



International Journal Of
**Recent Scientific
Research**

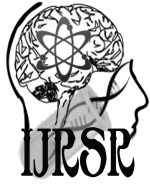
ISSN: 0976-3031
Volume: 7(5) May -2016

MOBILE NUMBER PORTABILITY IMPLEMENTATION PROCEDURES, IN SUDAN
ZAIN'S EXPERIENCE

Fatima khalaf alla abdelazim hamad and
D.Mohammed Abaker Hussian



THE OFFICIAL PUBLICATION OF
INTERNATIONAL JOURNAL OF RECENT SCIENTIFIC RESEARCH (IJRSR)
<http://www.recentscientific.com/> recentscientific@gmail.com



ISSN: 0976-8031

Available Online at <http://www.recentscientific.com>

International Journal of Recent Scientific Research
Vol. 7, Issue, 5, pp. 11057-11062, May, 2016

**International Journal of
Recent Scientific
Research**

Research Article

MOBILE NUMBER PORTABILITY IMPLEMENTATION PROCEDURES, IN SUDAN ZAIN'S EXPERIENCE

Fatima khalaf alla abdelazim hamad and D.Mohammed Abaker Hussian

Engineering - Al Neelain University-Khartoum, Sudan

ARTICLE INFO

Article History:

Received 11th February, 2016
Received in revised form 14th March, 2016
Accepted 18th April, 2016
Published online 28th May, 2016

Keywords:

MNP, Ported Number, service provider, donor network, ACQ.

ABSTRACT

Number portability services or technology that enables users to keep your phone number after moving from services provider to another which have evolved in the area of quality of services and make the client satisfaction or customer is the upper hand. And sparked completion among service providers to compete by providing better service to customers ,otherwise the customer will move easily to any other service provider offer best Qos. Qos include availability, speed (band width data rate) and delay, as well as in the prices of the services and application available. In this paper we will take the implementation procedure of this service in term of technical side from the point of view of service provider. Will take company in the field telecommunication in Sudan ZAIN as an example.

Copyright © Fatima khalaf alla abdelazim hamad et al., 2016, this is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

This paper provides MNP technology by study of the network in ZAIN Communication Company. And is an integrated project between all service providers under supervision and management of the NTC. Have been many changes in network nodes such as Core Network Nodes is MSS FNR and HLR configuration changes and add new features to activation this new service.

Main Principles and Major changes

- ACQ (All Call Query) is the adopted routing mechanism.
- Introduce of New field in the voice CDR (called Party MNP Info).
- SMS CDRs were not changed.
- Ported in subscribers will be allocated in HLR 5&6.
- New interrogation routes towards FNRs were defined.
- New Routes for incoming international towards ported out subscribers were defined [1].

Executive manager ZAIN (CEO: Alfatih Earwa), said that the company has moved from the Fair usage policy system to quotas system. It is universally used quotas system. This system allows the Internet users to choose the package that suits the needs of them, Change of the service system is offset by excellent services, good quality of system and high-speed Internet up to 42Mbps. The change that has occurred in the

company's system play a role in the transmission of users from and to the company. Here comes the role of MNP service. Which made it easier for users to benefit from this new system, which provides better service quality and transformation to ZAIN Where the Chief Executive stressed that the number of users who have asked to join after uses of the quota system of 400 users out of 2.4 million users Internet in ZAIN, note that the number of subscribers nearly 12 million and the numbers of users asked to convert their numbers to his company 4585 to join the ZAIN versus 2086 asked to go to the competitive company [2].

RELATED WORKS

This paragraph has been reviewing a group of countries has implemented this technique and compared with each other in a simple points main task, comparison between countries vary according to the work on the basis of demand and consumption, infrastructure and timing of implementation to take advantage of the experiences of previous country when implementation, geography of the country and market depends on postpaid or prepaid:

UK experience: United Kingdom Very large competing market in field of communications. The uses of the FNP was not widespread in the UK as in the US, Most of the world did not care FNP because they are no longer available and does not have a strong competitive market such as MNP example, both India and Malaysia, Saudi Arabia does not have FNP, In the

*Corresponding author: *Fatima khalaf alla abdelazim hamad*
Engineering - Al Neelain University-Khartoum, Sudan

UK it has been used the mechanism of indirect routing (onward) It is cheaper and less expensive than the mechanism of direct routing and there are no Data Base centralized and their uses generated other problems later in this way donor network is that collect call charges and routing call if the donor network fails for any reason, many users will lose their numbers because there are no network heading their calls .It became clear in the kingdom that the network architecture has become limited and they have a promotion network in less than one week and increased operators and user complaints about loss of services and applications and the denial of port requests and promotions due to limited architectural NP And the absence of procedural controls the United Kingdom is still the only country in which the customer must obtain a license upgrade code (PAC). Regulatory body OFCOM changes the system to a central system ACQ in 2006 [3].

