongoing maintenance, and a determination of eligibility of resources for the pool.

The INC recommends that embedded 1000s blocks, either uncontaminated or contaminated up to a level of 10%, be considered by the pool administrator for placement in the industry pool, initially and on an ongoing basis. The INC recognizes that the use of contaminated blocks, although potentially improving number utilization, adds administrative burden, increases capacity requirements in LNP SCPs, and may not be warranted in all cases.

The specific level of contamination (0% to 10%) necessary to meet industry needs in a specific area will be determined by the pool administrator, consistent with pooling guidelines. The administrator should attempt to satisfy industry demand with blocks associated with the lowest level of contamination; first considering the use of uncontaminated blocks (i.e., 0%), and only then considering employing blocks with increasing levels of contamination (up to 10%).

Embedded 1000s blocks for which a service provider has a forecasted demand will not be considered for placement in the industry pool.

16.0 RECOMMENDATIONS [10]

Number pooling potentially offers improvement in number utilization. Its implementation, however, requires significant changes to current administrative processes, modifications to existing systems, and the development of new systems. The extent of these changes and additions and, therefore, the time frame in which pooling could be implemented are specifically dependent upon the pooling alternative selected and the local conditions where pooling is to be implemented.

The INC recommends that number pooling be implemented in an evolutionary manner, with the initial deployment of 1000s block pooling (Alternative 2) with migration to an individual TN pooling arrangement (e.g., Alternative 1 or 3) as a long term goal.

Further, the INC believes that 1000s block pooling appears to be less complex than individual TN pooling and could be implemented in a shorter time frame. It is further recognized that individual TN pooling, although more administratively complex, may offer even further improvement in utilization than block pooling.

The implementation of 1000s block pooling cannot be realized without modifications to existing systems and industry consensus on specific key details relevant to the

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10 It must be recognized that only LNP capable networks should participate in number pooling. Non -LNP-capable networks, nonetheless, must have equivalent access to adequate numbering resources via current industry assignment guidelines.

assignment and administration processes. These include the need to identify the arrangement for snapback, a method for determining the LERG Assignee, the use of pre-port or port on demand, criteria for the identification and the possible use of embedded number resources, a uniform pooling architecture, the development of administrative and assignment guidelines and the selection of a pooling administrator(s). Therefore, the INC recommends that the industry's immediate efforts focus on these and other issues essential for the near term implementation of block pooling.

Subsequent to resolution of the issues associated with block pooling, the INC will develop a proposal for the transition to individual TN pooling.

APPENDIX 1

INDUSTRY NUMBERING COMMITTEE (INC) CONTRIBUTION

LNPA WORKSHOP

TITLE: Number Pooling Evaluation Matrix - Issue 105 – LNPA-48

DATE: 9/29/97

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ABSTRACT: Attached is a draft alternative evaluation matrix.

NOTICE:

Assessment Criteria	1 -Line lvl, SPIV optional	2 - Thou blks, SPIV required	3 - Line lvl, SPIV required
1. Number utilization	Most efficient use of numbers; only "stranded" numbers are those unused in SP inventories; issue may be size of SP inventories Efficiency could be maximized if all embedded codes in IIV. Maximum benefit	Provides more efficient use of numbers compared to current 10,000 number allocation; more "stranded" numbers for SPs who need <1000 numbers/rate center. Could be even less efficient if "slightly contaminated" 1000 blocks not in IIV. Relatively lower benefit compared to Alts. 1 & 3	Most efficient use of numbers; only "stranded" numbers are those unused in SP inventories; issue may be size of SP inventories Efficiency could be maximized if all embedded codes in IIV. Maximum benefit

	1 -Line lvl, SPIV optional	2 - Thou blks, SPIV required	3 - Line lvl, SPIV required
2. Infrastructure impacts	**IIV pool** - supports TN inventory at line level; larger database required; database functionality required to track status of numbers (assigned, spare, aging, reserved) for SPs without SPIV; large database could be required if large SPs opt for no SPIVs. Must support "on demand" requests for specific numbers/"good numbers". Very High Impacts **IIV pool interface to SP OSSs** - Downloads allocations at individual TN level. High volume interface for updates to IIV pool for every change in TN status for SPs with no SPIVs. High volume interface to support search for, obtaining numbers	**IIV pool** - supports TN inventory only to thousands block; smaller database required; "Good" numbers embedded in thousands blocks. Low compared to Alts. 1 & 3 **IIV pool interface to SP OSSs** - lower volume interface; still in critical path for pooling implementation but lower risk because less complex.	**IIV pool** - supports TN inventory at line level; larger database required. Supports specific number/"good number" requests but not on demand basis. High **IIV pool interface to SP OSSs** - Downloads allocations at individual TN level. Still in critical path for pooling implementation but may be less risk compared to Alt. 1.

