WHITE PAPER

Best Practices for Number Portability Success

Number portability is a winning proposition for all key stakeholders — regulators, Communications Service Providers (CSPs) and subscribers. To implement number portability successfully, multiple factors need to be considered. This paper discusses the benefits of number portability, the best practices to implement a national solution and how CSPs can prepare to make the transition to support number portability.

Number Portability — A Winning Formula for All

Number portability allows subscribers to keep their existing telephone numbers when they change CSPs. Since the mid-1990s, many countries have been implementing number portability as their telecommunications markets are open to competition. The United States and Canada support number portability for subscribers of fixed and mobile services. The European Union (EU) mandated its member states to support number portability (Directive 2002/22/EC, Article 30) in July 2003, although many EU countries had already implemented portability well before the mandate. In Asia, Hong Kong and Singapore were the first to implement number portability, followed by implementations in Japan and Malaysia. Mexico was the first Latin American country to have number portability operational, followed by Brazil. South Africa and Egypt lead the way in Africa. Countries in the Middle East, such as Saudi Arabia and Oman, also have number portability in place.

It is easy to understand why liberalization and number portability go hand in hand. Number portability is a winning proposition for all key stakeholders — regulators, CSPs and subscribers.

For subscribers, number portability offers the freedom to choose and switch CSPs at will while maintaining their valuable identity — their telephone numbers. Without it, most users are reluctant to switch CSPs, even as they become dissatisfied, because of the inconvenience and cost of informing others of the change. Examples are abundant of CSPs that have attractive services yet fail to acquire customers because there are no provisions for number portability.

For regulators, it delivers two powerful benefits: an efficient approach to allocate limited numbering resources; and a way to level the competitive playing field. What is more, by removing a key obstacle to subscriber choices, it does not redistribute the existing market as some may believe but rather grows the pie by encouraging CSPs to reach out to underserved markets and innovate to acquire and retain customers. By expanding the telecom marketplace and making the deployment of telecom services faster and more cost-effective, number portability can, in fact, boost the productivity, competitiveness and economic growth of a nation.

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For CSPs, it presents opportunities to acquire customers and generate higher Average Revenue Per User (ARPU) through new services. While there are understandable concerns about the costs of implementation and the risks of greater churn, number portability can promote growth in subscribers and revenue for CSPs that deliver high quality, innovative marketing, service features and pricing models.

Planning A National Number Portability Solution

The successful implementation of number portability requires close collaboration among regulators and CSPs. Together, these key stakeholders work to develop and implement the crucial components of number portability:

- Well-defined policies and end-to-end business rules for porting, including port durations and penalties
- Clear principles on solution ownership, cost allocation, recovery and inter-operator tariffs
- Cost-effective, holistic, forward-looking and future-proof solutions
- Realistic project schedules to ensure a working implementation from the day the portability service is introduced to the public
- On-time, low-cost and high-quality implementation.

To increase customer adoption, key issues such as subscriber awareness, simplicity and speed of porting transactions, and minimal to zero cost per transaction must be addressed. To this end, CSPs and regulators need to work jointly to develop detailed responses to the following questions:

Business Operations

- What should a CSP do when a subscriber wants to port an existing number?
- What ordering, provisioning, notification and customer care processes are needed to support this request?

Network Considerations

- How does a CSP route a call to a ported number?
- Where should the CSP find the correct routing information?
- What is the impact on call signaling and routing for call flows and user experience?
- care processes are needed to support this request?

Commercial Issues

- What are the costs to implement and operate number portability?
- Who should pay to port numbers?

The best global practice for a successful implementation of number portability typically calls for a centralized national solution that manages number portability transactions across CSPs. In addition, it addresses how each CSP should prepare their operations environment and network infrastructure to integrate with the centralized national solution seamlessly.

In rare cases, decentralized or partially centralized approaches may be cost effective, at least in the short term, for a specific national environment.

Implementing A National Number Portability Solution

To address the speed of porting transactions and the costs of porting, two key aspects need to be considered in a national number portability solution:

- Administration or what must be done when a user requests number porting
- Call routing or how to route a call to a ported number

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Administration

When a user requests number porting, the port request order initiated by the recipient CSP needs to be processed by both the original CSP (or donor) and the new CSP (or recipient). When the port is completed, all connecting CSPs need to be notified of the change so that all calls or service sessions (e.g., SMS, MMS, video calls) to this user are correctly routed.

