

TELECOMMUNICATIONS REGULATORY AUTHORITY BAHRAIN



هيئة تنظيم الاتصالات
Telecommunications Regulatory Authority

Central System Specification

Version: 1.0
Status: Final
Date: 31-10-2010

Modification History

Issue	Date	Modification
0.1	02-10-2009	First Draft
0.2	16-11-2009	Updated after review and WG meetings
0.3	09-12-2009	Review of specification text, clarifications, and proof-reading in preparation for public consultation
0.4	14-01-2010	Formatting changes
0.5	31-07-2010	Incorporated feedback from Consultation
0.6	02-09-2010	Final review
0.7	06-09-2010	Update following the NP Specification Document
1.0	18-10-2010	Finalised version

Distribution

Issue	Date	Addressees
0.1	02-10-2009	CDB WG, TRA
0.2	16-11-2009	CDB WG, TRA
0.3	09-12-2009	Public Consultation
0.4	09-12-2009	TRA
0.5	29-03-2010	TRA
0.6	02-09-2010	TRA
0.7	06-09-2010	TRA

Review History

Issue	Date	Review By
0.1	22-10-2009	Review by STC and ZAIN (see DRF documents)
0.2	09-12-2009	Review by TRA
0.3	Consultation Period	Batelco, STC, ZAIN, Ericsson, GIZA Systems, Syster (Public Consultation) TRA

Referenced Documents

Reference	Description
[1]	Number Portability Regulation issued by the Telecommunications Regulatory Authority; 27-04-2010
[2]	National Numbering Plan, 10-09-2008, final version
[3]	Number Portability Process Specification, Final v1.0; 31-10-2010
[4]	Routing & Charging Specification, Final v1.0; 31-10-2010

Contents

1	Introduction	5
1.1	NP implementation in Bahrain	5
2	Number Portability (NP)	6
2.1	Definitions	6
3	NP Procedures and the Central System	7
3.1	The Central System for Number Portability	7
3.2	Number Porting procedures and exchanged messages	7
3.2.1	Phase 1: Preparation.....	7
3.2.2	Phase 2: Execution.....	8
3.2.3	Phase 3: Deactivation	8
3.2.4	Phase 4: NP Query.....	9
3.2.5	Phase 5: Billing Resolution.....	9
4	Central System for Number Portability	11
4.1	General Requirements.....	11
4.2	Detailed requirements	11
4.2.1	Clearing House for message validation and message handling and routing	11
4.2.2	Interface for Licensees and Other Parties	12
4.2.3	Operator administration and system configuration	12
4.2.4	Ported Number Database.....	13
4.2.5	Reporting on NP execution and performance	13
4.2.6	Delivery of NP Query Results	17
4.2.7	Test operator platform.....	17
4.2.8	Provide the ability for Licensees to update and/or synchronise their Licensee Copy with the Ported Number Database	17
4.3	Architecture.....	18
4.3.1	Overview	18
4.3.2	Connection of Operators to the Central System	18
4.4	Technical Requirements	19
4.5	Performance Requirements	20
4.5.1	System performance requirements.....	20
4.6	Process Requirements.....	20

Specification [2]: Central System Specification

4.7	Service Level Agreement	20
5	Central System for Number Portability	22
	Glossary	24

1 Introduction

This document is issued pursuant to Article 3 of the Number Portability Regulation (the “Regulation”) issued by the Telecommunications Regulatory Authority of the Kingdom of Bahrain (TRA) on April 27, 2010¹. It contains the detailed specification for the Central System and its processes associated with both Fixed Number Portability (FNP) and Mobile Number Portability (MNP) as must be implemented within the Kingdom of Bahrain.

1.1 NP implementation in Bahrain

Article 6 of the Regulation establishes that Number Portability is a Recipient-led process that is initiated when a Subscriber submits a valid Number Portability Request and any necessary supporting documents to the Recipient Operator. Article 6(c) of the Regulation explicitly prohibits contact between the Donor Operator and the Subscriber in the context of Number Portability. Consequently the Recipient Operator, through the Central System, coordinates all communications concerning Number Portability.

Details on the Number Portability Process are referenced in Specification [1], Number Portability Process Specification.

Details on routing and charging processes are specified in Specification [3], Routing and Charging Specification.

Article 5(a) of the Regulation obliges all Licensees granted a Telecommunications License that allows the use of Numbers to implement Number Portability. Article 4 mandates the use of a Central System by all such Licensees, who must be connected to the Central System and use it in accordance with the Number Portability Specifications.

Article 11 of the Regulation articulates that the Authority will establish and administer the Central System and that each Licensee obliged to implement Number Portability shall bear its own costs relating to its own copy (Licensee Copy) of the Central System, connectivity between the Licensee Copy and the Central System as well as routing and support systems required in order to comply with the obligations of the Regulation. Figure 1 illustrates the Number Portability network that will be implemented as a consequence of the Regulation.