USA: in United States plenty of postpaid service and customer in US depends on the application and service offered by 3G, 4G unlike what is happening in India. Save the mobile number has a higher priority than the cost of moving, 1994 800 (non-geo), 1999 Fixed, 2003 mobile. Services and devices are generally bundled together, allowing customers to transfer their telephone numbers at will between fixed, mobile, and VoIP carriers(full Number portability [4][3].

INDIA: plenty of prepaid service and the dominance of the 2G service the use of wireless handsets that support multiple carriers, low penetration of fixed telephony. Implement number portability in India the best solution is to implement the centralized system number porting database, and use the All Call Query (ACQ) call routing scheme to route the calls, some complaints from user like porting transactions that take seven days and are likely to include down time, little perceived benefit and too many rejections all will make subscribers turn away from number portability [4].

Saudi Arabia: first Arabic country has implementation MNP in 2006.the convertibility of numbers is weak and rate of rejected request was high in first 12month were more than half requests for following reason: Not match ID (security threat), Non-payment of bills. To reduce the rejection request it was limited the reason of reject in four points:

- **The number to be ported separated**
- **Data submitted is identical to the data recorded in the donor network**
- **Non-payment of bills**
- **If ported number from another network must exceed two month to port to another one.**

The uptake on portability has been low—less than 2 percent in 2011, according to Yankee Group estimates, Time to execute a porting transaction Postpaid 5days Prepaid1day.

Factors that affect of the MNP success cannot be clear between countries must therefore regulator and services provider depends on their markets local properties [3].

Lesson learned

- Choice of technology wisely.
- Future Plans to upgrade architectural MNP to avoid the problems that can take place in the future.

- Study all the ways to implement the project and choose the best and most appropriate, taking into account its impact on the long term.
- Organizers and service provider's one hand to the project's success
- Should things up, even if things have become very well in the beginning[3]

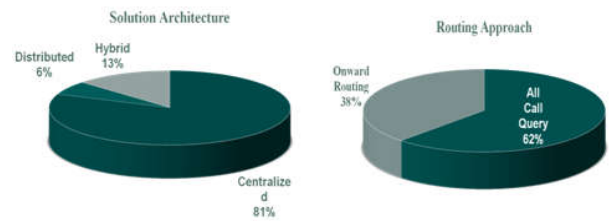


Figure (1) [5]

TYPE OF NUMBER PORTABILITY

Number portability enables customers to switch between services, locations, or operators while retaining the original mobile number.

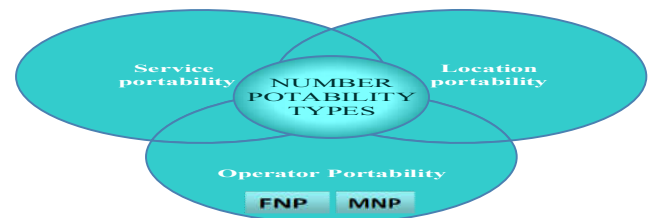


Figure (2)

Service Portability save the same number phone when you change from service to another, and enjoy by services in the same way when they roam outside their home networks, like covert between from basic telephone to ISDN (Integrated Service Digital Network)

Location portability saves the same number phone when you change from location to another [6].

Operators portability saves the same number phone when you change from services provider to another within the same service area fixed to fixed, or mobile-to-mobile, had to type:

- **Fixed Number Portability (FNP)** is portability of fixed geographic number.
- **Mobile Number Portability (MNP)** is the portability of mobile telephone numbers [7].