	"on demand," as well as for SPs with no SPIV IIV pool access is in critical path for volume interface to support search for, obtaining numbers "on demand," as well as for SPs with no SPIV IIV pool access is in critical path for pooling implementation; availability and speed of response issue. High **LNP SMS, LNP SCPs** - Potential LNP SMS interaction for every activated number for SPs without SPIV (if updates done by PA). If no pre-port, LNP transaction for disconnects on non-LERG assignee switches. Different impacts if pre-port SPIV, or if snapback to SPIV	Lower compared to Alts. 1 & 3 **LNP SMS, LNP SCPs** - *pre-port* - very large, immediate increase in size or modification to support treatment by blocks; (open issue GTTs). *port on demand* - LNP SMS interaction for every activated number and disconnected number on non-LERG assignee switches. *Snapback* to block assignee vs. code assignee impacts LNP SMS translations.	Medium/High **LNP SMS, LNP SCPs** - If no pre-port, LNP transaction for disconnects on non-LERG assignee switches. Different impacts if pre-port SPIV or snapback to SPIV vs. IIV. . Medium/High **SSPs** - No impacts unless

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	vs. IIV. High **SSPs** - No impacts unless pre-port. If pre-port SPIV, unassigned number must be acceptable in GAP; change from LNP procedures Potential SSP real time processor issue if pre-port and use "two pass" database search method.	Low/Medium **SSPs** - If pre-port, unassigned number must be acceptable in GAP; change from LNP procedures. Potential SSP real time processor issue if pre-port and use "two pass" database search method.	pre-port. If pre-port SPIV, unassigned number must be acceptable in GAP; change from LNP procedures Potential SSP real time processor issue if pre-port and use "two pass" database search method.

	1 -Line lvl, SPIV optional	2 - Thou blks, SPIV required	3 - Line lvl, SPIV required
3. Operations impacts	Interface with IIV (see above). Increased administration associated with lack of block structure. If no SPIV, may need to consult IIV pool to determine status of own numbers. If so SPIV, OSS changes to support updates to IIV pool regarding number status. OSS changes for rate center association with numbers at line level. Some manual "exception" treatment of ported numbers may require mechanization due to increased volume. If port on demand, modifications to service negotiation and service order processing systems will be required to indicate that	Interface with IIV (see above). OCN mapping to thousands blocks in TPM, LERG. OSS changes to assign numbers only within assigned blocks, changes to support thousands block/rate center structures in administrative tables. SP OSSs continue to perform TN assignment, administration, and inventory for thousands blocks assigned to them. OSS changes to mechanize If port on demand, modifications to service negotiation and service order processing systems will be required to indicate that	Interface with IIV (see above). Increased administration associated with lack of block structure. OSS changes for rate center association with numbers at line level. Some manual "exception" treatment of ported numbers may require mechanization due to increased volume. If port on demand, modifications to service negotiation and service order processing systems will be required to indicate that

	pooled number must be ported in when assigned to a customer. High	pooled number must be ported in when assigned to a customer. Medium	pooled number must be ported in when assigned to a customer. Medium/High

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	1 -Line lvl, SPIV optional	2 - Thou blks, SPIV required	3 - Line lvl, SPIV required
4. End user impacts	Few end user impacts - supports ability to obtain sufficient numbers to meet an end user's request. Possible concern regarding IIV pool in critical path if no SPIV or insufficient numbers in SPIV, e.g. how to serve demand requests in IIV system down or data links to it are down. Medium	Minimal end user impacts - supports ability to obtain sufficient blocks of numbers to meet an end user's request. Possible concern regarding IIV pool critical path if insufficient numbers in SPIV Low	Minimal end user impacts - supports ability to obtain sufficient numbers to meet an end user's request. Possible concern regarding IIV pool critical path if insufficient numbers in SPIV. Low

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	1 -Line lvl, SPIV optional	2 - Thou blks, SPIV required	3 - Line lvl, SPIV required
5. Number assignment impacts		Most straightforward allocation plan. All SPs get blocks of numbers based on forecast. "Good" numbers allocated equitably. Most like current approach to SPIVs. Snapback impacts will differ if snapback to IIV vs. SPIV. Low compared to Alts. 1 & 3.	

