

number than to their landline number. A regulatory mandate for service provider portability in this market at this time is inappropriate.

PCS is still in the early stages of its development. Standards, vendors, pricing, target markets, and other specifics are still being identified. Until the market is more mature, it is unwise to divert resources (both capital and personnel) which are needed to bring the PCS service itself to the commercial market to the pursuit of an interim service provider portability feature which the market may not desire. It is better policy to encourage industry bodies to monitor the market and technical feasibility of service provider portability and ensure that the ultimate architecture defined will allow PCS to participate once competitive and market forces demand. In previous rulings, the FCC has chosen not to limit the types of products PCS can offer or dictate those which it must provide. Mandating service provider portability at this time would be inconsistent with that policy.

The paging market is already mature and extremely competitive; numerous providers compete in the major markets.⁹ In Los Angeles, for example, there are over 200 providers of paging service. The Atlanta Yellow Pages show six different facilities-based competitors and 60 resellers.

⁹ There are more than 20 million domestic paging customers.

Both customer churn and competition in the paging industry are very high. Lack of service provider portability has not impeded competition in this industry.

Exclusion of paging from participation would not be inconsistent with a policy of mandating the participation of the wireline voice providers. Paging serves a much different market than other telephone providers. Paging is not currently a real time voice service. A customer with a pager cannot originate a call and cannot actually be called. Paging is a complement to wireline rather than a substitute.

The lack of service provider portability in paging will not adversely affect service provider portability (and competition) in the wireline industry.

Paging meets an important market demand for inexpensive wireless notification services. Average monthly bills are much lower than for cellular, for several reasons. Paging operators purchase trunks from LECs in large number blocks at wholesale rates. The paging terminals (which are connected to the PSTN) are relatively inexpensive (compared to a Mobile Switching Center (MSC), for example). However, paging terminals are basic in their design and are terminating devices only. They differ from MSCs in that they cannot originate calls and have no switching capability. The enormous installed base of these devices is nonetheless a major investment by the paging companies.

The implementation of number portability in the paging

environment represents a fundamental change in its architecture. Paging which is inherently a terminating service, would have to include switching capabilities. This would undoubtedly result in higher rates for basic paging service, quickly leading to loss of customers and less competition in the industry.

Although the current status of competition in wireless markets does not support a service provider portability requirement in these markets, it is nevertheless imperative that wireless impacts be considered in current efforts to craft a portability solution. This is true for two reasons. First, although not currently needed, it will be appropriate to include CMRS in a future long term portability requirement. And second, whether or not wireless numbers are made portable in the short term, there will be implications for wireless services as wireline numbers themselves are made portable.

D. There is No Demonstrated Market Demand for Non-Geographic Market Portability

The Commission seeks comments on the potential portability of non-geographic numbers, including numbers assigned from the "900" and "500" service access codes ("SACs").¹⁰ In discussing these types of services, the Commission explores the possibility of a single database to support number portability for these services and 800

¹⁰ NPRM para 69.

service collectively. BellSouth opposes mandating portability for either 900 or 500 service, and in any event considers a single database for all such services inadvisable.

The demand for 900 numbers continues to decline. No change has taken place which would justify the cost it would require to deploy an architecture to support the portability of 900 numbers in the face of shrinking market demand.¹¹

Conditions are different in the 500 service market. While demand for 900 service is in decline, 500 is a relatively new market that is yet to mature. Though the two markets appear to be headed in opposite directions, there is an obvious similarity -- neither market now has sufficient demand to support number portability. While this may never exist for 900, it remains to be seen how the 500 market will develop. Although these two services must be approached from different directions, the final analysis renders a similar conclusion -- market demand today does not justify a number portability capability and its attendant costs. BellSouth is cognizant of the Commission's earlier stated desires to see the implementation of 500 number portability. At that time, the desire to provide 500 service as evidenced by the huge initial demand for codes would have indicated

¹¹ BellSouth will continue to monitor the 900 services market and is not opposed to the introduction of number portability for this market should sufficient demand and willingness to pay materialize to warrant the necessary expenditures.

that 500 portability was indeed desirable. However, after two years of reflection and the emergence of only a few service providers, this can no longer be considered the case.

