



Number portability in Sweden – Administrative process for number portability, including the administrative interface and the central reference database

Nummerportabilitet i Sverige – Administrativa rutiner för nummerportabilitet inkluderande administrativa gränssnitt och central referensdatabas

A Swedish Standard on functions and requirements for the reference database, administrative interface and processes supporting number portability and mobile number portability in Sweden.

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Preface

This standard is structured in the following way:

Introduction is a general introduction to the document.

Clause 1 describes the scope of the document.

Clause 2 lists reference documents.

Clause 3 lists definitions of terms used in the document.

Clause 4 explains abbreviations used in the document.

Clause 5 gives a functional overview of the different activities related to the complete porting process.

Clause 6 describes the corresponding process flows for the activities described in Clause 5.

Clause 7 describes the data model

Clause 8 describes the status models for the porting process.

Clause 9 lists the message types.

Clause 10 is a description of the message formats and parameters.

Clause 11 gives the values of the parameters.

Clause 12 lists the timers.

Clause 13 describes the common infrastructure to be used.

Clause 14 states the requirements imposed on the central reference database

Annex A is a specification of alternative procedures in the absence of a central reference database.

The network interface and associated methods for the support of number portability is described in the Swedish Standard: **SS 63 63 90**, *Number Portability in Sweden – Network solutions for Service Provider Portability for fixed public telecommunications services* [4].

The network interface and associated methods for the support of mobile number portability is described in the Swedish Standard: **SS 63 63 92**, *Number Portability in Sweden – Network solutions for Service Provider Portability for public digital mobile telephony services* [5].

This document is produced by Working Group 15, AG15 of Information Technology Standardization, ITS. Members of the group have been interested parties representing the telecommunications operators and industry.

Introduction

The introduction of number portability in Sweden may for some network solutions require a technical interface between the public telecommunications operators' administrative systems (e.g. OSS, administrative and operational databases).

This Swedish national standard describes the requirements imposed on the management and administration of information for the support of number portability in Sweden. It also outlines the common infrastructure to be used. The requirements are related to the central reference database, procedures for the transfer of information between public telecommunications operators and to and from the central reference database and other organisations concerned (e.g. public telecommunications operators (PTO) in the routing domain, the numbering plan administration (NPA), the emergency services enterprises (ESE), the law enforcement agencies (LEA)).

This standard assumes a need for a reference database. That will be the case if at least one PTO in the routing domain uses the All Call Query or Direct routing methods over the network interface, see references [4] and [5]. This standard is developed for the management of ported numbers (Geographic Numbers, Non-Geographic Numbers including numbers for public digital mobile telephony services) for fixed public telecommunications services and public digital mobile telephony services. The standard is a technical document. It is assumed that the public telecommunications operators sign separate commercial agreements .

The considerations concerning the choice of a centralised or distributed reference database are accounted for in Report ITS 16 [12]. A brief background is also given of the other parts of the specification and of the assumptions liable to have an impact on the operation of the Swedish Number Portability Administrative Centre (SNPAC).

Report ITS 13 analyses the possibility of using the central reference database solution and the basic administrative process, as described in SS 63 63 91:1999 edition 1, for mobile number portability in Sweden, see reference [11].

The following major changes have been incorporated in edition 2 of this standard:

- Adaptation of the standard to also handle service provider portability for public digital mobile telephony services;
- Possibility to keep multiple numbers/number ranges together for a porting
- Possibility to give several Order Reject Cause Codes for a porting;
- Improved the possibility to change the reference data;
- Improved the possibility to inquire about reference data;
- Directory Number is in international format;
- Possibility to separately identify Donor network, Donor service provider, Recipient network and Recipient service provider;
- Annex A – State Diagrams, has been removed.

1 Scope

This standard

- Describes the administrative process between PTOs. This process also applies between the donor service provider and recipient service provider in the case where no Reference Database Administrator or SNPAC are in operation;
- specifies requirements to be imposed on a central reference database for number portability;
- describes a model for transfer of information between PTOs and between PTOs and other organisations concerned;
- describes a model for transfer of information between PTOs and the reference database;
- describes procedures to be followed for the information exchange;

- describes interface protocols allowed towards the reference database.

In this standard, Number portability is used in the sense of Service provider portability for both fixed public telecommunications services and public digital mobile telephony services.

2 References

2.1 Normative References

ETSI TR 101 698	Number Portability Task Force (NPTF), Administrative support of service provider portability for geographic and non-geographic numbers, V7.1.1 [1]
SS-ISO 8601:1991	Data elements and interchange formats – Information interchange – Representation of dates and times [2]
ISO 8859	Information processing – 8-bit single-byte coded graphic character sets [3]
SS 63 63 90, ed. 1 (1999)	Number Portability in Sweden – Network Solutions for Service Provider Portability for fixed public telecommunications services [4]
SS 63 63 92, ed. 1 (2000)	Number Portability in Sweden – Network Solutions for Service Provider Portability for public digital mobile telephony services [5]

2.2 Informative References

Regeringens proposition 1997/1998:126	Nummerfrågor [6]
OVUM report on Number Portability in Sweden	Ovum's study (report and annexes) on the possible introduction of Number Portability (February 1997) [7]
Svensk nummerplan för telefoni (E.164)	NPTA decision Hk 94-4621 and additional decisions, see PTS webpage http://www.pts.se [8]
PTSFS 1999:3	Post- och telestyrelsens föreskrifter och allmänna råd om nummerportabilitet för fasta teletjänster [9]
PTSFS 1999:4	Föreskrifter om ändring i Post- och telestyrelsens föreskrifter (1994:15) om tilldelning och reservering av nummerkapacitet ur den svenska nummerplanen för telefoni (E.164) [10]
Report ITS 13	Number Portability in Sweden – Administrative process for number portability for public digital mobile telephony services, including the administrative interface and the central reference database – Technical Prestudy [11]
Report ITS 16	Number portability in Sweden – Administrative process for number portability for fixed public telecommunications services, including the administrative interface and central reference database – Technical Prestudy [12]

3 Definitions

For the purpose of this standard the following terms and definitions apply.

3.1 Entities

3.1.1 network operator

An entity operating a public telecommunications network in order to route calls.

NOTE: A network operator can also be a service provider.

3.1.2 numbering plan administration (NPA)

An entity responsible for the administration and assignment of numbers, or number blocks, within a national numbering plan.

NOTE: In Sweden it is the National Post & Telecom Agency.

3.1.3 number range holder

An entity responsible for the administration and allocation of numbers within a particular range.

3.1.4 public telecommunications operator (PTO)

A telecommunications operator in Sweden offering public telecommunications services.

NOTE: This term includes both Service Provider and Network Operator.

3.1.5 reference database administrator (RefDB Adm)

The functions and services surrounding the physical reference database which performs the activities for handling the porting of numbers.

3.1.6 service bureau

An entity offering specific services to interested parties.

NOTE: e.g. statistical reports to a PTO.

3.1.7 service provider

An entity offering public telecommunication services to subscribers and users involving the use of network resources.

NOTE: "Service Provider" is, in this standard, used in a generic sense, and may have a different status according to the service provided.

3.1.8 Swedish number portability administrative centre (SNPAC)

The entity operating the Central Reference Database and the support functions and services.

3.2 Numbers

3.2.1 international directory number (IDN)

The international public telecommunication number for geographic areas, composed of a variable number of decimal digits arranged in specific code fields. The international public telecommunication number code fields are the Country Code (CC) and the National (Significant) Number N(S)N.

NOTE 1: National and international prefixes are not part of the international public telecommunication number for geographic areas.

NOTE 2: The MSISDN consists of the country code and the national (significant) number for public digital mobile telephony services.

3.2.2 geographic number (GN)

An International Directory Number of geographical significance.

3.2.3 national (significant) number (N(S)N)

The portion of the number that follows the national (trunk) prefix. The National (Significant) Number consists of the National Destination Code (NDC) followed by the Subscriber Number (SN).

3.2.4 non-geographic number (NGN)

An International Directory Number which is not a Geographic Number.

NOTE: A Non-Geographic Number does not indicate the location of the subscriber. An example of Non-Geographic Numbers is Service Numbers or numbers for public digital mobile telephony services.

3.2.5 ported number

An International Directory Number subject to number portability.

3.3 Networks

3.3.1 donor network

The network from which a number is ported.

3.3.2 initial donor network

The initial network to which a number range was allocated by the NPA.

3.3.3 recipient network

The network where a number is located after being ported.

3.3.4 relinquishing network

The network from which the number is ported to the recipient network.

NOTE: If it is the first porting of the number, the relinquishing network is the donor network.

3.4 Other definitions

3.4.1 administrative database (AdmDB)

The Service Provider's database, not call-related or with any similar function, in charge of the storage and updating of the Operational Database of ported International Directory Numbers necessary for the Service Provider's correct routing of calls.

3.4.2 administrative interface

The interface between Service Providers' Administrative Databases, and between the Service Providers' Administrative Databases and the Reference Database, if implemented.

NOTE: See Figure 3.1.

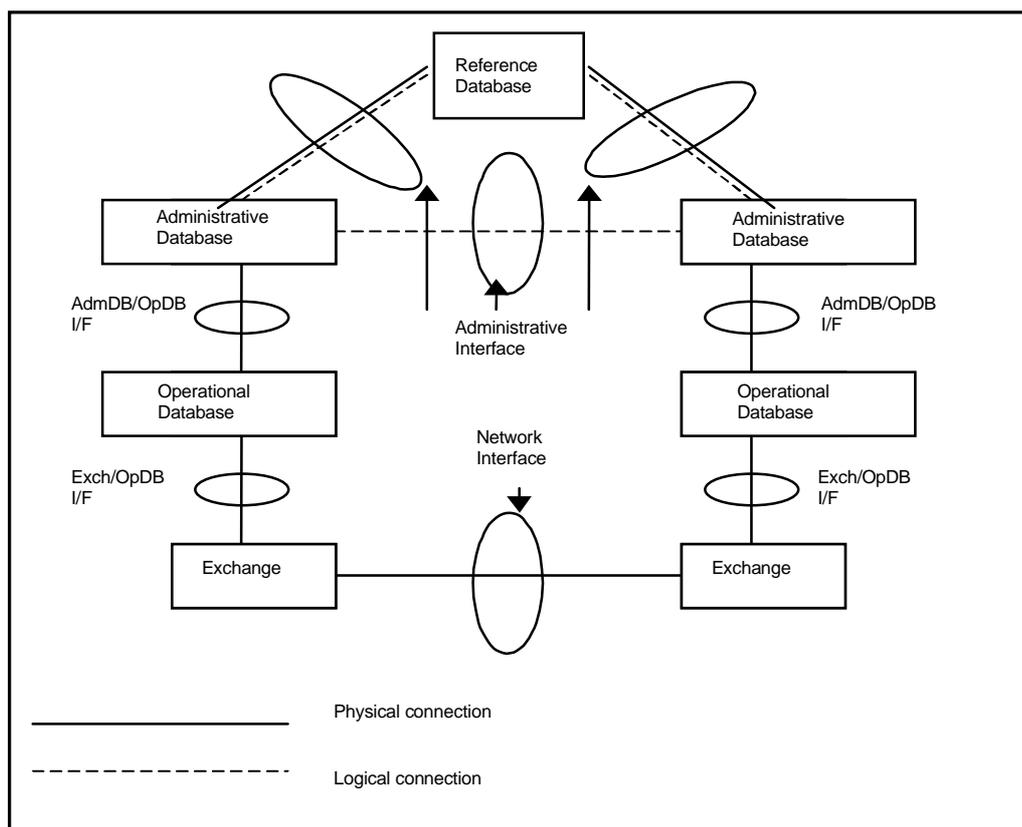


Figure 3.1

3.4.3 mobile number portability

Service provider portability for public digital mobile telephony services within a country.

3.4.4 national numbering plan

A national numbering plan provides a structure for the numbers used and the number space available in a country.

NOTE: See ref. [8] for the structure of the Swedish numbering plan for telephony.

3.4.5 network interface

The interface between public telecommunications operators supporting Number Portability.

NOTE: See Figure 3.1.

3.4.6 operational database (OpDB)

A database used in real-time by the network operator or service provider for the correct routing of calls to ported International Directory Numbers.

NOTE: The Operational Database could form part of an IN implementation, could be embedded within the exchange or could be some other type of on-line database.

3.4.7 point of interconnection (POI)

A connection point between public telecommunications networks.

3.4.8 portability domain

The part of the number ranges of the national numbering plan where number portability is supported for a certain type of public telecommunications services.

NOTE: A Portability Domain may represent e.g. specified fixed subscriber number ranges, freephone number ranges or number ranges for public digital mobile telephony services.

3.4.9 reference data

The data concerning ported International Directory Numbers, used for e.g. routing purposes.

3.4.10 reference database (RefDB)

The database in charge of the storage and updating of the Administrative Databases of the Service Providers' ported International Directory Numbers.

NOTE: The data stored is necessary for correct routing of calls by all PTOs in the Routing Domain using the All Call Query or Direct routing method. The Reference Database can be centralised (CRefDB) or distributed (DRefDB). If no network has implemented All Call Query or Direct routing, there is no need for a Reference Database.

3.4.11 routing domain

The part of the national public telecommunications network obliged to perform a portability check and to route the call accordingly.

NOTE: The Routing Domain includes the Portability Domain.

3.4.12 service provider portability, number portability

A function enabling the subscribers to cancel their subscriptions with a Service Provider and to contract another subscription with another Service Provider, without changing their International Directory Numbers and the nature of the service offered.

3.4.13 system operator

The person responsible for the operation of the Central Reference Database.

4 Abbreviations

AdmDB	Administrative Database
CC	Country Code
CRefDB	Centralised Reference Database
DDI	Direct Dialling In
DQSP	Directory Enquiry Service Provider
DRefDB	Distributed Reference Database
DSP	Directory Service Provider
ESE	Emergency Services Enterprise (In Sweden, it is SOS Alarm AB)
IP	Internet Protocol
ITS	Information Technology Standardisation
LEA	Law Enforcement Agency
MSISDN	Mobile Station International ISDN Number
NDC	National Destination Code
NPA	Numbering Plan Administration
NPTA	National Post & Telecom Agency, the national regulatory authority for the telecommunications sector
N(S)N	National (Significant) Number
OpDB	Operational Database
OSS	Operational Support System
PTO	Public Telecommunications Operator
RefDB	Reference Database
RefDB Adm	The functions and organisation operating the RefDB
SN	Subscriber Number
SNPAC	Swedish Number Portability Administrative Centre

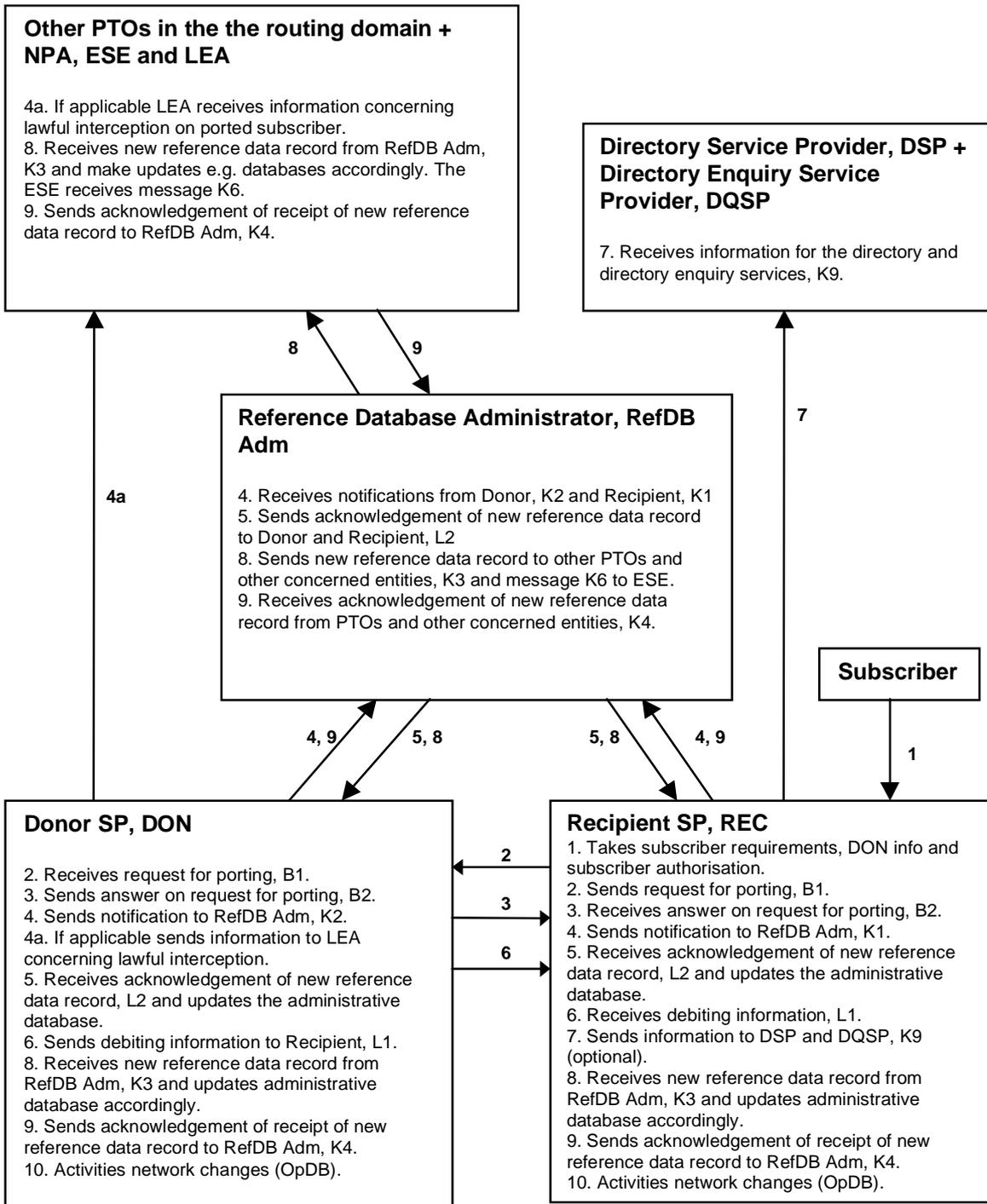
5 Functional overview of the porting process

This clause describes the different activities related to the porting of numbers at a high level. It also gives guidelines concerning the porting of numbers in the absence of a reference database and the SNPAC.

Each public telecommunications operator provides an arrangement for exchanging number porting orders, and each operator locally carries out the number administration functions.

The Reference Database Administrator (RefDB Adm) in the Swedish Number Portability Administrative Centre (SNPAC) is used to notify other public telecommunications operators in the Routing Domain of the necessity of updating their Administrative Databases (AdmDB) and Operational Databases (OpDB) for the control of the number porting provisioning and number porting notification processes.

The diagram below shows the high level sequence of operations which are performed for the initial porting of a subscriber from a Donor PTO to a Recipient PTO.



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Figure 5.1

5.1 Pre-ordering functionality

Describes activities of investigation as to whether a porting is possible. The possible results are listed in subclause 11.19.

The pre-ordering functionality is separate and need not be followed by ordering. It can also be repeated.

5.2 Ordering functionality

The subclause describes the dialogue between donor and recipient before the porting process up to the final agreement on porting and the updating of the reference database. Possible results:

- Agreement on date and time of porting
- Porting is not possible

5.3 Porting and notification functionality

The subclause describes the process from the receipt of messages K1 and K2 by the reference database administrator up to the notification of all PTOs and other entities concerned. Result:

- The reference database administrator is updated
- The reference database administrator has notified all PTOs and other entities concerned.
- The porting is performed at the Porting Time.

5.4 Order change functionality

The subclause describes how an agreed porting order is changed before the Porting Time. Result:

- The planned porting is changed
- The reference database is updated with the change
- All other operators and entities concerned which have been informed are notified accordingly by the reference database administrator.

NOTE: It is possible to change an already placed order up to **REFDATA2**¹ before the agreed porting time.

5.5 Order cancellation functionality

The subclause describes how an agreed porting order is cancelled before the Porting Time. Result:

- The planned porting is cancelled.
- The reference database is updated with the cancellation
- All other operators and entities concerned which have been informed are notified accordingly by the reference database administrator.

NOTE: It is possible to cancel an already placed order up to **REFDATA2** before the agreed porting time.

5.6 Data management functionality

The subclause describes how information concerning changes in the numbering plan or reference data is managed. It also describes how an Operator or other entity concerned makes a query for reference data. Possible results:

- The databases of the PTOs and other entities concerned have been updated concerning changes in reference data or in the numbering plan.
- The operator or other entity concerned has received the requested reference data from the reference database.

¹ See Subclause 12.2.

5.7 Cancellation functionality

The subclause describes the handling of a cancellation of a subscription to a ported number. Result:

- The subscription is cancelled
- The number remains in the recipient network² or the number range holder retrieves the number.
- All other operators and entities concerned are notified accordingly by the reference database administrator.

5.8 Disaster recovery and backup functionality

The subclause describes how an operator performs recovery of lost data in his own administrative database or how a new operator³ loads the administrative database. Possible results:

- The operator recovers the administrative database by retrieving information from the reference database administrator.
- The administrative database of the new operator is updated.

5.9 Number administration process

The subclause describes the procedures to be applied in the following two cases.

- Change of number plan
- Change of number range holder of number range.

5.10 Subsequent porting process

The subclause describes the procedure of a request for a subsequent porting.

5.11 Error handling functionality

The subclause describes the procedure of incorrect or missing information being received in a message. Possible results:

- The faulty message is corrected and resent and the procedure continues.
- The problem is not corrected and the procedure is aborted.

5.12 Procedures in the absence of a reference database administrator

In case there is no reference database administrator established but porting of International Directory Numbers is requested, procedures according to Annex A should apply.