	1 -Line lvl, SPIV optional	2 - Thou blks, SPIV required	3 - Line lvl, SPIV required
6. Administration impacts	Analysis of reports from SPIV assignees + interactive demands to assess NXX exhaust. TN administration for SPs with no SPIVs. Potential LNP SMS interaction for every activated number for SPs without SPIV (if updates done by Pooling Administrator). High	Analysis of reports from block assignees to assess NXX exhaust. Low compared to Alts. 1 & 3	Analysis of reports from SPIV assignees to assess NXX exhaust. Medium

	1 -Line lvl, SPIV optional	2 - Thou blks, SPIV required	3 - Line lvl, SPIV required
7. Relative costs	Probably highest cost relative to Alternatives 2 & 3 both to establish and on-going industry and SP administration.	Probably least cost approach both to establish and on-going industry and SP administration.	Probably lower cost than Alternative 1 but higher cost than Alternative 2 both to establish and on-going industry and SP administration.
8. Time for availability	Critical path concerns - IIV pool database planning and development, interface to LNP SMS, pooling administrator, assignment guidelines, operations impacts. Probably longest path because most complex.	Critical path concerns - SCP capacities; modifications for pre-porting, pooling administrator; assignment guidelines, OSS impacts. Probably shortest path because least complex.	Critical path concerns - IIV pool database planning and development, interface to LNP SMS, pooling administrator, assignment guidelines, operations impacts. Probably shorter path than Alt. 3 but longer than Alt 2 because of relative complexities.

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Acronyms

GAP	Generic Address Parameter
SPIV	Service Provider Inventory
IIV	Industry Inventory
SSP	Service Switching Point
LERG	Local Exchange Routing Guide
OSS	Operations support systems
LNP	Local Number Portability
TPM	Terminating Point Master
NPAC	Number Portability Administration Center
SCP	Service Control Point
SMS	Service Management System
SP	Service Provider

APPENDIX 2

The “Industry Numbering Committee (INC) Initial Report to the North American Numbering Council (NANC) on Number Pooling” presents the consensus view of the INC participants on the number pooling issues addressed in the report. The report represents a concerted effort by the industry to reach agreement on the many issues associated with the introduction of number pooling. During the development of this report however, individual companies may have expressed an opinion that differs from the consensus reached by the INC.

This appendix provides an opportunity for those individual companies to express their “minority” opinion and have them considered along with the INC consensus report.

MCI Comments Regarding INC Number Pooling Recommendations

MCI hereby submits these comments as a minority opinion concerning the contents of the Industry Numbering Committee (INC) Report To The North American Numbering Council (NANC) On Number Pooling, as submitted to the NANC on December 15, 1997.

MCI has participated actively in all aspects of the INC LNPA committee's work, and concurs with the majority of analysis and conclusions contained in the report. However, MCI does not concur in the committee's consensus positions on some of the key issues discussed in the report. Following is a statement of MCI's position on these issues and supporting rationale.

1) Early in the process of evaluating alternatives for number pooling, the INC majority voted to eliminate Alternative 4 from further consideration as a pooling alternative. While MCI readily acknowledges that Alternative 4 represents the greatest departure from the status quo, of all the pooling alternatives, it objectively does the most to:

- maximize number utilization;
- eliminate the ability of carriers to engage in number hoarding;
- completely remove numbering as a potential competitive barrier;
- maximize customer choice; and
- maximize the ability for number administrators to have accurate utilization information for area code relief planning.

Given the significance of these benefits, it would seem obvious that this alternative should have at least been offered a complete evaluation. Instead, the alternative was dismissed on its face because it was "too burdensome," and because it didn't allow carriers to use their current systems. During the meetings, it was also suggested that lack of time to evaluate it properly (i.e., before the initial report was due on 10/21/97) made it unsuitable for further evaluation.