The number portability order transaction process can take place in two ways:

- Bilaterally between the donor and receiving CSPs, who are also responsible for informing all others of the change
- Through a neutral centralized clearinghouse

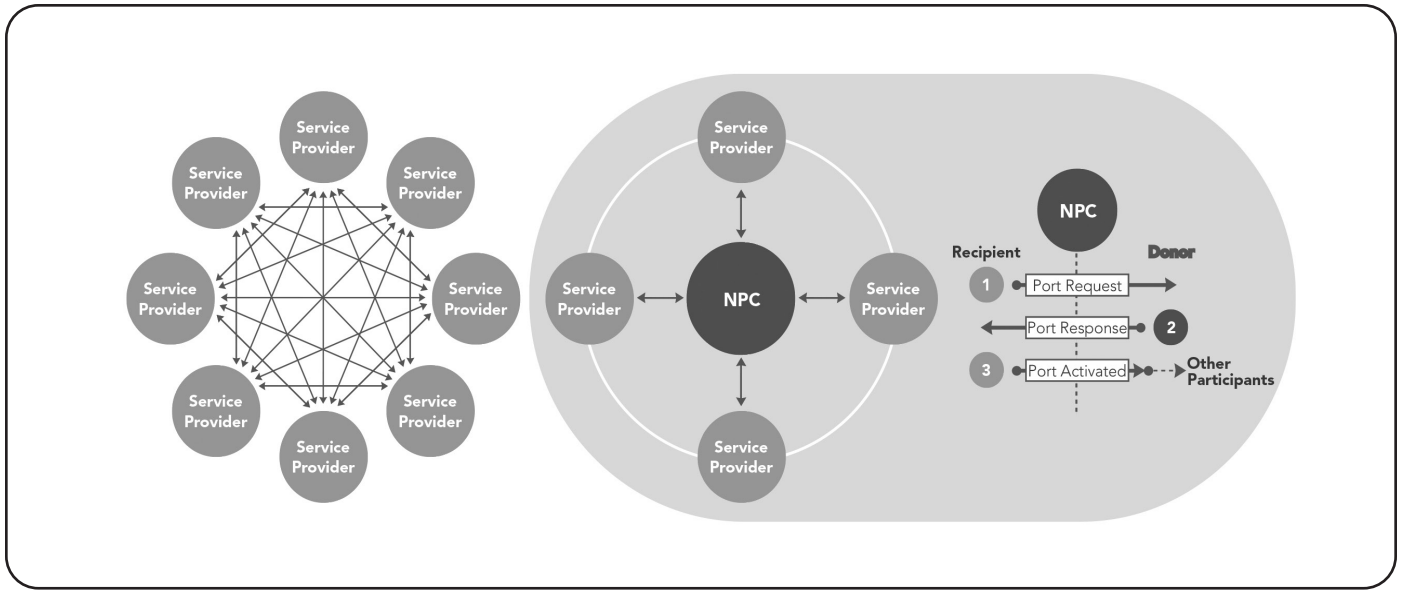
With the bilateral, or peer-to-peer approach, CSPs communicate directly with each other in either a standard or proprietary manner and they must all track the status and response time for each request. As each CSP's technical capabilities to communicate with each other differ, managing the transaction processing on time and transparently to minimize disputes becomes a growing challenge. For example, some may want requests to be sent via fax or e-mail while others prefer direct access. Furthermore, as the number of CSPs increases, the bilateral approach becomes a great burden to all CSPs involved in terms of time, cost and resources.

The centralized clearinghouse approach enables each CSP to communicate through one single interface to a centralized system regardless of the number of CSPs involved. The clearinghouse manages the transaction process between the donor and the recipient, enforces the response timers and distributes updated information to all CSPs. The simplicity of using a clearinghouse solution is the reason why many countries adopt this approach and why it has become the best practice for handling number portability administration.

Once a customer has ported a number from one CSP to another, all calls to that customer now should be routed to the new CSP. So, what should a CSP do when a call is initiated to the customer with a ported number?

While multiple solutions exist to address call routing issues, the two most common approaches are Indirect Routing and Direct Routing. Standards defined by ETSI and 3GPP describe the query mechanics for various technologies needed for a particular routing method.