- The interface protocol used for communication between donor and recipient is subject to a bilateral agreement. If no agreement can be reached, telefax or e-mail shall be used.
- The bilateral ordering and porting process as described in Annex A is followed.
- The Donor has the responsibility for informing NPA, ESE (the Recipient shall also inform ESE), LEA and all PTOs (that so demand) about the porting of International Directory Numbers in a message similar to K3 and K6.

As soon as the reference database administrator is established, NPA or the reference data keeper⁴ updates it with respect to all ported numbers. Other PTOs and entities concerned are informed by the reference database administrator, and the process described in this standard is followed.

² Depending on regulations published by NPTA under Swedish law.

³ New operator also includes present operators who start using the ACQ-method or the Direct Routing-method.

⁴ See Annex A.

6 Process flows

In this clause, the different processes related to the complete handling of the porting of International Directory Numbers are described. The main process is divided into the sub-activities defined in Clause 5.

In this clause, the messages are referred to by acronyms. For detailed descriptions, see Clauses 9, 10 and 11.

In case no centralised database is established, procedures according to Annex A shall apply.

6.1 Pre-ordering process

This process describes how a recipient operator can investigate the possibility of porting a number from a donor operator.

1. The recipient operator sends a porting inquiry, A1.
2. The donor operator checks it as if it were a request – but does not enter it as a request.
3. The donor operator sends back an answer, A2 – either positive or negative⁵.
4. The recipient operator makes a note of the answer.

See Figure 6.1

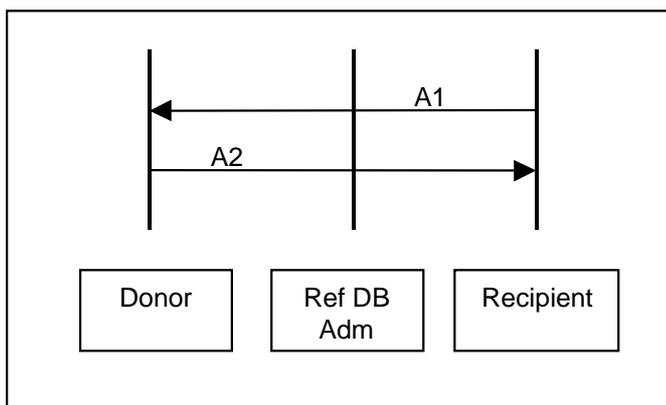


Figure 6.1

6.2 Ordering process

This process flow defines the ordering flow preceding a porting.

1. The recipient operator sends a porting order request, B1.
2. The donor operator checks whether porting is possible.
3. If porting is possible, the donor operator enters the porting order request in his system and sends a positive acknowledgement, B2, to the recipient operator and a donor notification, K2, to the reference database administrator. If lawful interception is activated on the subscriber, the donor operator also informs LEA.
4. If porting is not possible, a negative acknowledgement, B2, is sent and the process is terminated. (No negative K2 shall be sent. The recipient operator can restart the request for porting by sending a new B1)
5. The recipient operator enters the answer and, if positive, sends a recipient notification, K1, to the reference database administrator.
6. The reference database administrator matches K2 against K1.

⁵ For negative answers, see Subclause 11.19.

7. In case the reference database administrator has received either of the messages K1 or K2, and the other one has not been received within a given time (timer K1K2WAIT), the following procedure applies.
8. Any of the messages K1 or K2 has been received by the reference database administrator.
9. Timer K1K2WAIT expires.
10. The reference database administrator sends message L4, porting a notification request to the donor or recipient operator which failed to send K2 or K1.
11. If K1 or K2 is not received anyway, L4 is sent once more.
12. If K1 or K2 is still not received, message L3 is sent to the Recipient and Donor Operators and K1 and K2 are regarded as unmatched.

See Figure 6.2 for successful ordering and Figure 6.3 for unsuccessful ordering.

Comments:

- Type B messages need not be preceded by type A messages.
- Type A messages need not be followed by type B messages.
- The reference database administrator can receive K1 and K2 in any sequence.

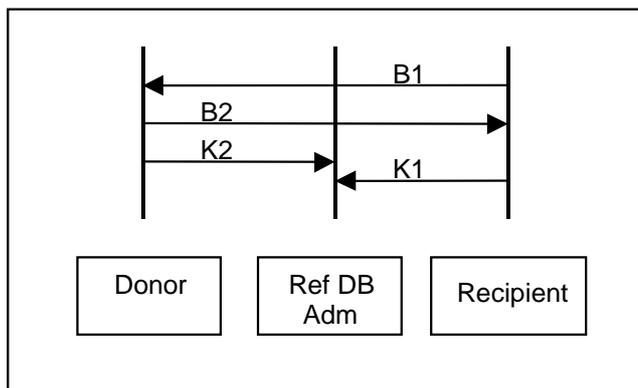


Figure 6.2

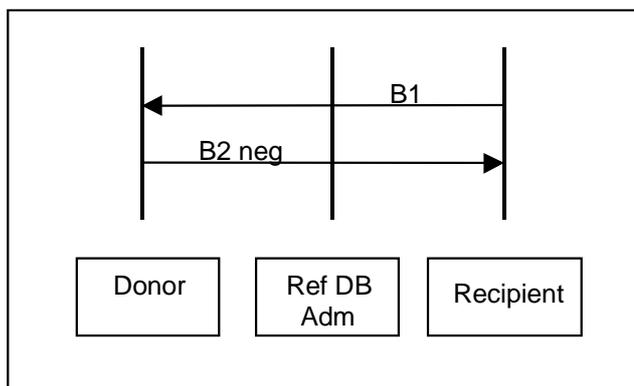


Figure 6.3

Coherent order request containing multiple numbers/number ranges

In case there is a need to keep multiple numbers/number ranges together, the Recipient Operator has the possibility of sending several B1 messages containing identical Porting IDs. The parameter Total Order Number in the B1 message for a coherent order is used to indicate how many B1 messages are included. For each B1 message sent, a Sequence Order Number is sent together with the Total Order Number.

The Donor Operator will validate each B1 message received and answer by a corresponding message B2. If the validation of any of the participating B1 messages results in a porting obstacle, a negative B2 is returned and the order is thus partially rejected.

In case of a partial reject, the Recipient Operator may issue a change message C1, or a cancel message C3, for the Porting Order Request rejected within PORT-TIME3. Otherwise the Recipient Operator will have to issue cancel messages C3 for every Porting Order Request that has been sent, and so the coherent order is terminated.

See figure 6.4 for an example of a successful coherent porting order.

Exceptions

If a B1 message is received containing a counter value greater than zero (0), and no preceding B1 message for same Porting ID has been received, it is regarded as an error, the error message Z1 will be sent and the coherent order process is terminated.

If two B1 messages in a coherent order request contains the same sequence value, it is regarded as an error, the error message Z1 will be sent and the coherent order process is terminated.

If a B1 message that is a part of a coherent order request has a counter value equal to zero (0) it is regarded as an error, the error message Z1 will be sent and the coherent order process is terminated.

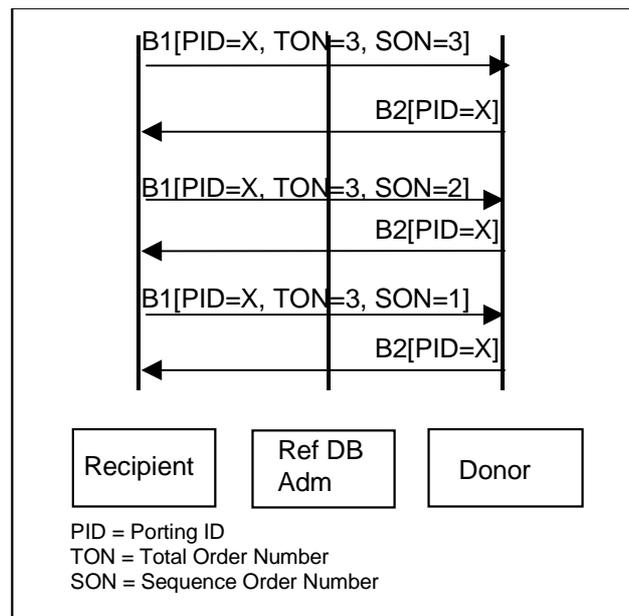


Figure 6.4

6.3 Porting and notification process

The conditions of porting are that:

- The recipient operator has sent a K1-message to the RefDB Administrator.
- The condition of sending a K1-message is that the recipient operator has **received** an acknowledgement (B2/C2) with the same data as in the K1 message.
- The donor operator has sent a K2-message to the RefDB Administrator.
- The condition of sending a K2-message is that the donor operator has **sent** an acknowledgement (B2/C2) with the same data as in the K2 message.

- There is an equal number of K1 or K2 messages (positive or negative) for the same porting. The latest versions must be matched.
- The data in K1 and K2 are matching.

The reference database administrator has received matching K1 and K2 messages. It updates the reference database and sends messages to all PTOs and other entities concerned. See Figure 6:5.

- Matching K1 and K2 messages have been received by the reference database administrator
- The Reference database administrator sends an L2 message to both donor and recipient confirming the creation of the reference database record.
- The donor operator optionally sends a message L1 to the recipient containing charging information concerning the porting.
- When the recipient operator has received the L2 message, it optionally sends message K9 to the Directory Service Provider, DSP and the Directory Enquiry Service Provider.

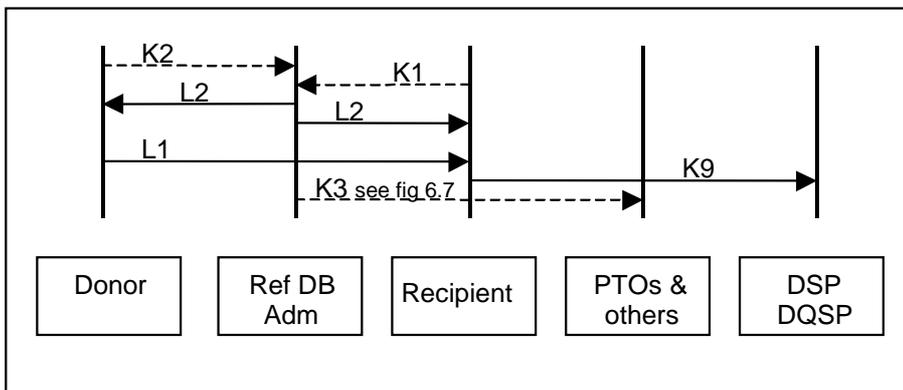


Figure 6.5

6.3.1 Error handling

If K1 and K2 are not identical, an L3 message should be sent to both operators. The recipient operator is responsible for correcting the data and sending a C1 to the donor operator, who responds with a C2 and a K2. The recipient operator sends a K1 when a C2 is received. See Figure 6.6.

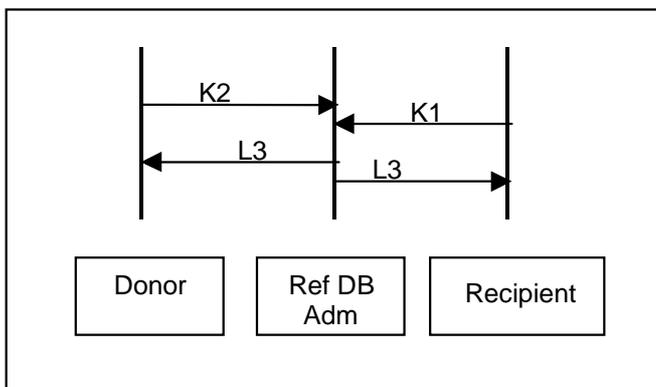


Figure 6.6

When an L3 message is sent, the two non-matching messages (K1 and K2) shall be discarded. Both operators must send new messages for new matching. The purpose of this procedure is to prevent matching of an old message against a new message.

6.3.2 Porting notification

All PTOs and other entities concerned are to be notified of the new reference data record. See Figure 6.7.

- The reference database administrator has received matching messages K1 and K2 as described above.
- The reference database administrator sends the message K3 to all PTOs and to NPA, and message K6 to ESE.
- The PTOs and other entities concerned acknowledge by sending message K4.

The message K3 is sent to all public telecommunications operators in the Routing Domain and to other entities concerned e.g. the Emergency Services Enterprises or the Numbering Plan Administration. See Clause 10.

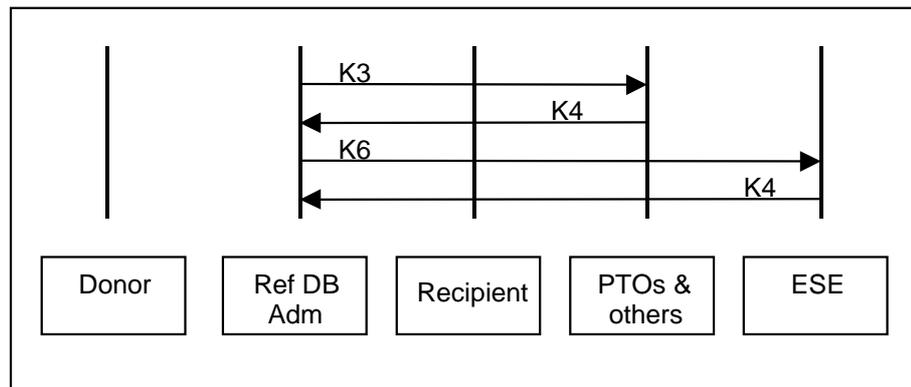


Figure 6.7

6.4 Order change process

If the recipient operator realises that some data in a request must be changed, e. g. the Porting Time, the order change process is used. This is allowed up to **REF-DATA2** before the Porting Time. If an order change procedure is initiated later than **REF-DATA2** before the porting, the order change request is not accepted.

The change procedure can only be initiated by the recipient operator after sending K1. If K1 has not been sent and a change has to be initiated, a K1 must first be sent. The reason for this is to avoid uneven numbers of K1 and K2 messages received by the reference database administrator. See Figure 6.8.

- The recipient operator sends a change request C1.
- If porting is possible also after the change, the donor operator enters the change in his system and sends an acknowledgement C2 and a new confirmation K2 to the reference database administrator. The recipient operator sends a positive K1 to the reference database.
- If porting is not possible, a negative C2 message is sent, and a negative K2 is sent to the reference database administrator.
- The recipient operator enters the answer and a new K1, positive or negative, must be submitted.
- The reference database administrator matches K2 against K1.

After the matching of K1 and K2, the appropriate procedures are applied for updating PTOs and other entities concerned.

In case porting is still possible:

- The reference database administrator informs all other PTOs and the NPA of the change by sending message K3. The ESE is informed by sending message K6.
- The messages K3 and K6 are acknowledged by sending message K4 to the reference database administrator.

In case porting is not possible:

- The reference database administrator sends the message Q4 to all PTOs and other entities concerned.
- The operators concerned acknowledge by sending message Q5.

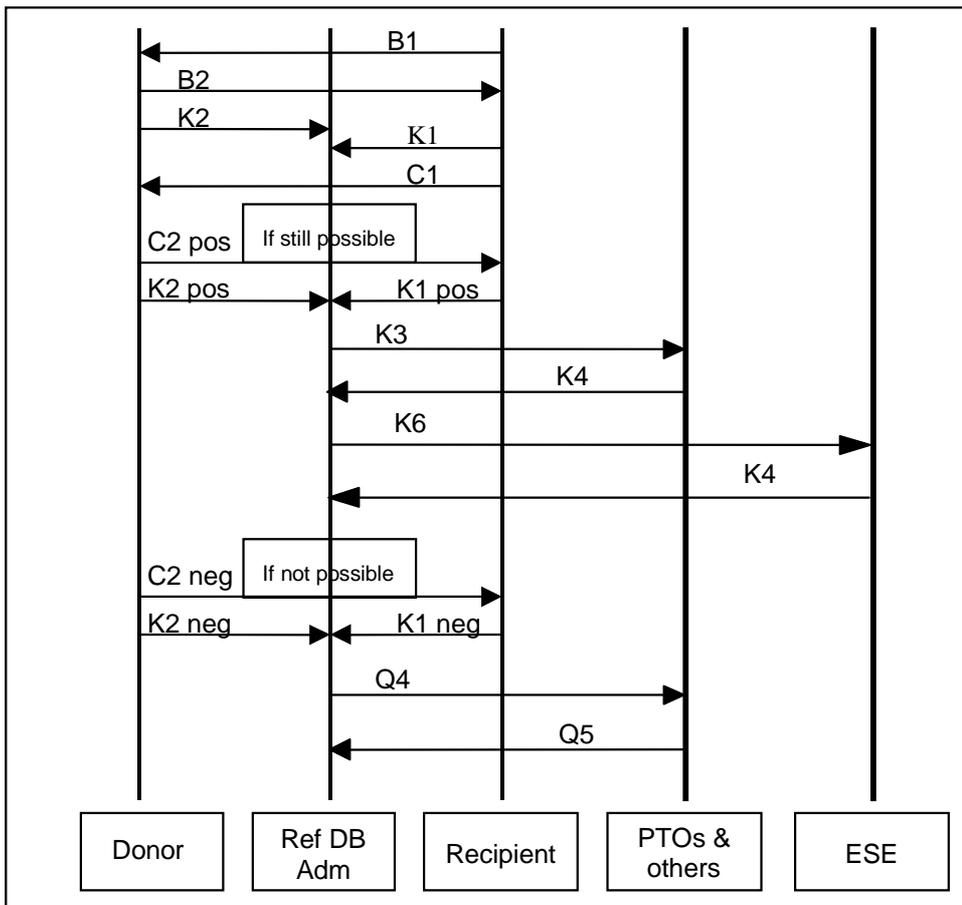


Figure 6.8

6.5 Order cancellation process

If the recipient operator realises that a planned porting must be inhibited, the order cancellation process is used. This is allowed up to **REFDATA2** before the Porting Time. See Figure 6.9. If an order cancellation procedure is initiated later than **REFDATA2** before the porting, the cancellation request is not accepted. Instead, the recipient operator must activate the procedure of cancellation of a subscription to a ported number.

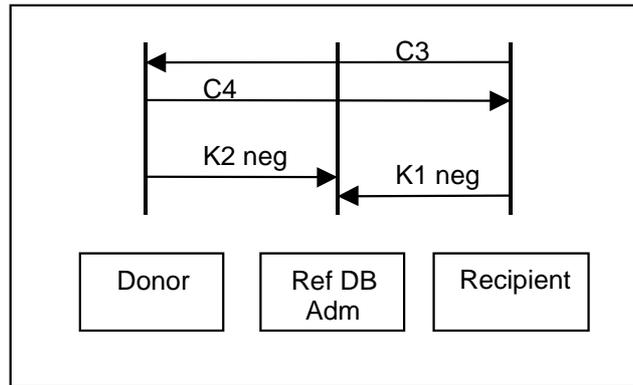


Figure 6.9

6.5.1 Cancellation initiated by recipient operator

1. The recipient operator sends a cancellation request C3.
2. The donor operator sends an acknowledgement C4, and a negative K2 is sent.
3. The recipient operator enters the answer and sends a negative K1.
4. The reference database administrator matches K2 against K1.

After the matching of K1 and K2, the appropriate procedure is applied for updating PTOs and other entities concerned.

Comment

In case of cancellation, negative K1 and K2 must be matched for security reasons.

6.5.2 Cancellation initiated by the donor operator

If the donor operator realises that the prerequisites of a planned porting are no longer valid and the porting must be inhibited, the order rejection process is used. This is allowed up to **REFDATA2** before the Porting Time. See Figure 6.10. If an order rejection procedure is initiated later than **REFDATA2** before the porting, it is not accepted. Instead, the donor operator must request the recipient operator to activate the procedure for cancellation of subscription to a ported number.

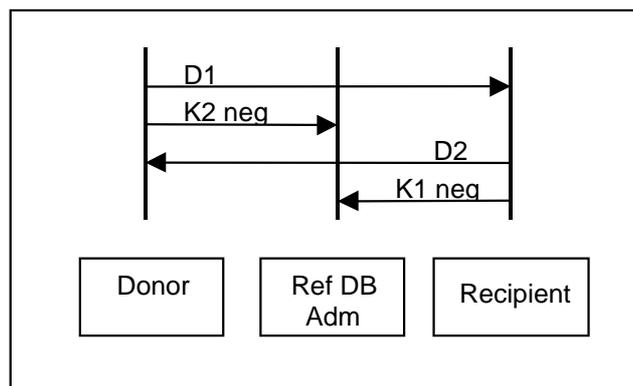


Figure 6.10

If the donor operator after the acknowledgement of a porting realises that it is not possible to carry out, a rejection message shall be sent to the recipient operator.

- The donor operator sends a porting order reject message D1 and a negative K2.
- The recipient operator receives the rejection message and sends an acknowledgement D2 and a negative K1.

After the matching of K1 and K2, the appropriate procedure is applied for updating PTOs and other entities concerned.

If after contact both operators have agreed on how to resolve the problem, the recipient operator sends a C1 message according to the change process above, with the new, correct data.

Comment

For security reasons, the reference database administrator must match K1 and K2.

6.6 Data management process

6.6.1 Removal of reference data record

When all operators concerned within the Routing Domain are to be informed of a removal of a reference data record, the following procedure shall apply. The situations below activate this process. See Figure 6.11.

- The reference database administrator has received message Q2 and sent Q3.
- The vacancy period of a ported number has come to an end.

Process

- The reference database administrator sends the message Q4 to all operators concerned, and to the NPA and ESE.
- The operators concerned acknowledge by sending message Q5.