It is MCI's opinion that elimination of this alternative before giving full consideration of all benefits and impacts represents a significant lack of critical evaluation in the current version of the INC report that will ultimately reduce the effectiveness of the INC effort. MCI would point out, as it did in its INC contribution, that continued consideration of Alternative 4 as a viable TN-level pooling alternative would not have committed any carrier to ultimately supporting it, or deny any interested party the opportunity to comment on the merits or deficiencies of the proposal. However, its exclusion so early in the evaluation process artificially censored the debate on number pooling before it even began.

2) MCI sought, through several contributions (INC LNPA-51,53, 54, 55, 62, 63, 64) to have Customer Flexibility adopted as a pooling Principle, and included as one of several criteria that should be used to evaluate specific pooling proposals. The Customer Flexibility Principle supports the ability of any customer requesting a specific, unassigned telephone number to choose any service provider, regardless of the service provider's current allocation of Central Office codes and/or individual telephone numbers.

This principle is vital in evaluating any pooling alternative, because it recognizes that customer needs must be balanced with carrier convenience in determining the optimal pooling mechanism. Numbering issues should not be a factor in a customer's choice of local service provider. By failing to at least recognize the importance of enabling customer choice, to the greatest extent practicable, the industry may miss an opportunity to consider the needs of the very customers that numbering administration is designed to serve.

3) MCI agrees with the industry recommendation to use contaminated 1000s blocks in the industry number pool. However, MCI believes the 10% contamination maximum is arbitrary and will limit the ability of 1000s block pooling to maximize number utilization, customer flexibility, and equal availability of numbers among competitors. MCI believes instead that specific levels of contamination should be determined based on the unique circumstances of each area in which pooling is implemented, and not be constrained by an arbitrary limit.

MCI further objects to the failure of the recommendation to recognize the jurisdiction of state regulators to consider additional criteria (other than forecasted demand) in establishing contamination levels, and the authority of those regulators to modify pooling administrator determinations regarding the optimal contamination level for an area.

GTE Comments regarding the INC Number Pooling Report

The following are GTE's comments regarding the latest draft of the pooling document that will be reviewed by the NANC on December 15th 1997. Significant work still is required to finish the report. The present version was not intended to be the final draft. GTE submits these comments as a minority opinion concerning the contents of the INC draft report on pooling.

There are many elements of the document for which there is no agreement. Although there was consensus to make recommendations to the NANC, no evaluation of the three alternatives has been accomplished. The document is not ready for publication because no analysis has been done to validate the recommendation against the criteria developed within the report. Neither is the document sufficiently complete to guide decisions by NANC.

Many PUC/PSCs want number pooling to be their salvation for injudicious decisions regarding NPA code relief activities. Two factors work against the expectation that pooling will magically provide a solution to the difficult trade-offs of NPA relief. The first factor is that the number pooling methodology under consideration in INC requires LRN. This constrains the timing of pooling implementation to follow the LRN deployment schedule. The second factor is that number pooling is constrained by LRN to the wire center. This constrains the degree of efficiency that can be gained from pooling.

GTE has participated actively in all the meetings held at the INC LNPA Workshop. We have serious concerns that the report could be interpreted as a blanket confirmation that pooling should be implemented regardless of local circumstances and/or as a panacea for numbering availability problems and NPA code relief situations.

GTE feels that it is extremely important that any recommendation that comes out of the NANC be implementable. Therefore, GTE feels very strongly that the section on Criteria for Pooling Implementation should be strengthened in the report. To this end, we propose that the following text should be considered by NANC and incorporated in any final recommendation that NANC proposes with respect to pooling.

It is our opinion that pooling can potentially be very useful to the industry in obtaining more efficient use of numbering resources. In certain circumstances and pooling may potentially be used to prolong the life of NPA codes. However, we feel that it is necessary that each situation be evaluated on its own merit. The costs in money, administrative complexity, network modifications and customer impacts need to be studied in each case where pooling is being considered for implementation.