One administrative database is not in the best interests of the consumer or the industry. It may be technically possible (BellSouth is not aware of any actual trials or tests which have actually constructed such a model) to administer non-geographic SAC services, including 800, from one administrative database. However, BellSouth believes it is more likely that fundamental service differences would constitute unique interfaces and requirements that would, in effect establish, "separate" databases. It also seems the sheer magnitude of numbers would require tremendous storage capacity and possibly create a process time problem for a single database. Depending upon the required interface to routing databases, BellSouth is unsure of the effects a single database solution may have on call processing time.

800 Service continues to experience tremendous growth. Many businesses use 800 numbers as their lifeline to consumers. As the industry experienced with the transition to an 800 database in 1993, all precaution should be taken to ensure that 800 service is not jeopardized in any way. 900 Service is in a declining state for reasons not at all related to portability. 500 Service is in its early stages

of growth. BellSouth is not aware of any pressing need to make either of the latter services portable at the potential expense of 800 Service. Furthermore, the industry desire to have an independently "owned" administrative database owner for future geographic and non-geographic numbers precludes the present use of the SMS/800 system because of its current ownership status. Reliance on a single database simply will not further the public interest in ensuring that service quality and reliability is maintained.

II. THE ARCHITECTURE

The public interest in a reliable public switch telephone network ("PTSN") compels the Commission's role in ensuring that certain minimum performance requirements are achieved in any long term number portability solution. The Commission, however, should refrain from mandating any specific solution, leaving this task to the industry. In order to illustrate the issues which need to be resolved within the industry, BellSouth submits in the following two sections these general comments on the number portability architecture and its impacts.

As industry discussion surrounding number portability has evolved, three general areas of focus have emerged. These are the databases involved, the routing methodology, and the triggering mechanism.

- A. A Service Management System ("SMS") is Critical to Any Portability Solution, and Must be Administered by a Neutral Third Party

As an initial matter, it is important to recognize that there are two distinct levels of databases involved in a long term number portability solution. The first level is an administrative database, often referred to as a Service Management System (SMS), which houses information associated with "ported" numbers to ensure that such numbers are assigned properly and that information is downloaded to the appropriate routing databases. The second level involves routing databases, often described as Service Control Points ("SCPs"), which direct the network elements in call routing and completion as well as provide geographic information on which to base billing.

It is clear from industry discussions that the owner/operator of the administrative database should be an independent party not associated with any telecommunications company which competes or plans to compete in the telecommunications industry. BellSouth agrees with this conclusion of the industry. The owner(s) of the administrative databases should be knowledgeable in the business of operating large "storing house" database operations. Given the critical nature of the database to any number portability solution, it should be a company which is established and financially secure. Its operation should be driven by cost control yet not at the expense of a quality level expected by the industry and the ultimate consumer.

The administrator of this database should have the following responsibilities:

- Monitor database operation on a daily basis.
- Provide training to new database users.
- Upgrade system enhancements based on user direction.
- Interface with users on trouble shooting.
- Provide recommendations to users on methods for reducing costs.
- Install security mechanisms to ensure privacy of records and yet allow each user to access data needed in a timely fashion.
- Provide users with updates to any system or process changes.
- Respond to any transition issues/needs.
- Act as a central point of contact for the industry when coordination is required.

BellSouth believes the SMS administrator should be selected through a bidding process for the area or areas to be administered. Selection could be made by the existing local service providers in the area, or potentially through the involvement of the recently established North American Numbering Council ("NANC"). The criteria and responsibilities including those identified above, can be specified by the industry via this RFP bidding process. Any administrator selected should be physically located in such

a manner that there would be no undue cost on the service providers.

At the present time, it is assumed that only one administrative database administrator could manage any specific geographical area. Thus, service providers will have no choice but to obtain relevant routing and billing information from this single source. Consequently, it will be essential that measures be in place to ensure that charges to service providers are not exorbitant.

