



**Response to Consultation Paper on Mobile
Number Portability**

**Prepared for:
Telecom Regulatory Authority of India**

**Submitted
29 August 2005**

PROPRIETARY AND CONFIDENTIAL

THIS MATERIAL IS THE PROPRIETARY PROPERTY OF AND CONFIDENTIAL TO SYNIVERSE TECHNOLOGIES, INC. (SYNIVERSE). DISCLOSURE OUTSIDE OF SYNIVERSE IS PROHIBITED EXCEPT BY LICENSE AGREEMENT OR OTHER CONFIDENTIALITY AGREEMENT.

THE INFORMATION CONTAINED HEREIN IS NON-BINDING AND PROVIDED FOR BUDGETARY PURPOSES ONLY. NOTWITHSTANDING ANYTHING IN THE RFP (IF APPLICABLE) TO THE CONTRARY, THE FINAL TERMS AND CONDITIONS GOVERNING THE ACTUAL SERVICES AND PRODUCTS TO BE PROVIDED, AS WELL AS THE RIGHTS AND OBLIGATIONS OF THE PARTIES, SHALL BE COVERED BY A SEPARATE AND DISTINCT AGREEMENT TO BE NEGOTIATED BY THE PARTIES. NOTHING HEREIN SHOULD BE CONSTRUED AS OBLIGATING EITHER PARTY TO THE OTHER FOR ANY PURPOSE WHATSOEVER.

THE PROVISION OF ANY NETWORK ELEMENTS, COMPONENTS AND/OR SERVICES DEFINED IN THIS PROPOSAL, IS SUBJECT TO ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, STATUTES, RULES, AND REGULATIONS.

INFORMATION CONTAINED IN THIS PROPOSAL, INCLUDING BUT NOT LIMITED TO PRICING AND EXCLUDING HARDWARE CONFIGURATION (IF APPLICABLE), IS VALID FOR NINETY (90) DAYS FROM THE DATE SET FORTH ON THE FRONT OF THIS PROPOSAL.

The following are services, software products, service marks, and/or trademarks of Syniverse Technologies, Inc.:

ACCESS [®]	inpack SM
ACCESS S&E [®]	INPort [®]
ACCESSibility [®]	INPosition SM
Brience [®]	LATALink SM
CCNS SM	Phone Me Anywhere Plus [®]
Crossroads SM	PMA Plus [®]
EDT SM	RoamerXchange [®]
Electronic Data Transport SM	SmartChallenge [®]
Encrypt-A-Key [®]	SOLUTIONS [®]
Fleet-On-Track SM	Solutions Without Limits [®]
FMR Plus [®]	S.T.A.R.S. STREAMLINER TM
Follow Me Roaming Plus [®]	S.T.A.R.S. STREAMLINER Terminal Access Reporting System [®]
FraudChallenger [®]	STREAMLINER [®]
FraudForce [®]	Syniverse SM
FraudInterceptor [®]	Syniverse logo
FraudManager [®]	Syniverse Spark design
Fraud Resource Center SM	Syniverse Connections SM
FraudX [®]	UniRoam SM
InForum	Visibility [®]
INLink [®]	Whatever It Takes SM

® Denotes registration in the United States

All other companies' marks and names are the trademarks or service marks of the respective company.

© Syniverse Technologies, Inc.

All rights reserved under U.S. and international copyright laws.

Contents

1. EXECUTIVE SUMMARY	3
1.1 SOLUTION OVERVIEW	3
1.2 OUR EXPERIENCE.....	5
1.3 WORLD-WIDE EXPERIENCE PROVIDING NP SERVICES	5
1.4 THE SYNIVERSE DIFFERENCE.....	6
1.5 SYNIVERSE PROFILE.....	7
1.6 SYNIVERSE RESPONSE TO TRAI CONSULTATION PAPER ON MOBILE NUMBER PORTABILITY – CHAPTER 6. ISSUES FOR CONSULTATION	8

1. EXECUTIVE SUMMARY

Syniverse Technologies Inc. (Syniverse) appreciates the opportunity to deliver this response to questions posed in the MNP Consultation Paper by the Telecom Regulatory Authority of India (TRAI). We are confident that our approach to Mobile Number Portability will meet both the current and long-term needs of the TRAI, the Operators of India and most importantly, the subscribers comprising the marketplace. We understand that you are in the initial phase of MNP. Should you have questions at all regarding our solution or the intricacies of MNP, please do not hesitate to call upon us.

1.1 *Solution Overview*

Syniverse's proposed solution is designed to address all elements of a NP solution which includes inter-operator communication (IOC), communication between operator and central database (Service Order Activation or SOA), centralized repository of all porting routing information and the means to broadcast that information to all operators for call completion (Local Service Management System or LSMS). Our solution is an all-encompassing integrated business solution that addresses efficient architecture, business processes and the local-marketing expertise required to launch this new industry service.

The proposed centralized model leverages Syniverse's overall Central Service Bureau Model and will afford Participating operators with multiple benefits that include:

- **Full Service End-To-End Solution Delivery** – Syniverse will deliver TRAI every element of a Number Portability Solution – all under the watchful eye of a secure and reliable hosting facility managed and located within India.

Syniverse will work with operators to facilitate and guide the NP planning process. We will assist in setting-up the steering and decision making groups that address crucial areas such as: business process formulation, technical planning, implementation planning and acceptance testing committees.

Syniverse will work with operators to manage the complexity of change within their Network, Customer Relation Management, Billing, Provisioning, and Point of Sale infrastructure that must occur to accommodate the porting process. Syniverse can also optionally provide back-office integration work necessary to connect Operator port-flow processing to the NP system.

Reporting will be delivered via a secure Internet portal for information management. Lastly, full ISO 9001:2000 certification ensures quality and controls to our valued customers.

- **Central Application for a Standard, Automated Approach to Number Portability** - A standard, published interface into the systems means

operators implement a single API which translates into a FAST, COST-EFFECTIVE implementation.

Tiered-architecture separating core system functionality and written on industry standard platforms, translates to a highly flexible service. As a result, NP business rules can be modified and implemented quickly. The automated approach enables fast, efficient ports, which can impact the success of NP in India by increasing subscriber satisfaction.

Our Service Bureau approach allows operators to share the solution costs among all operator-users in a fair and equitable manner. Flexible business models are easily employed utilizing this approach.

Central application means ONE CONTROLLED SOURCE from which operators can manage routing and call processing activity.

- **Security of Participating Operator's Data** – Syniverse's trusted third party position in the industry means that your data will be secure at all times. Syniverse will protect the privacy of subscriber data insuring that the data of your most important asset; the subscriber, will not be compromised.
- **Marketing/Product Development Expertise** – Syniverse has the existing infrastructure and expertise to assist TRAI create additional value-added opportunities and product enhancements. Our Product Management and Business Development team will manage both the lifecycle of this service as well as drive new complimentary service opportunity such as Calling Name (CNAM), Wireless Directory Assistance (WDA) within the marketplace.

Syniverse is able to provide TRAI with a master database to support the NP process. After our solution has been implemented, TRAI will have a centralized database that will provide you and all operators within India the ability to:

- Allow a fixed or mobile phone user to keep his phone number after changing the subscription to another operator
- Allow operators to seamlessly communicate porting information between Donor and Recipient Operators.
- Maintain a record of the routing information associated with ported phone numbers so that calls can be routed properly
- Have one consistent, reliable source for porting data, namely the NP Central database
- Have one standard interface in which operators communicate both to each other and the central database
- Provide a central point of reference for any Service Provider or Network Operator to understand which Network Operator currently owns the number
- Provide a fully automatic process, requiring no human intervention

- Provide a manual GUI interface as an alternative to a fully automated process
- Maintain common functionality
- Maintain historical data for analysis

1.2 Our Experience

Syniverse is well positioned to meet TRAI's requirements for the provision of Number Portability within India. To bring NP to market, we will leverage our current industry relationships and our core competencies in:

- Central Database Facilities
- C7/SS7 Network Expertise
- Call Handling Expertise
- World-Class Customer Care

Syniverse has the staff and infrastructure in place to support this initiative and looks forward to establishing a long and mutually beneficial relationship with the TRAI.