¹ The Number Portability Regulation is available at “http://www.tra.org.bh/en/pdf/NPRegulation-English_2_.pdf”

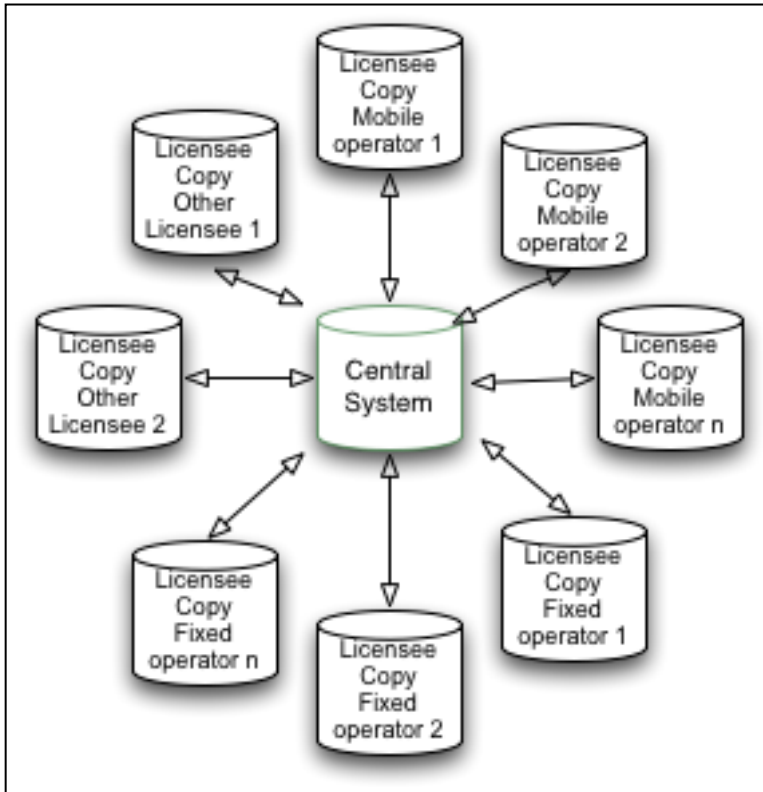


Figure 1 Centralized model for Number Portability Implementation

All Licensees must be able to connect to the Central System. All Licensees have the potential to be involved in the Number Portability process as a Donor Operator, Recipient Operator or Block Operator, depending on the Number Ranges involved in the Porting Request.

2 Number Portability (NP)

2.1 Definitions

Unless otherwise stated herein all capitalized terms will have the same meaning as that ascribed to it in the Regulation, the National Numbering Plan or the Telecommunications Law.

“**Other Operator**” means any party involved in a particular instance of the Number Portability Process other than the Donor Operator or Recipient Operator.

“**Serving Operator**” means the network on which the Subscriber is located.

“**Subscription Network**” means the network to which a Number has been Ported.

3 NP Procedures and the Central System

For all procedural steps, the Central System needs to update the Number Porting Account and log all executed actions including the time stamp of those actions for a particular Number belonging to that account. The Central System should also set timers for responses to be received, where applicable. For each “Port-ID” assigned, an Account should be kept in the Central System that logs all actions, messages and timers applicable to that Port-ID. If a Number has been Ported several times then several accounts should be kept which are linked to that Number.

The relevant format validation rules for each procedural task are defined in Specification [1], NP Process Specification.

3.1 The Central System for Number Portability

All messages exchanged in the Porting phases are exchanged between participants via the Central System.

3.2 Number Porting procedures and exchanged messages

The Number Porting Process is described in detail in Specification [1], NP Process Specification. The requirements for the Central System derived from those Process Specifications are:

3.2.1 Phase 1: Preparation

- Receiving Porting Request messages, format validation of messages and the ability to send Error Notifications to the message sender. The Central System will accept Porting Requests (as well as other messages) outside of the Porting Window, but will process them at the earliest opportunity once the Porting Window is open.
- Assignment of Port-ID and registration of Porting Request Account.
- Sending of Porting Request Acknowledgement messages to the Recipient Operator, with the Port-ID included.
- Validation of Porting Request, ability to send NpRequestReject messages.
- Forwarding of NpRequest message to the Donor Operator.
- Receiving NpRequestReject and NpRequestAccept messages from the Donor Operator.
- Format validation of messages and ability to send Error Notifications to the message sender.
- Distribution of NpRequestReject and NpRequestAccept messages to the Porting Request initiator (Recipient Operator).
- Retransmission (as appropriate) of any messages sent by the Central System in case Error Notifications are received from Licensees connected to the Central System.

To perform these tasks the Central System needs:

- 1) Format validation rules. These rules are defined in Specification [1], NP Process Specification. An unsuccessful format validation will lead to an Error Notification.
- 2) Message validation rules. These rules are defined in Specification [1], NP Process Specification.
- 3) Being able to implement the requirements of the Execution Phase (Phase 2)

3.2.2 Phase 2: Execution

- Receiving Porting Execution messages, format validation of messages and the ability to send Error Notifications to the message sender.
- Distribution of Porting Broadcast messages to the Donor Operator and all Other Operators. The Central System will manage to which parties the Porting broadcast is to be sent, and which parties are expected to respond with Porting Executed messages.
- Receiving Porting Executed messages. Format validation of messages and ability to respond with Error Notifications to the message sender.
- Distribution of Porting Executed message to the requester of the Porting Request. At a minimum, when the Donor operator has responded successfully to the Porting Execution Message the Central System will send a Porting Executed message to the Recipient Operator (default configuration). The Central System will be able to optionally configure whether:
 - the key transit operators should also have responded;
 - a set of other operators should also have responded;
 - all operators should also have responded.
- Retransmission (as appropriate) of messages sent by the Central System in case Error Notifications are received from Operators connected to the Central System.

3.2.3 Phase 3: Deactivation

- Receiving Deactivation messages, format validation of messages and the ability to send Error Notifications to the message sender.
- Assignment of Port-ID and registration of Deactivation account.
- Sending of Deactivation Acknowledgement message to the Recipient Operator, with the Port-ID included.
- Distribution of Deactivation messages to the Block Operator and all other Operators. The Central System will manage to which other parties the Deactivation Broadcast message is to be submitted, and which parties are expected to send Deactivation Complete messages.