B. Portability Architecture Must Maintain Traditional Routing Protocol But Can Achieve Flexibility in Other Areas.

1. The Routing Databases.

Service Control Points ("SCPs") are the elements within an SS7 network which will house information used to properly route calls through the network. These databases will be periodically updated by the SMS described above. It is expected that these databases will be owned by any network provider willing to provide a routing function. Since these databases may be expensive, it is also expected that some service providers will wish to access the databases of others to obtain routing information.

2. The Routing Methodology or Addressing Scheme.

This element of a portability solution involves the manner by which calls are routed between network elements. This is basically the information that is returned from a

portability database in response to a query which is launched based on the triggering mechanism described below. It is important to recognize that in a location portability environment the information required by the switch to route a call will no longer be sufficient for the switch to successfully record and bill for that same call.

The AT&T approach proposes to route a call on the basis of a 10 digit switch identifier called a network routing address ("NRA"). There is one switch identification/network routing address ("**Switch ID/NRA**") per switch in the PSTN. The Switch ID/NRA then populates the called party number found in the Signalling System Seven ("SS7") protocol and the network uses the called party number field to route the call to the correct terminating switch. With this proposal, there is one Switch ID/NRA per thousands of dialed telephone numbers depending on the switch size.

The Stratus/U.S. Intelco proposal involves a split domain of dialable logical numbers known as Customer Node Addresses ("CNA") and separate physical domain numbers known as network node addresses ("NNA"). In response to database queries, appropriate ten digit NNAs are returned for call routing purposes. An end user cannot directly dial an NNA if the CNA has been designated "portable" because a database dip will occur and a new NNA will be mapped to the dialed number.

The MCI Metro approach proposes to route on a 3 digit Carrier Portability Code ("CPC"). With this proposal, when the database is queried the dialed area code/central office code ("NPA-NXX") combination is replaced with the appropriate CPC-NXX, the NPA thus being replaced with the CPC for call routing. This CPC-NXX combination uniquely identifies a single switch in the network of the carrier to which the CPC has been assigned.

A significant objective the industry must have in addressing a routing methodology is to maintain to the greatest extent possible the traditional routing employed within the NANP. Each of the preceding methods employs some element of traditional NANP routing.

In addition, another significant objective that must be considered in any addressing scheme is to continue to provide the capability to record enough information for each call so that the end users can be billed appropriately. None of the defined addressing schemes lend themselves to satisfying this requirement in all portability environments. This results from the fact that local calling areas will not, most probably, be identical between service providers. Assuming that current rate structures will for the most part, remain unchanged for the incumbent LECs, additional information will be needed to determine local from toll and to determine distances on which to calculate appropriate

charges. This information will need to be obtained from the administrative database.

3. The Triggering Mechanism.

The triggering mechanism fundamentally relates to where in the call flow a query is launched to obtain further routing information. The industry normally discusses this in terms of originating, terminating and "N-1" triggers.

Originating triggers involve the launching of a query at the first point of switching as a call progresses through the network. This mechanism may be viewed as the optimum solution since a call can be most efficiently routed through the network if the ultimate destination of the call is known early in the call progress path. However, this method will also result in the most significant impact on the SS7 network. This will consequently require the most databases, signal transfer points ("STP"), and SS7 signalling links and, consequently the highest associated costs.

50. Terminating triggers involve the launching of a query by the switch which originally served the dialed ported number. While this method results in a fewer number of queries, it has the disadvantage of including the former serving switch in the call path thereby reducing network routing efficiency. In addition, since end user billing is based on recordings made, generally, at the originating end of the call, any additional billing information provided by

the portability database will need to be available for the recording produced. This presents a major challenge to the billing and switch recording systems which must be met for this triggering method to be implemented. There may also be some negative impact in terms of overall call set-up and transmission quality (in cases of non-digital facilities). However, in some cases a terminating query is likely to be the triggering method used if a nearby switch is incapable of performing queries.

A third type of trigger is the N-1 trigger. With this mechanism, the next to the last network or switch in a call flow launches the database query. With this method, a query is performed before including an unnecessary switch in the call path. This concept applies most readily to calls of a known interLATA nature. This method also must overcome the challenge of providing billing recordings with portability database information at the originating end of the call for end user billing purposes.