Syniverse has the necessary knowledge and experience to support TRAI's end-to-end implementation of all elements of Number Portability (NP). We have the necessary experience in developing and delivering carrier-grade solutions in a secure and reliable production environment. Syniverse has demonstrated our ability to process high-volume, high-value transactions associated with NP in a consistent and efficient manner while providing exceptional customer service to both fixed and mobile operators within India. Most importantly, we have experience in several countries around the world in addressing their unique requirements and the inherent complexities associated with the porting of numbers. By implementing a centralized application and reference database, all existing and future operators can share in the benefits while equally distributing the associated costs with our flexible pricing models. Lastly, we have the capability to assist the Operators of India's efforts to ensure the NP system successfully integrates into their back-office infrastructure.

1.3 World-wide Experience Providing NP Services

Syniverse's solution leverages our experience with the United Kingdom Mobile NP system that we have had in production since July 2001. This proven solution has recorded porting by more than 60 Service Providers reaching in excess of 90,000 numbers per month, and availability above 99.5%. The product has also been implemented to support NP in Finland, where mobile porting is running at more than 20% per year.

In the United States, Syniverse operates, in a service bureau environment NP solution for five of the top six operators, seven days a week, including holidays. Since the start of mobile number portability in the U.S. (November 24, 2004), we

have processed more than three million port requests.

Syniverse was a contributing editor to the Cellular Telecommunications Internet Association (CTIA) Wireless NP Report (TR45.2) to modify the IS-41 request to accommodate the need for troubleshooting and customer service.

Syniverse actively participates in several NP industry teams including:

- Wireless NP Administration Working Group (WNPA WG), including the following subcommittees:
 - Fallout Reduction Task Force (FORT) – working with wireless operators to develop industry methods, procedures and standards to help reduce fallout rates and resolve fallout faster. Syniverse is a co-chair of the FORT.
 - Wireless Testing Subcommittee – working to coordinate service provider-to-service provider testing and developing the WLNP test plan
 - Interspecies taskforce – to help address issues in porting between wireless and wireline carriers
- Operations and Billing Forum (OBF) - Syniverse participates in several ways including its Wireless Committee and the Local Service Order and Provisioning (LSOP) Committee

Syniverse also played a key role in several industry subcommittees that, having completed their mission, have been disbanded. The most notable of these was the Wireless NP Operations Team, which defined wireless specific industry practices and processes and resolved issues associated with WLNP. This subcommittee is rolling up to the LNPA WG in August 2004.

Syniverse is a member of CIBERNET subcommittees dealing with the intercarrier communication process for exchange of customer porting information. In addition, the Syniverse Users' Group has a subcommittee dedicated to WNP and related issues.

1.4 The Syniverse Difference

Syniverse is best positioned to provide the solution for TRAI for several reasons:

- A Track Record of Success – We have successfully deployed a full NP service offering within the United Kingdom, Finland and the United States over the past 3 years. We have been providing services to mobile and fixed operators worldwide clients for more than 20 years.
- A Proven Solution – Our approach is based on our solution that has been successfully deployed in Finland in an NP environment very similar to that in India.
- Top-class program management expertise – Program management is one of our core strengths. We understand the common implementation challenges and have the experience to successfully manage projects. We

coordinate and manage network design, engineering and implementation activities.

We have engineered the implementation of numerous large-scale projects that span different countries across multiple time zones and have continually met the expectations of our satisfied customers.

- Excellence in services – We have been providing services to clients in support of the systems that we have delivered for mission critical business processes, providing near 100% availability.
- Strong knowledge of demanding J2EE applications – We have successfully implemented multiple large scale and demanding systems using an industry standard J2EE architecture.

Our solution is based on an existing, proven product that requires only minor potential modifications based upon the porting requirements within India. Therefore, we can ensure a timely delivery of the solution in a cost efficient way with low risk.

Syniverse looks forward to working with TRAI to support the deployment of an NP Solution that meets and exceeds your requirements.

1.5 Syniverse Profile

Syniverse (formerly TSI Telecommunication Services, Inc.) is a global communications technology company specializing in innovative business and network engineering solutions that manage and interconnect voice and data systems in 26 countries throughout North America, Central and Latin America, Asia Pacific and Europe.

Syniverse provides technology interoperability, network services and call processing to more than 300 customers representing mobile operators, wireline carriers and emerging telecom market entrants. Products include SS7 intelligent network solutions, clearing and settlement services, voice and data roaming facilitation, fraud management, revenue enhancement solutions and more than 25 other integrated services.

Syniverse is public company (NYSE: SVR) headquartered in Tampa, Fla., U.S.A., with offices in major cities throughout the United States and international offices in New Delhi, Hong Kong, Beijing, London, Amsterdam, Bratislava, Rome, Luxembourg, Rio de Janeiro and Belo Horizonte.

For more information, visit www.syniverse.com.

1.6 Syniverse Response to TRAI Consultation Paper on Mobile Number Portability – Chapter 6. Issues for Consultation

1. What is the anticipated impact of number portability on customer satisfaction? and increased competition between services and operators?

Syniverse Response:

Number portability is a prerequisite for competition in a telecommunications market. Without this facility users are locked into their existing suppliers and can change operator only with considerable disruption and expense. For example, businesses have to reprint letterheads and business cards. They may also have to repaint lorries and vans. A change of number, whether for a business or for an individual, requires others to change the number stored in mobile phone handsets, PDAs, software on personal computers, in fax machines and so on. Consequently, it is increasingly difficult because others must effect the change. The principle of number portability is fully applicable to mobile telecommunications. Many operators have claimed that Mobile Number Portability (MNP) is unnecessary and is an unwarranted expense, using assertions that the sector is highly competitive. Some mobile operators have gone to considerable trouble to make MNP difficult and have discouraged customers from exercising this right. They have suggested alternatives such as personal numbering and Universal Personal Telephony (UPT). However, these are not substitutes for MNP, but are expensive, value-added services.

We encourage governments and Regulatory Agencies to recognize that Mobile Number Portability (MNP) is an essential part of the competitive framework and should be made legally binding on all operators and service providers. We believe that the mobile telecom market cannot be considered competitive until users have the right to change operators at no cost and without inconvenience. Mobile network operators and service providers must compete on price, quality and service offerings, rather than by trying to lock users into their networks. Fundamentally, the increased competition between operators resulting from Number Portability will indeed be a catalyst to overall increased levels of end-user satisfaction. Additionally, we believe that benefits derived from Number Portability are not only reserved for the end-user subscriber. Number Portability benefits can be enjoyed by all parties when this new service is implemented within the India marketplace.

Why Mandate NP?

Regulatory agencies mandate NP because it is good for consumers. It eliminates a particular barrier unique to the telecommunication industry, that is, the ownership of the phone number. However, additional reasons to mandate and implement NP include market, regulatory and operator benefits.

Consumer Benefits

NP clearly benefits the consumer. At the individual subscriber level, the biggest impact to changing phone numbers is not to the subscriber, but to those individuals in the subscriber's circle of friends, family and acquaintances. Updating written address books, changing programmed contacts lists, remembering the new number, are all unnecessary burdens. For a business the scope of changes forced by a change in phone number is even more considerable: business cards, stationary, print advertising, Web sites, signage, the sides of delivery vehicles, and invoices. All the changes that affect a business contribute to the reason why a business, in general, would not change service providers if it means also changing phone numbers.