- Receiving Deactivation Complete messages. Format validation of messages and the ability to send Error Notifications to the message sender.
- Distribution of Deactivation Complete message to the requester of the Deactivation. At a minimum, when the Block Operator has responded successfully to the Deactivation Broadcast Message the Central System will send the Deactivation Complete message to the Subscription network (default configuration). The Central System will be able to optionally configure whether:
 - the key transit operators should also have responded;
 - a set of other operators should also have responded;
 - all operators should have responded.
- Retransmission (as appropriate) of messages sent by the Central System in the event that Error Notifications are received from Operators.

3.2.4 Phase 4: NP Query

- Receiving the NpQuery message. Format validation of messages and the ability to send Error Notifications to the message sender.
- Distribution of the NPQueryComplete message.
- The Central System will store a file for the requestor that contains the requested data at a designated location. The query process allows for specific criteria including Service Type, Porting start date/time, Porting end date/time, Operator Code, Number and Number Range.
- Retransmission (as appropriate) of messages sent by the Central System in case Error Notifications are received from Operators connected to the Central System.

3.2.5 Phase 5: Billing Resolution

- Receiving the NpBillingResolution and NpBillingResolutionReceived messages and the ability to send Error Notifications to the message sender.
- Transmission of the NpBillingResolution message to the Subscription Network Operator.
- Transmission of the NpBillingResolutionReceived message to the Donor Operator.
- Receiving the NpBillingResolutionEnd and NpBillingResolutionAlert messages from the Donor Operator and the ability to send Error Notifications to the message sender.
- Distribution of NpBillingResolutionEnd and NpBillingResolutionAlert messages to the Subscription Network Operator.
- Retransmission (as appropriate) of any messages sent by the Central System in case any Error Notifications are received from Operators connected to the Central System.

To perform these tasks the Central System needs:

- 1) Format validation rules. These rules are defined in Specification [1], NP Process Specification. An unsuccessful format validation will result in an Error Notification.
- 2) Message Validation rules. These rules are defined in Specification [1], NP Process Specification.

The Central System will raise a flag for each Number that has an ongoing Billing Resolution process. If the flag is raised, the Central System will reject any new Porting Requests for that Number. Specific Reject Codes have been defined for such cases. Upon completion of the Billing Resolution process, regardless of outcome, the flag will be removed.

If a Porting Request for a Number has already been approved, but not completed, prior to the initiation of a Billing Resolution process on the same Number, the Central System will block the execution of the Porting Execution message. Specific Error Codes have been defined for such cases.

4 Central System for Number Portability

4.1 General Requirements

Functions of the Central System are:

1. Clearinghouse for message validation and message handling and routing;
2. Interface for Licensees and other parties to conduct Number Porting transactions (machine-to-machine interface);
3. User Administration and System configuration;
4. Hosts and maintains the Ported Number Database;
5. Provides the ability for Licensees to update and/or synchronize their Licensee Copy with the Ported Number Database;
6. Delivery of NP Query results;
7. Reporting on Number Portability execution and performance;
8. Test operator platform;

4.2 Detailed requirements

4.2.1 Clearing House for message validation and message handling and routing

The clearinghouse functions of the Central System are described above in 3.2 *Number Porting procedures and exchanged messages*, and are based on Specification [1], NP Process Specifications. The Central System performs all format validations as described in the Specification.

The initial message validation checks to be applied by the Central System are:

- 1) Check if a Porting is already in progress for the Number requested;
- 2) Check if the Recipient Operator, Donor Operator, Origination ID and Destination ID are valid in the context of the Number Porting Request and the Number requested for Porting;
- 3) Check if the Service Type of a Porting Requests matches the Number to be Ported
- 4) Check if the Number requested to be Ported is, according to the Number Management System and/or the Ported Number Database, serviced by the Operator the Porting Request is intended for (Correct Donor Operator validation).

- 5) Check if the authentication data provided (some combination of CPR, Passport Number and/or Commercial Register Number as per the validation rules in Specification [1]) is correct in relation to the Company Flag (“N” for private entity or “Y” for a business entity).

The Central System will support the Porting preparation, execution, and deactivation procedures during the Porting Window. The NP Query process will be supported by the Central System on a 24/7 basis.

The Central System will process each Porting Request at the first opportunity to do so (e.g. if the Porting Request is submitted outside of the Porting Window, it will be processed as soon as the Porting Window is open). If a Subscriber wishes to Port a Number at some future date then the Recipient Operator holds the Porting Request and submits it when the requested Porting date has come within reach (i.e. maximum three days before the requested Porting date to account for 1 day Donor Operator response time and 2 day Porting Process time).

4.2.2 Interface for Licensees and Other Parties

The interface for Licensees to the Clearing House function is primarily a machine-to-machine interface.

4.2.2.1 Machine-to-Machine interface

Electronic communications between the Central System and the Licensee are to be set to exchange Porting messages in an automated way. The messages will be defined in XML format. As part of the Central System an XML gateway will be defined within each Licensee's network in order for the Operator to send and receive XML messages.

For the machine-to-machine interface, Licensees must be capable of connecting directly to the Central System through dedicated links or leased local connectivity. Connections through the Internet will not be allowed. Licensees must provide their own connectivity to the Central System.

4.2.3 Operator administration and system configuration

The Central System will have a system administrator function that will be able to establish necessary user and system privileges and configurations.

System administration will involve password administration for system access. Passwords will be subject to retention and change procedure for passwords, protection from unauthorized use and denial of access rights for misuse.

System administration will also support User Profile Management. The purpose for User Profile Management is to group all users of the Central System in different authority levels in relation to what each user is allowed to do in the system. System users will be system administrator personnel, TRA personnel and Licensee personnel.

The different authority levels are:

- System Administrator Rights
- Read/Write Access Rights for defined areas and functions of the Central System
- Read-only Access Rights

The Central System shall also manage a configurable list of Operator Codes and corresponding Routing Numbers.