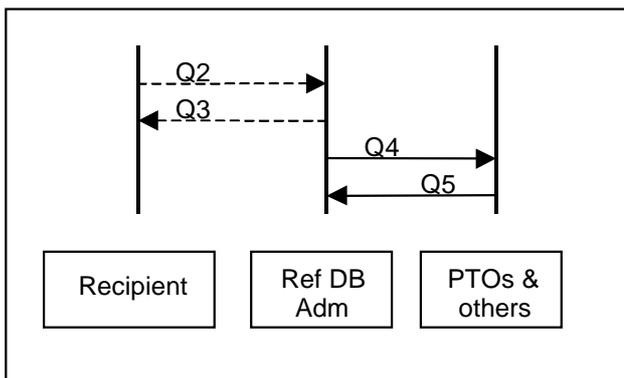


Figure 6.11

6.6.2 Query for reference data information

If an operator needs to check a reference data record, the following procedure applies. See Figure 6.12.

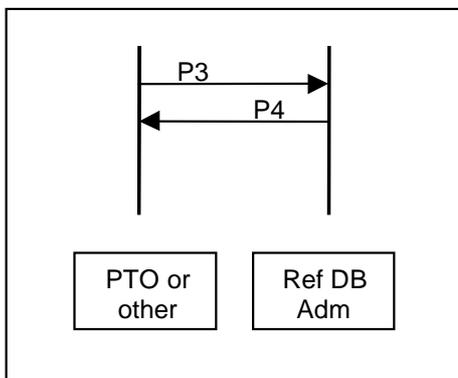


Figure 6.12

- The operator or other entity concerned sends an inquiry, P3, to the reference database administrator.
- The reference database administrator returns the requested reference data with the message P4.

6.7 Cancellation process

If a subscription with a ported number is cancelled, there are two possible cases⁶.

1. The ported number shall remain with the Recipient Operator.
2. The ported number shall be returned to the Initial Donor.

If a porting is cancelled due to transfer of a number range, the reference data record shall be removed.

6.7.1 Cancellation of subscription if number shall remain with recipient operator

The last recipient operator is responsible for the "not available"- information on the number during the vacancy period. See Figure 6.13.

- The recipient operator sends message Q1 to the reference database administrator and, as an option, a K9 message to the DSP/DQSP.

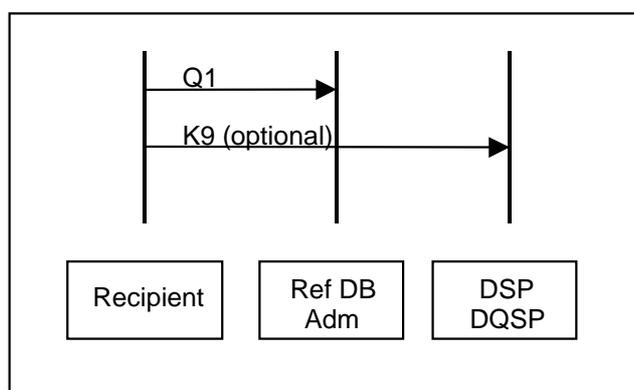


Figure 6.13

6.7.2 Cancellation of subscription if number shall be returned to Initial Donor

- The operator that was the last recipient operator, is responsible for returning the number to the initial donor operator. The last recipient operator sends a message Q1 indicating that the subscription has been cancelled and that the number will be returned to the initial donor operator after the vacancy period. The last recipient operator is also responsible for the "not available"- message on the number during the vacancy period (time VACANCY3) stated in Q1. During this time, the number is blocked for usage. The Q1-message should be sent before the subscription is cancelled, i.e. before the beginning of the vacancy period.
- The last recipient operator sends a Q2 message to the reference database administrator at the same time as the Q1 message stating the end date of the porting. As an option, a K9 message is sent to DSP/DQSP.
- The RefDB administrator enters an end time at the reference data record and sends an acknowledgement (Q3) to the last recipient operator.
- The reference database administrator sends the message Q4 to all PTOs concerned, and to the NPA and ESE.
- The PTOs concerned acknowledge by sending message Q5.
- A week after the vacancy period⁷ the record can be erased from the reference database.

See Figure 6.14.

⁶ Depending on regulations published by NPTA under Swedish law.

⁷ Recommended value.

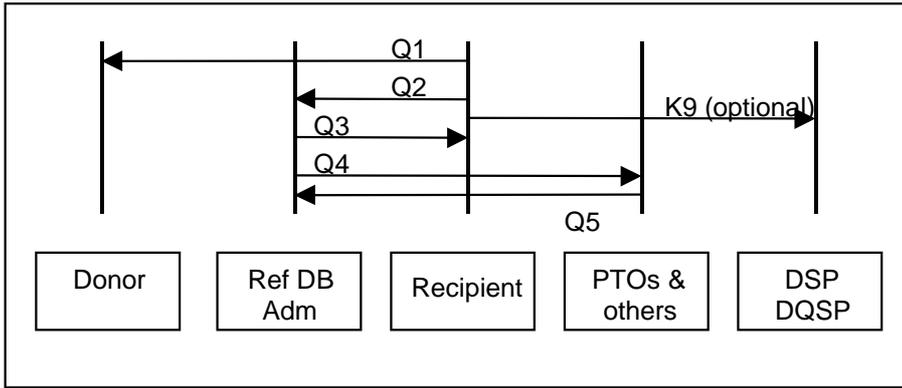


Figure 6.14

6.8 Disaster recovery and backup process

These process flows define the backup and recovery activities performed by the reference database administrator and the operators.

6.8.1 Backup of administrative database of a PTO or other entity concerned

If an operator or another entity concerned requests backup of the complete reference data from the central reference database, this is done by sending the message P10, request for backup of reference data. See Figure 6.15.

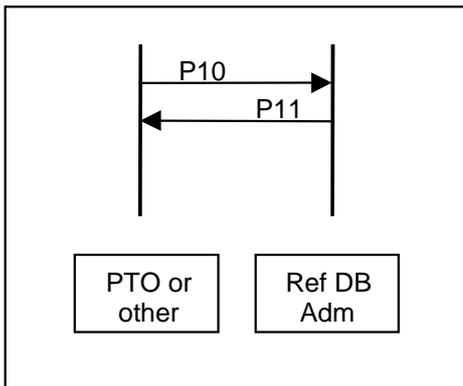


Figure 6.15

- Any operator or other entity concerned sends a request for backup in message P10.
- The reference database administrator sends the message P11 to the requesting PTO or other entity concerned as an acknowledgement of the request for backup.

The reference database administrator transfers a backup of the reference data. The transfer of the backup information is done using one of the alternatives described in Clause 13.

6.8.2 Load of administrative database

If a new operator, or an existing operator, starts using the ACQ-method or the Direct Routing-method and requests a download of the complete reference database to the administrative database, this could be done by sending the message P10, request for backup of reference data. See Figure 6.16.

- A new or an existing operator sends a request for database load in message P10.
- The RefDB Administrator sends the message P11 to the requesting operator as an acknowledgement of the request for load.

- The RefDB transfers a backup of the reference database to the requesting operator.

The transfer of the database information is done using one of the alternatives described in Clause 13.

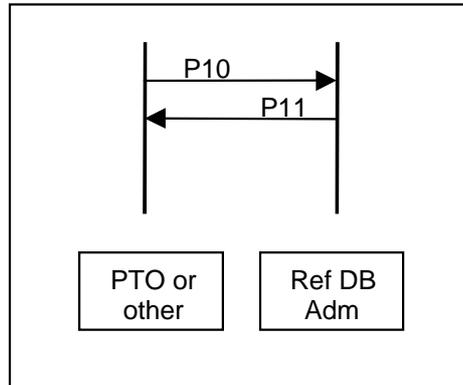


Figure 6.16

6.9 Number administration process

6.9.1 Numbering plan change

When the NPA changes a number range, all operators with ported numbers in that range should manage the change (including subscriber contacts). The operator responsible for the number range should only manage his own unported numbers. NPA must therefore inform all operators about the number change - not only the one responsible for the number range. The operator noticing that he has a ported number that will be changed should send a message to the reference database administrator. The message contains the old number with the last date of use, and the new number with the first date of use. The reference database administrator updates all other PTOs in the Routing Domain and other entities concerned. See Figure 6.17.

- The recipient operator of a number to be changed sends a P5 message to the reference database administrator.
- The reference database administrator acknowledges by sending message P2.
- The reference database administrator informs all other PTOs, NPA and LEA by sending message K3. The ESE is informed by sending message K6.
- The PTOs, other entities concerned and the ESE acknowledge by sending message K4.

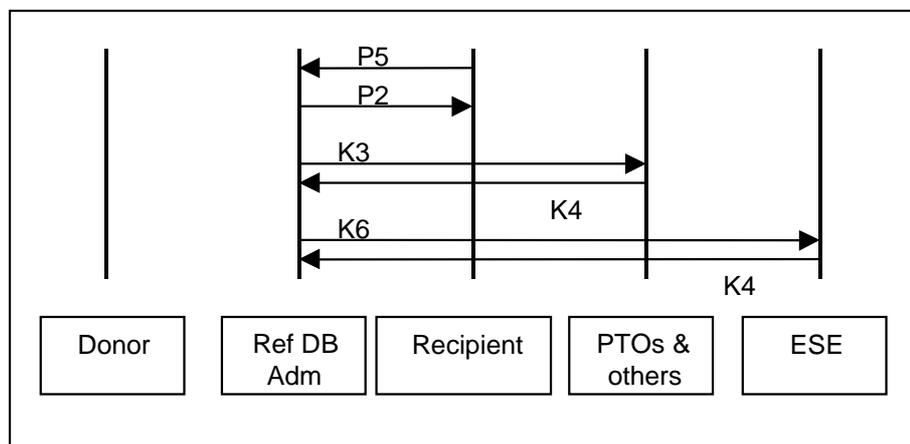


Figure 6.17

6.9.2 Transfer of number range

When the responsibility for a number range is transferred from one PTO to another, the following procedure should apply. See Figure 6.18.

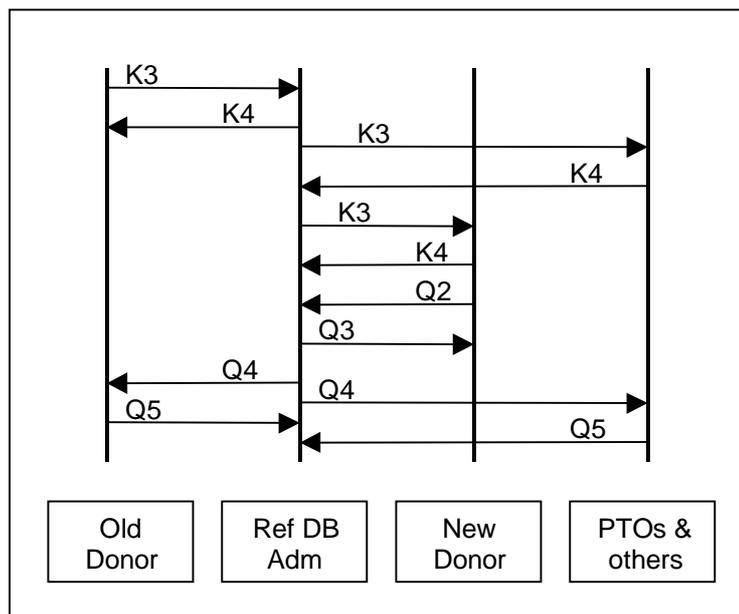


Figure 6.18

- All PTOs in the Routing Domain⁸ have been informed by the NPA concerning the range and date of the transfer.
- The old Initial Donor network (new recipient) informs the RefDB Adm of all numbers in the range, with subscriber contracts still belonging to the Initial Donor network, by sending message K3.
- The RefDB Adm acknowledges by sending message K4.
- The RefDB Adm informs all other PTOs (including the new range holder) and the NPA of these numbers as new reference data records by sending message K3.
- All other PTOs and the NPA acknowledge this by sending message K4.
- The numbers from the range, which were ported out to the new Initial Donor network, are not to be considered as ported numbers any longer. The new Initial Donor network initiates removal of reference data by sending message Q2 to the RefDB Adm.
- The reference database administrator acknowledges by sending message Q3 to the new Initial Donor Operator.
- The reference database administrator sends message Q4, reference data removal to the PTOs and the NPA.
- The PTOs and the NPA acknowledge by sending message Q5.

⁸ All PTOs (notified and licensed) in Sweden are informed by the NPA.

6.10 Subsequent portability

Subsequent Number Portability will occur when a subscriber who has previously changed PTO while keeping the same International Directory Number, decides to change to yet another PTO, again keeping the same International Directory Number. Hence the International Directory Number moves from the original PTO (Donor Operator), to a second PTO (Relinquishing Operator) and then on to a third PTO (Recipient Operator).

NOTE: This procedure avoids unnecessary “tromboneing” in case the Initial Donor SP applies Onward Routing or Indirect Routing.

6.10.1 Successful subsequent port order request

This process flow defines the order flow for a successful subsequent porting order.

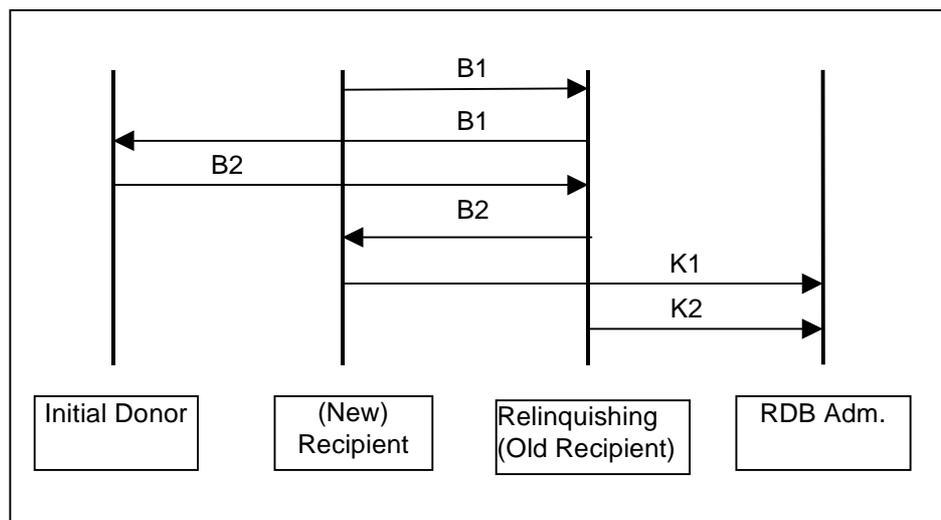


Figure 6.19

1. The (New) Recipient Operator sends a port order request, B1, to the Relinquishing Operator.
2. The Relinquishing Operator validates the request and finds out that the order concerns a subsequent porting. The Relinquishing Operator sends a subsequent port order request, B1, to the Initial Donor Operator.
3. The Initial Donor Operator validates the request (i.e. the porting time) and an acceptance of the request, B2, is sent to the Relinquishing Operator.
4. The Relinquishing Operator validates the answer and an acceptance of the port order request, B2, is sent to the (New) Recipient Operator.
5. The (New) Recipient Operator sends a notification of the port, K1, to the Reference Database Administrator.
6. The Relinquishing Operator also sends a notification of the port, K2, to the Reference Database Administrator. If lawful interception is activated for the number, the Relinquishing Operator also informs the LEA.
7. The Reference Database Administrator matches K2 against K1.
8. The process continues as described in Subclause 6.2 and onwards.

6.10.2 Unsuccessful subsequent port order request

These process flows defines the order flow for unsuccessful subsequent porting orders.

There are two cases when a subsequent port order request is regarded as unsuccessful.

- The Relinquishing Operator finds in the validation of the port order request a reason to reject it.
- The Initial Donor cannot agree to the desired porting time.

6.10.2.1 The relinquishing operator rejects the request.

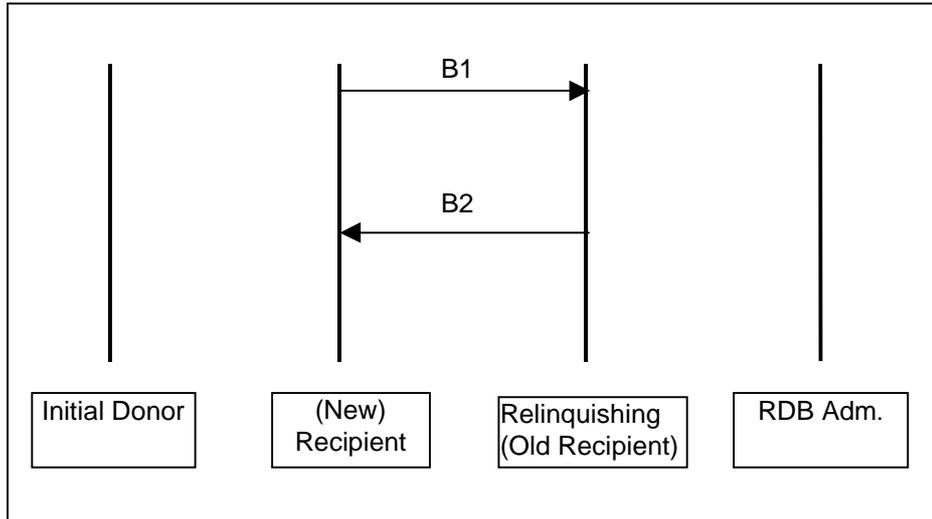


Figure 6.20

1. The (New) Recipient Operator sends a port order request, B1, to the Relinquishing Operator.
2. The Relinquishing Operator validates the request, finds out that the porting is not possible, and sends message B2, providing the reason for rejection, to the (New) Recipient Operator.
3. The process is terminated.

6.10.2.2 The initial donor operator rejects the request.

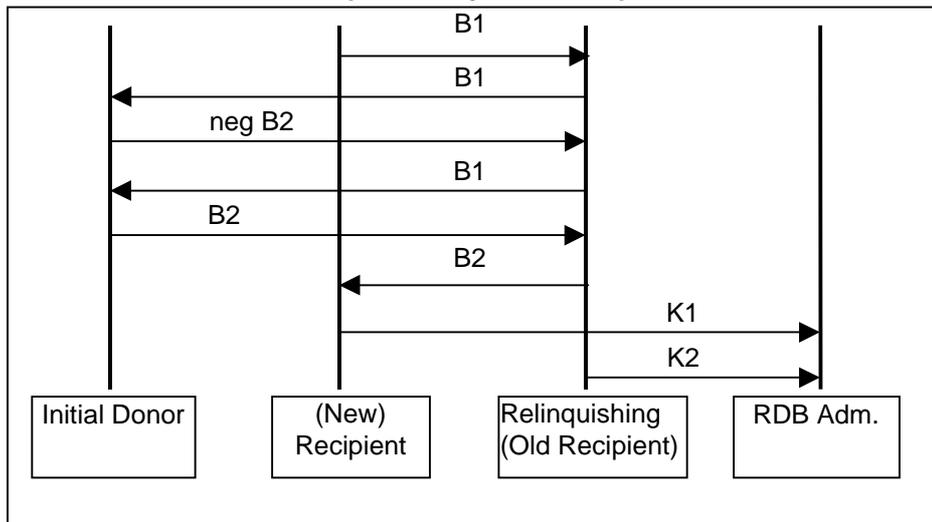


Figure 6.21

1. The (New) Recipient Operator sends a port order request, B1, to the Relinquishing Operator.
2. The Relinquishing Operator validates the request and finds that the order concerns a subsequent porting. The Relinquishing Operator sends a subsequent port order request, B1, to the Initial Donor Operator.

3. The Initial Donor Operator validates the request and finds that the desired porting time cannot be accepted. The request is rejected by sending message B2, suggesting a new porting time to the Relinquishing Operator.
4. The Relinquishing Operator validates the suggested new porting time and accepts the new porting time by sending a new subsequent port order request to The Initial Donor Operator.
5. The Initial Donor Operator validates the request (i.e. the porting time) and an acceptance of the request, B2, is sent to the Relinquishing Operator.
6. The Relinquishing Operator validates the answer and an acceptance of the port order request, B2, is sent to the (New) Recipient Operator.
7. The (New) Recipient Operator sends a notification of the port, K1, to the Reference Database Administrator.
8. The Relinquishing Operator also sends a notification of the port, K2, to the Reference Database Administrator. If lawful interception is activated for the number, the Relinquishing Operator also informs the LEA.
9. The Reference Database Administrator matches K2 against K1.
10. The process continues as described in Subclause 6.2 and onwards.

6.11 Error handling process

Message Z1

If message Z1, Missing or Incorrect Data is sent, the last message which carried the missing or incorrect data shall be resent. If the data is still missing or incorrect after a predefined number of re-sendings, the process is aborted and the problem must be escalated.

General procedure of reminders

If an answer or acknowledgement to a sent message is missing and the appropriate timer expires, the last message shall be resent with a higher Message version number. This is repeated the number of times as indicated in Clause 12. If the answer or acknowledgement still has not been received after the predefined number of re-sendings, the process is aborted and the problem must be escalated.

7 Data model

This clause describes the high level requirements associated with managing data for ported International Directory Numbers from an operations perspective.

7.1 SNPAC user data

SNPAC User Data contains information about authorised SNPAC users. The data items that need to be administered by the SNPAC data management functions are identified in Table 7.1.

Name of Attribute	Mandatory or Optional	Description
SNPAC User ID	M	This attribute represents the SNPAC User instance.
SNPAC User Name	M	A unique SNPAC User Name. A user will understand it as representing either <ul style="list-style-type: none"> • an entity that will be participating in a porting of an International Directory Number or • an entity that shall be notified of a new/changed porting.
Contact Type	M	The type of SNPAC User Contact organization. Valid values are: <ul style="list-style-type: none"> • PTO – Public Telecommunications Operator • NPA – Numbering Plan Administration • DSP – Directory Service Provider • DQSP – Directory Enquiry Service Provider • ESE – Emergency Service Enterprise
Contact Name	M	Name of SNPAC User contact organization.
Contact Address	M	Address of contact organization
Contact Postal	M	Postal code of contact organization.
Contact City	M	City of contact organization.
Contact Country	M	Country of contact organization.
Contact Phone	M	Phone number of contact organization.
Contact Mobile	O	Mobile phone number of contact organization.
Contact Fax	O	Fax/phone number of contact organization.
Contact Internet Address	O	Internet address of the web interface.
Contact Email	O	E-mail address of contact organization.