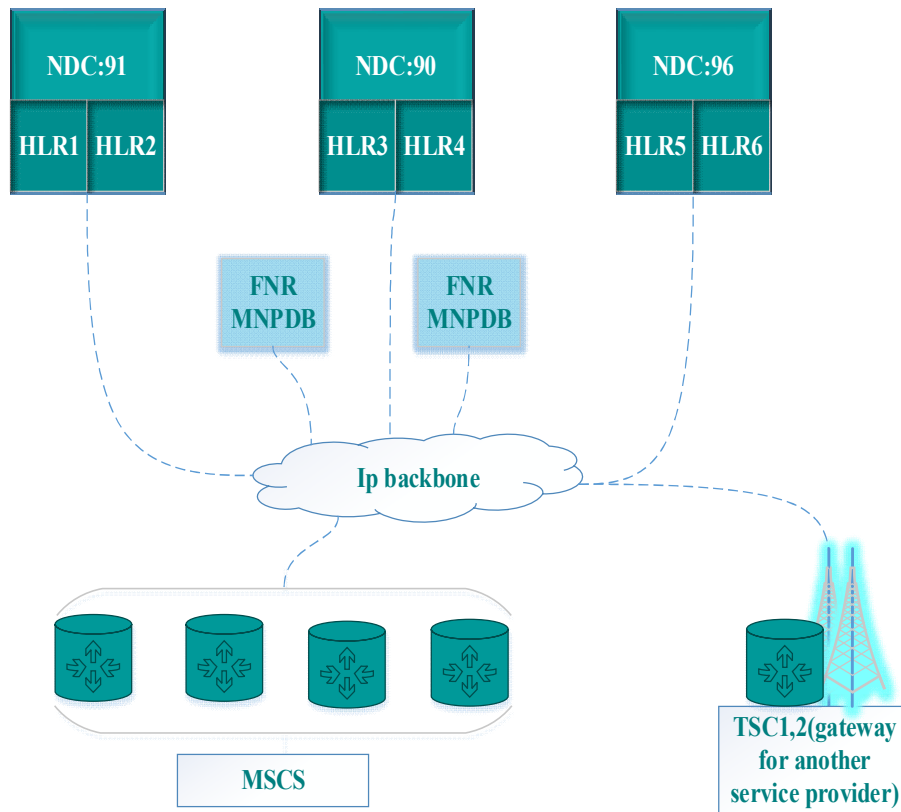
In this paper discusses operator number portability (MNP).

ZAIN'S MILESTONE TRACKING

The time table for the company to implementation of the work plan for the project contains , the most important main points of the action plan from the beginning of the project design and even implement it on the ground and launching service to customers and network testing internal and make sure it's working good test work also with all service providers because it is an integrated project Any delay in implementation by any operator leads to delay the launching of service and effective

the work of other operators. Below is a simple explanation for the topology of the network and how test it.

operators to allocate subscriber identities in a flexible way, avoiding restrictions based on the fact that once



Network Topology Figure (3)

Table (1) [1]

Milestone	Completion Date (Planned)	Completion Date (Actual)	Verification
Planning & Design Test	05 Mar 2015	12 May 2015	Approval for HLD & LLD
Environment Readiness	05 Apr 2015	31 Mar 2015	Test nodes installed configured and ready for testing
Internal PoC Testing	01 May 2015	29 Apr 2015	Sharing the test results and CDR with the new fields
Inter-operator testing	31 May 2015	22 Oct 2015	Sharing the test results and CDR with the new fields
Rollout	03 June 2015	08 Oct 2015	MNP setup is implemented in all network nodes
MNP Cut-Over/ Launching	30 June 2015	11 Nov 2015	Customers can enjoy the service
Acceptance & Handover	08-Jan 2015	22 Nov 2015 (PAC)	PAC & FAC Sign-off

- **HLR** (Home Location Register) It is a permanent record to the adjust the settings for each subscribers (turning his calls, or wait service is also mobile location inside or outside network) the network has a single HLR, but can distribute several HLR's [8]. In case of HLR failure the mated HLR handles all subscribers' traffic for both nodes and keeps record of the subscribers with charged data. **Ported in subscribers will be allocated in HLR 5&6.**
- **FNR** (Flexible Number Register) The purpose of the Flexible Numbering (FNR) feature is to enable mobile

the subscriber gets the SIM card, the ability to choose MSISDN is restricted to the MSISDN number series assigned to the HLR where the corresponding IMSI number series is held. In GSM systems when a node has a need to communicate with the HLR of a mobile subscriber and the HLR address is not known, that node uses either the IMSI or the MSISDN to address the HLR, depending on the traffic case and on which identity is available [9]. In MNP the FNR analysis numbers to determines whether the number port in or port out Because the prefix numbers (090, 091, 096) does not specify any mobile number belongs to the which one network (Zain, Sudani, MTN or Canar).