With Indirect Routing, the originating CSP first routes calls to the donor CSP, which then forwards the call to the receiving CSP for delivery to the ported user. At first glance, this approach appears to be attractive, as only the donor provider needs to maintain the information on the ported user and there is no increase in the call setup time for non-ported numbers. It has several significant disadvantages, however, since all calls need to go through the donor CSP, which no longer serves the ported user:



- Routing to the ported user is indirect and possibly costly because additional transit charges, interconnect charges and/or extra conveyance costs may be generated even when the originating CSP is the same as the terminating recipient CSP.
- For the donor network, billing associated with ported and non-ported numbers cannot be differentiated easily.
- If the donor network uses a small, non-high-performance database, increased call setup time for ported numbers is inevitable.
- Due to the dependence on the donor network, the receiving network cannot serve the ported user reliably because it has no control over the quality of service on the donor network.
- If the donor CSP discontinues its operations or is experiencing a network failure, the ported subscribers cannot be reached even if they ported phone numbers years ago. This is a growing concern due to the increasing number of failures and the high cost of putting these subscribers back into service.

With Direct Routing, the originating CSP queries, for each call, the actual CSP serving the destination user, and routes the call directly. This approach is attractive as it eliminates the reliance on the donor CSP and the associated headaches that can come from routing inefficiency, costs, and management. Direct Routing does, however, require each CSP to either maintain a local database of all ported number information in the country or to query a hosted database in real time for routing information. While its advantages outweigh the negatives, the few countries that initially selected Indirect Routing are now switching to Direct Routing or are planning to do so.

One factor to consider with Direct Routing is getting the latest ported information to CSPs. The distribution of the portability data does not depend on the administration option selected that is, either bilateral or centralized. A central reference database for ported numbers, however, is absolutely necessary. The centralized clearinghouse approach, which combines centralized order processing and a centralized reference database for ported numbers, clearly wins with its transparency, scalability and manageability in helping to ensure timely transaction processing and information updates for a growing number of CSPs. Centralizing both port order processing and number portability reference data lowers the overall cost significantly and minimizes risks.

To summarize, the best practices for implementing a national number portability solution that addresses the speed and costs of porting are to:

- Use a centralized clearinghouse to manage the number portability request transactions and distribute porting data.
- Adopt a Direct Routing approach for call routing to give the receiving CSP with maximum control.

Definitions According to ETSI 123.066

	Signaling Relay Function (SRF)	Intelligent Network
Onward Routing	Indirect Routing (with reference to subscription network)	Terminating Query on Digit Analysis
Query on Release	N.A.	Query on HLR Release
All Call Query	Direct Routing	Originating Query on Digit Analysis

Figure 2: Query mechanics versus routing methods

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Preparing Your Operations and Network to Interact with a Clearinghouse

The success of number portability implementation depends on another factor, which is the seamless integration of the national solution with each CSP's network and operations environment. So, what does a CSP need to do internally to get ready for number portability?

Operational Readiness

The first step to operational readiness is to assess the ability of the existing operations environment to manage the interactions with the clearinghouse for porting requests and communicating ported data updates. Some considerations include:

- What changes are required in existing processes, particularly for service fulfillment such as ordering, provisioning, activation and billing, when a customer requests number porting?
- What new processes need to be in place?
- Which IT systems, both business and operations support systems, will be affected, and in what ways?
- How can successful port information be provisioned in network elements for call routing?

Not surprisingly, any manual effort is going to be costly, time consuming and error prone. An alternative solution is to use a direct interface between the existing service fulfillment system and the clearinghouse. This approach requires the service fulfillment system to manage tasks that are typically not part of service fulfillment, such as managing number porting transactions, coordinating process flows within the time specified for number portability, and updating routing data used by network elements for successful porting transactions.

The best approach is to deploy a commercially available "gateway" system, which is specifically designed to:

- Automate number portability provisioning processes between the service fulfillment systems and the clearinghouse.
- Taking the successful port data from the clearinghouse to the element management systems to update the routing data in network elements.

The gateway can translate, process, manage and monitor number portability message flows with the clearinghouse to ensure that ports are completed within the mandated time. It can also provide workflow management and administration functions to coordinate with internal IT systems and existing process flows.

Network Readiness

Operational readiness prepares CSPs to manage porting transactions and to route updates. Network readiness refers to the network's ability to deliver calls to ported numbers. While the clearinghouse holds the reference database of ported numbers and their CSPs, each CSP must determine, in real time, the route to deliver each call to the destination user.