Table 7.1 – SNPAC user data model

7.2 Ordering data

Ordering Data consists of information used in connection with number portability ordering. Data items administered by the operator's data management functions are identified in Table 7.2.

Name of Attribute	Mandatory or Optional	Description
Ordering ID	M	This attribute represents the Ordering Data instance.
Porting ID	M	The porting identity consists of the concatenation of Operator Identity, Date and First International Directory Number. Operator Identity is defined in [4] and [5]. Date refers to the year and day of the Porting Order Request. International Directory Number according to sub-clause 11.7.
First International Directory Number	M	International Directory Number of a single line to be ported or first number in a number range when porting multilines.
Last International Directory Number	M	Last International Directory Number in a range when porting multilines. Equal to First International Directory Number when porting a single line.
Recipient Service Provider	M	Recipient Service Provider Identity.
Donor Network/ Operator Identity	M	Identity of the PTO from which the International Directory Number is ported. For a public telecommunications operator with more than one logical network, there shall be one identity for each network. (E.g. one for PSTN/ISDN and one for PLMN (GSM).)
Recipient Network/ Operator Identity	M	Identity of the PTO from which the International Directory Number is ported. For a public telecommunications operator with more than one logical network, there shall be one identity for each network. (E.g. one for PSTN/ISDN and one for PLMN (GSM).)
Subscriber Name	M	Name of the actual or prospective subscriber.

Name of Attribute	Mandatory or Optional	Description
Personal Identity Number/Corporate Identity Number	M	A subscriber's identity number or an organization's registration number.
Subscriber Address	M	Subscriber's address. ⁹
Subscriber Postal Code	M	Subscriber's postal code.
Subscriber City	M	Subscriber's city.
Contact Person	O	Name of person in contact organization.
Contact Department	O	Responsible department of contact organization.
Contact Phone	O	Phone number of contact organization.
Contact Mobile	O	Mobile telephone number of contact organization
Contact Fax	O	Fax number of contact organization.
Contact Email	O	E-mail address of contact organization.
Contact Requested	O	Used to indicate whether a personal contact is necessary in connection with a complex port order.
Porting Order Result	M	OK or Not OK.
Order Priority	M	Possible values are Normal or Express.
Porting Time	M	Cut-over time for effective rerouting of calls to the number to be ported.
Donor Operator Cut-off Date	M	The due date planned by the donor operator for cut-off of traffic.
Retain Directory Information	M	Used to indicate whether the subscriber wants to retain the information held by the directory service provider and directory enquiry service provider. Possible values are yes or no.
Retain Subscription	M	Used to indicate whether the subscriber wants to retain the subscription by the donor operator. Possible values: Yes – The subscriber ought to be contacted No – Cancel the subscription

⁹ The subscriber address might contain both the address of the network termination point and a billing address.

Name of Attribute	Mandatory or Optional	Description
Order Reject Cause Code	M	Used to specify reason for rejecting a port order by the donor operator. Default value = "yes". The valid values are listed in subclause 11.19.
Order Reject Cause Code Explanation	M	Explanation of some of the reasons for rejecting an order request. Mandatory if values 00, 01, 06, 07, 08, 10 or 99 above are indicated.
Status	M	States of ordering. Valid states for the Recipient Operator are: <ul style="list-style-type: none"> • Accepted Order • Cancel Order • Change Order • Order Sent Valid states for the Donor Operator are: <ul style="list-style-type: none"> • Accepted Order • Cancel Order • Received Order • Query Order

Table 7.2 – Ordering data model**7.3 Porting data**

Porting Data consists of information used in connection with the actual porting of a number. The data items that need to be administered by the SNPAC data management functions are identified in Table 7.3.

Name of Attribute	Mandatory or Optional	Description
Porting ID	M	The porting identity consists of the concatenation of Operator Identity, Date and First International Directory Number. Operator Identity is defined in [4] and [5]. Date refers to the year and day of the Porting Order Request. International Directory Number according to sub-clause 11.7.
First International Directory Number	M	International Directory Number of a single line to be ported or first number in a number range when porting multilines.
Last International Directory Number	M	Last International Directory Number in a range when porting multilines. Equal to First International Directory Number when porting a single line.

Name of Attribute	Mandatory or Optional	Description
Donor Service Provider	M	Donor Service Provider Identity.
Donor Network/ Operator Identity	M	Identity of the PTO from which the International Directory Number is ported. For a public telecommunications operator with more than one logical network, there shall be one identity for each network. (E.g. one for PSTN/ISDN and one for PLMN (GSM).)
Recipient Service Provider	M	Recipient Service Provider Identity.
Recipient Network/ Operator Identity	M	Identity of the PTO from which the International Directory Number is ported. For a public telecommunications operator with more than one logical network, there shall be one identity for each network. (E.g. one for PSTN/ISDN and one for PLMN (GSM).)
Cause for Porting Rejection	M	Used to indicate the reason for rejection of a porting request, assigned when matching information of a porting received from Donor and Recipient Operators.
Porting Order Result	M	Assigned by the Donor and Recipient Operators in connection with ordering, possible values are OK or Not OK.
Reference Data ID	M	This attribute refers to a Reference Data instance
State	M	States of the Number porting. Valid states are: <ul style="list-style-type: none"> • Active • Active Pending • Broadcast • Match • Pending • Unmatched

Table 7.3 – Porting data model**7.4 Reference data**

The reference data represents the attributes associated with network routing data and charging data with respect to number portability. This information is used by the respective network exchanges to route calls to ported numbers at their new network termination points and to enable accurate charging of those calls. One record for each active ported number is stored in the central reference database.

The data items that need to be administered by the SNPAC data management functions are identified in Table 7.4.

Name of Attribute	Mandatory or Optional	Description
Reference ID	M	This attribute represents the Reference Data instance.
First International Directory Number	M	International Directory Number of a single line to be ported or first number in a number range when porting multilines.
Last International Directory Number	M	Last International Directory Number in a range when porting multilines. Equal to First International Directory Number when porting a single line.
Donor Service Provider	M	Donor Service Provider Identity
Donor Network/ Operator Identity	M	Identity of the PTO from which the International Directory Number is ported. For a public telecommunications operator with more than one logical network, there shall be one identity for each network. (E.g. one for PSTN/ISDN and one for PLMN (GSM).)
Recipient Service Provider	M	Recipient Service Provider Identity
Recipient Network/ Operator Identity	M	Identity of the PTO to which the International Directory Number is ported. For a public telecommunications operator with more than one logical network, there shall be one identity for each network. (E.g. one for PSTN/ISDN and one for PLMN (GSM).)
Date and time of porting	M	Year, Month, Date, Hour, Minute, Second of switchover.
Geographical Information	O	The area to which the International Directory Number is assigned.
Service Information	O	Description of e.g. a service category.
Additional Charging Information	O	Charging information for the International Directory Number defining other charging criteria than geographical data, e.g. subscriber class.
Information for a special Point of Interconnection	O	The information is the Network Indicator (NI=3) + Signalling Point Code of a Special Point of Interconnection of the Recipient Exchange, e.g. the exchange to which the International Directory Number is connected.
Price per minute – Subscriber	O	For future use

Name of Attribute	Mandatory or Optional	Description
Price per call – Subscriber	O	For future use
Price Code	O	For future use
Port Termination Date	O	Date & Time at which a port is no longer effective.
Number Vacancy Termination Date	O	Date of termination of vacancy period for a cancelled subscription to a ported number

Table 7.4 – Reference data model

8 Status models

8.1 Order status interaction

8.1.1 From Recipient operator's view

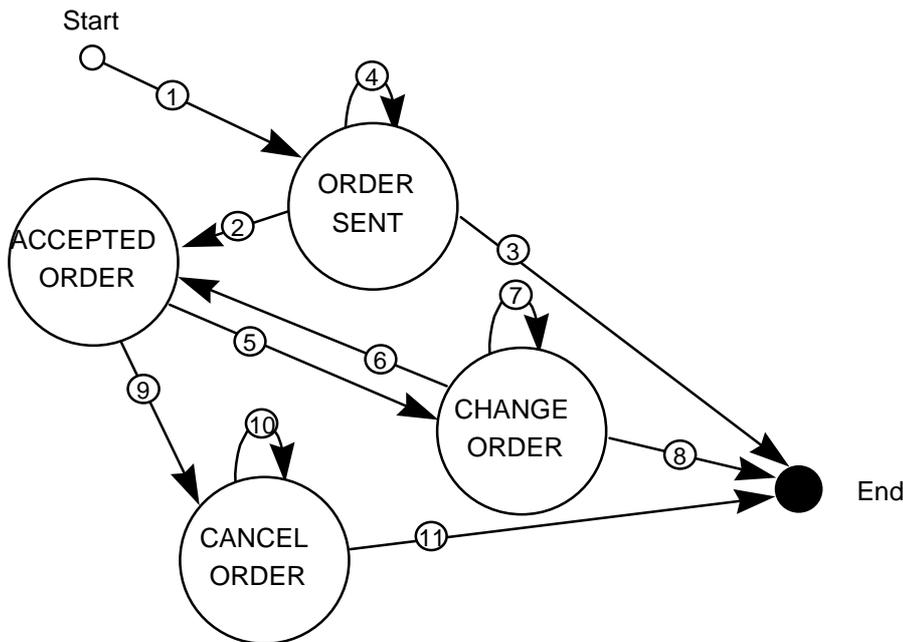


Figure 8.1 – Order status, interaction diagram, recipient operator

Order Status, Recipient Operator, Interaction Descriptions		
#	Interaction	Description
1	Porting Order	Creation of an order by issuing a porting order request to the Donor Operator.
2	Porting Order Accepted	A positive response from the Donor Operator changes the status to Accepted Order.
3	Porting Order Rejected	A negative response to a porting order request terminates the order.

Order Status, Recipient Operator, Interaction Descriptions		
#	Interaction	Description
4	Renewed Porting Order	A renewed porting order request issued due to: <ol style="list-style-type: none"> 1. Time Guard: no response to a previously sent request is received. 2. A message from the Donor Operator that data of a previously sent porting order request was missing or incorrect.
5	Change Porting Order	An accepted order may be changed due to: <ol style="list-style-type: none"> 1. The Recipient Operator wants to make some changes to a previously issued and accepted porting order request. 2. The recipient Operator has to make changes to a previously issued and accepted porting order request due to rejection from the Donor Operator.
6	Porting Order Changed	Approval by the Donor Operator of an order change request changes its status into Accepted Order.
7	Renewed Porting Order Change	A renewed porting order change request issued due to: <ol style="list-style-type: none"> 1. Time Guard: no response to a previously sent change request is received. 2. A message from the Donor Operator that data of a previously sent porting order change request was missing or incorrect.
8	Porting Order Change Rejected	A negative response to porting order change request terminates the order.
9	Porting Order Cancellation	For some reason, the Recipient Operator decides to cancel a previously accepted porting order request.
10	Renewed Porting Cancellation	A renewed porting order cancellation request issued due to: <ol style="list-style-type: none"> 1. Time Guard: no response to a previously sent request is received. 2. A message from the Donor Operator that data of a previously sent porting order cancellation request was missing or incorrect.
11	Porting Order Cancelled	An acknowledgement of a cancellation request from the Donor Operator terminates the order.

Table 8.1 – Order status, interaction descriptions, recipient operator

For the Recipient Operator, order instances may at any given time assume one of the following statuses:

- Accepted Order – The order is accepted by the Donor Operator.
- Cancel Order – The order has been cancelled, awaiting acknowledgement from the Donor Operator.
- Change Order – The order has been changed/amended, awaiting response from the Donor Operator.
- Order Sent – An order request has been sent to the Donor Operator, awaiting response.

8.1.2 From Donor operator's view

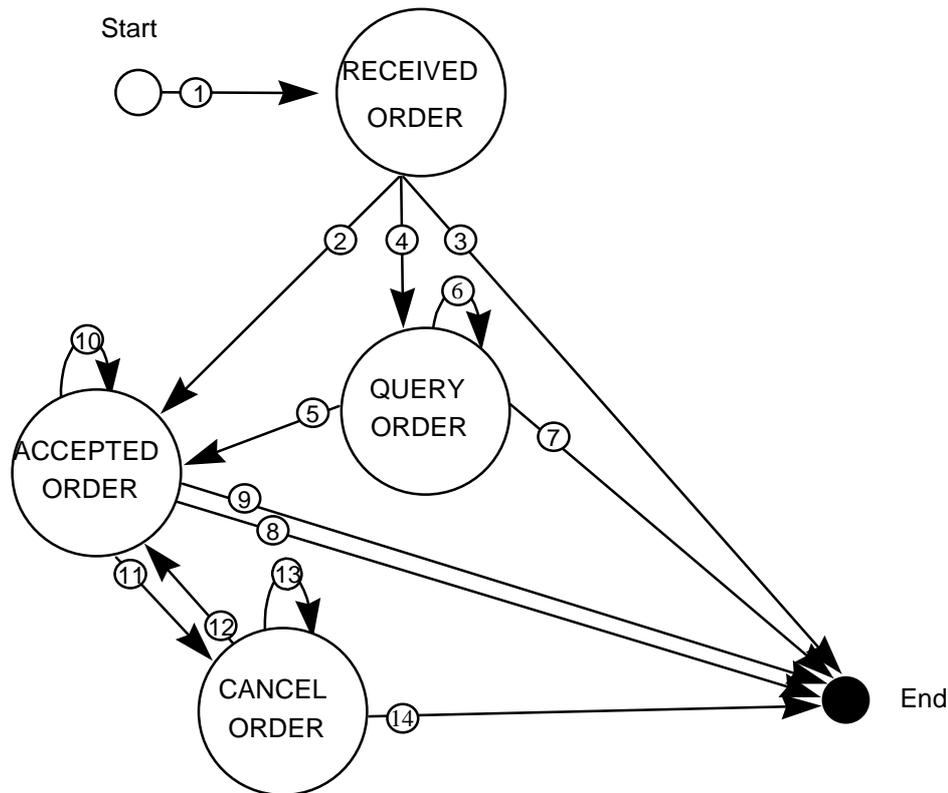


Figure 8.2 – Order status, interaction diagram, donor operator

Order Status, Donor Operator, Interaction Descriptions		
#	Interaction	Description
1	Porting Order Received	Porting order request from the Recipient Operator. Sets status of Received Order.
2	Porting Order Answer	An order has been checked and accepted, its status is changed into Accepted Order.
3	Porting Order Rejected	An order has been checked but not accepted since porting is not possible. The order is terminated.
4	Incorrect or Missing Data	An order has been checked but not accepted due to missing or incorrect data of the order request. Its status is changed into Query Order.
5	Queried Order Accepted	A queried order has been checked and accepted, its status is changed into Accepted Order.
6	Incorrect or Missing Data	A queried order has been checked but not accepted due to missing or incorrect data in the order request. Status is unchanged.
7	Queried Order Rejected	A queried order has been checked but not accepted since porting is not possible. The order is terminated.
8	Porting Order Change Rejected	A changed/amended order has been checked but not accepted since porting is not possible. The order is terminated.
9	Order Cancelled	A previously accepted order has been cancelled by the Recipient Operator. The order is terminated.

Order Status, Donor Operator, Interaction Descriptions		
#	Interaction	Description
10	Porting Order Change Accepted	A changed/amended order has been checked and accepted, status unchanged.
11	Reject Order	A reason for rejecting a porting order request has been discovered after previous acceptance of an order request. Its status is changed into Cancel Order. The Recipient Operator is obliged to send a change order request or a cancel order request.
12	Porting Order Change Accepted	A changed/amended order, resulting from a cancellation by the Donor Operator, has been checked and accepted, its status is changed into Accepted Order.
13	Incorrect or Missing Data	Data is missing in a porting order change request, due to cancellation by the Donor Operator, or the message is incorrect.
14	Porting Order Change Accepted	A changed/amended order, resulting from a cancellation by the Donor Operator, has been checked but not accepted since porting is not possible. The order is terminated.

Table 8.2 – Ordering status, interaction descriptions, donor operator

For the Donor Operator, order instances may at any given time assume one of the following statuses:

- Accepted Order – A porting order request has been accepted.
- Cancel Order – A previously accepted porting order has been cancelled, awaiting change/amend order from the Recipient Operator.
- Received Order – A porting order request has been received and is currently being checked.
- Query Order – A porting order request has been found to be incorrect, awaiting a renewed porting order request.

8.2 Porting status interaction

SNPAC statuses are described below.

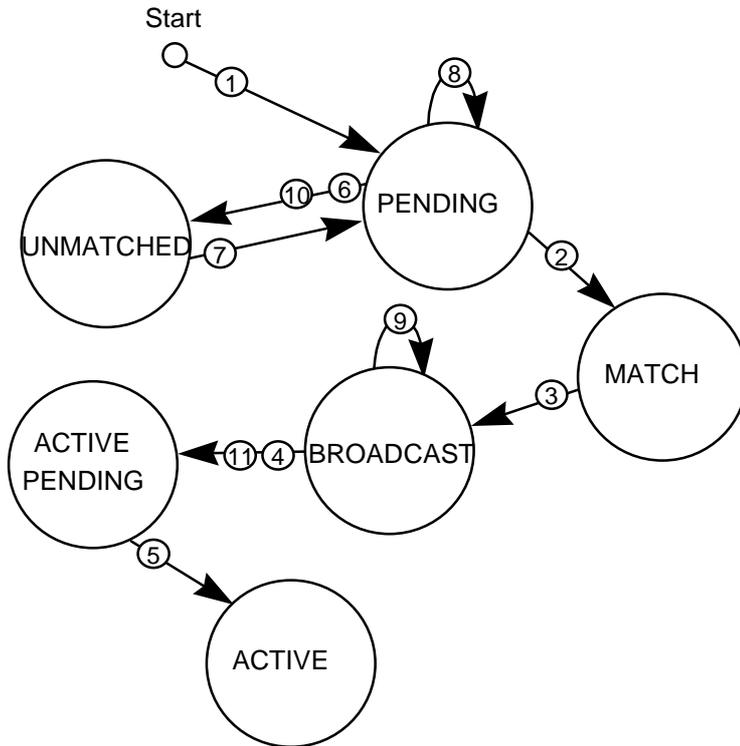


Figure 8.3 – Porting status interaction diagram

Porting Status, Interaction Descriptions		
#	Interaction	Description
1	Creation 1 st Porting Notification	Creation of a Porting instance by a Porting Notification from either the recipient or donor operator, its status set to Pending.
2	2 nd Porting Notification	A concurrent Porting Notification from another operator, and provided data do match previous notification, status changed to Match.
3	Time Release	Time Guard: No later than REFDATA2 before cut-over of traffic in the network, a notification of new reference data is broadcast to all operators in the routing domain and other entities concerned. Status changed, set to Broadcast.
4	Reference Data Notification Acknowledgement	When all operators have acknowledged a notification of new reference data, the Porting is set to Active Pending.
5	Time Release	Time Guard: No later than REFDATA2 before cut-over of traffic in the network, the porting is regarded active. Status is changed to Active.
6	2 nd Porting Notification	A concurrent Porting Notification from either the Recipient Operator or Donor Operator does not match. Status changed to Unmatched.

Porting Status, Interaction Descriptions		
#	Interaction	Description
7	1 st Porting Notification	A renewed Porting Notification from either the recipient or donor operator due to previous unmatched versions. Status is changed to Pending.
8	Time Release	Time Guard: no concurrent Porting Notification received. Request for Porting Notification issued for either the recipient or donor operator depending on which operator failed. Status is changed to Pending.
9	Reference Data Notification repeated	When a Reference Data Notification has not been acknowledged by all entities concerned, the message is repeated to those entities. No change of status.
10	Counter Exceeded	When a Porting Notification Request has been repeated twice due to either Recipient or Donor Operator's failure to respond, a Porting Notification Reject is sent and status is changed to Unmatched.
11	Counter Exceeded	When a Reference Data Notification has been repeated twice due to Operator's failure to respond, an escalation is performed and status is changed to Active Pending.

Table 8.3 – Porting status, interaction descriptions

SNPAC Porting instances may at any given time assume one of the following statuses:

- Active – Porting active in the network.
- Active Pending – Porting awaiting effective cut-over time.
- Broadcast – Porting being sent to all operators in the routing domain and other entities concerned.
- Match – Porting agreed to by the Recipient and Donor Operator. Information provided by the operators has been validated and found to match.
- Pending – Porting awaiting a concurrent approval notification from either the Recipient or Donor Operator.
- Unmatched – Porting agreed to by the Recipient and Donor Operator, but provided information does not match.