Another potentially useful compromise is the use of a "lookahead" capability. With this capability, a switch will attempt, through signaling, to establish a call to the switch where the dialed NXX resides. If the dialed telephone number has been ported, a message is returned to the originating switch with an indication of this condition. The originating switch then queries the database as in the originating trigger scenario. "Lookahead" results in fewer

database queries but its effects on overall post dial delay are largely unknown and require future study. As with the originating trigger method billing information can be acquired at the originating point and included in the switch recordings as is currently done.

Thus, there are many tradeoffs involved in the triggering mechanism (routing information, adequate and controllable billing information etc.). If these considerations can be adequately addressed some amount of originating, terminating, N-1, and lookahead queries could all exist simultaneously through engineering and business arrangements. Therefore, neither the Commission, nor the industry, need to select any single triggering mechanism to effectuate a number portability solution. Furthermore, it is also significant to note that triggering mechanisms are independent of the routing methodology discussed above. The particulars of existing network configurations especially the location of non-Advanced Intelligent Network ("AIN") switches, will also impact where triggering takes place.

C. Of the Various Portability Solutions Proposed to Date, the Network Routing Address Proposal Appears to be the Best Alternative

In its NPRM, the Commission requests comment on the specific proposals for long term number portability which have been advanced within the industry¹². As an initial

¹² NPRM para. 35.

matter, BellSouth urges the Commission to refrain from focusing entirely on the merits of these competing solutions in an effort to select one over the other. BellSouth believes that the industry's efforts should be focused on the ultimate objectives a solution should meet. As will be shown, these objectives include, among other things, maintenance of feature transparency, minimization of database queries, and provision of needed billing information. By adopting this approach, the industry may arrive at a hybrid, or even a unique solution that has yet to be advanced within the industry.

For the record in this docket, and based upon its experience to date, BellSouth makes the following observations relative to the current proposals.

1. Network Routing Address Proposal:

BellSouth finds that the Network Routing Address proposal, advanced by AT&T, has the fewest disadvantages overall, and is therefore the best foundation for a long term database architecture for long term portability. This "single number" approach, where the serving switch associates the subscriber with a single number as opposed to two numbers, ensures that the correct calling party number is used whenever a ported subscriber originates a call. Thus, no switch modifications or queries on call origination are required and this approach minimizes adverse feature interactions within the switch and the network.

Furthermore, by identifying the subscriber by one number as opposed to two, operational system impacts are lessened. NRA, by virtue of addressing each switch of a service provider, does not disadvantage service providers with multiple switches, be they incumbent LEC providers or new entrants. Location portability can also be supported in this approach without any inherent additional complexity.

BellSouth also believes that, of the three current proposals, the NRA solution utilizes the North American Numbering Plan ("NANP") resources in the most efficient manner. Only one ten digit address is required to identify the switch, regardless of how many subscribers the switch serves. The "Split Domain" approach is less efficient in that it requires allocation of Network Node Addresses ("NNA") in proportion to the number of subscribers served from a switch. Since it is possible that NNA will be allocated on a central office code ("NXX") basis, it is anticipated that these resources will not be utilized in the most efficient manner. The carrier portability code ("CPC") approach allocates the equivalent of an entire area code ("NPA") value for each service provider in a serving area and is the least efficient use of numbering resources.

While each approach will require some switch development, the NRA approach, overall, results in fewer adverse impacts. The NRA approach does require additional definition in a number of areas (for example, non-call

associated ("TCAP") routing, and interactions with operator services) and its impact on wireless networks should be researched so as to not provide any unequitable disadvantages. Overall, NRA provides the most flexible foundation for a long term solution portability by allowing for location portability and service provider portability.