CONDITIONS FOR POOLING IMPLEMENTATION

GTE hereby proposes considerations and criteria that should be evaluated prior to the implementation of any proposed pooling arrangement that is recommended by the industry. By assessing the selected pooling arrangement with respect to these criteria it will then be possible to determine the practicality of implementing a given pooling arrangement in a particular location.

IMPLEMENTATION CRITERIA LIST

1. Quantity of numbers available to be pooled

An analysis should be conducted to quantitatively evaluate the benefit of pooling to determine the potential quantity of numbers that will be made available because of pooling. For example, if there are a potential of 8 million numbers in a given area but only 10,000 additional numbers will be made available as a result of the implementation of a pooling arrangement then, pooling may not be a practical approach to solving a numbering resource problem.

To justify the implementation of a pooling solution more numbers need to be made available to all service providers participating in the pool. It is also recommended that the Bellcore/Lockheed pooling evaluation tool be used to help conduct this evaluation. The use of this tool requires that all participating carriers provide code utilization data (both estimates and actual values) to a neutral third party as input for the tool. Conducting this evaluation will determine if the introduction of pooling provides a significant quantity of numbers to be made available for assignment to all participating carriers.

2. Administrative procedures required.

An assessment should be conducted to get a measure of the pooling administrative procedures required to effectively manage the pooling process. For example it must be determined that competitive service providers are prepared to accept the responsibility of becoming the carrier of record for pooled CO Codes. A service provider is required to be designated as the LERG assignee for every CO code that is entered into the pool so that vacant number treatment is provided when a code is first opened. The LERG designee may potentially not use the majority of the numbers in a given code. Another such administrative issue is the need to provide the pooling administrator access to certain proprietary business information. The pooling participants must be ready to accept certain administrative responsibilities and obligations to participate in a pool. Finally, these participants must be prepared to pay for the pool administration and to be bound by the agreed to pooling procedures.

It is recommended that an evaluation be conducted to determine the cost benefit of adopting a pooling approach.

3. Time frame of implementation.

An assessment is required to determine the time frame by when the pooling arrangement can be implemented. This evaluation should take into account the time frame necessary to transition to the pooling environment and time required to coordinate all the steps to implement the desired pooling arrangement. The assessment should be made relative to the existence of Administrative procedures and the availability of LNP in the coverage area where pooling is being considered. If LNP is not available in the time frame that pooling is being recommended then pooling may not be a viable alternative.

4. Circumstances that justify the implementation of pooling.

The implementation of pooling should be justified by ascertaining the circumstances under which a particular number pool is beneficial to all the participants in the pooling arrangement. There should be a determination / assessment conducted in an unbiased fashion that shows how all pooling participants benefit. If there are any negative impacts to particular industry segments, these issues should be taken into consideration before a pooling arrangement is implemented. For example, if one or more industry segments are disadvantaged by the adoption of pooling (i.e. inadequate or limited numbering resources are made available), then the adoption of pooling should be questioned. Only, for a set of circumstances where all pooling participants benefit and obtain adequate numbering resources should pooling be implemented.

5. Network Architectural impacts.

An assessment of the network architectural impacts on the different networks that participate in any pooling arrangement should be conducted before pooling is adopted in a particular location. For example, the adoption of pooling should not require excessive changes to existing network architectures of potential pooling participants. These changes could include, the addition of new data interfaces, additional security, additional data bases, and changes to existing network architectural elements. Conducting this type of assessment will provide a relative technical impact analysis for the different networks that could potentially participate in any pooling arrangement. It should also include a detailed analysis of any architectural infrastructure changes required for pooling relative to being able to support a regular portability environment. Any impacts on network performance / quality (i.e. additional time delays, additional database dips, storage requirements, etc.). should be included in such an analysis.

6. Verify that the pooling to be implemented is the standard method that has been recommended through out the area served by the NANP.

NANC has determined that a NANP wide uniform Number Pooling solution be adopted by the industry. Therefore, it is required that the pooling approach being implemented be compliant with the NANC recommended method. The adoption of pooling should not require that unique regulatory, business, or architectural arrangements be adopted for a particular location.

The above set of criteria should be used in assessing the possibility for pooling implementation. The results generated as a result of such an evaluation are necessary to justify the benefits of pooling. Before pooling is implemented its benefits should be clearly understood, and justified. for a given location.