9 Message types

Type	Contents	Sender	Receiver
A1	Porting Inquiry	REC	DONOR
A2	Porting Inquiry Answer	DONOR	REC
B1	Porting Order Request	REC	DONOR
B2	Porting Order Request Answer	DONOR	REC
C1	Porting Order Change Request	REC	DONOR
C2	Porting Order Change Request Acknowledgement	DONOR	REC

Type	Contents	Sender	Receiver
C3	Porting Order Cancellation Request	REC	DONOR
C4	Porting Order Cancellation Request Acknowledgement	DONOR	REC
D1	Porting Order Reject	DONOR	REC
D2	Porting Order Reject Acknowledgement	REC	DONOR
K1	Recipient Porting Notification	REC	RefDB ADM
K2	Donor Porting Notification	DONOR	RefDB ADM
K3	New Reference Data Notification	RefDB ADM New REC	CONC RefDB ADM
K4	New Reference Data Notification Acknowledgement	CONC RefDB ADM	RefDB ADM New REC
K6	ESE Notification	DONOR	ESE
K9	Directory Provider Notification	REC	CATALOG
L1	Porting Charging Notification	DONOR	REC
L2	Porting Notification Acknowledgement	RefDB ADM	REC & DON
L3	Porting Notification Rejection	RefDB ADM	REC & DON
L4	Porting Notification Request	RefDB ADM	DONOR or REC
P2	Reference Data Change Request Acknowledgement	RefDB ADM	REC
P3	Reference Data Control Request	Any	RefDB ADM
P4	Reference Data Control Request Acknowledgement	RefDB ADM	Any
P5	Ported Number Change	REC	RefDB ADM NPA
P10	Reference Data Backup Request	Any	RefDB ADM
P11	Reference Data Backup Request Acknowledgement	RefDB ADM	Any
Q1	Ported Number Disconnect	REC	IDONOR, RefDB ADM
Q2	Reference Data Remove Request	REC, New IDONOR	RefDB ADM
Q3	Reference Data Remove Request Acknowledgement	RefDB ADM	REC, New IDONOR
Q4	Reference Data Remove Notification	RefDB ADM	CONC
Q5	Reference Data Remove Notification Acknowledgement	CONC	RefDB ADM
Z1	Missing or Incorrect Data	Receiver	Sender

Table 9.1 – Message types

Abbreviations

CATALOG	Directory Service Provider, Directory Enquiry Service Provider
CONC	All operators concerned within the Routing Domain and other entities (e.g. NPA, ESE)
DONOR	Donor Operator
ESE	Emergency Service Enterprises
IDONOR	Initial Donor
RefDB Adm	Reference Database Administrator
REC	Recipient Operator
Any	Any Operator and other entities concerned (e.g. NPA, ESE)

10 Message formats and parameters**10.1 Structure of messages**

Each message is opened and closed by a flag. There are three types of parameters:

- | | |
|--|----|
| 1. Mandatory parameters of fixed length | MF |
| 2. Mandatory parameters of variable length | MV |
| 3. Optional parameters of variable length | OV |

The sequence of the parameters in each message should be as shown in the tables below. A length indicator precedes all parameters. See Subclause 11.9.

10.2 General format diagram

Order of transmission

8	7	6	5	4	3	2	1	Octet
Flag								1
Length Indicator								2
Message type								
Mandatory Fixed Parameter								
Length Indicator								
Mandatory Variable Parameter								
Length Indicator								N – 2
Optional Variable Parameter								N – 1
Flag								N

Table 10.1

Mandatory and optional parameters can be interleaved.

The length indicator of optional variable parameters without contents is set to 0000 0000.

10.3 Label

Each message has a label common to all message types. See table below .

- Name (Contents):** The name of the parameter, normally also a description of the contents.
- No:** The position of the parameter in the message.

3. **Type:** Description of the type of parameter, MF (only flag), MV, and OV.

4. **Comments:** Comments where necessary.

Name (Contents)	No	Type	Comments
Flag	1	MF	
Message type	2	MV	See list above
Sender of the message	3	MV	
Receiver of the message	4	MV	
Message time stamp	5	MV	
Own message identity	6	MV	Unique message ID
First International Directory Number	7	MV	First number in the range to be ported
Last International Directory Number	8	MV	Last number in the range to be ported (if only 1 number = previous field)
Message version number	9	MV	Used for reminders. The original message is always of version 1
Time of preceding message version	10	MV	If first version same as Message time stamp, parameter number 5

Table 10.2

10.4 A1 Porting inquiry

Name (Contents)	No	Type	Comments
Personal Identity Number/Corporate Identity Number	11	MV	
Subscriber Name	12	MV	
Subscriber Address	13	OV	
Subscriber Postal Code	14	OV	
Subscriber City	15	OV	
Contact Department	16	MV	Of the sender of the message
Contact Person	17	OV	
Contact Phone	18	MV	
Contact Fax	19	MV	
Contact E-mail	20	OV	
Contact Requested	21	MV	Used for more complicated cases requiring discussion
Porting Time	22	MV	Time of cut-over (redirecting traffic)

Table 10.3

10.5 A2 Porting inquiry answer

Contents	No	Type	Comments
Opposite Party's Message ID	11	MV	
Porting Order Result	12	MV	OK or Not OK

Order Reject Cause Code Indicator	13	MV	Indicates how many Order Reject Cause Codes are provided.
Order Reject Cause Code	14	OV	This parameter is mandatory if any order reject cause code is indicated.
Order Reject Cause Code Explanation	15	OV	Additional explanation of a cause code
Contact Department	16	MV	Of the sender of the message
Contact Person	17	OV	
Contact Phone	18	MV	
Contact Fax	19	MV	
Contact E-mail	20	OV	
Contact Requested	21	MV	Used for more complicated cases requiring discussion

Table 10.4

The number of Order Reject Cause Code and Order Reject Cause Code Explanation parameters provided may vary depending on the value of the Order Reject Cause Code Indicator. The Order Reject Cause Code Explanation parameter is provided only for certain cause codes. If an Order Reject Cause Code Explanation parameter is provided, it is aligned with the corresponding Order Reject Cause Code parameter.

10.6 B1 Porting order request

Contents	No	Type	Comments
Porting ID	11	MV	A unique number of a porting request
Subscriber Personal Identity Number/Corporate Identity Number	12	MV	
Subscriber Name	13	MV	
Subscriber Address	14	MV	
Subscriber Postal Code	15	MV	
Subscriber City	16	MV	
Contact Department	17	MV	Of the sender for the message
Contact Person	18	OV	
Contact Phone	19	MV	
Contact Fax	20	MV	
Contact Requested	21	MV	Used for more complicated cases requiring discussion
Contact E-mail	22	OV	
Porting Time	23	MV	Time of cut-over (redirecting traffic)
Donor Operator ID Cut-Off Time	24	OV	Time of disconnection of access to outbound traffic (normally same as Porting Time)
Retain Subscription	25	MV	Yes = contact the subscriber No = cancel the subscription

Retain Directory Information	26	MV	Yes = do not cancel the number with the DSP and DQSP No = cancel the number with the DSP and DQSP
Priority	27	MV	
Total Order Number	28	MV	This attribute is used to indicate whether a current Porting Order Request is part of a coherent order.
Sequence Order Number	29	MV	This attribute is used to indicate a porting instance within the coherent order sequence.
Recipient Service Provider	30	MV	Recipient Service Provider Identity.
Recipient Network/Operator Identity	31	MV	Identity of the PTO to which the International Directory Number is ported. For a public telecommunications operator with more than one logical network, there shall be one identity for each network. (E.g. one for PSTN/ISDN and one for PLMN (GSM).)

Table 10.5**10.7 B2 Porting order answer**

Contents	No	Type	Comments
Opposite Party's Message ID	11	MV	
Porting Order Result	12	MV	OK or Not OK
Order Reject Cause Code Indicator	13	MV	Indicates how many Order Reject Cause Codes are provided.
Order Reject Cause Code	14	OV	This parameter is mandatory if any order reject cause code is indicated.
Order Reject Cause Code Explanation	15	OV	Additional explanation of a cause code
Porting ID	16	MV	May differ from requested time
Porting Time	17	MV	
Donor Operator ID Cut-Off Time	18	MV	May differ from requested time
Contact Department	19	MV	Of the sender for the message
Contact Person	20	OV	
Contact Phone	21	MV	
Contact Fax	22	MV	
Contact E-mail	23	OV	
Contact Requested	24	MV	Used for more complicated cases requiring discussion

Table 10.6

The number of Order Reject Cause Code and Order Reject Cause Code Explanation parameters provided may vary depending on the value of the Order Reject Cause Code Indicator. The parameter Order Reject Cause Code Explanation is provided only for certain cause codes. If an Order Reject Cause Code Explanation parameter is provided, it is aligned with the corresponding Order Reject Cause Code parameter.

10.8 C1 Porting order change request

The same content as a B1-message.

10.9 C2 Porting order change acknowledgement

The same content as a B2-message.

10.10 C3 Porting order cancellation request

Contents	No	Type	Comments
Porting ID	11	MV	
Total Order Number	12	MV	This attribute is used to indicate whether a current Porting Order Cancellation Request concerns part of a coherent order.
Sequence Order Number	13	MV	This attribute is used to indicate the porting instance within the coherent order sequence.

Table 10.7

10.11 C4 Porting order cancellation acknowledgement

Contents	No	Type	Comments
Opposite Party's Message ID	11	MV	
Porting ID	12	MV	

Table 10.8

10.12 D1 Porting order reject

Contents	No	Type	Comments
Porting ID	11	MV	
Order Reject Cause Code Indicator	12	MV	Indicates how many Order Reject Cause Codes are provided.
Order Reject Cause Code	13	MV	
Order Reject Cause Code Explanation	14	OV	Additional explanation of a cause code
Contact Department	15	MV	Of the donor operator
Contact Person	16	OV	
Contact Phone	17	MV	
Contact Fax	18	MV	
Contact E-mail	19	OV	

Table 10.9

The number of Order Reject Cause Code and Order Reject Cause Code Explanation parameters provided may vary depending on the value of the Order Reject Cause Code Indicator. The Order Reject Cause Code Explanation parameter is provided only for certain cause codes. If an Order Reject Cause Code Explanation parameter is provided, it is aligned with the corresponding Order Reject Cause Code parameter.

10.13 D2 Porting order reject acknowledgement

Contents	No	Type	Comments
Opposite Party's Message ID	11	MV	
Porting ID	12	MV	

Table 10.10

10.14 K1 Recipient notification

Contents	No	Type	Comments
Porting ID	11	MV	
Porting Time	12	MV	
Donor Network/ Operator Identity	13	MV	Identity of the PTO from which the International Directory Number is ported. For a public telecommunications operator with more than one logical network, there shall be one identity for each network. (E.g. one for PSTN/ISDN and one for PLMN (GSM).)
Porting Order Result	14	MV	OK/Not OK
Special Point of Interconnection	15	OV	The POI to route the call over
Subscriber Name	16	MV	For ESE
Subscriber Address	17	MV	For ESE
Geographical Information	18	MV	For ESE
Price/minute – subscriber	19	OV	Used for services with non-number dependent charging
Price/call – subscriber	20	OV	Used for services with non-number dependent charging
Price code IOA (Inter Operator Accounting)	21	OV	Used for services with non-number dependent charging
Service Information	22	OV	Description of e.g. a service category
Recipient Service Provider	23	MV	Recipient Service Provider Identity
Recipient Network/ Operator Identity	24	MV	Identity of the PTO to which the International Directory Number is ported. For a public telecommunications operator with more than one logical network, there shall be one identity for each network. (E.g. one for PSTN/ISDN and one for PLMN (GSM).)

Table 10.11

Parameters 19 through 22 are not used yet.

If a porting, for which a K1 already has been sent, is not carried out, a similar K1 with "Not OK" in the field "Porting Order Result" shall be sent. This is called a "negative K1".

10.15 K2 Donor notification

Contents	No	Type	Comments
Porting ID	11	MV	
Porting Time	12	MV	
Porting Order Result	13	MV	OK/Not OK
Subscriber Name	14	OV	For ESE
Subscriber Address	15	OV	For ESE
Geographical Information	16	OV	For ESE
Donor Service Provider	17	MV	Donor Service Provider Identity
Donor Network/ Operator Identity	18	MV	Identity of the PTO from which the International Directory Number is ported. For a public telecommunications operator with more than one logical network, there shall be one identity for each network. (E.g. one for PSTN/ISDN and one for PLMN (GSM).)
Recipient Service Provider	19	MV	Recipient Service Provider Identity
Recipient Network/ Operator Identity	20	MV	Identity of the PTO to which the International Directory Number is ported. For a public telecommunications operator with more than one logical network, there shall be one identity for each network. (E.g. one for PSTN/ISDN and one for PLMN (GSM).)

Table 10.12

If a porting, for which a K2 already has been sent, is not carried out, a similar K2 with "Not OK" in the field "Porting Order Result" shall be sent. This is called a "negative K2".

10.16 K3 Reference data notification

Contents	No	Type	Comments
Porting ID	11	MV	
Porting Time	12	MV	
Donor Network/ Operator Identity	13	MV	Identity of the PTO from which the International Directory Number is ported. For a public telecommunications operator with more than one logical network, there shall be one identity for each network. (E.g. one for PSTN/ISDN and one for PLMN (GSM).)

Recipient Network/ Operator Identity	14	MV	Identity of the PTO from which the International Directory Number is ported. For a public telecommunications operator with more than one logical network, there shall be one identity for each network. (E.g. one for PSTN/ISDN and one for PLMN (GSM).)
Geographical information	15	OV	The area to which the International Directory Number is assigned.
Additional charging information	16	OV	Charging information for the International Directory Number defining other charging criteria than geographical data, e.g. subscriber class.
Service Information	17	OV	Description of e.g. a service category
Information for a special Point of Interconnection	18	OV	The information refers to the Network Indicator (NI=3) + Signaling Point Code of a Special Point of Interconnection of the Recipient Exchange, e.g. the exchange to which the International Directory Number is connected.
Price per minute – Subscriber	19	OV	Used for services with non-number dependent charging.
Price per call – Subscriber	20	OV	Used for services with non-number dependent charging.
Price code	21	OV	Used for services with non-number dependent charging.

Table 10.13**10.17 K4 Reference data acknowledgement**

Contents	No	Type	Comments
Opposite Party's Message ID	11	MV	
Porting ID	12	MV	

Table 10.14**10.18 K6 ESE notification**

Contents	No	Type	Comments
Porting ID	11	MV	
Porting Time	12	MV	
Donor Network/ Operator Identity	13	MV	Identity of the PTO from which the International Directory Number is ported. For a public telecommunications operator with more than one logical network, there shall be one identity for each network. (E.g. one for PSTN/ISDN and one for PLMN (GSM).)

Recipient Network/ Operator Identity	14	MV	Identity of the PTO from which the International Directory Number is ported. For a public telecommunications operator with more than one logical network, there shall be one identity for each network. (E.g. one for PSTN/ISDN and one for PLMN (GSM).)
Subscriber Name	15	OV	
Subscriber Address	16	OV	
Geographical Information	17	OV	

Table 10.15**10.19 K9 Directory and directory enquiry service provider notification**

Contents	No	Type	Comments
Subscriber Personal Identity Number/Corporate Identity Number	11	MV	
Subscriber Name	12	MV	
Subscriber Address	13	MV	
Subscriber Postal Code	14	MV	
Subscriber City	15	MV	
Contact Department	16	MV	Of the sender for the message
Contact Person	17	OV	
Contact Phone	18	MV	
Contact E-mail	19	OV	
Porting Time	20	MV	
Retain Directory Information	21	MV	No = the record will be deleted. The recipient operator is responsible for sending new data to the service providers of Directories and Directory Enquiry services (and also to a central directory database if applicable).

Table 10.16**10.20 L1 Porting charging notification**

Contents	No	Type	Comments
Porting ID	11	MV	
Invoice Date	12	MV	Date of reference in invoices.
Order Priority	13	MV	No Priority or Priority
Additional Charging Information	14	MV	E.g.hours, numbers

Table 10.17

10.21 L2 Porting notification acknowledgement

Contents	No	Type	Comments
Porting ID	11	MV	

Table 10.18**10.22 L3 Porting notification rejection**

Contents	No	Type	Comments
Porting ID	11	MV	
Cause for Rejection of Porting	12	MV	

Table 10.19**10.23 L4 Porting notification request**

Contents	No	Type	Comments
Porting ID	11	MV	
Cause for Porting Reject	12	MV	

Table 10.20**10.24 P2 Reference data and number change acknowledgement**

Contents	No	Type	Comments
Porting ID	11	MV	

Table 10.21**10.25 P3 Reference data inquiry**

Contents	No	Type	Comments
Porting ID	11	MV	If no number is provided in the label, the Porting ID is regarded as primary key.

Table 10.22**10.26 P4 Reference data inquiry result**

Contents	No	Type	Comments
Porting ID	11	MV	
Porting Time	12	MV	Year, Month, Date, Hour, Minute, Second of switchover.
Donor Network/ Operator Identity	13	MV	Identity of the PTO from which the International Directory Number is ported. For a public telecommunications operator with more than one logical network, there shall be one identity for each network. (E.g. one for PSTN/ISDN and one for PLMN (GSM)).

Recipient Network/ Operator Identity	14	MV	Identity of the PTO to which the International Directory Number is ported. For a public telecommunications operator with more than one logical network, there shall be one identity for each network. (E.g. one for PSTN/ISDN and one for PLMN (GSM)).
Geographical information	15	OV	The area to which the International Directory Number is assigned.
Additional charging information	16	OV	Charging information for the International Directory Number defining other charging criteria than geographical data, e.g. subscriber class.
Service Information	17	OV	Description of e.g. a service category
Information for a special Point of Interconnection	18	OV	The information refers to the Network Indicator (NI=3) + Signaling Point Code of a Special Point of Interconnection of the Recipient Exchange, e.g. the exchange to which the International Directory Number is connected.
Price per minute – Subscriber	19	OV	Used for services with non-number dependent charging.
Price per call – Subscriber	20	OV	Used for services with non-number dependent charging.
Price code	21	OV	Used for services with non-number dependent charging.
Port termination date	22	OV	Date & Time at which a port is no longer effective.
Number vacancy termination date	23	OV	Date of termination of the vacancy period for a cancelled subscription to a ported number.

Table 10.23**10.27 P5 Ported number change**

Contents	No	Type	Comments
Number Disable Date	11	MV	Date on which the old number is no longer effective
First New International Directory Number	12	MV	International Directory Number after the number change. First New International Directory Number in the range
Last New International Directory Number	13	MV	Last New International Directory Number in the range (if only 1 number = previous field)
New International Directory Number Enable Date	14	MV	Date on which the new number becomes effective

Table 10.24

Parameters 7 and 8 match parameters 12 and 13 which results in an unambiguous matching of an old number to a new number in a range.

This message type should create two actions:

- Update the existing record with an End Time
- Create a new record for the new number

Thus there will be two records in the reference database during the overlap-calling period, when both numbers could be used.

10.28 P10 Reference data backup request

Contents	No	Type	Comments
Start time for file transfer	11	OV	The starting time of the download if dial-up file transfer is used

Table 10.25

The method of downloading is agreed between the entities concerned and the RefDB Administrator according to Clause 13.

10.29 P11 Reference data backup request acknowledgement

Contents	No	Type	Comments
Start time for file transfer	11	OV	The starting time of the download if dial-up file transfer is used

Table 10.26

10.30 Q1 Ported number disconnect

Contents	No	Type	Comments
Subscriber Disconnect date and Time	11	MV	Time of cancellation of a subscription to a ported number
Number Vacancy Termination Date	12	MV	Time of termination of the porting ; either of the two alternatives applies. The ported number shall be returned to the Initial Donor. The ported number shall remain with the Recipient Operator
Retain Number at Recipient	13	MV	Indicates whether a number shall be kept by Recipient or returned to Initial Donor ¹⁰ . Default is kept.

Table 10.27

10.31 Q2 Reference data remove request

Contents	No	Type	Comments
Porting Termination date and Time	11	MV	Time at which the porting should be terminated
Cause for Porting Termination	12	MV	

Table 10.28

¹⁰ Depending on regulations published by NPTA under Swedish law.

10.32 Q3 Reference data remove request acknowledgement

Contents	No	Type	Comments
Opposite Party's Message ID	11	MV	

Table 10.29**10.33 Q4 Reference data remove notification**

Contents	No	Type	Comments
Porting ID	11	MV	
Cause for Porting Termination	12	MV	

Table 10.30**10.34 Q5 Reference data remove notification acknowledgement**

Contents	No	Type	Comments
Opposite Party's Message ID	11	MV	
Cause for Porting Termination	12	MV	

Table 10.31**10.35 Z1 Missing or incorrect data**

Contents	No	Type	Comments
Opposite Party's Message ID	11	MV	
Cause for Message Rejection	12	MV	

Table 10.32**11 Parameter values**

This clause lists the different values of each parameter. All parameters are coded in ISO 8859 (ASCII) [3] unless otherwise specified. A length indicator precedes each parameter

11.1 Summary of parameters

The table below lists all parameters.

Subclause	Name
11.11	Additional Charging Information
11.11	Cause for Termination of Porting
11.11	Cause for Rejection of Porting
11.11	Cause for Rejection of Message
11.11	Contact Departement
11.11	Contact Email
11.7	Contact Fax
11.7	Contact Mobile
11.11	Contact Person
11.7	Contact Phone

11.11	Contact Requested
11.5	Donor Operator Cut-Off Time
11.4	Donor Network/ Operator Identity
11.23	Donor Service Provider
11.7	First International Directory Number
11.2	Flag
11.11	Geographical Information
11.5	Invoice Date
11.7	Last International Directory Number
11.9	Length Indicator
11.5	Message Time Stamp
11.3	Message Type
11.8	Message Version number
11.7	New Number
11.5	Number Disable Date
11.5	Number Enable Date
11.5	Number Vacancy Termination Date
11.6	Opposite party's message identity
11.15	Order Priority
11.21	Order Reject Cause Code Indicator
11.19	Order Reject Cause Code
11.11	Order Reject Cause Code Explanation
11.6	Own Message identity
11.5	Porting Termination Date
11.14	Porting ID
11.20	Porting Order Result
11.5	Porting time
11.18	Price code
11.17	Price per call – Subscriber
11.16	Price per minute – Subscriber
11.4	Receiver of the message
11.4	Recipient Network/ Operator Identity
11.24	Recipient Service Provider
11.13	Retain Directory Information
11.13	Retain Number at Recipient
11.13	Retain Subscription
11.4	Sender of the message
11.22	Sequence Order Number
11.11	Service information

11.11	Special Point Of Interconnect
11.5	Start Time for File Transfer
11.11	Subscriber Address
11.11	Subscriber City
11.5	Subscriber Disconnect Date
11.11	Subscriber Name
11.10	Subscriber Personal Identity Number/Corporate Identity Number
11.12	Subscriber Postal Code
11.5	Time for preceding message version
11.22	Total Order Number

Table 11.1**11.2 Flag****Length:** One octet

Value	Interpretation	Comments
11111111 (Binary)	Flag	Start and stop of a message

Table 11.2**11.3 Message type**

Coded according to type as indicated in Clause 9.