Market Benefits

With the advent of NP comes a more competitive marketplace. Without a doubt, the mobile industry is already a highly competitive industry. However, by lifting of the last remaining barrier to what some would consider a completely free market, operators become even more focused on subscribers. Rather than continuing price wars, in countries where MNP has been implemented, operators tend to start consumer loyalty programs, improve customer service, reduce hold times, increase outbound calling programs, focus on renewal incentives, work to improve network coverage, roll-out additional differentiated services such as Wi-Fi agreements, push-to-talk service, 3G, and other customer-pleasing new functionality.

Regulatory Benefits

The infrastructure developed for NP has been used to solve other problems in some countries. Where directory number resources (i.e. number ranges) were being exhausted, the infrastructure to make NP possible was also used to allow numbering plan administrators to assign numbers in a more efficient manner (to assign a block of 1000 numbers to an operator rather than a block of 10,000 numbers). In another example, in countries where the mandate for NP also included fixed-to-mobile as well as mobile-to-fixed porting, the regulatory agency could encourage greater competition to incumbent fixed operators. With fixed-to-mobile portability mandated, mobile operators become a competitor to fixed service, since the subscriber can change from fixed to mobile easily, and of course, keep the same directory phone number.

Operator Benefits

On the surface, it would seem that NP is a financial and implementation burden to operators; and with the increased competition comes lower prices and hence lower margins. And certainly, some operators have argued that the implementation of number portability is cost prohibitive and would be bad for consumers since the cost of implementing NP would have to be paid for by subscribers, and could ultimately put the operator out of business. However, some operators have used the mandate for NP as an

opportunity to gain market share and target high ARPU subscribers as well as multi-line business customers. As with any market where a barrier to competition is lifted, some of the free market agents will gain, and some will lose. In the U.S., operators who took a proactive stance in preparing for NP were able to increase net additions in the face of increased competition. This was through a combination of customer service improvements, network improvements, targeted advertising, focus on fixed- to-mobile porting (also known as displacement), and to a lesser degree, more competitive rate plans.

2. The following technical options have been discussed in the consultation paper.

Please indicate your preference with reasons:

- a. All-Call-Query**
- b. Query-On-Release**
- c. Onward Routing (Call Forwarding)**
- d. Call-Drop-Back**
- e. Any other solution**

Syniverse Response:

As the TRAI evaluates Number Portability, it is imperative that the selected solution have the flexibility to ensure calls are routed in any fashion that the network operators/TRAI deem appropriate for the country requirements. Currently, Number Portability solutions deal primarily with the porting of a circuit switched voice call. The fundamental activity and processes behind the porting of a number in this environment will remain unchanged regardless of the routing technology. Operators will still need to communicate with each other and the central database where the porting information resides, and ultimately disseminate this information to interested and affected parties to ensure call processing activity. The Syniverse solution Number Portability application can facilitate all of these various methods listed above. Hence your investment in the Syniverse proposed solution will be safe regardless of future routing and call processing technology. Each of the routing techniques however, has various advantages and disadvantages that are depicted below for your evaluation criterion. Primary factors in your decision include cost, benefit and lifecycle. While solutions such as onward routing can be implemented quickly and cost-effectively in the short-term, long-term inefficiency must be considered. Given the growth statistics cited in TRAI paper, the All-Call-Query appears to be most advantageous and is the recommended approach. Lastly, MNP must also consider new services that result from IP and future technologies. Currently, these include VOIP, ENUM, Multi-Media Voice, Video Conferencing, Presence Detection and others. Syniverse will work with the TRAI to ensure that these new platforms can communicate with the selected Number Portability platform.

After the inter-operator process has been completed and the port is in effect, calls made to the ported number must be re-routed – i.e. an incoming call must find its way to the new service provider. The routing information used prior to the implementation of porting would route the call to where it always went – the Old Service Provider. Although there are many

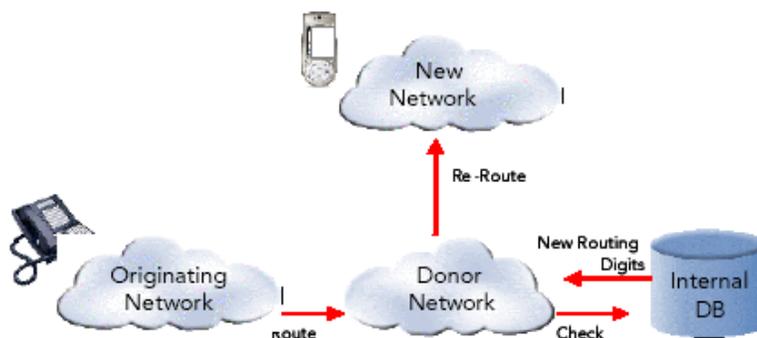
variations and hybrids, routing of incoming calls in a ported environment can be categorized into three basic methodologies or schemes:

- Onward Routing (OR)
- Query on Release (QoR)
- All Call Query (ACQ)
- Call-Drop-Back

A description of the call processing for each of these schemes follows, but first a brief explanation of the roles of the operators in the following diagrams.

The originating network typically refers to the network that places or originates the call, but for purposes of this document, it could refer to the network prior to the terminating network. If the call originates in another country, the network denoted by “originating network” in these diagrams would be the long distance carrier. If the call was originated by a mobile operator that subtends all calls to the local PTT or local LEC, then that PTT or LEC would take on the role denoted by “originating network” in these diagrams. This role is referred to as the “N-1” network, i.e. the network one prior to the terminating network. The donor network is the network from which the number was ported. The donor switch is the switch to which the number range is assigned, and to which, by default, calls are routed. The new network is the network to which the number has been ported. Although the following diagrams are simplified, there could be more than one donor and/or new network, if the subscriber has ported, and then ported again.

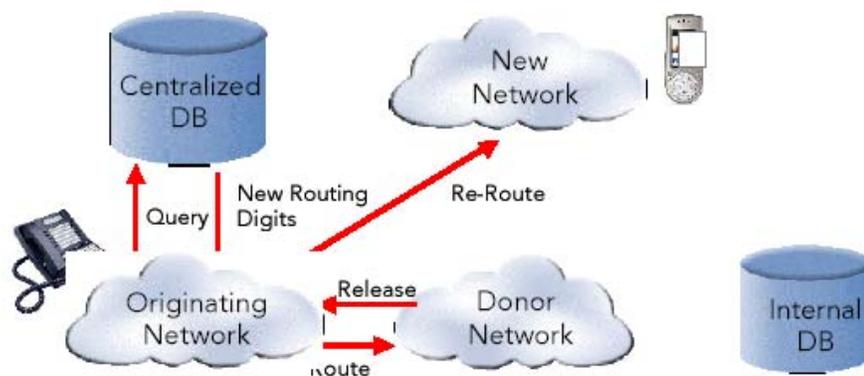
Onward Routing (OR)



In the OR scheme, calls generated from an originating network are routed just as if there was no porting, that is, according to the path indicated by the dialed digits. The donor network checks against an internal database, notes that the number has been ported, determines to which network the call should be routed, and then routes (“trunks”) the call to the new network.

The internal database may be a stand-alone database, shared by all switches belonging to that donor operator, or may be switch-resident, and only contain information about numbers ported out of that switch. This method has been referred to as a “call forwarding” scheme and has some positive aspects and some drawbacks. Most switches have some call forwarding capability, therefore this method is a very quick and relatively simple to implement. It does not involve a centralized database, as does the other methods, and therefore does not require close cooperation among competitive operators. This scheme does require the setup of multiple call segments; this scheme can become very inefficient with regard to transmission facilities (i.e. circuits and trunks) and switch resources (i.e. cards, racks, and memory) – all expensive components in an operators network. Furthermore, a donor network that loses subscribers may incur costs for additional transmission facilities and switch resources to handle the routing for subscribers that it has lost – not a good position to be in.