4.2.4 Ported Number Database

The Ported Number Database will contain information on the state of all Numbers, in every Number Range allocated by TRA that is subject to Number Portability.

For each Number, the Ported Numbers Database will list:

- The Subscription Network
- The Routing Number
- Reference to the Ported Number Account(s) (logging of history and details of Porting procedures related to the Number and Port-ID)
- Status (not Ported, Ported, deactivated, etc.)

The Ported Numbers Database will be capable of providing reports on the total volume of Ported Numbers (per operator, per Number Range, per time/date window).

In case a change is made, or attempted to be made, to the Ported Numbers Database, a record is required to log who, when and why the change was made and the result of the change attempt.

The Central System should have the ability to configure Number Ranges according to the National Numbering Plan of the Kingdom of Bahrain.

The Ported Number Database will also include the ability for Licensees to update their Licensee Copy of the Database, whether as a full update or an incremental update.

4.2.5 Reporting on NP execution and performance

The Central System administrator shall measure the performance of all Licensees, on an individual Operator basis.

Total Number of Porting Requests:

This is the Number of Porting Requests that have been submitted by Recipient Operators. The report should provide, on a per-day basis, the total number of Porting Requests, and

subtotals per Recipient Operator. The subtotals should further be broken down on a per Donor Operator basis.

Number of Rejected Porting Requests:

This is the number of rejected Porting Requests that have been received by Recipient Operators. The report should, on a per-day basis, provide the total number of rejected Porting Requests, the subtotals of rejected porting requests per Reject Code, the subtotal of rejected Porting Requests from the Central System and rejected porting requests from the Donor Operator. The subtotals should be further broken down on a per Donor basis. The total and subtotals of rejected Porting Requests should also be provided as a percentage of the total number of Porting Requests for the given period.

Number of Accepted Porting Requests:

This is the number of accepted Porting Requests that have been received by Recipient Operators. The report should provide, on a per-day basis, the total number of accepted Porting Requests, and the subtotals on a per Donor Operator basis. The total and subtotals of rejected Porting Requests should also be provided as a percentage of the total number of Porting Requests.

Number of Porting Requests successfully executed within the expected Porting time:

The report should provide the total number of Porting transactions that were executed within the expected Porting time, on a per day basis. The number should also be provided as a percentage of the total number of planned porting for the particular day (per day and per quarter).

Number of Porting Requests successfully executed later than the expected Porting time:

The report should provide the total number of Porting transactions that are executed (per day, per quarter and per annum, subdivided by Donor Operator):

- 1) 1 working day late
- 2) 2 working days late
- 3) 3 working days late
- 4) 4 working days late
- 5) 5 working days late
- 6) More than 5 working days late

The number should also be provided as a percentage of the total number of planned Porting transactions for the particular day (per day, per quarter and per annum).

Number of unsuccessfully executed Porting Requests:

The report should provide a total number of Porting Requests that were not executed within the expected time frame. The number should also be provided as a percentage of the total number of planned Number Ports (per day, per quarter and per annum).

Number of Porting Requests cancelled by the Recipient Operator:

The report should provide a total number of Porting Requests cancelled by the Recipient Operator (per day, per quarter and per annum).

Donor response times:

The report should provide a summary of response times from the Donor Operator to the Porting Request (on a per day, per quarter and per annum basis, subdivided by Donor Operator):

- 1) Within 4 working hours
- 2) Within 8 working hours
- 3) Within 16 working hours
- 4) Longer than 16 working hours

Number of Error Notifications:

This is the number of Error Notifications that have been sent or received by the Central System. The report should (on a per-day basis) provide the total number of Error Notifications, the subtotals per Error Code, the subtotal of Error Notifications sent by the Central System and received by the Central System per Destination/Origination, as well as the breakdown per Message Type.

Number of Deactivations:

This is the number of Deactivations that have been executed by the Central System. In order to monitor the return if Numbers to the Block Operators, the report should (on a per day, per month and per quarter basis) provide the total number of Deactivations, the total number of Deactivations per Block Operator, and the total number per Subscription Network.

Number of Billing Resolution cases:

This is the total number of Billing Resolution cases that have been initiated distributed by the Central System. The report should (on a per day, per month and per quarter basis) provide the total number of Billing Resolution initiated (on a per Donor Operator basis), the total number of Billing Resolution End messages sent (on a per Donor Operator basis), the total number of Billing Resolution Alert messages (on a per Donor Operator, and on a per level basis) and the total number of Maximum Billing Resolution Alert time expiries.

KPI reports:

The following Key performance Indicators are defined for the NP Process. These KPIs can also be referenced in Section 11: Key Performance Indicators (KPI) of Specification [1]: Number Portability Process Specification.

Name of Timer	Timer value	KPI
Porting Request Acknowledge time (T1)	5 minutes	At least 98% of Porting Acknowledgements should be sent by the Central System to the Recipient

Specification [2]: Central System Specification

		Operator within 5 minutes.
The Central System check on blocking issues (T2)	15 minutes	At least 98% of Porting Rejections should be sent by the Central System to the Recipient Operator within 15 minutes.
DONOR check on blocking issues (T3, T4)	8 working hours	At least 98% of Porting Requests received by the Donor Operator must be responded to within 8 working hours.
Standard Porting time (T11)	Maximum 16+8 working hours	At least 98% of Number Ports requested should have been executed at the planned date of execution.
Porting Execution Time (T6)	10 minutes	At least 95% of Porting execution cases by the Donor Operator must be completed within 10 minutes.
Porting Broadcast Time (T5a/b)	15 minutes	At least 95% of Porting broadcast execution cases by other operators must be completed within 15 minutes.
Deactivation Acknowledge time (T7)	5 minutes	At least 98% of Deactivation Acknowledgements should be sent by the Central System to the Recipient Operator within 5 minutes
Deactivation Time (T8a)	30 minutes	At least 95% of Deactivation cases by the Block Operator must be completed within 30 minutes.
Deactivation Broadcast Time (T8b)	30 minutes	At least 95% of Deactivation Broadcast cases by other operators must be completed within 30 minutes.