11.4 Identification of sender/receiver of the message or donor/recipient for the porting

Coded according to recommendation by independent entity. See Subclause 11.14.

11.5 Date and time

Coded with most significant bit first. In format CCYYMMDDhhmmss in accordance with ISO 8601 [2].

Message time stamp

Time for preceding message version

Porting Time

Donor Operator Cut-Off Time

Number Disable Date

Number Enable Date

Subscriber Disconnect Date

Porting Termination Date

Invoice Date

Number Vacancy Termination Date

Start Time for File Transfer

11.6 Own message identity

The principle used is year plus sequence number.

The sequence numbering starts at 1.

11.7 International Directory Number

The telephone number should be of the following format: CC+N(S)N.

11.8 Message version number

First version is coded by digit 1, then incremented by one for each version¹¹.

11.9 Length indicator

Length: One octet

This parameter is binary coded.

The length indicator precedes each parameter except for the flag. The coding is as follows.

Value	Interpretation
0000 0000	No contents in an Optional Variable Parameter
0000 0001 to 1111 1111	Binary coded length in octets

Table 11.3

An Optional Variable length parameter without contents is marked with length indicator zero. The length indicator itself is not included in the total length of the parameter.

11.10 Subscriber personal identity number /Corporate identity number

Coded with national identity plus two digits if Swedish. Format as below. The national identity is in text format.

Coding of digits for Swedish citizens or organisations
Thousand digit in year/Digit twelve ¹²
Hundred digit in year/Digit eleven
Ten digit in year
Single digit in year
First digit in month
Second digit in month
First digit in day
Second digit in day
First digit control number
Second digit in control number
Third digit in control number
Fourth digit in control number

Table 11.4

For physical persons, the thousand and hundred digits of the year are used. For organisations, the coding of the first and second octet (digit twelve and eleven) is not defined and set to 0 0.

¹¹ First version coded in ASCII digit 1, second version digit 2 etc.

¹² Digit eleven and twelve coded to zero for corporate identity numbers.

11.11 Text

Text conveys the information relevant to the context. Coding as a text string:

Additional Charging Information
Cause for Termination of Porting
Cause for Rejection of Porting
Cause for Rejection of Message
Contact Department
Contact Email
Contact Person
Contact Requested
Subscriber Address
Subscriber City
Subscriber Name
Geographical Information
Order Reject Cause Code Explanation
Special Point of Interconnect

11.12 Subscriber postal code

Coded with the most significant digit/letter first.¹³

11.13 Yes/No parameter

Coded in text.

Defined values: Yes or No.

Retain Directory Information

Retain Subscription

11.14 Porting identity

The principle of identification of a porting is:

Operator Identity+Date+First International Directory Number in an unbroken string.

Operator identity according to definitions in SS 63 63 90 [4] and SS 63 63 92 [5] .

Date refers to the year and day on which the Porting Order Request was submitted.

International Directory Number according to sub-clause 11.7.

NOTE: The Operator Identity is allocated by an independent entity.

11.15 Order priority

Coded in text.

Defined values: No priority or Priority

11.16 Price per minute – subscriber

Coded: Currency code + amount

11.17 Price per call – subscriber

Coded: Currency code + amount

11.18 Price code

Coded: Currency code + price

¹³ The coding shall allow for foreign postal codes.

11.19 Order reject cause code

Code for reasons (common for A2, B2, C2 and D1):

Code	Explanation
0	Number ported to another operator. (see Order Reject Cause Code Explanation for more information)
1	A concurrent order request exists. (see Order Reject Cause Code Explanation for more information)
2	Number part of a DDI-range.
3	Number not associated with stated subscriber.
4	No responsibility for stated subscriber.
5	Number not associated with any subscriber.
6	Order cannot be processed due to lack of information. (see Order Reject Cause Code Explanation for more information)
7	Desired time of porting not possible. (see Order Reject Cause Code Explanation for more information)
8	Number not portable.
9	Number has been assigned to a new subscriber.
10	Order cannot be processed due to binding agreement.
11	Unknown prepaid subscription.
99	Another reason (see Order Reject Cause Code Explanation for more information)

Table 11.5**11.20 Porting Order Result**

Used to state the result of a validation of a Porting Inquiry, Porting Order Request or a Porting Order Change Request. The parameter applies to messages A2, B2 and C2. Possible values are OK or Not OK.

The parameter is also included in messages K1 and K2 used to notify RefDB Adm of an agreed porting.

11.21 Order Reject Cause Code Indicator

Used to indicate how many Order Reject Cause Codes are provided in a current message. The indicator applies to messages A2, B2, C2 and D1. If Porting Order Result is OK, the indicator shall be set to zero (0).

11.22 Order Number

The Total Order Number is used to indicate how many numbers/number ranges a coherent order consists of. The Sequence Order Number is used in each porting request to indicate the request concerned within the coherent order.

If a current Porting Order Request is not part of a coherent order, the Total Order Number and Sequence Order Number shall be set to zero.

11.23 Donor Service Provider

Used to indicate the donor service provider.

11.24 Recipient Service Provider

Used to indicate the recipient service provider.

12 List of timers

The timers defined in this clause may have different settings depending on the common infrastructure used as defined in Clause 13. The timers may also have different settings depending on the type of services provided, i.e. fixed public telecommunications services or public digital mobile telephony services.

12.1 Timers related to messages

For each message type requiring an action by the receiver and an acknowledgement, the following timers apply. See table below.

T1: The time from sending the message until the latest delivery of the acknowledgement.

T2: The time from the end of T1 until the first reminder may be sent.

T3: The time from the previous reminder until the next reminder may be sent.

12.2 Other timers

K1K2WAIT: The maximum time for the Reference Database Administrator to wait for either of K1 or K2 if the other one has been received.

PORTTIME1: Minimum time from receipt of correct order to porting of the number.

PORTTIME2: Maximum time from receipt of correct order to normal porting of a single number.

PORTTIME3: Maximum time from receipt of a B2 message implying a partial reject until a C1 or C3 message is sent.

REFDATA1: The time before a porting at which information should be sent to the Reference Database Administrator from the Recipient Operator.

REFDATA2: The time before a porting at which correct information should be sent out from the Reference Database Administrator to all other Operators within the Routing Domain and other entities concerned.

REFDATA3: The time before a porting at which correct information should be sent to the Reference Database Administrator from the Donor Operator.

VACANCY3: The period from the cancellation of a subscription to a ported number until the end date of the vacancy marking of the number.

After this period, either of the two following alternatives applies¹⁴.

1. The ported number shall remain with the Recipient Operator.
2. The ported number shall be returned to the Initial Donor.

¹⁴ Depending on regulations published by NPTA under Swedish law.

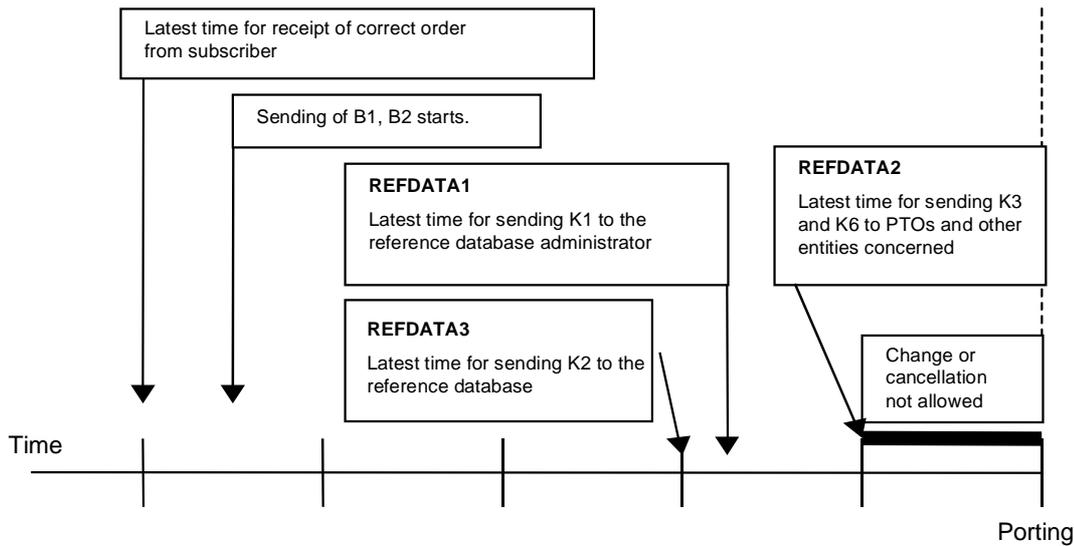


Figure 12.1

	Description	T1 (sending to acknowledgement)	T2 (expiration of T1 to sending of reminder)	T3 (First reminder to following reminders)
A1	Porting Inquiry	not decided	not decided	not decided
A2	Porting Inquiry answer	N/A	N/A	N/A
B1	Porting Order Request	not decided	not decided	not decided
B2	Porting Order Request Answer	N/A	N/A	N/A
C1	Porting Order Change Request	not decided	not decided	not decided
C2	Porting Order Change Request Acknowledgement	N/A	N/A	N/A
C3	Porting Order Cancellation Request	not decided	not decided	not decided
C4	Porting Order Cancellation Request Acknowledgement	N/A	N/A	N/A
D1	Porting Order Reject	not decided	not decided	not decided
D2	Porting Order Reject Acknowledgement	N/A	N/A	N/A
K1	Recipient Porting Notification	N/A	N/A	N/A
K2	Donor Porting Notification	N/A	N/A	N/A
K3	New Reference Data Notification	not decided	not decided	not decided
K4	New Reference Data Notification Acknowledgement	N/A	N/A	N/A
K6	ESE Notification	N/A	N/A	N/A

	Description	T1 (sending to acknowledgement)	T2 (expiration of T1 to sending of reminder)	T3 (First reminder to following reminders)
K9	Directory Provider Notification	N/A	N/A	N/A
L1	Porting Charging Notification	not decided	not decided	not decided
L2	Porting Notification Acknowledgement	not decided	not decided	not decided
L3	Porting Notification Rejection	not decided	not decided	not decided
L4	Porting Notification Request	not decided	not decided	not decided
P2	Reference Data Change Request Acknowledgement	N/A	N/A	N/A
P3	Reference Data Control Request	N/A	N/A	N/A
P4	Reference Data Control Request Acknowledgement	not decided	not decided	not decided
P5	Ported Number Change	not decided	not decided	not decided
P10	Reference Data Backup Request	not decided	not decided	not decided
P11	Reference Data Backup Request Acknowledgement	N/A	N/A	N/A
Q1	Ported Number Disconnect	not decided	not decided	not decided
Q2	Reference Data Remove Request	not decided	not decided	not decided
Q3	Reference Data Remove Request Acknowledgement	N/A	N/A	N/A
Q4	Reference Data Remove Notification	not decided	not decided	not decided
Q5	Reference Data Remove Notification Acknowledgement	N/A	N/A	N/A
Z1	Missing or Incorrect Data	N/A	N/A	N/A

Table 12.1 – Timers related to message exchange**13 Common infrastructure****13.1 General**

This clause specifies the requirements imposed on the common infrastructure for administration of number portability in Sweden.

13.2 General requirements

The communication related to the porting of numbers should be based on forms with specified information. It must be possible to transfer these forms over different interfaces.

Timers and procedures as defined by the process flows in Clause 6 set the general requirements on the common infrastructure. Depending on the choice of technical level for the administrative interface, the common infrastructure can be based on manual instructions or software programs.

13.3 Technical solutions for message transfer

The common infrastructure shall provide two levels of technical solution for message transfer, one low-tech and one high-tech solution.

To allow for different interface protocols to interact, all communication between the PTOs must physically pass the Reference Database Administrator which acts as protocol converter. The reasons for this are:

- A PTO only needs one physical interface¹⁵.
- A PTO only needs to support one technical level.
- The RefDB Adm should be able to monitor the information flow.
- No barriers for new entrants are created.

13.3.1 Low-tech solution

The low-tech solution shall be partly automated based on a web interface and file transfer as components.

The web interface, located at the SNPAC, provides forms¹⁶ to be used by a PTO wanting to place a number porting order. In connection with the ordering there will be forms for amendment to and cancellation of an order.

The web interface also provides a form to be used for cancellation of a subscription to a ported number.

For management purposes, the web interface provides forms for queries and updating of reference data.

When a form in the web interface has been filled in and submitted to processing, it shall be transformed into a file. The file is then sent to the appropriate receiver by means of FTP according to the TCP/IP protocol suite.

13.3.2 High-tech solution

The high-tech solution shall be fully automated. The TCP/IP protocol suite shall be used as carrier for the protocol.

The administrative interface shall support two-way communication between PTOs and between PTOs and the Reference Database Administrator.

High capacity performance of the links used in the interface will be required.

The interface shall support multiple application associations per PTO.

13.3.3 Information on selected technical level

Each PTO must inform the Reference Database Administrator which technical level it supports.

The following information must be provided to the Reference Database Administrator.

¹⁵ Including NPA and ESE.

¹⁶ The layouts of the forms are not defined in this standard.

- Technical level.
- Relevant address information for communication (e.g. IP address).
- Information on how to get in touch, e.g. name, telephone number, e-mail address.

The Reference Database Administrator must provide all PTOs (including the NPA and the ESE) with the following information.

- Address information for communication with the Reference Database Administrator, e.g. web address, and IP address.
- Information on how to get in touch, e.g. name, telephone number, e-mail address, web address.

13.4 Methods of copying the reference database

For backup support of a PTO's¹⁷ administrative database, a copy of the central reference database will be made on demand by the Reference Database Administrator using one of the following methods.

- Storing on Compact Disk
- Storing on Magnetic tape
- File transfer

The formats to be used are defined by the organisation for the SNPAC and will be based on accepted products on the market.

Each PTO must inform the Reference Database Administrator about at least one method of copying a backup.

The following information must be provided to the Reference Database Administrator.

- Preferred method (Mandatory).
- Other methods (Optional).
- Relevant addresses for communication using the preferred and optional methods (Postal address or dial-up number for access to modem for file transfer).

13.5 Monitoring of the common infrastructure

The Reference Database Administrator and the users concerned must monitor the timers. Each PTO and the Reference Database Administrator are required to monitor expiration of timers and abnormal or fault situations and to take appropriate action.

The Reference Database Administrator is required to log and store the communication over the common infrastructure for at least one year.

For personal integrity reasons, the data to be logged and stored must not contain any data related to subscribers.

13.6 Security

Independent of the method used for message transfer, security must be ensured by means of authentication. The Swedish Number Portability Administrative Centre decides on the authentication methods to be used.

¹⁷ Or NPA or ESE.

13.7 Secure common communication infrastructure

The common communication infrastructure shall provide a reliable¹⁸ and secure platform for message transfer, and shall be based on secure VPN together with Internet as carrier.

To guarantee security, a communication infrastructure shall be used, based on the Internet as carrier combined with an IPSEC-compliant VPN product.

13.8 Performance

The performance of the common infrastructure must meet the requirements on the porting of numbers, see Clause 14.

13.9 Reliability and Availability

The requirements on reliability and availability of the common infrastructure must be at least as high as for the Central Reference Database, see Clause 14.

14 Central reference database

14.1 General

This clause states the requirements imposed on the Central Reference Database for number portability in Sweden. It outlines the general functions and capabilities to be met by the database.

The requirements on the Central Reference Database are derived from the assumptions described in Report ITS 16 [12].

14.2 General requirements

Logically, the database shall be of the centralised type¹⁹ and technically a relational or object database.

The establishment and operation of the database must be possible without maintenance by the public telecommunications operators and the NPA and ESE which are to be connected.

The geographical location of the CRefDB shall not influence its functionality.

14.3 Interface protocols

For communication towards the connected public telecommunications operators, the NPA and the ESE, the following requirements must be met:

- Interface Protocol/s/ as described in Clause 13 must be supported
- Interface to standard file transfer protocols as described in Clause 13 (over dial-up or fixed connections) must be supported.
- The information to be transferred as described in the Process Flows, Clause 6, must be possible to convey using either of the methods described in Clause 13.

14.4 Audit capability

It must be possible to audit the system automatically and on-demand.

¹⁸ The way IP routes packets makes it vulnerable and limits and complicates the use of large IP networks (including the Internet) for sensitive communications. Therefore the IP Security (IPSEC) protocol suite shall be used - a set of IP extensions providing security services at network level. IPSEC technology is based on modern encryption technologies, making possible very strong data authentication and privacy guarantees. Because it secures the network itself, the IPSEC protocol suite guarantees security for any application using the network.

¹⁹ The database can be physically centralised or distributed.

Audit capabilities for history of transactions, resolution of discrepancies between operators and other similar activities must be supported.

It must be possible to have different levels of audit and to change the audit levels.

14.5 Exception handling

Functions for the detection and reporting of conflicting data must be implemented. Erroneous data posts must be possible to cancel or correct.

The database must be able to check messages according to Clause 9, both concerning syntax and contents.

14.6 Man machine interface

For the Man Machine Interface the following shall apply:

- Based on a commonly accepted computer interface
- Operated through menus and short commands (for the experienced user).
- One or several Reference Database operator positions (system operators)
- In case of several simultaneous users: priority management based on message type or user type.
- Different geographical locations must be possible for the system operator positions.
- Security facilities for all access to the centralised reference database.
- Several authorisation levels.
- Several system operator and user profiles.

14.7 Service bureau functionality

- It must be possible to store transactions related to one or several PTOs.
- It must be possible to define and generate user specific reports (see Subclause 14.11 below).
- It must be possible to measure and record usage of the Reference Database resources.
- It must be possible to log all or parts of the communication related to a porting process.

14.8 Security

It shall only be possible to access the centralised reference database by means of a relevant authorisation.

The authorisation levels, user identities and passwords shall be set by a system administrator.

The default passwords given to a user must be possible to change by the user.

14.9 Performance

The system must initially be capable of storing information for at least up to 500.000 ported numbers.

The system must be capable of storing and managing old versions of information for at least ten years. Only the information of the last year needs to be directly accessible.

The system must be capable of handling no less than 10 porting process transactions per second.

The system must be capable of having at least 5 different system operator positions.

The system must be capable on demand of sending a copy of current reference data to the entities concerned, using methods described in Clause 13.

14.10 Reliability and availability

The availability of the system shall be at least 99 % on a yearly basis

The recovery time after a minor outage²⁰ must not exceed one hour. (Time measured from the start of restoration until the system is in service again)

The recovery time after a major outage¹⁷ must not exceed 24 hours. (Time measured from the start of restoration until the system is in service again)

14.11 Reporting and query functionality

It must be possible to define reports. These reports shall be possible to generate as standard reports or on-demand.

Reports must be possible to printout or to file.

The system must be capable of handling queries about a single record/message, type of record/message, parameter and different types of historical events without influencing the performance of the normal operation.

14.12 Backups, recovery and disaster recovery

The system must include backup functions giving a fully updated backup version of the reference database.

The system must support automatic recovery procedures in connection with loss of data.

The automatic back-up time for the part of the database containing ported numbers must not exceed one hour.

The automatic backup time for the complete database must not exceed two hours.

The backup, recovery and disaster recovery procedures must be well documented, allowing management by system operators without knowledge of the contents of the reference database.

14.13 Data maintenance

The system must be complemented with procedures and documentation for data maintenance.

The data maintenance must contain consistency checks and other controls relevant for the checking of the contents of the database.

14.14 Support of application programs

The system must support necessary interfaces as defined in other parts of this document.

14.15 Scalability and upgradability

The system must be scalable allowing expansion of the number of ported numbers to at least 50 million²¹.

The scalability must also meet requirements for a size expansion of each record to include all the parameters in the messages described in Clause 10

It must be possible to upgrade both hardware and software components of the system.

²⁰ It is assumed that the supplier of the system and the SNPAC define together minor and major outage.

²¹ The amount of numbers **in use** in the Swedish Numbering Plan is estimated at 15 million.

The upgrading and enlargement of the system must be possible to do with a minimum of interruption. Major upgrades at planned service interruptions are allowed.

14.16 Physical protection

It must be possible to install and operate the system with physical protection against unauthorised access, fire and other events not constituting force majeure.

The physical construction of the system must prevent total loss of information in case of fire or other major disasters.

14.17 Environmental requirements

The system must fulfil environmental conditions of indoor operation.

Annex A (informative)

Simplified processes for porting

A.1 General

This annex describes the processes to be used in connection with Number Portability in the absence of a centralised Reference Database Administrator with an active role as described in the main document.

These simplified processes support the two methods Onward Routing and All Call Query as described in SS 63 63 90, see reference [4] and SS 63 63 92, see reference [5].

In this annex, the function Reference Data Keeper is introduced. The Reference Data Keeper stores information about ported numbers in Sweden. The Reference Data Keeper function is maintained by an independent entity.

Two scenarios are described, one without and one with the Reference Data Keeper function.

For the support of All Call Query, in the scenario without a Reference Data Keeper, it is assumed that the PTOs applying that method automatically, if required, receive information about ported numbers from the Donor SP.

For the support of All Call Query, in the scenario with a Reference Data Keeper, it is assumed that the PTOs applying that method automatically receive information about ported numbers from the Reference Data Keeper.

For the support of Onward Routing when used as the only method for number portability, there is no need for a Reference Database/Reference Data Keeper. The simplified process described under Clause A.5 could be used except that other PTOs will not be informed about new reference data from Donor SP.

NOTE 1: In SS 63 63 92 [5], the term Onward Routing is used for call related traffic. The corresponding term used for non-call related traffic is Indirect routing.

NOTE 2: In SS 63 63 92 [5], the term All Call Query is used for call related traffic. The corresponding term used for non-call related traffic is Direct routing.