Query on Release (QoR)



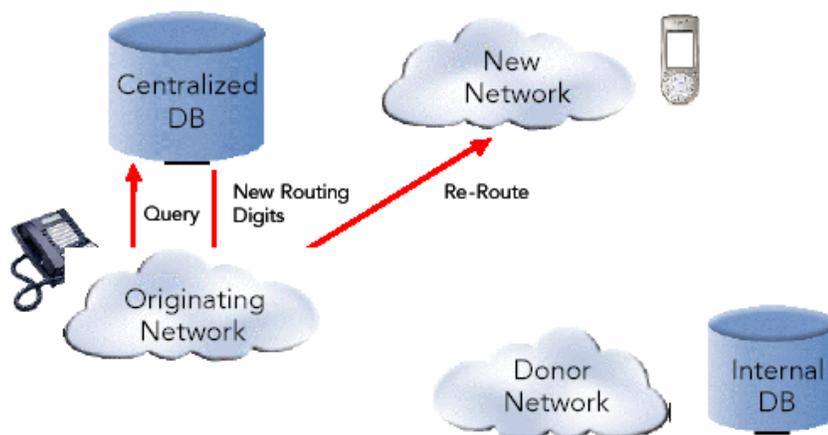
In the QoR scheme, the originating network first routes the call as if porting had not happened. The donor network checks if the number was ported, and if so, the call is released back to the originating network. Note that the donor network does not keep track of where the subscriber has ported, just that the number is not resident on the switch. The originating network queries a centralized database, determines the revised routing to the new network, and re-routes the call correctly. With QoR, circuits are allocated to the donor network but are released immediately rather than remain tied up for the length of the call, as in OR. And although the donor network is still involved in each call, its involvement is minimized. This method therefore is more efficient in terms of circuit and transmission facilities. But a new network element is needed – a centralized database. This requires that all operators agree on a process by which the centralized database is updated and maintained – typically by agreeing on a third party to own and operate the database. Also, the costs to own and operate the centralized database must be borne by all the operators. Various countries have rejected this

particular approach. The primary reasoning behind this decision is the additional amount of time (delay) required for call processing activity.

A special note on a hybrid model, proposed on paper but not seen implemented, known as Call Drop Back or Return to Pivot (RTP). As in OR, in RTP the donor operator maintains an internal database, which is used to look-up new routing information. The call is released back to the originating operator along with the new routing information that is also passed back to the originating operator. The originating operator in turn uses the routing information provided by the donor network to reroute the call. Therefore a centralized database is not needed, and a circuit from the donor operator to the new operator is not required. However, major changes to the signaling protocol is necessary to make this scheme happen, which is the major reason it has not been widely adopted.

OR is efficient when a limited number of ported numbers exist, by comparison, QoR becomes more cost effective as porting becomes more common. But as porting becomes even more prevalent in a country; QoR is less efficient than All Call Query.

All Call Query (ACQ)



In the scheme known as ACQ, the originating network does not route calls to the donor network; in fact, once a number has been ported, the donor network is not involved at all. The originating network queries a centralized database and the call is re-routed to the new network.

There are two forms of ACQ – in one, literally all calls are queried, in the other, the line range in which the number belongs is checked to see if that line range is eligible for porting prior to the database query. In reality, where ACQ is used, most operators query all calls to simplify administration. As in QoR, there is a process to update and maintain the database

and a third party to own and operate the database. All the operators must agree this upon. And as in QoR, the costs to own and operate the database must be borne fairly by all the operators. As porting volumes increase, QoR becomes the most efficient scheme for call routing. In some cases, countries have started with OR when porting volumes were low, and have migrated to ACQ as volumes have increased. In some countries, QoR and ACQ coexist, and the choice of implementation is left to each operator.

3. In the past, some countries have followed the approach of implementation of a short-term solution, with parallel planning for a long-term solution. Several other countries have opted directly for a long-term solution. The issues associated with either approach are discussed in this paper. Please give your opinion, with reasons, on the path India should adopt.

Syniverse Response:

The classic case study of the dilemma posed above is the United Kingdom implementation of Number Portability. Syniverse developed and manages the solution within the UK. As previously cited, the fundamental administrative activity and processes behind the porting of a number in this environment will remain unchanged regardless of the routing technology. Operators will still need to communicate with each other and the central database where the porting information resides, and ultimately disseminate this information to interested and affected parties to ensure call processing activity. The Syniverse solution Number Portability application can facilitate all of these various methods listed above in question two. With this, a distinction is made between the trade-offs associated in the evolution the call routing and our response specifically addresses this function of Number Portability.

The UK was the first country in Europe to introduce Mobile Number Portability in 1999. MNP was implemented after the country regulator Oftel, mandated mobile operators to port numbers on a reciprocal basis. The issues relating to the technical solution, call routing and cost sharing were left to the operators. The regulator opted an “off-hands” approach to number portability.

Because of the relatively higher cost associated with implementing an Intelligent Network-based ACQ and Central Database (long-term approach), operators selected the more simple solution onward routing and distributed database (short-term approach).

Recently, inherent problems associated with the inefficiency of the UK short-term solution has caused the operators to rethink their initial approach. These are driven by of issues that include:

- Inefficient utilization of voice circuits
- Additional cost of call conveyance

When analyzing these factors coupled with the strong growth predictions of the market, the initial conclusion leads to a long-term All-Call-Query, Central Database solution.

4. In case of a centralized database approach, who should be responsible for the setup, ownership, administration, and management of such a database? Should the administration and operation of a centralized database be assigned to a third party duly licensed by the licensor as an other service provider (OSP) on the lines of a clearing-house, or should some other approach be adopted?

Syniverse Response:

The central database should be maintained by a single organization third-party organization such as Syniverse whose core competency includes the set-up, administration and management of Number Portability solutions. This enables the operators within India to focus on their core competency of providing superior voice and data services to their end-users. The responsibility of Syniverse would be to technically and operationally maintain the database service, ensuring that the information held within the database is accurate, and updated where necessary, whilst providing a level of availability appropriate to a telecommunications network. Additional responsibilities would include the facilitation of working groups and other interested parties to establish the operating business rules and procedures necessary to implement Number Portability. The administration and operation of this central system should be awarded in a managed-service approach. Many different business models can be selected with respect to system cost and recovery of those costs. Syniverse would look forward to discussing further with the TRAI all necessary elements of this implementation approach.

The central database Approach carries the following Advantages:

- NP managed by an independent, neutral entity
- Security of cross-network information
- Independent audit of processes
- Independent dispute resolution
- Responsible to the Regulatory Authority
- Standardized API interface to Central System
- Assist Operators with back-office system integration
- Detailed Implementation/Project strategies coordinated with all operators
- An accurate central copy of the national database is maintained for reference by all operators

5. How should the database updates between different operators be synchronized? Where could the central database be located?

Syniverse Response:

In order to avoid discontinuity of service for the porting MSISDN, it is necessary to impose the following constraints/business rules on the porting transactions flowing to and from the central database application and the attached operators:

1. The porting transactions must take place in a specific sequence and managed with system timers. The message flow between Donor and Recipient Operator will stem around 3 primary activities:

- MISDN Activation (Recipient Operator)
- MISDN De-Activation (Donor Operator)
- NP Routing Database update (All Operators/Interested Parties requiring routing Data)

Essentially the central application (and Disaster Recovery Site) can be hosted in any geography providing it is a telecom-grade facility. In the proposed central service bureau approach, this location is one that is neutral to those operators utilizing the service. Typically it is a requirement to physically locate central number portability application and data within the country.