The Central System should be capable of delivering all reports on a per day, per month, and per quarter basis, unless specifically specified otherwise.

At the beginning of each Gregorian calendar quarter, the Central System administrator should provide a full report with all statistics for the preceding Gregorian calendar quarter. The Central System should also provide, at the beginning of each Gregorian calendar quarter, a summary of the total number of Numbers currently being served by each respective operator, in addition to the type of Numbers served (this is required for TRA to charge for numbers allocated).

All reports should be available in EXCEL (.XLS and .XLSX), .csv format, and XML formats.

The Central System should have the flexibility to configure additional new reports as and when required.

4.2.6 Delivery of NP Query Results

After receiving an NP Query message from a Licensee, the Central System will query the Ported Number Database, collect the requested data, generate a file and store the file at a specified folder location in the Central System accessible by the requesting Operator.

By receiving an NP Query Complete message the Licensee is notified that the file is available at the folder location.

4.2.7 Test operator platform

The Central System will be able to act as a Test Operator platform through which 'real' Network Operators can execute simulated Porting procedures against a virtual network operator. In this way the operational processes can be tested in a live environment.

4.2.8 Provide the ability for Licensees to update and/or synchronise their Licensee Copy with the Ported Number Database

The Central System should provide a mechanism to allow Licensees to synchronize or update their local copy of the Ported Number Database through a synchronisation process between databases. This will be on both an incremental basis and a total update basis.

4.3 Architecture

4.3.1 Overview

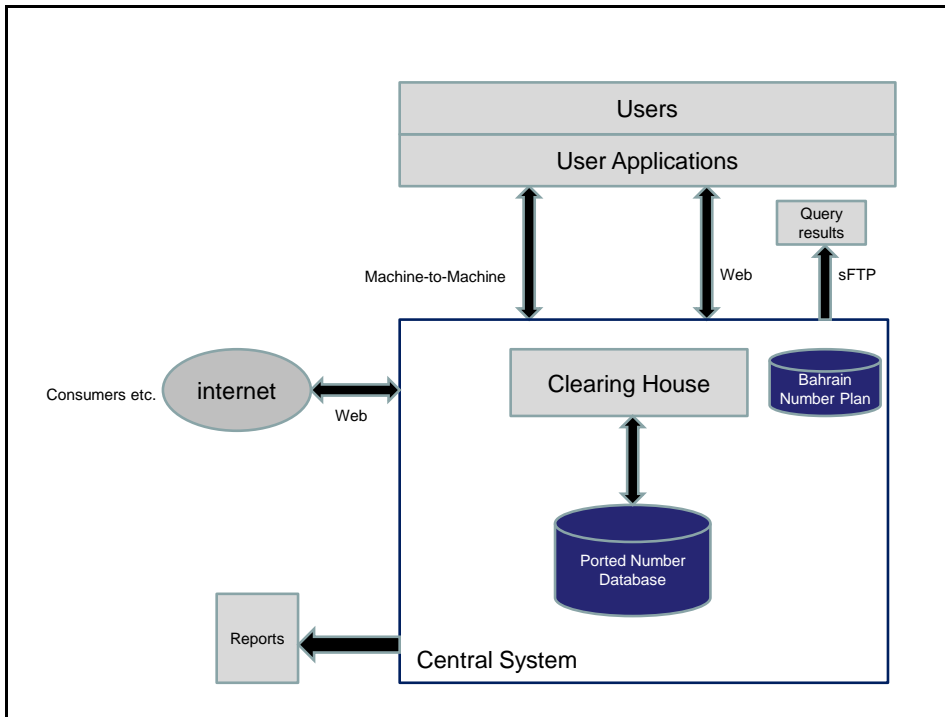


Figure 2 Architecture overview of the Number Portability Implementation

4.3.2 Connection of Operators to the Central System

Licensees must be connected to the Central System. The Central System communicates with the Licensees through a Gateway located in the Licensees' IT infrastructure. Through this gateway, the Licensee can send and receive XML formatted messages. The gateway at the Licensees' end is not considered to be part of the Central System. This communication is depicted in Figure 3 above. The Licensee needs to insert and collect XML messages/files in designated dedicated folders in the IT infrastructure of the Licensee. The communication gateway will also be used for collection of reports that the Central System submits to each individual Licensee, as well as NP Query results.

Secure transmission in this respect is the responsibility of the Central System, and of the Central System supplier.

The physical connectivity between the Central System Gateway and Central System communication module is the responsibility of each individual Licensee and can be any secure communications channel or media. However, Internet connections are not considered appropriate channels and are not allowed.