2. Split Domain Proposal:

The one essential drawback of the Split Domain proposal advanced by Status Computer and U.S. Intelco is the need to transport numbers in both domains to the terminating end of the call for correct operation of features and services that require human-recognizable numbers. People recognize numbers in the dialable, customer domain customer node address ("CNA") on their telephone bills, and on their customer premise equipment ("CPE") (e.g., caller ID displays, E911 service positions, operator positions). But the switches and machines in the network operate on a different set of numbers in the physical, network domain network node address ("NNA"). The human-recognizable numbers are stored in the network databases, while the machine-recognizable numbers are stored at the switches.

Take, as an example, a call which originates from a portable telephone number. If the called party has Caller ID service, the CNA of the calling party must be sent for the called party to recognize it. However switches do not use this CNA for routing. There are two possible solutions:

- 1) make a database query on calls from portable numbers to obtain the CNA; or
- 2) expand the switch memory to accommodate both the customer node address and the NNA.

This need for either additional database queries or expanded switch memory is the primary drawback of the Split Domain proposal.

3. MCI Metro Proposal.

As noted in the NPRM¹³, the Carrier Portability Code ("CPC") proposal by MCI Metro will have the definite potential to conflict with yet to be assigned or utilized area code ("NPAs"). The use of these codes effectively precludes the use of the corresponding code as an NPA, thus reducing the pool of resources available for, normal telecommunications growth. This is a significant area of concern which cannot be overlooked. Additionally, it is not apparent that this method would provide the details necessary to bill for calls in a location portability environment.

In fact, the CPC proposal does not allow for location portability. The NPRM suggests that the MCI proposal would only permit location portability within the area served by the number portability database, but in actuality the restriction is absolute, not relative. The fact that the

¹³ NPRM para. 47.

CPC- central office code ("NXX") combination must identify a single switch means that multiple switches in a single network cannot share an NXX. This precludes location portability, thus competitively disadvantaging some service providers. It further prevents a single service provider from most efficiently using the NXX resource.

In addition, the CPC scenario inherently confers distinct competitive advantages to single switch providers. This solution allocates a single CPC to each provider not each switch. Therefore, providers who have more than one switch in a ported calling area must effect actions in addition to those required of those providers with a single switch in order to deliver a ported call to its ultimate destination, thus adding cost, complexity, and adverse technical impacts. Also, single switch providers can serve the entire number portability area from one point resulting in a much larger, and logically more valuable, calling area than can be offered by incumbent LEC providers, absent costly technical changes and regulatory relief.

The use of CPC as a local area service provider identifier pushes the network architecture towards the query being performed near the terminating end of the call. The ultimate direction of number portability if a large amount of numbers are ported is toward predominantly originating queries. Therefore, the CPC proposal may be a significant step in the wrong direction.

Even as an interim database solution, the CPC proposal has deficiencies. The deployment of the CPC proposal followed by a migration to a more robust proposal will result in significantly increased disruption to the PSTN, significantly increased total cost, and an overall longer deployment schedule compared to going directly to the more robust long term proposal. The use of the expensive, and inefficient CPC proposal as a stopgap number portability solution must be avoided.

4. GTE Proposal.

GTE proposes is for the use of special non-geographic numbers for number portability. This proposal may not meet the expressed needs of some parties because of its requirements for a one-time number change. This is not to say that the proposal should be summarily discarded. The Commission's record established in this proceeding and the resultant cost/benefit analysis of making geographic numbers portable may prove the GTE proposal worthy of further future analysis.

D. A Degree of Uniformity is Essential to Ensure Network Interoperability and Both Technical and Economic Efficiency

The Commission raises the issue of the need for a uniform solution to the provision of number portability.¹⁴

¹⁴ NPRM para. 32.

BellSouth believes that a degree of uniformity will be essential to efficiently introduce a number portability capability. The deployment of completely different number portability methods across the country is definitely not in the public interest. BellSouth and other LECs use equipment, particularly switching equipment, procured from the same set of vendors. If these vendors are required to develop more than one solution to number portability as a result of multiple implementation requirements, the cost of number portability can be expected to rise enormously. From a signaling perspective, proposed clear channel signalling solutions currently before the industry make different uses of the same Signalling System Seven ("SS7") parameters. If these different uses are actually implemented, it is unknown whether interworking between these different solutions will even be feasible. Since these parameters impact switch billing recordings, the ability of the billing system to render an accurate bill would be in jeopardy if more than one approach is implemented. Other more subtle differences such as differences in the administration of number portability in different areas will also have significant cost impacts.