- TSC Is a gateway for other networks.
- Each terminals of the network connected over IP between MSC node and core CS.

Mnp Implementation Procedures

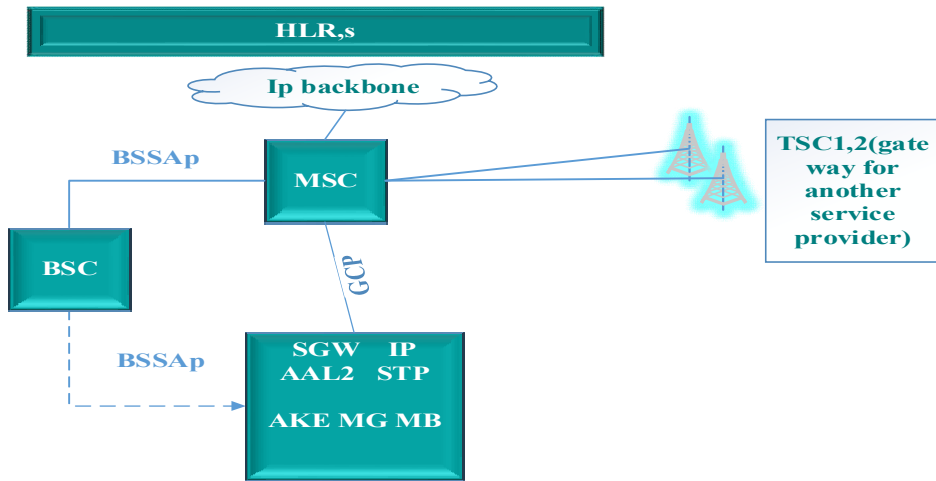
Technical Aspect (Routing Mechanism)

All Call Query direct routing

In the mechanism of direct routing when the user A wants make a call or send a message to the user B from another network. the original network which belongs joint A send a request to direct contact of the FNR database (also know NPDB) to analyze the number of user B of known any network belongs joint B (port in or out) and are responding to the demand determine the route of the common location of the other and then the original network directing of call to the user.

Testing Call from all Operators to another Table (2)

TESTING CALL TO:	ZAIN HOME	SUDANI HOME	MTN HOME	MTN PORT IN ZAIN	SUDANI PORT IN ZAIN	ZAIN PORT IN MTN	ZAIN PORT IN SUDANI	CROSS
ZAIN HOME	DONE	DONE	DONE	DONE	DONE	DONE	DONE	DONE
SUDANI HOME	DONE	DONE	DONE	DONE	DONE	DONE	DONE	DONE
MTN HOME	DONE	DONE	DONE	DONE	DONE	DONE	DONE	DONE



Test Environment Readiness Figure (4)

Note: Network donor doesn't play any role in directing Mechanism (All Call Query) but in the indirect routing like (**Onward routing**) original network receives call from user and send it to the donor network after that donor network detects the dialed directory number has been ported out of the donor and checks in NPDB, NPDB returns the routing number to donor The donor network uses the routing number to forward the call to the new network [10].

NPDB) to analyze the number of user B of known any network belongs joint B (port in or out) and are responding to the demand determine the route of the common location of the other and then the original network directing of call to the >user.

CDR (Call Details Record)