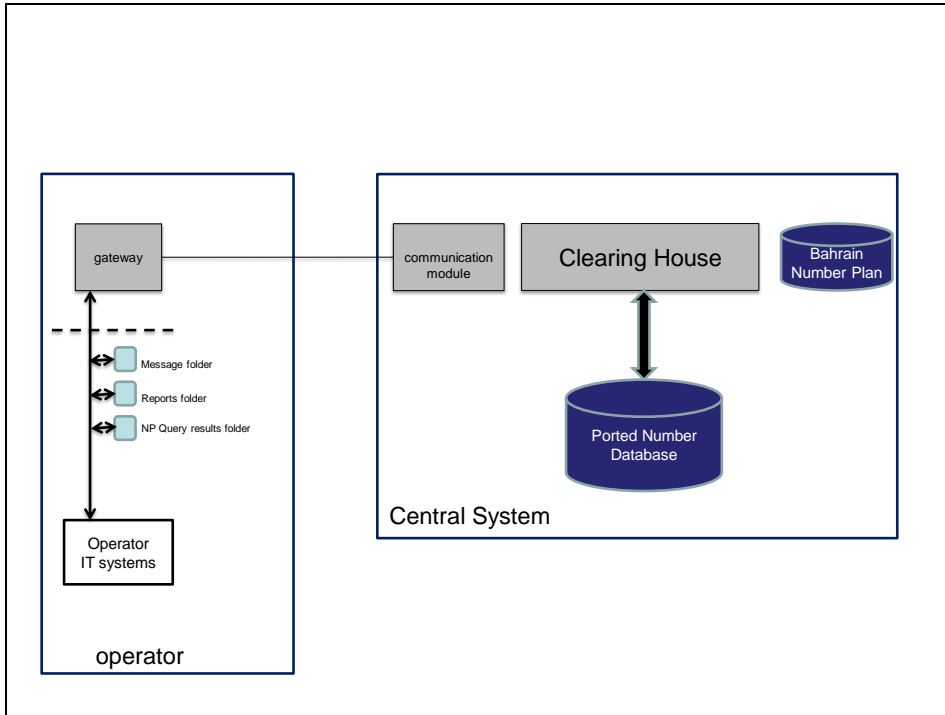


Figure 3 Connection of Licensees to the Central System

4.4 Technical Requirements

The Central System should be located in the Kingdom of Bahrain. The System must accommodate simultaneous multiple user access.

The communication of the Central System shall be based on, but not restricted to, at least the following communication protocols:

- Transaction based communication (TCP/IP)
- File based communication (FTP, sFTP, SCP)
- Web-based communication: HTML, HTTP/SOAP (asynchronous or synchronous mode), HTTPS/SSH
- Machine-Machine communication: XML

The Central System needs to provide a mechanism to send a technical confirmation to the sender (Licensee) to acknowledge a message was received correctly by Central System. This mechanism is not defined in the NP Specification Document as it is supposed to be of a technical nature. The confirmation messages should assist the System Administrators to monitor and analyze inconsistencies and errors in the Number Portability Process execution.

4.5 Performance Requirements

4.5.1 System performance requirements

The operational availability of the system should be at least 99.95% during the established working periods of each process or functionality.

The Porting Preparation, Execution, Deactivation and Billing Resolution procedures are operational during the Porting Window. The NP Query process is operational on a 24/7 basis.

Regular Support and Maintenance which require downtime to the Central System should be done outside the Porting Windows and do not count against the operational availability. These Support and Maintenance activities will be scheduled according to established SLAs.

The Central System should be recognized as the most accurate and authoritative source of Ported Number information. The accuracy of the Ported Number Database should be at least 99.999 per cent.

Completed Porting Requests, including Porting Request history, shall be saved in the active database for 3 years and in a secondary storage device thereafter. All Ported Numbers however, not their transaction history, should be kept in the active database.

4.6 Process Requirements

The Central System is not a network node that will be used for queries for real-time routing of calls. Each Licensee is responsible for obtaining the correct routing information by using a local copy of the Central System Ported Number Database, known as the Licensee Copy. The Licensee should maintain their Licensee Copy, either by incremental updates from Porting Execution messages, or by regularly synchronizing with the Central System Number Porting Database.

4.7 Service Level Agreement

A Service Level Agreement with the supplier of the Central System is required to define:

- Details of services to be provided by the System administrator to the operators
- Helpdesk Services
- Trouble Ticket (TT) management process
- Change Management process
- Response times
- Resolution time
- Resolution procedures and definitions

- Assignment of Contact persons
- Time to configure a new Licenseed or to change an existing one

The Central System should be backed up continuously. In case of recoverable failures, failure recovery of the system must be completed within a short time frame. This time frame will be defined by TRA in conjunction with the supplier of the Central System. It must be possible to back-up the system without disturbing the functionality of the system.

5 Central System for Number Portability

The data chart below represents the key data elements for the Central System Data model. Each box represents a data entity. There are 1:1 relations between the data entities, and 1:n relations between data entities. A Number may have a relation to one or several porting identities (Port_ID). Each Port_ID will have a relation to several message Codes and associated messages. In this way all message content that has been sent in various Number Porting procedures will be kept in the Central System Repository. In a similar way Error Notification message content is held in relation to a Port_ID. For each Port_ID a Status is kept in the Central System. Statuses will have values e.g. Porting Request received from Recipient, Porting Request Acknowledged, Waiting for Response from Donor etc. The Port_ID will be the primary reference to keep associated Timer values, as well as Billing Notification Period, Maximum Alert Time, and Minimum Alert Time.

Each Number in the Central System will have a relation to a data element Status. This is the status of the number itself e.g. Allocated to Block Operator, Ported, Backported, Deactivated.

For each Number, the Subscription Network value is kept in the Central System. This could be the Block Operator, or any network operator the Number is Ported to. The Subscription network is the network where the Number is currently supported. Each Number also has an associated data element known as the Billing Resolution Flag. The Billing Resolution Flag identifies if a Billing Resolution Procedure is in progress, so that the Central System is aware how to manage additional Porting Request and Porting Execution messages.

Although for most data elements it is not explicitly stated in the Data Model, the history of each values for each data element should be stored. These elements will be defined in further details during the final design and acceptance of the Central System.