6. What should be the level of centralization (metro, circle, national) for a centralized database? Should this be a permanent arrangement, or be subject to later revision?**Syniverse Response:**

The most common approach to centralization within the Number Portability database is to utilize a national segmentation approach. The majority of countries that have introduced number portability have embraced this model. Conversely, the US approach to the level of centralization was to divide the country into 8 regional areas based upon Local Area and Transport Areas (LATA). In this scenario, Operators providing service in all geographies must receive feeds from all databases. A major disadvantage to this configuration can be the added costs of multiple locations for all parties. A national approach that utilizes a single centralized database could deliver to the TRAI an efficient means of downloading routing data from a single source. Additionally for added flexibility, the Syniverse solution can partition this database into various machines and/or locations. Regarding performance and availability, the database virtually appears as a centralized DB. This approach will give the flexibility in configuration in a cost-effective approach.

7. How should NLDOs and ILDOs handle the routing of calls to support number portability?**Syniverse Response:**

A common approach used for routing calls to a ported number that originates on another network within the same service area, a network elsewhere in the country (NLDO routing), or a network in another country (ILDO routing) is the N-1 method. This rule of handling the routing calls to support Number Portability can be applied to all operators within India.

What is the N-1 Operator?

If N represents the number of involved in routing the call to the called party, then the N-1 operator is the one that does the database query. For example, if a call were routed from a local provider to a NLDO, and then to a second local provider the long distance provider would make a query to the number porting database to determine the right carrier. There are three carriers in this situation so $N = 3$ and $N-1 = 2$ so the N-1 carrier is the second carrier which is the long distance provider (NLDO).

In the case of a wireless subscriber in his On-network calling area calling a number in that same area (calling his office for example), the wireless carrier is the second-to-last-carrier to handle the call. In this case, the subscriber's home wireless carrier would be responsible for determining if the office number is ported and then delivering the call to the right carrier who serves the number. If, however, the wireless caller was calling a number outside the local calling area they are currently in, then the long distance carrier would be the N-1 carrier responsible for the call's final routing. If a carrier has multiple switches in its internal network that process the call, then these are ignored in determining which carrier makes the call routing decision. For example, if a carrier's switch that provides access to the long distance network routes a call to a wireless switch that serves subscribers, then both switches belong to the Nth carrier.

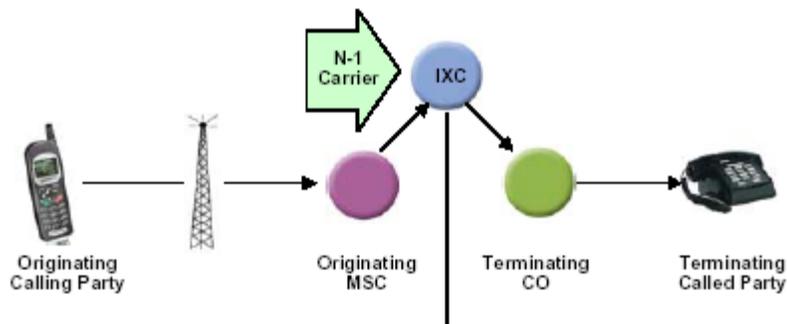
For instance, if a subscriber or a visiting roamer dials a wireline or wireless number that is in the same area as the serving switch, then in this case the serving carrier would be the N-1 carrier and its network would make the routing decision.

When Are You The N-1 Operator?

If a call is placed from network Operator A to a number on another Operator B's switch that is directly interconnected, then Operator A is the second to last carrier to handle the call. As the N-1 Operator, this operator is responsible for performing a number portability query to determine the called party's current network. However, if the call is to a number where Operator A and Operator B that does not have direct interconnection (i.e. they are interconnected to via an NLDO or ILDO), then Operator A is not the N-1 carrier does not have to determine the correct carrier. This responsibility would revert to the NLDO or ILDO.

N-1 Carrier Example

NLDO/ILDO



8. Are the existing interconnection arrangements (such as signaling) between mobile-to-mobile, mobile-to-fixed networks sufficient to achieve number portability, or are any changes required?

Syniverse Response:

Voice Circuit Interconnection arrangements currently in place between operators will be sufficient to achieve Number Portability using the Syniverse central solution. Signaling interconnection agreements may require some modifications. For example, in an All Call Query, Large operators, may offer full-service NP data access, switch, and transport. The originating operator may contract for these services, enabling NP database queries into that operator's database. A national provider utilizing this model will require negotiating and maintaining numerous interconnection agreements. Lastly, should an Onward routing method be employed, modifications will be necessary to account for the conveyance of calls from the original network operator to the recipient.

9. Are there any technical issues in the portability of services such as SMS, data, voicemail, or fax?

Syniverse Response:

Currently, Number Portability solutions deal primarily with the porting of a circuit switched voice call. However, when planning the implementation Number Portability, there are many other services that will be impacted. One such service is SMS. When an SMS is sent a query must be made to the number portability database (NPDB) to determine if the number is ported. If the number is ported, then routing information is returned identifying the new network service provider for that number. Depending on your operator requirements, Syniverse can return a number that identifies the new network service provider, or the actual location routing number can be provided for routing to the home switch. Launching queries to an NPDB may require SMS system or network upgrades and involves routing across the SS7 or secure IP networks.

10. What problems do you foresee with the current National Numbering Plan in

implementing number portability that may necessitate the modification of the existing National Numbering Plan?

Syniverse Response:

The introduction of Number Portability implies that numbers from the blocks that a particular operator was originally assigned will now be transferred to another operator. The main effect, if any, of Number Portability on a national numbering plan is the loss of structure since individual numbers within a number block previously 'allocated' to one operator are ported to other operators. Number Portability between network operators therefore implies that numbers no longer contain any operator or service provider identity.

11. Should number portability related charges be regulated? If not, then what measures will ensure that the portability charges are not set such as to discourage portability?

Syniverse Response:

As it directly relates to Number Portability charging principal, it is the fundamental obligation of any National Telecom Regulatory Agency to ensure that this new service meets the overall goal of enhancing competition by:

1. Ensure that any fees for NP are reasonable
2. Ensure that charges for charges are cost oriented and that direct charges to customers, if any, do not act as a disincentive for the use of the facility.

As a general rule, the vast majority of Regulatory agencies have intervened with legislation that have guided operators on the amounts that they can charge each other and the subscriber. In our experience, this appears to be a necessary to ensure that this service meets its fullest potential of ensuring subscribers the ability to change operators while retaining their number. Below are examples of the regulatory guidance in various countries.

UK Regulatory NP Charging Guidance

- Any charges for the provision of such Portability shall be made in accordance with the following principles:
- subject always to the requirement of reasonableness, charges shall be cost oriented and based on the incremental costs of providing Portability unless:
 - the Donor Provider and the Recipient Provider have agreed another basis for the charges, or
 - the Director has directed that another basis for charges should be used;

- the Donor Provider shall make no charge in relation to System Set-Up Costs or Additional Conveyance Costs;
- in respect of Mobile Portability, the Donor Provider shall make no charge or annual fee for ongoing costs relating to registration of a ported Telephone Number or a Subscriber;
- charges levied by the Donor Provider shall be based on the reasonable costs incurred by it in providing Portability with respect to each Telephone Number.