CDR file or record for each telephone or mobile call or text

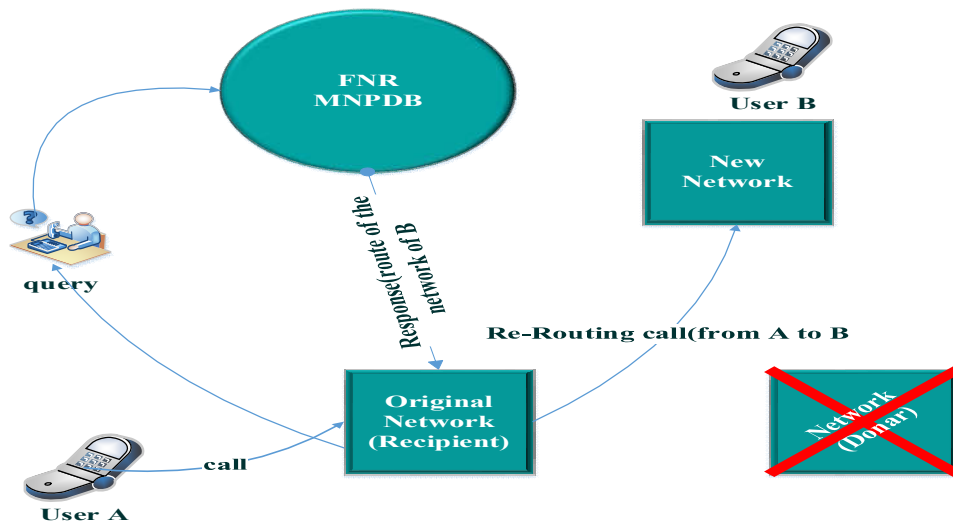


Figure (5)

Technical Aspect (Routing Mechanism)

All Call Query direct routing

In the mechanism of direct routing when the user A wants make a call or send a message to the user B from another network. the original network which belongs joint A send a request to direct contact of the FNR database (also know

message contains special data related to the call such as: time of start, time of stop, duration, source number (caller), distention number...etc. Through this information after analysis we know the network of the number form the prefix number. But now in the MNP the prefix is not define the network of the number because of that have been added **Called Party MNP Info** through which have been know port in/port

out number from new prefix (401 sudani,402 Zain,403 MTN) it not been visible to the users.

SMS CDR

- For MO-SMS (Mobile Originated Short Message) the MSC will not know if the MSISDN is ported out or not. MO-SMS is routed on Service Centre (SC address) only. There will be no indication in the MSC whether the B sub was ported out [10].

Fields to be added

- When the called or forwarded-to number is ported the result of the MNP query will be output in the MO, CF and Transit CDRs through an additional field (**Called Party MNP Info**)[10].

Port IN Procedure

Flexible Allocation IMSI(FAM,FAI) and NP it's proposed to add routing entry for DR with TT=249 which **resolved the issue**:

- Degradation in the Utilization on other service provider Trunks for inbound Roaming traffic after the cutover activity (22/10/2015), resolved by correctness for the configuration of routing [1].

Challenge or Disadvantage can occur in general

- Cannot switch again for the next 90 days.
- Customer's Services will be lost.
- Time it takes.
- Unsuccessful Porting.
- Cost involved in upgrading and maintaining the network infrastructure to support number portability.
- Cost involved in the usage of network resources to route the calls to the ported number [11] [12] [13].

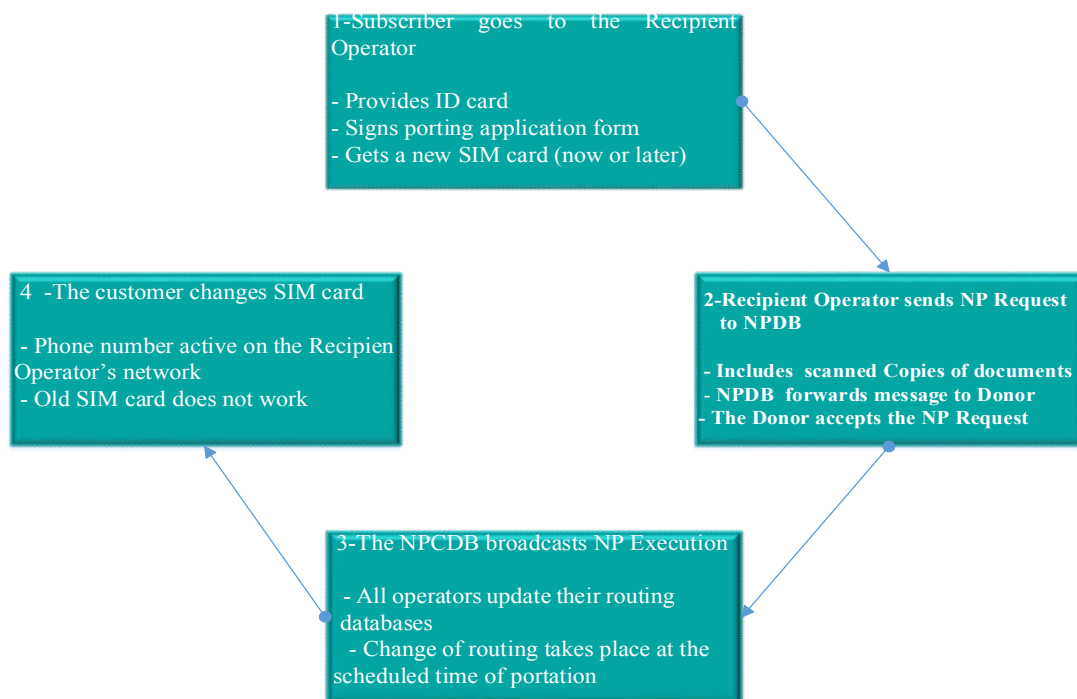


Figure (6) [11]