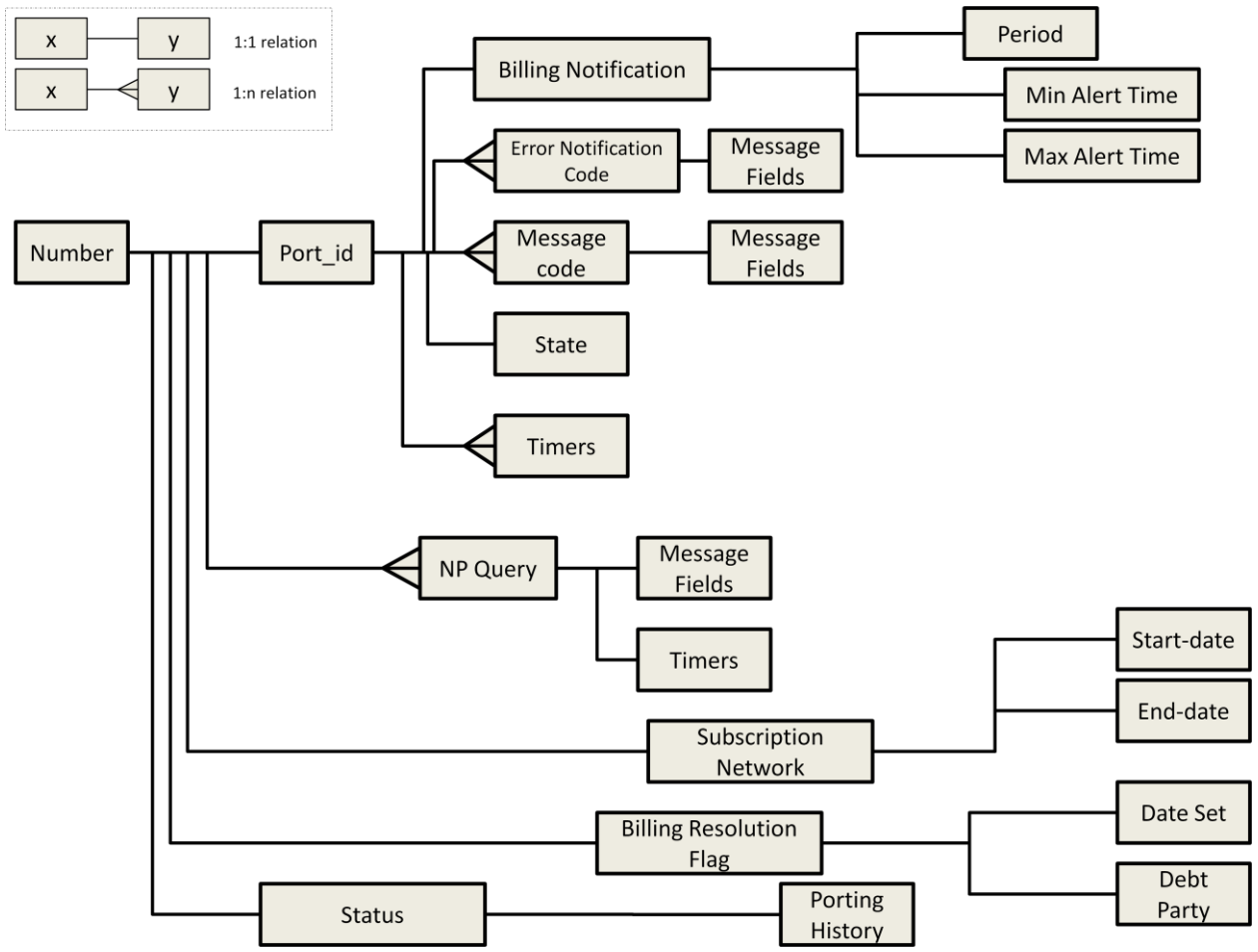


Figure 4: Data Relation Diagram

Glossary

ACQ	All Call Query, a routing method for Number Portability.
Back port	A Porting where the Number Ports back to the Block Operator/ original Number holder.
Bad Debt	'Bad Debt' is defined as 'unpaid fees, bills or other dues that have been invoiced and notified to a Subscriber, in direct relation to a Number that has been Ported out, which have passed the due date and are equal to or over BHD 3 in value. By this definition, unpaid fees which have not been invoiced or contractual payments which are not yet due (such as installment plans) do not constitute Bad Debt status, nor do any dues that were not communicated or notified to the Subscriber. Bad Debt is one of the possible reasons to reject a Porting Request. If the Subscriber that wishes to Port a Number has been issued an invoice for which the stated due date has passed (and a notification of that status has been issued to the Subscriber by SMS, by email, by postal delivery or by automatic call announcement), and the minimum amount of debt value (BD 3) is exceeded then the Donor Operator can reject the Porting Request for reasons of 'Bad Debt'.
Billing Notification Period	After the completion of a Number Porting (Recipient Operator having received Porting Executed message), if (bad) debt exists within the Billing Notification period then the Donor Operator may start the Billing Resolution Process.
Billing Resolution Process	A process which aids the Donor Operator in recovering outstanding Bad Debt from a previously Ported Subscriber. The Billing Resolutions process may result in the clearance of Bad Debt and the resumption of normal service to the Number; the disconnection of the Number; or a 'time-out' of the process which leads to the resumption of normal service to the Number.
Block Operator	The Licensee who is the original holder of a Ported Number-as it has been assigned the range.
Central System	The system for Number Portability in the Kingdom of Bahrain is referred to as the Central System. The Central System acts as the clearing House for message validation and message handling and routing, provides the communications channels for Licensees and other parties and holds the Ported Number Database.
Deactivation process	This process concerns the return of a Number to the Block Operator holding the Number Range to which the previously Ported Number belongs to. This return will take place within a maximum period of 30 days (Return Period) after the Subscription Network has disconnected a Number which has been previously Ported to the Subscription Network. The Ported Number must be returned to the Block Operator if the Subscriber has been disconnected for any reason other than onward Porting. Only the Block Operator is entitled to re-use the Number for a new subscription.
Destination	(In the context of call routing) The Licensee which is receiving a call.