From the foregoing, BellSouth concludes that it will be an absolute necessity that certain elements of a number portability solution be uniform on a national level. However, industry discussions are beginning to show that

other elements may be developed on an area or provider specific basis. An initial critical task will be to define which elements must be decided on a national basis. By developing such a list, the industry and the regulators can then be properly focused on the issues properly within each area of responsibility or jurisdiction. Therefore, BellSouth concludes that a first step in this process will be to reach industry consensus on those issues requiring national agreement.

III. THE IMPACTS

The implementation of a number portability capability will have significant impacts on many facets of the telecommunications industry. As the Commission and the industry consider the subject of number portability, BellSouth believes it to be essential that each of these impact areas be thoroughly analyzed before moving ahead with an implementation plan. In addition, BellSouth also believes that certain objectives must be maintained in regard to these potential impacts. The Industry Numbering Committee ("INC") has also recognized this need and has incorporated certain principles in its draft report on number portability. BellSouth is supportive of the INC efforts and urges the Commission to ensure that the impacts of number portability continue to be properly assessed.

- A. The Industry and the Commission Must Consider Impacts on the Public Switched Network, Operational Systems, Number Administration, Customer Premises Equipment, End User Feature Functionality, and the Wireless Industry As a Long Term Number Portability Implementation Plan is Being Developed.

To date the vast majority of industry work on number portability has been focused on network impacts or, more specifically, on how to route a call through the network. This area is obviously of critical concern. However, BellSouth believes that other impacts must be adequately addressed before a decision to move forward with an implementation plan can be made. These additional impact areas are discussed below.

In addition, to date, number portability initiatives have almost exclusively focused on technical routing from a wireline perspective. Further, discussions will require attention to geographic scope, operations systems, network conventions and business principles. In addition, considerable research and interaction between and among the wireline and wireless industries is required to ensure that number portability develops in such a way that all entities will be equally served and no entity will be unfairly disadvantaged by the presence of number portability in the networks.

1. The Network.

The primary impact of any portability solution will be on switching and signaling network elements. Switches that

are capable of performing the database queries for number portability will require new software, and many switches may require processor upgrades as a result of the increased number of database queries. Number portability requires Advanced Intelligent Network ("AIN") capabilities. However, there are many switches in the public switched telephone network ("PSTN") that do not have these capabilities and cannot be easily upgraded. These switches will not be able to participate in a number portability database architecture; consequently, telephone numbers will not be able to be ported to or from these non-capable switches as part of a database architecture. These switches will only be able to offer the "interim" number portability arrangements. The accelerated replacement of non-capable switches has the potential of becoming a major, if not the major, cost of implementing number portability. BellSouth believes this area has not received adequate attention, especially in terms of cost recovery.

An unresolved issue of number portability is how the Signal Transfer Points ("STPs") are to handle non-call-associated ("TCAP") messages associated with CLASS features and Alternate Billing Services. STPs route SS7 messages to switches and network databases based on the NPA-NXX of the dialed number, similar to voice switches. The resolution of this issue will cause either a significant increase in the

number of STPs required to route SS7 messages, or a significant increase in STP capabilities.

The costs associated with these increases are considerable but at least the technology exists in most wireline networks. Long term (i.e database) portability would require full implementation of SS7 and, in most current scenarios, at least basic AIN functionality.

to seek a third party ~~to provide~~

parts of their calls. In addition to STP additions, number portability may also require increased switch hardware and processor capacity.

2. Billing Systems.

BellSouth and industry billing and switch recording processes are designed to rely on the NPA/NXX combination for a number of fundamentally important functions. Among these are:

- to determine which local service provider should bill for calls
- to determine if a call is local or toll (and therefore whether or not a recording should be made)
- to calculate the distances between calling and called parties using vertical and horizontal coordinates