Reject request reason Table (3) [11]

Code	Reason	Prepaid	Post paid	Joint Account
0101	Number to be ported does not belong to said subscriber	OK	OK	OK
0102	Invalid customer name (does not match Donor records)	OK	OK	OK
0103	Customer's information is not registered in Donor records	OK	-	-
0104	The subscriber (s) has (have) outstanding debt	-	OK	OK
0105	The subscription contract is already terminated	OK	OK	OK
0106	Number to be ported does not belong to said operator	OK	OK	OK
0107	90 Days have not passed from date of subscriber number sale	OK	OK	OK
0108	There is disagreement between the subscriber and the donor operator	-	-	OK
0109	Number is suspended by Donor at the time of the porting request	OK	OK	OK
0110	The number is a secondary number (fax or data service number)	OK	OK	OK
0111	The amount of unbilled payments is not correct	-	OK	OK

Request – Rejection Challenges

Project Incidents (ZAIN)

- Degradation of LU (location update) Success Rate for CS users and attach success rate for data user in 25/2/2015, the problem was that: there is only one DR (default routing) for Flexible Allocation MSISDN &

LESSON LEARNED BY ZAIN SUDAN

- (POC) **Packet Order Correction** in the test environment was a brilliant idea that eliminates any risk to the real traffic.
- Early awareness for all related stakeholders by the impact of the project is very beneficial.

- Early coordination with NOC Department is needed, in order to secure approval for the activities.
- Project review meetings were very useful to facilitate any issues.
- To stress on the type of the project CSR to be either hot or emergency in order to guarantee swift response and solution for incidents.
- Provide alternative ways to quickly issue the LC (Letter of Credit) for the project related resources such as (MDEs) [1].

CONCLUSION

In this paper t was studied changes in network nodes such as Core Network Nodes by network providers to provide a service for the MNP.

know the modification and additions made in MNP model in Sudan experience and it Procedures and also has study some of the experiences of other countries and to know the most important key points in the MNP Implementation and lessons learned from each experience and also learn the factors that affect the success of the experiment and problems.

References

1. Mohammed Hyder, "MNP (Mobile Number Portability) Project Closure Report", ZAIN Company, 2015.
2. Newspaper (Alssayhah), "A newspaper article, No. 525, Wednesday, 3.February 2016.

3. Jennifer Pigg, Affiliate, Brian Partridge, Vice President, "Number Portability through the Global Lens", July 2012.
4. Neustar, "New White Paper Finds Vast Differences between U.S. and India Number Portability", May 2, 2012.
5. Telcordia, "Number Portability Worldwide Implementation Experience" June 27, 2007.
6. Atiya Faiz Khan, "Mobile Number Portability: Challenges and solutions", Journal of Emerging Trends in Computing and Information Sciences ©2010-11 CIS Journal. All rights reserved. <http://www.cisjournal.org1>.
7. Telecom Regulatory Authority of India. "Consultation Paper on Mobile Number Portability Consultation Paper No. 7/2005 Telecom", New Delhi: July 22, 2005.
8. <http://ctd.ucoz.net/>, April. 2016.
9. <http://www.axenet.ru/forums/index.php?act=Help>, April.2016.
10. Mohammed Hyder, "MNP report 2" ZAIN Company, 2015.
11. Aiman Atta: Country Manager, Mohamed Mustafa: Systems Engineer "Sudan Number Portability Training", NTC, 26-27 November 2012.
12. Alan Boniface: MNP Product Manager, "Mobile Number Portability Corporate (Bulk) Process"presentation, 28 March 2000.
13. "Mobile Number Portability: Challenges and solutions", on line presentation, April.2016.

How to cite this article:

Fatima khalaf alla abdelazim hamad et al. 2016, Mobile Number Portability Implementation Procedures, In Sudan Zain's Experience. *Int J Recent Sci Res.* 7(5), pp. 11057-11062.

T.SSN 0976-3031



9 770976 303009 >