Specification [2]: Central System Specification

Network	
Donor Operator	The Licensee who is transferring the Number to the Recipient Operator.
Execution	This process concerns the actual execution of the Number Porting between a Recipient Operator and a Donor Operator of the agreed Number within the defined timeframe.
FNP	Fixed Number Portability
FTA	Fixed Terminating Access fee, In Kingdom of Bahrain referred to as 'PSTN Terminating Access'
HLR	Home Location Register
IAM	Initial Address Message (ISUP)
IMSI	International Mobile Subscriber Identity. Number used for identification of a mobile subscriber. It is stored on the SIM card and sent by the phone to the network.
IOT	Inter Operator Tariff
ISUP	ISDN User Part or ISUP is part of the Signaling System #7 which is used to set up telephone calls in Public Switched Telephone Networks.
MAP	Mobile Application Part (ss7 signaling stack)
MCC MNC	Mobile Country Code & Mobile Network Code, also 5 (in USA 6) digits of IMSI
MMSC	Multimedia Messaging Service Centre
Maximum Resolution Alert Time	The maximum time between service degradation levels during the Billing resolution process is called the Maximum Billing Resolution Alert time. The Billing Resolution Alert Message should have been received before the Maximum Billing Resolution Alert Time expires. If the Maximum Billing Resolution Alert Time expires, the Billing Resolution Process is terminated and the subscription (using the Ported Number) returns to normal status.
MCC MNC	Mobile Country Code & Mobile Network Code, also 5 (in USA 6) digits of IMSI
Minimum Billing Resolution Alert Time	The minimum time between service degradation levels during the Billing resolution process is called the Minimum Billing Resolution Alert Time. After the Minimum Billing Resolution Alert Time expires the Donor Operator may send a Billing Resolution Alert Message, to force the Recipient Operator to a next level of degradation.
MNP	Mobile Number Portability
Number Portability	Messages exchanged via the Central System during the Porting Process: between

Messages	Recipient Operator and Donor Operator and Other Operator
MSISDN	Mobile Subscriber Integrated Services Digital Network Number
MTA	Mobile Terminating Access fee
NP	Number Portability: the capability for a Subscriber to change Licensee without changing their Number
Number Portability Phase	<p>The Number Porting Process consists of five procedures, not all of which are invoked sequentially:</p> <ol style="list-style-type: none"> 1. Preparation 2. Execution 3. Deactivation 4. Query 5. Billing Notification
NSN	National Significant Number, in Bahrain this is in the format ABCDEFGH
OR	Onward Routing
OLO	Other Licensed Operator
Other Operator	Other operator or other participants in the Porting Process: other mobile operators and fixed (transit) operators which are informed about the Porting of Numbers or deactivation of previously Ported Numbers via broadcast messages
Operator Code	A code used in Number Portability messages to identify a participant (example: ZAIN or the Central System). Used in fields like DONOR_ID, RECIPIENT_ID, ORIGINATION_ID.
Originating Network	(In the context of call routing) The Licensed Operator originating a call
Preparation process	This process concerns the information exchange between a Recipient Operator and a Donor Operator in order to accept or reject the Number Porting Request of a Subscriber.
Port-ID	Unique ID assigned by the Central System. To be used in messages referring to a specific Porting instance. It is constructed by a 4 digit Recipient Operator code-4 digit Donor Operator code- date of sending the Porting Request YYYYMMDD- 5 digit sequence number restarted each day. The combination of Date and Sequence Number is unique. Example: ZAIN-BATM-20100907-00001
Ported Number	The Number that a subscriber wishes to keep when changing from one Licensee to another. The Number shall be transferred from the Donor Operator to the Recipient Operator during the Porting process.

Query process	This process concerns the query to the Central System for some or all Numbers. The query may concern individual Numbers, ranges of Numbers, a certain time span or a specific Operator's Numbers that are Ported. This message is not to be confused with real-time Number Portability lookups performed for call processing within each Licensee's network.
Recipient Operator	The Licensee to whom the Number is being Ported.
Routing Number (RN)	A number (example a01) which is used to route voice calls or signaling (such as SMS) to the correct Subscription Network. This number is used in the Porting Broadcast messages, which allows participants to update their routing tables accordingly (also known as 'pointers').
Service Provider	A Service Provider is a reseller, using the equipments (such as SIM cards), and Numbers of a Licensee under its own brand. The Licensee will have to take responsibility for the Porting Process as it is responsible towards TRA to meet the terms of the Number Portability Regulation and is liable in case the reseller violates the Regulation.
SMS-C	Short Message Service Centre
Subscription Network	The currently serving Network for a given Number. Once a Number has been Ported to the Recipient Operator, then the Recipient Operator is further referred to as the Subscription Network.
SUBMISSION_ID	The SUBMISSION_ID is an identifier that the Recipient Operator adds to the Porting Request. Based on the SUBMISSION_ID the Donor Operator is able to identify Numbers which have been submitted as part of a single batch for a single Subscriber.
SRI_SM	Send Routing Info for Short Message (MAP)
TOR	Terms of Reference
Transit Network	Licensee carrying traffic between the Originating Network and Destination Network
Universal Number	A Number that may be defined as either a Fixed or Mobile Number by the Block Operator to whom Number Range has been allocated. Once defined as either Fixed or Mobile, the Number is no longer considered to be Universal and follows all the relevant processes, rules and restrictions of its type.
V-MSC	Visited Mobile Switching Centre