To fulfill this responsibility, each CSP receives information on successfully ported numbers via broadcast from the clearinghouse and maintains this information locally in the network so that switching elements can query it on a real-time basis for call delivery. By maintaining a local copy of the number portability database, CSPs can minimize call processing delays. The question is: What is the best way to maintain this local database?

Supporting the local number portability database by upgrading existing network elements, such as all Signal Transfer Points (STPs), is costly and labor intensive because each network element has to maintain the entire database and the upgrades may not be reusable as the CSP migrates to newer technologies such as IP.

Here too, leveraging a commercially available system — in this case, an address resolution system can easily position a network to work with a clearinghouse, while providing a seamless migration path to IP. The address resolution system can be queried by different network elements with standard protocols (for example, SS7, SIP, ENUM DNS), and it is scalable to accommodate new STPs, Signal Control Points (SCPs) or other network elements that need to access number portability information. The system can either be managed as another network element in the CSP's network or it can be accessed as a hosted solution, along with the clearinghouse, for smaller CSPs to query on a real-time basis.

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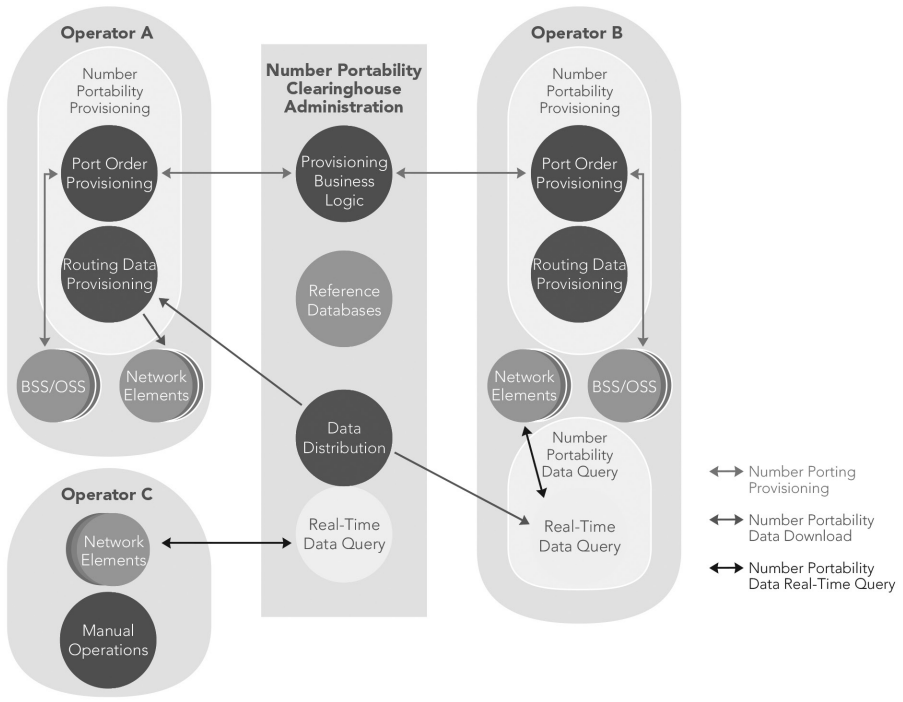

Figure 1: High level solution archetecture for centralized clearinghouse

Summary

Number portability has been an overwhelming success all over the world, delivering quantifiable benefits to its stakeholders and host countries.

Implementing number portability does involve a commitment from CSPs and national regulatory agencies. As most countries can attest, the stakeholder benefits far outweigh the costs and, despite regional and regulatory differences, best practices have emerged as dependable implementation success factors.

Central to these best practices is a centralized, shared number portability clearinghouse solution featuring the combination of centralizing port order request handling and a single national reference database for all ported numbers enabling direct routing. For CSPs, from an operational perspective, using a gateway function can streamline and automate interactions with the clearinghouse and its internal operations systems.

Similarly, with an address resolution system, either in the network or as a hosted solution, CSPs can easily query the routing information on a per-call basis without making significant investments to upgrade network elements to manage the vast amount of national portability data.

In the end, successful number portability implementation requires a holistic view to ensure seamless integration between the national solution and the CSP environment as well as adapting to emerging technologies and service needs. By reducing the time and costs associated with number portability transactions, such integration stimulates user adoption and achieves the benefits promised by number portability.

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