US Regulatory NP Charging Guidance

- Centralized regional databases (initially an LLC governed by RBOCS) shared by fixed and mobile
- Subscriber cannot be charged for port-out
- Fixed operators' cost recovery through monthly reasonable charge across all subscribers
- Mobile operators can recover in any fair means (free market)
 - Monthly charge for all subscribers
 - Charge on port-in
 - From margins

EU Regulatory NP Charging Guidance

- National regulatory authorities shall ensure that pricing for interconnection related to the provision of number portability is cost oriented and that direct charges to subscribers, if any, do not act as a disincentive for the use of these facilities.
- National regulatory authorities shall not impose retail tariffs for the porting of numbers in a manner that would distort competition, such as by setting specific or common retail tariffs.

12. What measures will ensure tariff transparency?

Syniverse response:

There is an inherent conflict between number portability and tariff transparency. Allowing a called party to keep his/her number when changing operator, location or service has significant competitive and user benefits. Nevertheless, it also reduces tariff transparency. Callers can no longer tell from the number dialed and as a consequence, what price they will pay for the call. As a result, the TRAI fundamentally has the following options with respect to regulation: A) choose to restrict the tariffs charged under Number Portability or B) require enhanced tariff transparency services.

Number Portability obscure differences in price between on-net and off-net for terminated calls. In many countries, some operators charge significantly less for on-net than off-net calls as a way of attracting customers. Number Portability can hide such price differences.

Number Portability can also cloak differences in the price of making calls to competing networks of the same kind. For example, in a call made from a fixed line to a mobile, the interconnection costs of the mobile network may differ from that of another mobile network. In some EU member states this led to different retail prices for fixed to mobile calls according to the mobile network called. Operator NP between mobile operators hides these differences in retail price and this also reduces tariff transparency.

Potential measures to ensure tariff transparency:

- Allowing the loss of tariff transparency on the grounds that it is immaterial; requiring the dominant fixed line operator to set a uniform retail price for calls to all mobile networks – whatever the call termination charge
- A full tariff transparency service (in which the user is automatically informed of the price of calls in advance of making them) would help solve these problems. Examples of these are recorded announcements at the start of a call or when the caller has a terminal with a screen the tariff or service information could be displayed on it.
- Provided via voice information service, SMS service, or Web page), which enables the subscriber to identify the network of the called party.
- Another approach, evident in Hong Kong and in the U.S., is to allow full transparency, with carriers taking advantage of on-network rates where available.

13. Considering that the Indian market is a growing market and number portability offers the possibility of attracting customers by an efficient operator, should it be mandated that the cost of the number portability should be absorbed by recipient network?

Syniverse Response:

The structure of costs for Number Portability varies with the technological implementation and with the specific business model arrangements selected by the industry. From an economic point of view, these costs fall into a limited number of categories, each of which can be separately analyzed. There are three categories of costs:

- System set-up costs – Fixed Cost
- Administrative costs of associated with each port – Variable Cost
- Call Routing or Conveyance - Variable expense

Theoretically, the full cost of implementing number portability should not be borne solely upon the recipient network operator. In considering the fixed costs of the initial set up of the service, this outlay will have to be set forth prior to any subscriber benefiting from the mandate. As a result, ALL operators should contribute to this portion of the cost. A decision point from the TRAI regarding this area is how operators will pay (individually

responsible or shared) and what measures will be granted from legislation to recover these costs if any. Regarding the variable Administrative costs associated with each port, it is reasonable to charge the Recipient Network operator on the premise that they will be gaining the revenue associated with a new net subscription. What follows below are guidelines that the TRAI can follow in determining the amount imposed upon the RNO.

In order to ensure the level of porting would not be inhibited due to excessive charges (Administrative costs associated with each transaction) being imposed on the porting customers, and due to the consideration about the external benefits relating to MNP as cited in the TRAI paper, the per subscriber set-up costs that could be recovered by the Donor Network Operator in carrying out the administrative work should be minimized. Too high a level of per subscriber set-up charge would compromise the ultimate objective of enhancing consumer interest through effective competition rendered by the availability of MNP.

In view of the highly competitive characteristics of the mobile industry, particularly after MNP has been made available, each mobile operator could have a more or less similar ratio of porting-in and porting-out customers. There should not be a great concern about established mobile operators imposing too high a per subscriber set-up charge on the RNO, because they themselves would also be the RNO for ported numbers from the new mobile operators. It is expected that the DNO charge set by each mobile operator should be similar and some of them may even agree to set zero charges on a reciprocal basis based upon this. IF the variable database updating/porting administration charges to be imposed on the RNO by the DNO could not be commercially agreed, TRAI should be prepared to look into the actual amount of work involved and determine the reasonable charge that could be imposed. In all circumstances, it is necessary to ensure that all the per subscriber porting set-up/variable cost procedures would be carried out efficiently and that no operators should be asked to compensate for the other parties' inefficiencies. The general level Long-Run Average Incremental Cost (LRAIC) theory can be considered for gauging this charge. Lastly, per question 7, the N-1 rule for determining responsibility of call routing/porting query charges can be considered.

14. Please share any additional information that you might have about number portability implementations in countries and jurisdictions around the world, and what we might learn from these experiences.

Syniverse response:

MNP Around the World

This section explores the worldwide evolution of number portability implementation, beginning with a tabular comparison of which of these schemes, OR, QoR, and ACQ, have been implemented in which countries.

Selected Country	Call Routing Method
Austria	OR (not yet implemented)
Belgium	ACQ
Canada	ACQ
Denmark	ACQ
Finland	ACQ
France	OR
Germany	ACQ (Operator Select)
Hong Kong	ACQ
Ireland	OR (Operator Select)
Italy	OR
Netherlands	ACQ/QoR
Norway	OR migrating to ACQ
Singapore	OR
Spain	ACQ/QoR
Sweden	ACQ/QoR
Switzerland	QoR
UK	OR
US	ACQ

While some countries are just considering a mandate for NP, other countries have had a portability model in place for several years. In fact, all members of the European Union are required to offer number portability, according to the Universal Service and Users' Rights Directive, Article 30 - Number Portability, set forth in July 2003,

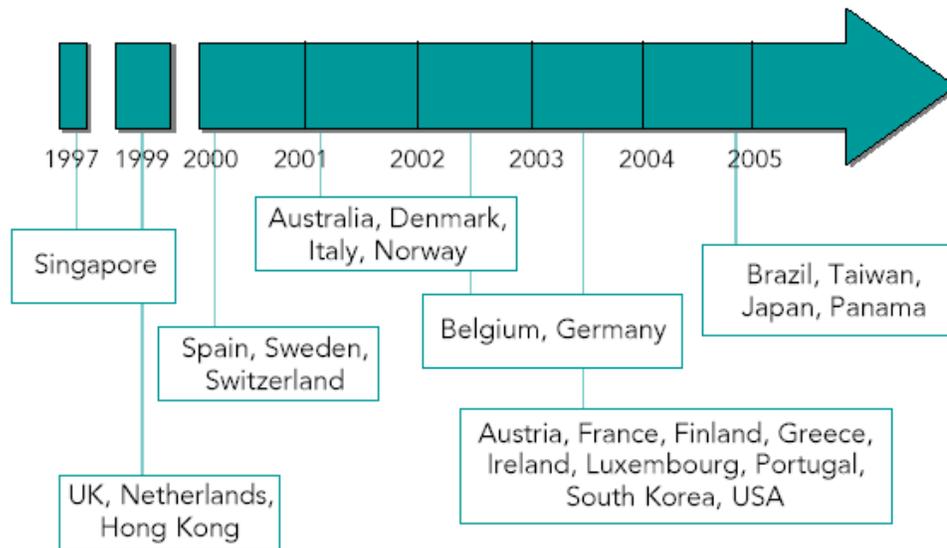
Member States shall ensure that all subscribers of publicly available telephone services, including mobile services, can retain their number(s) independently of the undertaking providing the service:

- (a) in the case of geographic numbers, at a specific location; and
- (b) in the case of non-geographic numbers, at any location.