A.2 Interface protocol and methods

The interface protocol consists of forms containing information equivalent to a subset of the messages defined in Clause 10 of the main document.

The forms²² used are identified in the table below.

²² The final design and layout of the forms is no part of this specification.

Form ID	Description of the form	Equivalent messages
FB	The form is used for ordering. The form is divided in two parts, an order request part for the Recipient SP to fill in, and an answer part for the Donor SP to fill in. The form is also used when the Recipient SP wants to make a change to an already placed order. For this purpose, a "change request box" will be ticked. The form is also used for subsequent porting. For that purpose, a "subsequent porting box" will be ticked.	B1, B2, C1 and C2.
FC	The form is used for cancellation of an already placed order by either the Recipient SP or the Donor SP. If the Donor SP cancels an order, the reason must be stated.	C3, C4, D1 and D2.
FK	The form is used for information by the Donor SP and Recipient SP about a new porting or changes to an already ported number.	K2, K3 and K6.
FQ	The form is used for cancellation of the porting of a number.	Q1, Q2, Q3, Q4 and Q5.

Table A.1

A form shall be transferred between the PTOs either as a fax message or as an attachment to e-mail.

Each PTO is, on request, responsible for informing any other PTO or other entity concerned about telephone numbers, fax numbers and e-mail addresses to be used for the process.

A.3 Time values

This clause describes time values valid for porting and cancellation according to the processes described in this annex. The diagrams and the table below show important events and their corresponding timers. The timers may also have different settings depending on the type of services provided, i.e. fixed public telecommunications services or public digital mobile telephony services.

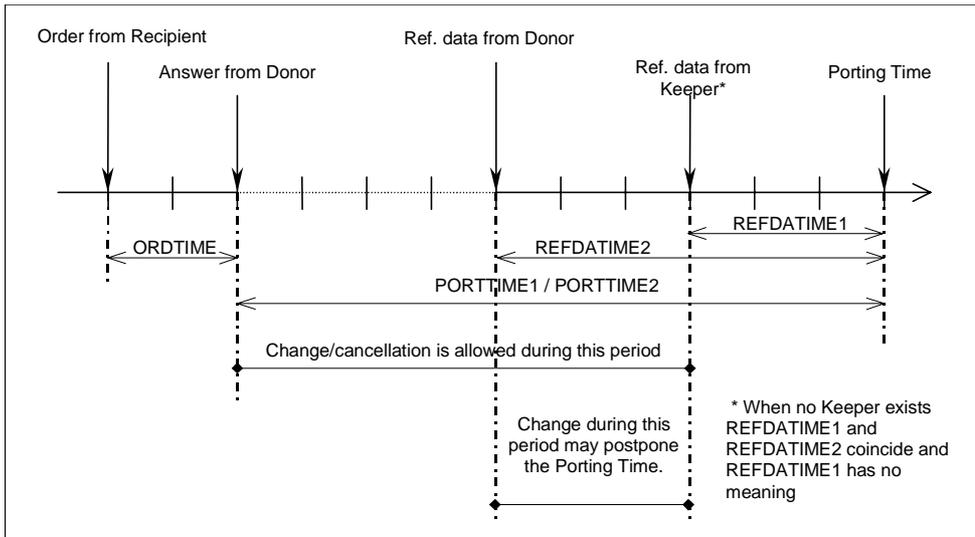


Figure A.1 – Events and timers in connection with porting

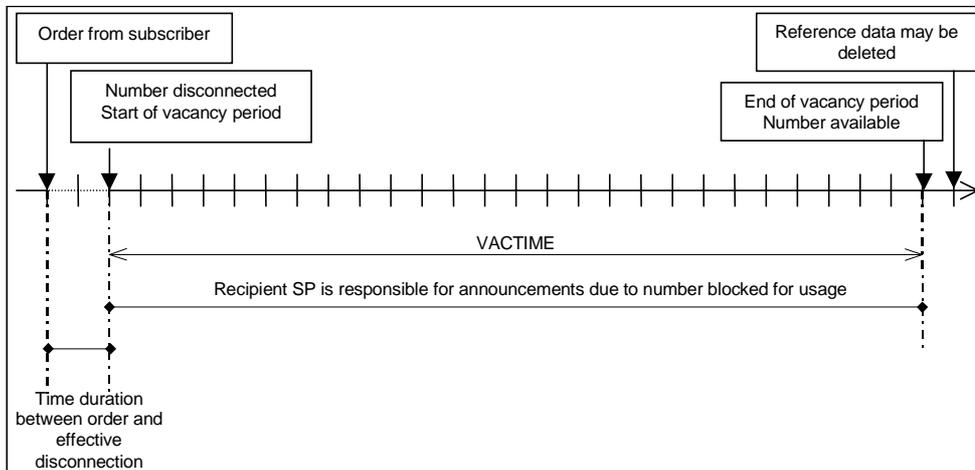


Figure A.2 – Events and timers in connection with cancellation

Timer	Description
ORDTIME	Maximum time for an order to be answered.
REFDATE1	Minimum time prior to the Porting Time in which the Reference Data Keeper shall send Reference Data to PTOs concerned.
REFDATE2	Minimum time prior to the Porting Time in which the Donor SP shall send Reference Data to the Reference Data Keeper/PTOs concerned.
PORTTIME1	Minimum time between the moment at which a correct order has been placed with the Donor SP, and the Porting Time.
PORTTIME2	Maximum time between the moment at which a correct order has been placed with the Donor SP, and the Porting Time.
VACTIME	The time from cancellation of a subscription to a ported number until the date when the number must be returned to the Initial Donor SP.

Table A.2

To reduce the risk of looping between networks while performing a porting, it is important that the change of traffic routing is made in the Recipient Network before it is made in the Donor Network (and also all All Call Query and Direct Routing networks).

The specific times for making changes in each network have to be decided between the PTOs during the ordering.

A.4 Scenario with no Reference Data Keeper

This clause describes the bilateral dialogue between Donor and Recipient SPs to agree to, change or cancel a porting.

The following diagram shows the high level sequence of operations which are performed for the initial porting of a customer from the Donor SP to the Recipient SP.

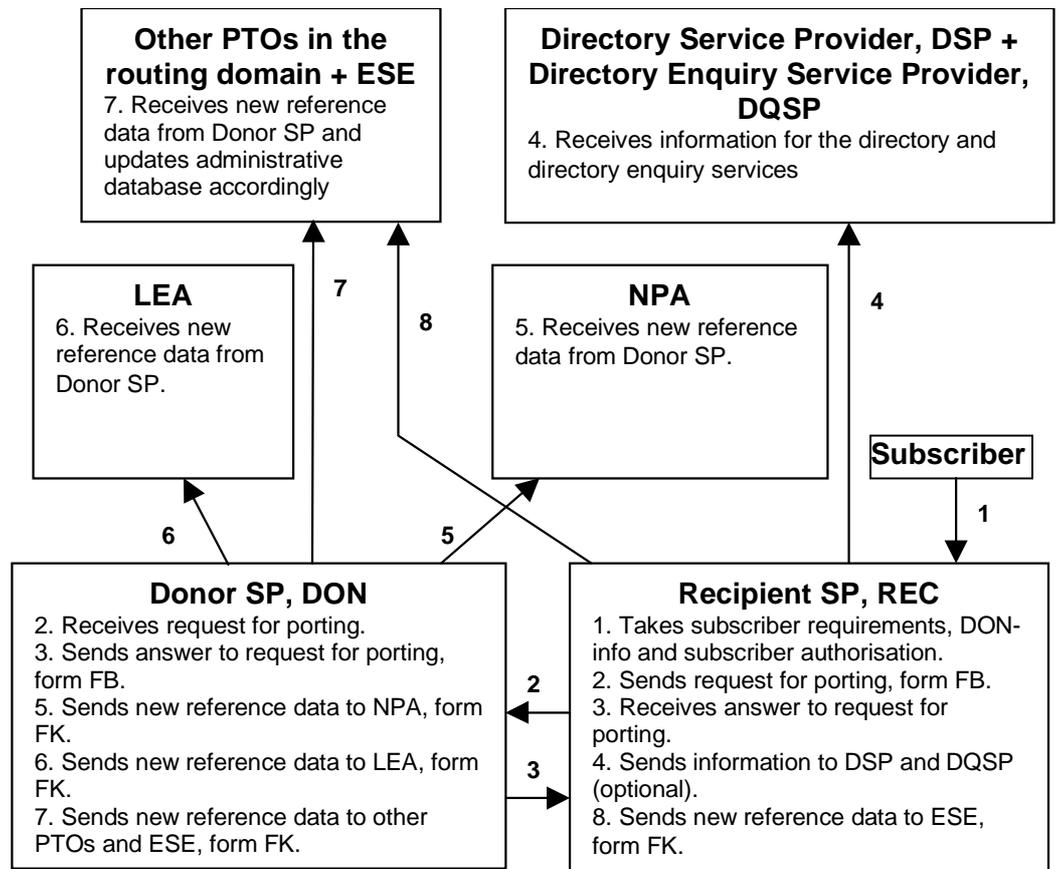


Figure A.3 – High-level sequence flow

The Donor SP will automatically inform NPA, LEA, ESE and all PTOs which so demand by sending information about new/changed/deleted reference data.

The PTOs may be supplied with information about ported numbers on a regular basis from the Donor SP. The method and frequency of information will be bilaterally agreed upon between the PTOs.

A.4.1 Port order

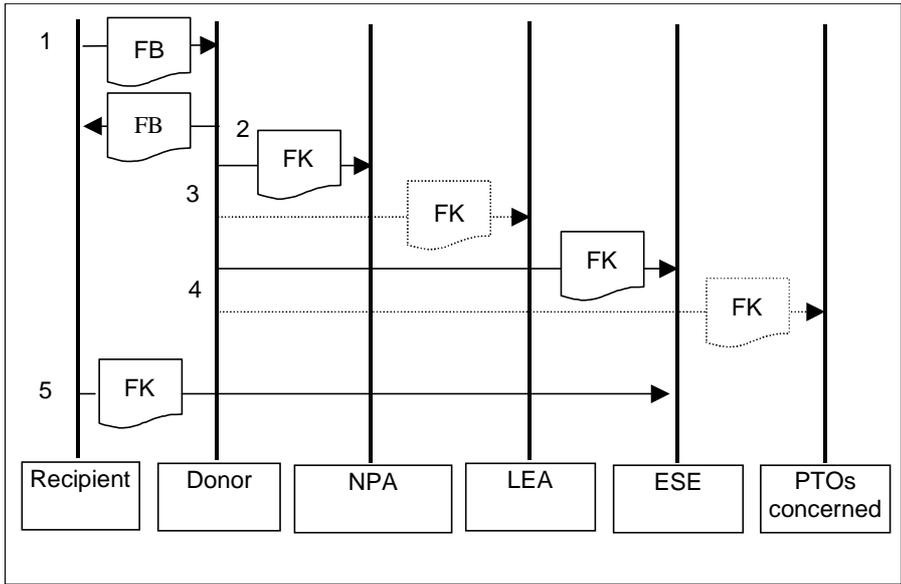


Figure A.4 – Successful order

1. The Recipient SP fills in the order request part of the FB form and sends it to the Donor SP.
2. The Donor SP responds by filling in the answer part of the FB form and returning it to the Recipient SP.
 The order will be either accepted or rejected. If the order is rejected, the Recipient SP has the option of either making a new order request or terminating the order.
3. The Donor SP informs the NPA and if required the LEA about the porting by filling in and sending the FK form.
4. The Donor SP informs the ESE and if required the PTOs concerned by sending form FK.
5. The Recipient SP informs the ESE.

As an option, the Recipient SP will inform the DSP/DQSP about possible new reference data.

A.4.2 Change order

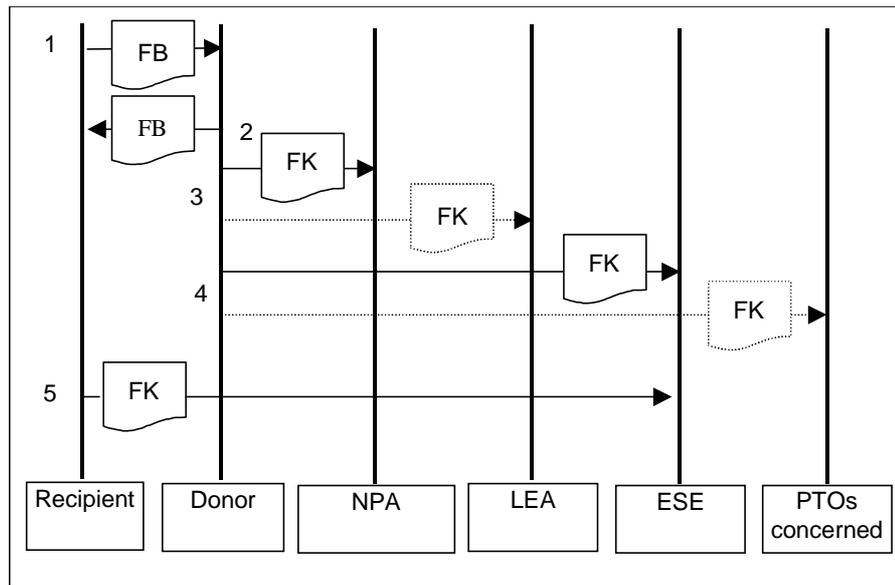


Figure A.5 – Successful change order

1. The Recipient SP ticks the change request box, fills in the order request part of the FB form and sends it to the Donor SP.
2. The Donor SP responds by filling in the answer part of the FB form and returning it to the Recipient SP.
The change order will be either accepted or rejected. If the change order is rejected, the Recipient SP has the option of either making a new change order request or terminating the change order.
3. The Donor SP informs the NPA and if required the LEA about the change by filling in and sending the FK form.
4. The Donor SP informs the ESE and if required the PTOs concerned by sending form FK.
5. The Recipient SP informs the ESE.

If necessary the Recipient SP will inform the DSP/DQSP about possible changed reference data.

A.4.3 Cancellation order by the Recipient Service Provider

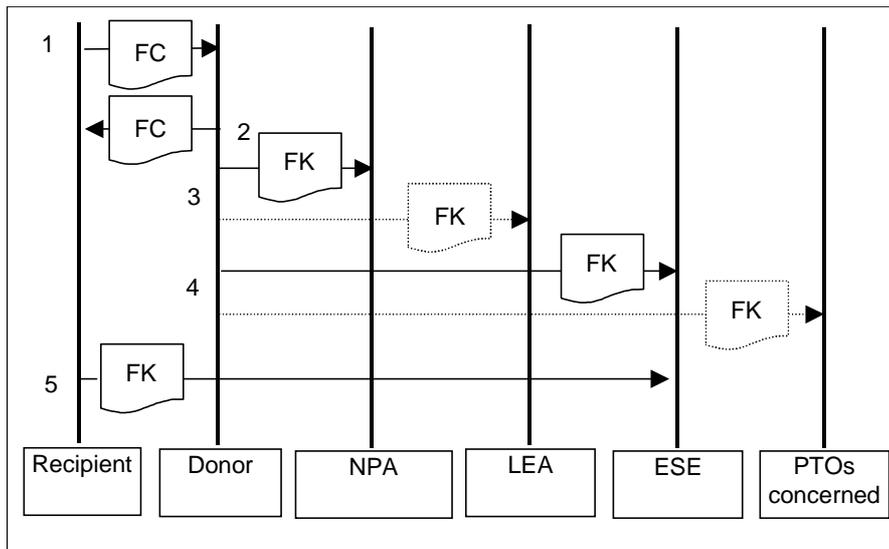


Figure A.6 – Successful order cancellation by Recipient SP

1. The Recipient SP fills in the form FC and sends it to the Donor SP.
2. The Donor SP confirms the cancellation by signing the form and returning it to the Recipient SP.
3. The Donor SP informs the NPA and if required the LEA about the cancellation by filling in and sending the FK form.
4. The Donor SP informs the ESE and if required the PTOs concerned by sending form FK.
5. The Recipient SP informs the ESE.

If necessary, the Recipient SP will inform the DSP/DQSP about possible deleted reference data.

A.4.4 Cancellation order by the Donor Service Provider

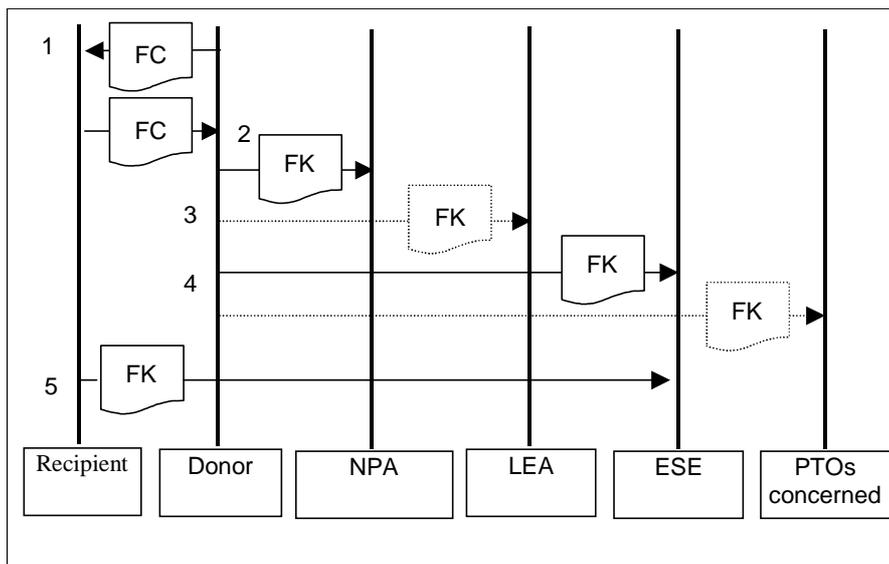


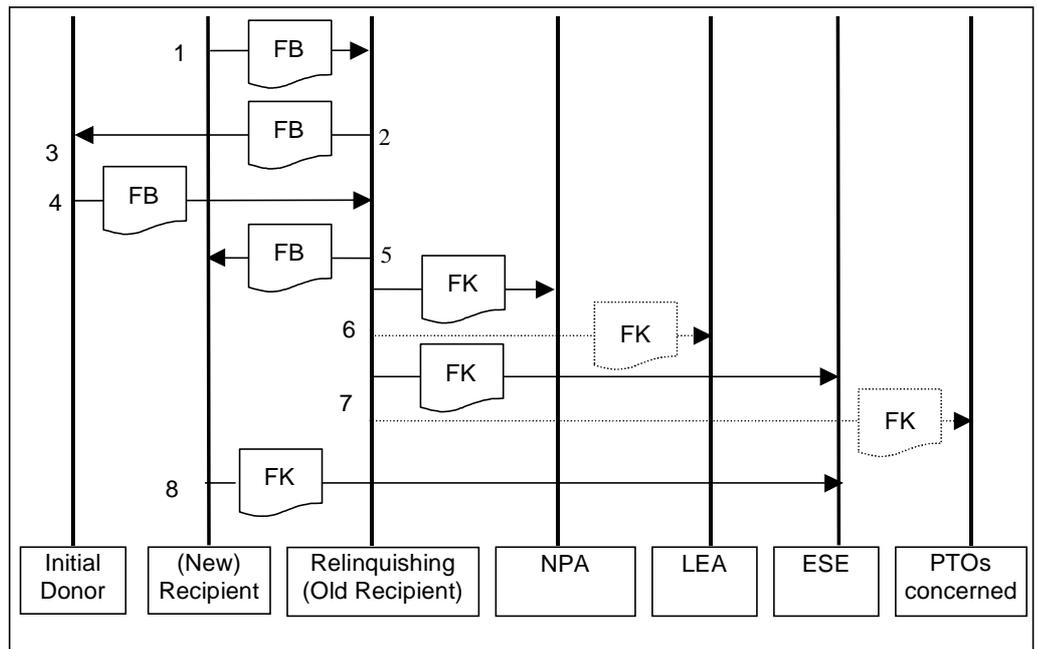
Figure A.7 – Successful order cancellation by Donor SP

1. The Donor SP fills in the form FC, providing the reason for cancellation of an already placed order and sends it to the Recipient SP.

2. The Recipient SP confirms the cancellation by signing the form and returning it to the Donor SP.
3. The Donor SP informs the NPA and if required the LEA about the cancellation by filling in and sending the FK form.
4. The Donor SP informs the ESE and if required the PTOs concerned by sending form FK.
5. The Recipient SP informs the ESE.

If necessary, the Recipient SP will inform the DSP/DQSP about possible deleted reference data.

A.4.5 Subsequent porting



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Figure A.8 – Successful subsequent porting

1. The new Recipient SP ticks the subsequent porting box, fills in the order request part of the FB form and sends it to the Relinquishing SP.
2. The Relinquishing SP forwards the form to the Initial Donor SP.
3. The Initial Donor SP checks if the allowed time for change of routing is sufficient and updates the routing information for the number.
4. The Initial Donor SP fills in the answering part of the FB form and returns it to the Relinquishing SP.
5. The Relinquishing SP forwards the form to the new Recipient SP.
6. The Relinquishing SP informs the NPA and if required the LEA about the porting by filling in and sending the FK form.
7. The Relinquishing SP informs the ESE and if required the PTOs concerned by sending form FK.
8. The Recipient SP informs the ESE.

If necessary, the new Recipient SP will inform the DSP/DQSP about possible changed reference data.

In case the new Recipient SP is not informed by the subscriber that this is a ported number and sends the FB form according to step 1 to the Initial Donor SP instead of to the Relinquishing SP, the Initial Donor SP will reject the request.

Then the new Recipient SP has to inquire from the requesting subscriber about the correct service provider of the number requested for porting.

In the case the subsequent porting concerns a return to the Initial Donor SP, the Initial Donor SP and the new Recipient SP will coincide, and so steps 2, 3 and 4 will be omitted in such a scenario.