This paragraph does not apply to the porting of numbers between networks providing services at a fixed location and mobile networks.

Japan's telecommunications ministry is recommending that the mobile number portability mandate take effect there by 2006. According to Reuters (February 2004): The ministry issued a preliminary report today, due to be finalized in April 2004, requesting that WNP be implemented as soon as possible. If the rule goes into effect, Japan would be joining 20 or so countries with similar regulations. The ministry believes nearly 30 percent of Japan's 80 million mobile phone users would be interested in WNP. However, limiting the advantages of WNP in Japan, the ministry says mobile phone users will still have to change their mobile phone email addresses for sending text messages.

The following graph shows a relative timeline of NP implementation in various countries.



Case Study: The Netherlands

The Dutch mobile market began porting in April 1999. Although there have been great improvements as of late, to date, customers have generally regarded porting as unsuccessful. The reasons for this are varied.

While churn is high, running at 35-40 percent per year, only five percent of customers who change networks choose to port, or keep their number when churning. One reason frequently cited for this is that porting times are typically 3-12 weeks, and retailers consequently do not recommend porting. In addition, the demanding and inflexible criteria for validation imposed by the donor causes many port attempts to be rejected by the donor operator, i.e. the subscriber is barred from porting his/her number. One reason for the subscribers' ineligibility to port is that subscribers must wait until the notice period in their contract expires before the donor will release the number. There are other reasons why porting is not as popular. Even when the donor operator authorizes the port, if for some reason there is a technical glitch in the changeover, there is little practical cooperation in resolving problems among the fiercely competitive operators.

And while donor service providers are prohibited from charging a fee to customers who leave and port their numbers, recipient service providers are allowed to charge, and frequently do charge, an administrative fee to cover the costs incurred for porting. Another deterrent to porting is the use of SIM lock, which is permitted by law for up to one year. Once the port has taken place, the operators use ACQ for an efficient call routing method.

Case Study: The United Kingdom

In the U.K., mobile number portability has been available since 1999. The porting process generally takes up to seven days and requires the subscriber to gain authorization from the current service provider; consequently only three percent of subscribers have ported their numbers. In this market, donor operators are allowed to charge customers for porting away, which serves as a deterrent to subscribers. With some operators the charge has been so high that customers were often dissuaded from porting. In the case of one operator, customers were charged £30. However, recently operators have voluntarily dropped porting charges. Another reason cited as a deterrent to porting is the failure of the operators to implement a fast and reliable (automated) exchange.

The current process, implemented in 2001, begins with the subscriber requesting an authorization from the donor operator. This paper authorization form is a Porting Authorisation Code (PAC) which is generated by a centralised brokering system (a database), and contains all the information needed by the recipient operator to complete the port. In effect, this gives the donor a certain amount of power over the porting process. Once the PAC is obtained, the subscriber is responsible for providing the PAC and MSISDN to the recipient operator of choice to allow the porting record to be retrieved from the system and the port to be completed. Upon completion of the port, Onward Routing is the methodology for call routing, as the centralized database is not used during the actual call.

Case Study: The United States

The Telecom Act of 1996 mandated porting in the U.S. Fixed-to-fixed porting was first addressed in a phased approach, which began in December 1997 and rolled out through the top 100 markets in 1998. Mobile porting was not mandated until November 2003. In the brief period from November 24, 2003 to Jan 12, 2004, 1 million mobile ports were requested, which is slightly fewer than 50 percent of churn. The reasons why porting was much higher than in some European countries mentioned above were:

1. Fixed-to-mobile, fixed-to-fixed and mobile-to-mobile were all included in the mandate
2. Consumers expected a mobile -to-mobile port to occur in two hours and 30 minutes, and a fixed-to-mobile port to occur in two to three days
3. Subscribers only had to present their new service providers with their account number phone number, billing address and name, and the recipient operator took care of the administrative tasks
4. Contract terms or debt issues with the donor subscriber did not preclude validation of the port
5. The porting process, for the most part, was fully automated end-to end

Another hallmark of the model derived by operators and regulators in the U.S. was that a common message set was developed for the exchange of subscriber information and was agreed upon by a consortium of operators. This minimized validation criteria on porting information and prevented the donor operator from any arbitrary rejection of a port request, thereby imposing fairness across all operators. Also, business methods, back-office

systems, billing systems, point of sales systems, and generally all methods and procedures associated with acquisition of a subscriber were modified to incorporate the porting process. The obvious tradeoff is that this took many months of system and software development and had a substantial cost associated with the modifications.

Centralized, outsourced systems and vendors were retained for cross-operator interaction. Port requests are sent from recipient operator to donor operator via a trusted, third-party clearinghouse. The clearinghouse is responsible for format validation, proper routing, and timer management. The clearinghouse also acts as an audit point and a place for troubleshooting ports that do not happen correctly the first time. After the port request is confirmed, both old and new operators submit the port information to a single centralized database, called the NPAC (Number Portability Administration Center). This serves both as a repository and audit point, as well as a double check that both operators have agreed to port the number, and have agreed on the date and time of the port to take place. Finally, when the NPAC has “approved” the port, distribution network databases, typically co-located with Signal Transfer Points (STPs), are updated with routing information, which is used in the response to a switch query. All switches in the U.S. use the ACQ method, and hence have access to the same centralized data.

Conclusions, Recommendations, and Considerations

This section presents relevant lessons learned after looking at NP implementations around the world and provides some considerations for regulators to think about when determining how to proceed with a mandate for number portability; as well as special considerations for operators to remember when implementing this important mandate.

Lesson 1: Number Portability is Inevitable

One of the tenets we have observed is that number portability is inevitable. As subscribers become aware of NP in other countries, they too begin to ask, “Why can’t I keep my number when I change service providers?” NP lifts a barrier to competition, which is unique to the telecommunications industry. And increasing competition is always in the best interest of consumers.

Lesson 2: Experience Counts

If the ability to port is not costly, relatively quick and convenient, porting is more successful, and the mandate for porting is more successful. The customer experience is very critical. If it is a hassle, costs a lot, or takes weeks to complete, customers do not bother.

Lesson 3: Centralized Databases and Centralized Clearinghouses

A centralized clearinghouse:

- Gathers and collects porting information
- Ensures fairness among operators
- Corrects for differences between operators
- Eliminates version control issues between operators
- Provides a “referee” function in the case of dispute

- A centralized database where all ports are validated before network distribution:
- Ensures that operators cooperate in a fair manner
- Ensures accuracy with porting dates and times, thereby eliminating potential
- service outages for subscribers
- Provides audit points to reduce the potential for “slamming” fraud, whereby a
- Subscriber is ported without his/her knowledge

Lesson 4: Porting Does Not Increase Churn

In several countries where MNP implementation took place, analysts predicted that churn would “go through the roof”. This prediction never materialized. NP does not cause churn; rather the impact of portability only exaggerates existing reasons to churn -- clear quality issues, holes in coverage, better data services, availability of more exciting handsets. After the implementation of NP in the U.K., monthly churn increased only 0.1% per month. Australia saw a 0.3% increase in monthly churn. It is true that there can be a significant percentage of subscribers who have held off on churning because of the lack of number portability. This “pent-up-demand” results in an increase in churn once number portability becomes available; however, this is a temporary effect. Evidence shows that number portability creates the most incremental churn in the first six months, and then stabilizes. For example, in Hong Kong, prior to porting, the monthly average churn rate was 2.5% to 3.5%. In the initial months of porting this jumped to 9% -10%. And after the first three months, churn returned to 2.5% - 3.5% monthly.

Belgacom’s property Proximus stated that churn actually decreased by 17% despite full impact of MNP in 2003 (number portability was launched there in October 2002). A successful loyalty strategy was credited with this result. Profitability for Belgacom, expressed in terms of EBITDA, rose by more than 10%. Furthermore, churn in the U.S. varied widely by operator. Just as in other countries, operators who developed strategies around loyalty, service improvements, improved network quality, and better customer service, saw churn actually decrease despite the implementation of number portability, while other operators had significant increases in churn.

Cost Models for NP

There will be costs associated with NP implementation, fixed portability or MNP, and operators have a right to recover these costs. There are several cost recovery models; each with unique tradeoffs.

Model One

This first model uses a fund owned and controlled by the regulatory agency or its assignee. Each operator contributes to the fund based upon its number of subscribers and withdrawals are based on actual costs. The benefit of this model is that the costs are shared among all subscribers of all operators. Because portability benefits everyone, not just those who port, through better coverage, better customer service and better rate plans, this is considered a fair cost model. The downside is that there is no incentive to keep costs down, since an operator will be reimbursed for costs incurred.

Model Two

This second cost model calls for each operator to assess a small monthly fee to all its subscribers. Since all subscribers benefit from number portability, this is a fair model, which allows for cost sharing among the subscribers. And costs are kept at a minimum because the operator wants to keep its monthly fees low or it will lose subscribers. In this model, the regulators should enforce a reasonable ceiling for charges.

Model Three

The third model involves charging the subscriber who ports. In this case, the recipient operator, the donor operator, or both may collect the fees. Please note that in some countries contract law limits what the donor operator may collect. In general, the recipient operator is in a better position to charge a fee because it is gaining a customer. The recipient operator also may choose to waive the fee during special incentive periods or for highly valued subscribers. Charging a subscriber to port is a deterrent to porting and operators may end up paying up front for mandated changes for which it can never fully recover costs.

Another question in determining cost models is to determine who will do the work, i.e. who selects the clearinghouse and the centralized database providers. In some countries where each operator was allowed to pick vendors, competition was greatest since many vendors vied for the same opportunities. However it was the least efficient, since the same systems were developed several times by several vendors, with different levels of quality. And when the vendors of different operators attempted to exchange data, inconsistencies in interpretation of the standards set back testing efforts by months. In countries where one vendor was chosen, data exchange consistency was ensured. Since several vendors bid on the contract, competition was still present in the process.

Considerations for Regulators

Regulators tasked with developing a mandate face a formidable mission. The difficulty is not that number portability is to be mandated. Rather, the difficulty is in determining what outcome regulators desire. Is the desired outcome an increase in competition between mobile operators at minimal cost to operators, or an increase in competition at minimal cost to subscribers? The answer to these questions can result in very different mandates. Is the desired outcome that mobile operators can act as competitors to fixed operators, or just to other mobile operators? Again, the answer will drive a different mandate. The wrong approach would be for regulators to mandate how number portability should be implemented. Instead, regulators should clearly articulate in a mandate what needs to happen, and should help influence how it will be accomplished in collaboration with operators, their vendors and subscribers. Along the path toward number portability, regulators need to be prepared to offer guidelines and respond to conflicts as they arise. Below are some considerations for a regulator to keep in mind when determining the "what":

Deadlines

In terms of deadlines, sooner is better than later, but the implementation of number portability takes time. The amount of time provided will, in some part, determine how

number portability is implemented. If a very short time to implement is given, then the methods of implementation will be very limited. For example, OR may be the only call routing approach if number portability is to be implemented in a few months. To compromise on deadlines, a trial in one market could take place. This allows operators to exercise methods and procedures in that market before rolling out the remainder of the markets or cities.

15. Give your comments, with reasons, as to when number portability should be introduced in India?

Syniverse Response:

Once a date is mandated by the TRAI, a reasonable time to implement Number Portability is estimated to be approximately 6-9 months. Milestone tasks to consider in this implementation include:

- ***Project Management and Control*** – Project Management and Control is a fundamental aspect of the quality of Syniverse's delivery mechanism and we adhere rigorously to our own internal project management processes. We also work hard to ensure excellent communication of requirements, progress and issues when necessary.
- ***Product Review Workshops*** – A number of workshops will be held during the initial period and are built into our plan to enable Syniverse to present the details of the various technical and non-technical aspects of the product to the relevant and appropriate Operator resources. These workshops will form the basis of the NP Product training allowing the intended audience to gain a thorough understanding of the product, both from a technical and non-technical perspective.
- ***Customization, Unit and System Test*** – Experienced Syniverse NP technical staff perform Business Process, XML Messaging and GUI screen layout customization and localization working alongside a clearly delimited configuration management and test organizations to ensure that the resultant system is functionally correct.
- ***Production Hardware Planning and Set-up*** – Sizing of the requirement and set-up of appropriate new hardware or configuration of existing hardware. This includes the installation and set-up of the 3rd party software and the Core NP product. On completion of the installation, appropriate testing and fine-tuning will be carried out.
- ***Production System Deployment*** – Once the base product is installed and tested the product will be configured with the appropriate country specific information and this includes implementation of the configurable parameters of the NP Product. The system will undergo regression testing thereafter.

- **Operator Integration** – Syniverse can provide the Operators with some test facilities for their own tests. These include a test client and a test server for sending and receiving M2M messages and an installed message receiver with functionality on the Production system.
- **Trial Operation** – Syniverse recognizes the need for operators to test “live” data, end-to-end, in a test environment. We have extensive experience bringing up markets, with several large operators simultaneously preparing for the same mandated go-live date. Syniverse’s offer incorporates two facets to assist in this effort. We can optionally support a test platform through to the go-live date, for operators to use for end-to-end testing. Additionally, we can optionally provide hands-on support for testing, whereby Syniverse coordinates the testing schedule, facilitates the actual tests, and assists in troubleshooting, where appropriate.
- **Stability Verification Phase** – The most critical phase of operation, and the most widely watched by industry and press, is the first few weeks of actual operation. Syniverse experience has shown that staffing additional resources during this period, providing rapid response to correct software anomalies, as well as assist operators in finding errors in back-office systems and modifications, is the most effective way of maintaining a stable environment.

16. Should MNP be implemented progressively by service area or directly across the nation at one time?

Syniverse response:

Per response of question 14, the answer is driven to a certain extent to the amount of time prior to the mandated date of number portability can impact both the overall solution as well as the markets selected. Additionally, staggering the geography by order of importance, will give all parties involved the latitude in gaining operational efficiencies. In the US for example, it was determined that implementing the largest 100 markets in the first phase and then the rest of the country at a later timeframe would be the optimal approach. In the guidance of this topic, the FCC ruled in their First Reconsideration Order of Number Portability:

“In the First Reconsideration Order, the Commission concludes that within the 100 largest MSAs, LECs must provide number portability only in switches for which another carrier has specifically and reasonably requested the provision of number portability.⁷⁵ The Commission reasoned that such an approach allows carriers to focus their resources where competitors plan to enter, which is where number portability is likely to have the most impact in the short run on the development of competition for local services.⁷⁶ Structuring implementation in this fashion reduces costs, eases the demands on software vendors, and encourages efficient deployment, network planning, and testing.⁷⁷ The

commission emphasized, however, that all carriers, even those operating portability-incapable switches, are still responsible for properly routing calls to telephone numbers in locations where number portability is available.⁷⁸ Carriers can meet that responsibility either by routing the call to one of their switches that is capable of performing the necessary database query, or by arranging for another carrier or a third party to query the database or route the call.⁷⁹

17. What will be the effect, if any, on the different aspects of implementation if phased roll-out is adopted?

Syniverse Response:

Regarding a potential phased roll-out deployment of Number Portability, net effect to implementation will be minimal. As each area is opened to porting requests, the same process and procedures would be replicated according to definitions outlined in precedent markets.