This procedure avoids unnecessary "tromboneing" in case the Initial Donor SP applies Onward Routing or Indirect Routing.

A.4.6 Cancellation

A.4.6.1 The number shall be remain with the Recipient SP

This procedure applies at the cancellation of a subscription to a ported number. The last Recipient SP is responsible for announcements to the end user during the vacancy period. During the vacancy period the number is blocked for usage.

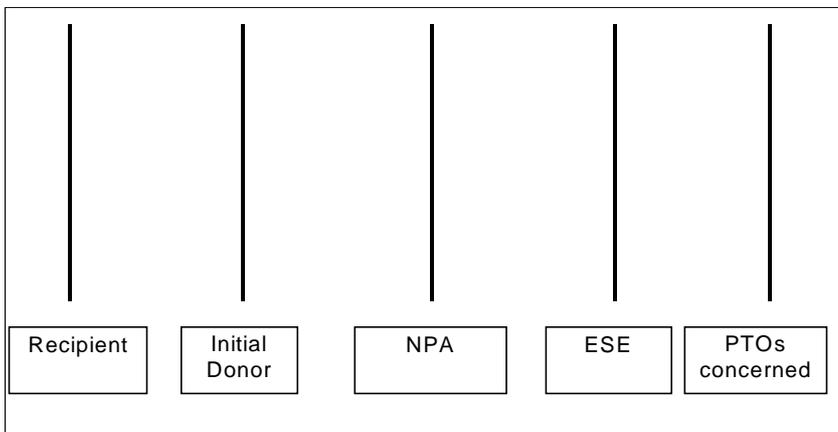


Figure A.9 – Number remains with Recipient SP

If necessary, the Recipient SP will inform the DSP/DQSP about possible deleted reference data.

A.4.6.2 The number shall be returned to the Initial Donor SP

This procedure applies at the cancellation of a subscription to a ported number. The last Recipient SP is responsible for returning the number to the Initial Donor SP. The last Recipient SP also is responsible for announcements to the end user during the vacancy period. During the vacancy period the number is blocked for usage.

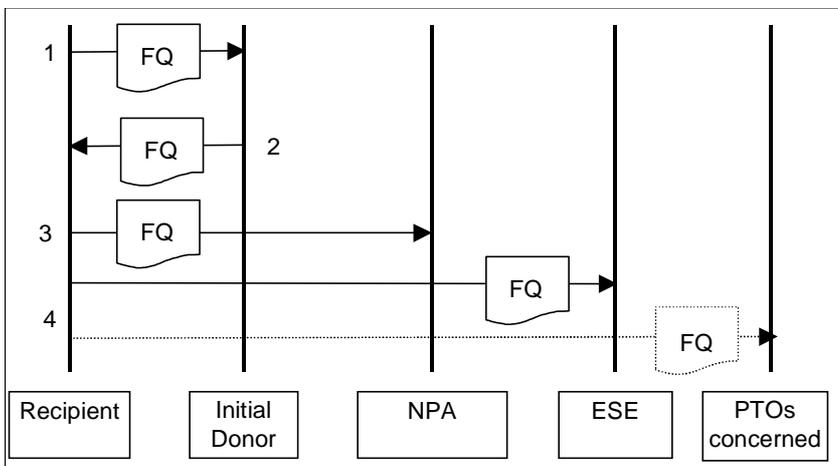


Figure A.10– Number returned to Initial Donor SP

1. The Recipient SP fills in the FQ form and sends it to the Initial Donor SP.

2. The Initial Donor SP acknowledges the information by filling in the acknowledge field of the FK form and returning it to the Recipient SP.
3. The Recipient SP sends the FQ form to the NPA.
4. The Recipient SP sends information about the cancellation to the ESE and if required to all PTOs concerned at the end of the vacancy period.

If necessary, the Recipient SP will inform the DSP/DQSP about possible deleted reference data.

At a predefined time after the end of the vacancy period, the Recipient SP may delete reference data about the Number.

A.5 Scenario with a Reference Data Keeper

This Clause describes the bilateral dialogue between Donor and Recipient SPs to agree to, change or cancel a porting.

The following diagram shows the high level sequence of operations performed for the initial porting of a customer from the Donor SP to the Recipient SP.

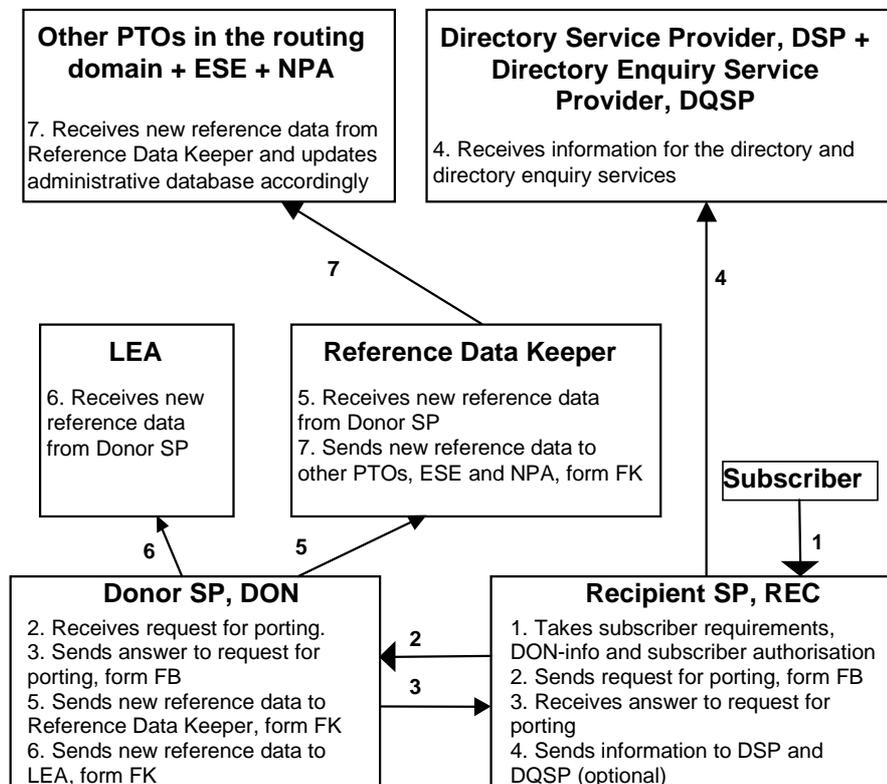


Figure A.11 – High-level sequence flow

The Reference Data Keeper will automatically inform all PTOs and other entities which so demand by forwarding information about new/changed/deleted reference data received from the Donor SP.

Other PTOs and entities will be supplied with information about ported numbers on a regular basis from the Reference Data Keeper. The method and frequency of information will be agreed upon between the PTOs and the Reference Data Keeper.

A.5.1 Port order

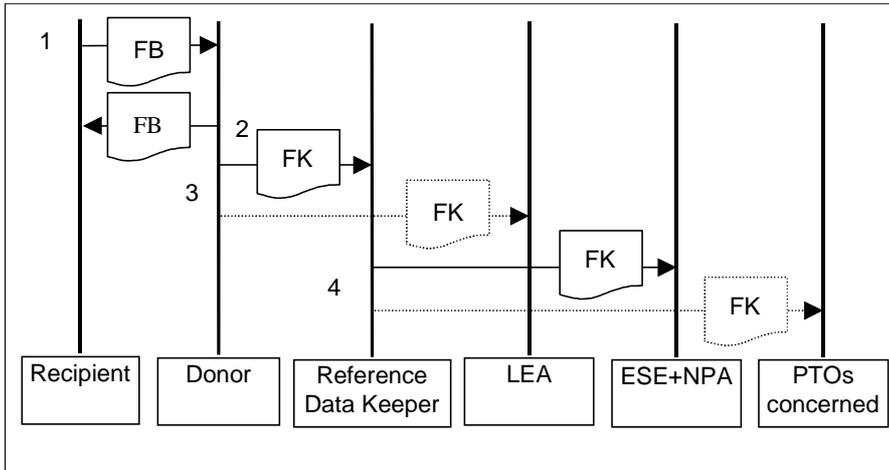


Figure A.12 – Successful order

1. The Recipient SP fills in the order request part of the FB form and sends it to the Donor SP.
2. The Donor SP responds by filling in the answer part of the FB form and returning it to the Recipient SP.
 The order will be either accepted or rejected. If the order is rejected, the Recipient SP has the option of either making a new order request or terminating the order.
3. The Donor SP informs the Reference Data Keeper and, if required, the LEA about the porting by filling in and sending the FK form.
4. The Reference Data Keeper forwards received information to the ESE, NPA and if required to the PTOs concerned.

As an option, the Recipient SP will inform the DSP/DQSP about possible new reference data.

A.5.2 Change order

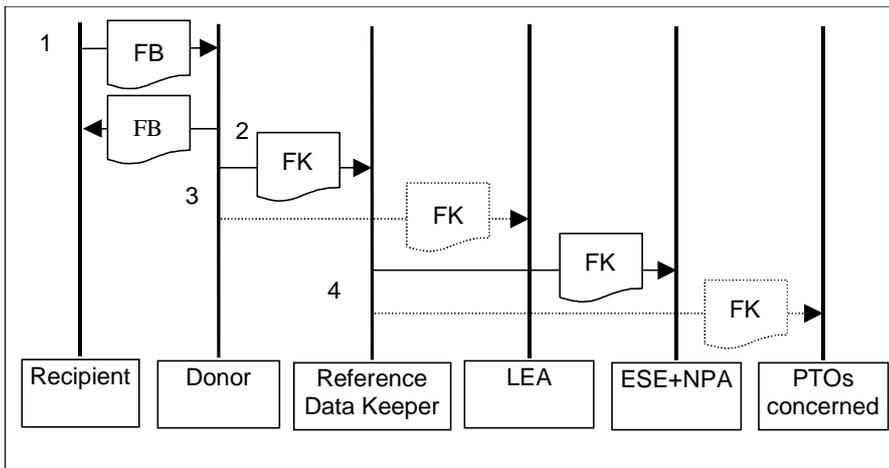


Figure A.13 – Successful change order

1. The Recipient SP ticks the change request box, fills in the order request part of the FB form and sends it to the Donor SP.

2. The Donor SP responds by filling in the answer part of the FB form and returning it to the Recipient SP.
 The change order will be either accepted or rejected. If the change order is rejected, the Recipient SP has the option of either making a new change order request or terminating the change order.
3. The Donor SP informs the Reference Data Keeper and if required the LEA about the change by filling in and sending the FK form.
4. The Reference Data Keeper forwards received information to the ESE, NPA and if required to the PTOs concerned.

If necessary, the Recipient SP will inform the DSP/DQSP about possible changed reference data.

A.5.3 Cancellation order by the Recipient Service Provider

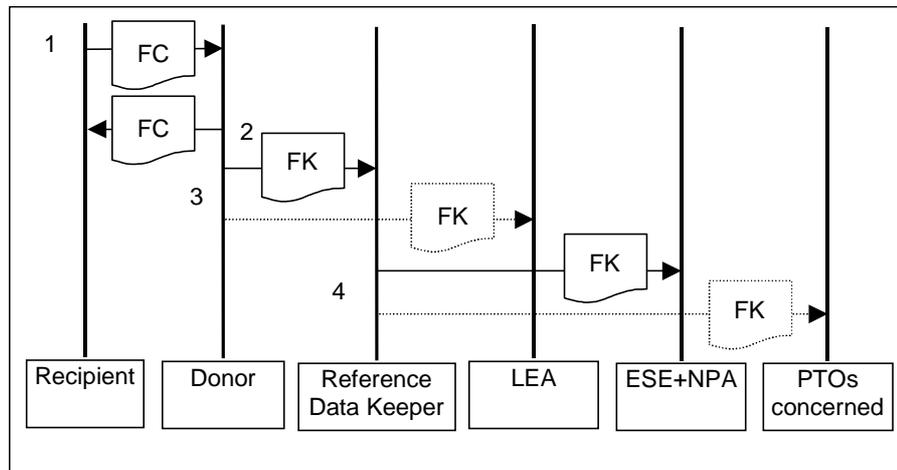


Figure A.14 – Successful order cancellation by Recipient SP

1. The Recipient SP fills in the form FC and sends it to the Donor SP.
2. The Donor SP confirms the cancellation by signing the form and returning it to the Recipient SP.
3. The Donor SP informs the Reference Data Keeper and if required the LEA about the cancellation by filling in and sending the FK form.
4. The Reference Data Keeper forwards received information to the ESE, NPA and if required to the PTOs concerned.

If necessary, the Recipient SP will inform the DSP/DQSP about possible deleted reference data.

A.5.4 Cancellation order by the Donor Service Provider

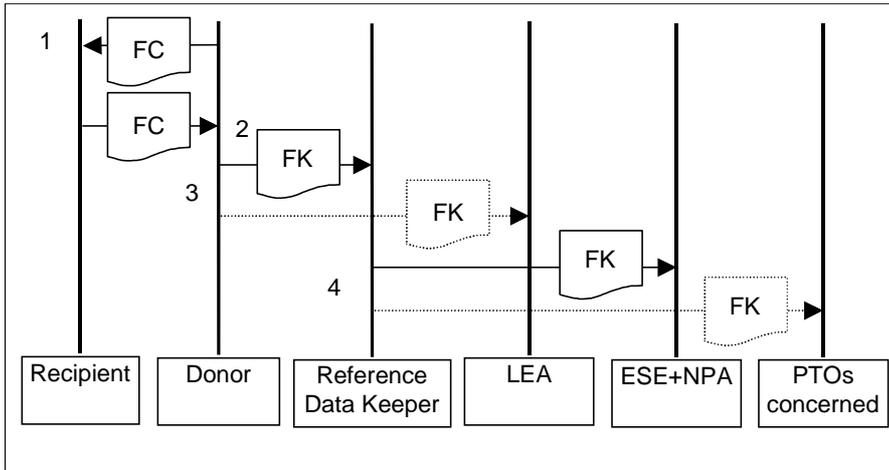


Figure A.15 – Successful order cancellation by Donor SP

1. The Donor SP fills in the form FC providing the reason for cancellation of an already placed order, and sends it to the Recipient SP.
2. The Recipient SP confirms the cancellation by signing the form and returning it to the Donor SP.
3. The Donor SP informs the Reference Data Keeper and if required the LEA about the cancellation by filling in and sending the FK form.
4. The Reference Data Keeper forwards received information to the ESE, NPA and if required to the PTOs concerned.

If necessary the Recipient SP will inform the DSP/DQSP about possible deleted reference data.

A.5.5 Subsequent porting

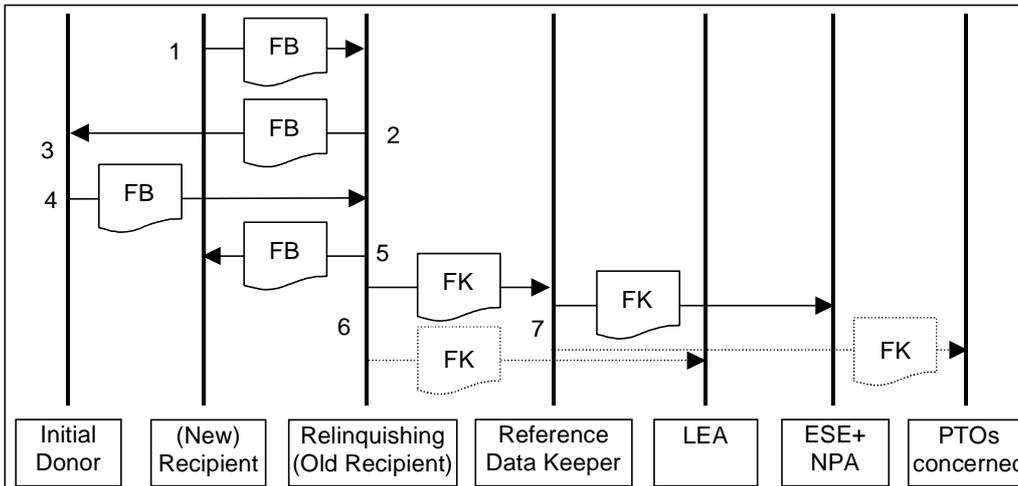


Figure A.16 – Successful subsequent porting

1. The new Recipient SP ticks the subsequent porting box, fills in the order request part of the FB form and sends it to the Relinquishing SP.
2. The Relinquishing SP forwards the form to the Initial Donor SP.
3. The Initial Donor SP checks if the allowed time for change of routing is sufficient and updates the routing information for the number.
4. The Initial Donor SP fills in the answering part of the FB form and returns it to the Relinquishing SP.

5. The Relinquishing SP forwards the form to the new Recipient SP.
6. The Relinquishing SP informs the Reference Data Keeper and if required the LEA about the porting by filling in and sending the FK form.
7. The Reference Data Keeper forwards received information to the ESE, NPA and if required to the PTOs concerned.

If necessary, the new Recipient SP will inform the DSP/DQSP about possible changed reference data.

In case the new Recipient SP is not informed by the subscriber that this is a ported number, and sends the FB form according to step 1 to the Initial Donor SP instead of to the Relinquishing SP, the Initial Donor SP will reject the request. Then the new Recipient SP has to inquire from the requesting subscriber about the correct service provider of the number requested for porting.

In case the subsequent porting concerns a return to the Initial Donor SP, the Initial Donor SP and the new Recipient SP will coincide, and so steps 2, 3 and 4 will be omitted in such a scenario.

This procedure avoids unnecessary "tromboneing" in case the Initial Donor SP applies Onward Routing.

A.5.6 Cancellation

A.5.6.1 The number shall be remain with the Recipient SP

This procedure applies at the cancellation of a subscription to a ported number. The last Recipient SP is responsible for announcements to the end user during the vacancy period. During the vacancy period the number is blocked for usage.

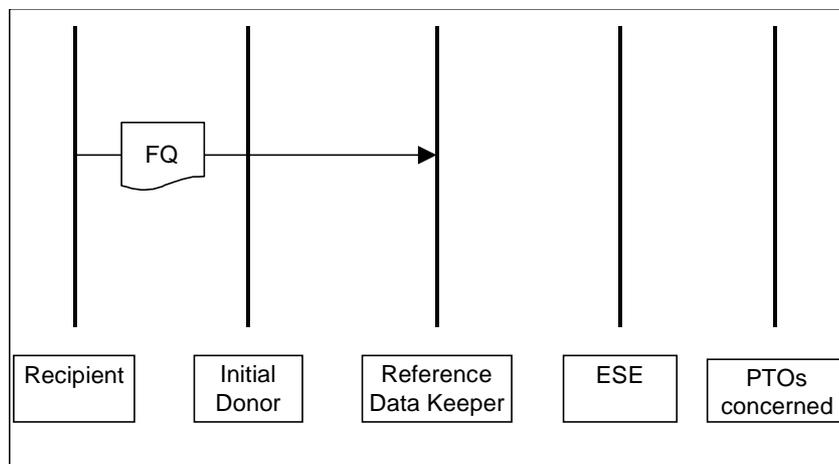


Figure A.17– Number remains with Recipient SP

The Recipient SP fills in the FQ form and sends it to the Reference Data Keeper.

If necessary, the Recipient SP will inform the DSP/DQSP about possible deleted reference data.

At a predefined time after the end of the vacancy period, the Reference Data Keeper may delete reference data about the Number.

A.5.6.2 The number shall be returned to the Initial Donor SP

This procedure applies at the cancellation of a subscription to a ported number. The last Recipient SP is responsible for returning the number to the Initial Donor SP. The last Recipient SP is also responsible for announcements to the end user during the vacancy period. During the vacancy period, the number is blocked for usage.

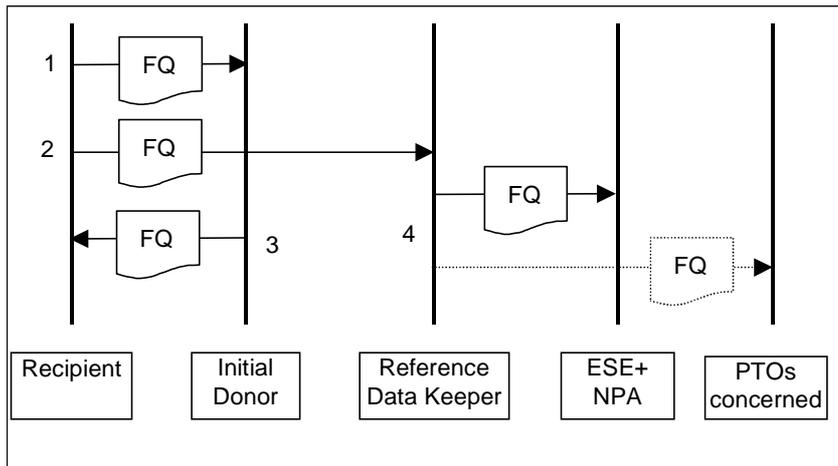


Figure A.18 – Number returned to Initial Donor SP

1. The Recipient SP fills in the FQ form and sends it to the Initial Donor SP.
2. The Recipient SP sends the FQ form to the Reference Data Keeper.
3. The Initial Donor SP acknowledges the information by filling in the acknowledgment field of the FK form and returning it to the Recipient SP.
4. The Reference Data Keeper forwards the information about the cancellation to the ESE, NPA and if required to all PTOs concerned at the end of the vacancy period.

If necessary, the Recipient SP will inform the DSP/DQSP about possible deleted reference data.

At a predefined time after the end of the vacancy period, the Reference Data Keeper may delete reference data about the International Directory Number.

A.6 Error handling

If any form lacks or presents incorrect information, the receiver of that form will make a notation and return it to urge the sender to re-send the form with correct information.

If the information is still missing or incorrect, the process will be terminated.

A.7 Security

The same requirements apply as in Subclauses 13.6 and 13.7 of the main document.