

## Mobile Number Portability 20-23 July 2015

## Muhammad Talib Dogar DG (Services)

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#### **Mobile Number Portability**



#### **Mobile Number Portability**

Ability of a cellular mobile service user to change his subscription to another cellular network operator while retaining his original directory number (including the NDC/Operator prefix).

#### **Porting**

The process of shifting the connectivity of a subscriber form one operator to another while retaining the same subscriber number.

#### **Types of Number Portability**



Operator Portability

Is the facility enabling a customer to retain the original telephone number switching from one Service Provider/ Mobile Operator to another within a defined geographic area. Applies both to fixed and mobile networks





Service Portability

Is the facility enabling a customer to retain the original telephone number after **switching from one telecom service to another** (i.e. fixed to mobile)



Geographic Portability

Is the facility enabling a customer to retain the original telephone number when **moving from one geographical/ physical location to another**. Geographic Portability only applies to fixed networks





While National Regulators push MNP to boost competition and benefit customers, different players can have opposite business perspectives

#### **MNP** objectives

#### Regulators perspective

- Enhance competition among mobile operators by:
  - reducing considerably barriers to switch
  - decreasing barriers to entry for new operators
- Benefit final customers by:
  - creating downward pressure on prices
  - forcing operators/service providers to increase their efforts in customer care & cultivation, quality of service and coverage

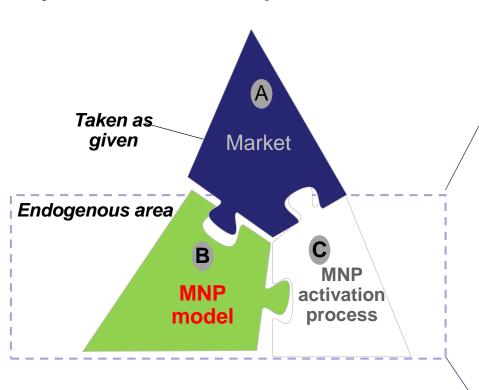
#### **Business perspective**

- ATTACKER: promote
  successful MNP by fostering
  process simplicity and
  implementing a simple and quick
  customer experience for
  switchers
- DEFENSIVE POSITION: try to limit MNP effects on market by promoting strict process and capacity requirements and encouraging rules and lead times that allow retention and win back

MNP objectives

Operators can play on both regulatory influence & commercial behaviours to achieve their promoter v defensive objectives

#### **Key levers for MNP implementation**



### Regulatory levers

Topics to be influenced during the design / review of MNP common rules and mechanisms

### Commercial levers

Marketing and commercial actions/ behaviours to maximize /minimize MNP impact, given a certain regulatory framework

# MNP effectiveness is determined by market conditions and the way overall model and activation process are defined

Strategic areas for MNP implementation



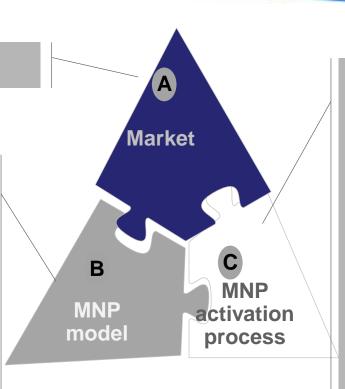
#### Market characteristics

How overall MNP
architectural model and
governance are
designed
MNP Model

B.1 DB model

B.2 Voice, SMS &
International
routing

B.3 Regulatory path
for MNP adoption



How MNP activation
process works, which
activities/costs are
performed/sustained by the
different actors
Activation process

Order processing
& Authentication
Port initiation
Technical porting

Credit transfer

#### Why Regulator to Implement MNP



#### **Industry Trio**

#### Regulator

Encourage Investment
Efficient Use of Infrastructure
Ensuring Competition

#### **Industry**

Return of Investment
Uniform Standard and
inter connectivity
Fair Regulation

#### Consumer

Consumer benefit from New Services

QOS

Value for Money

#### **Methodology to Implement**



- Policy
- Regulation
- Implementation
- Board / Consortium
- Solution
- Interface
- Testing
- Subscriber Guideline
- Soft Launch
- Advertisement and Launch
- Monitoring and Improvement

#### **Basic MNP Definitions**



#### Originating Network

Network where the calling party is located.

#### Number Range Holder Network

Network who originally owns the mobile number series.

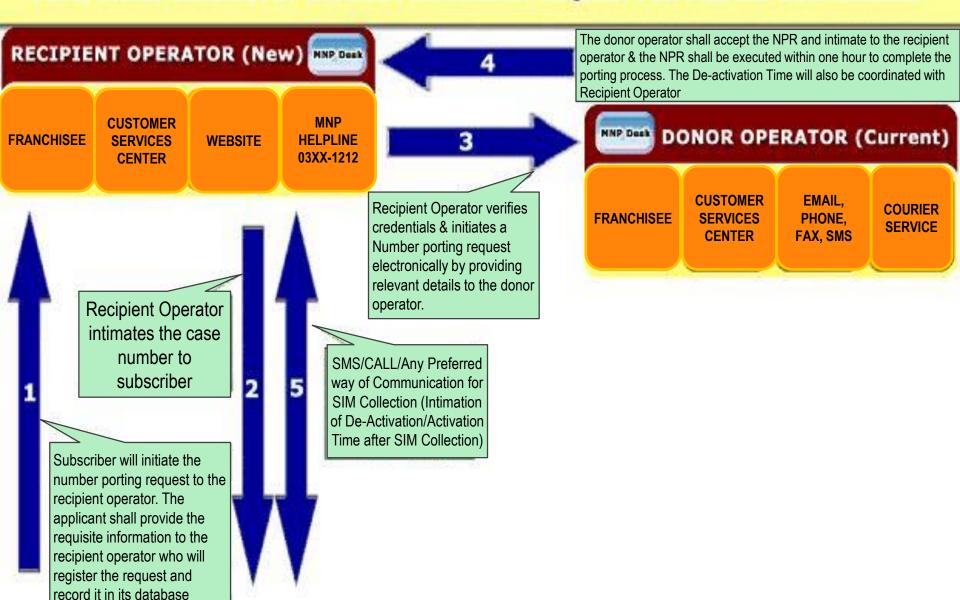
#### Recipient Operator

The Recipient is the operator who receives porting-numbers into their network.

#### Donor Operator

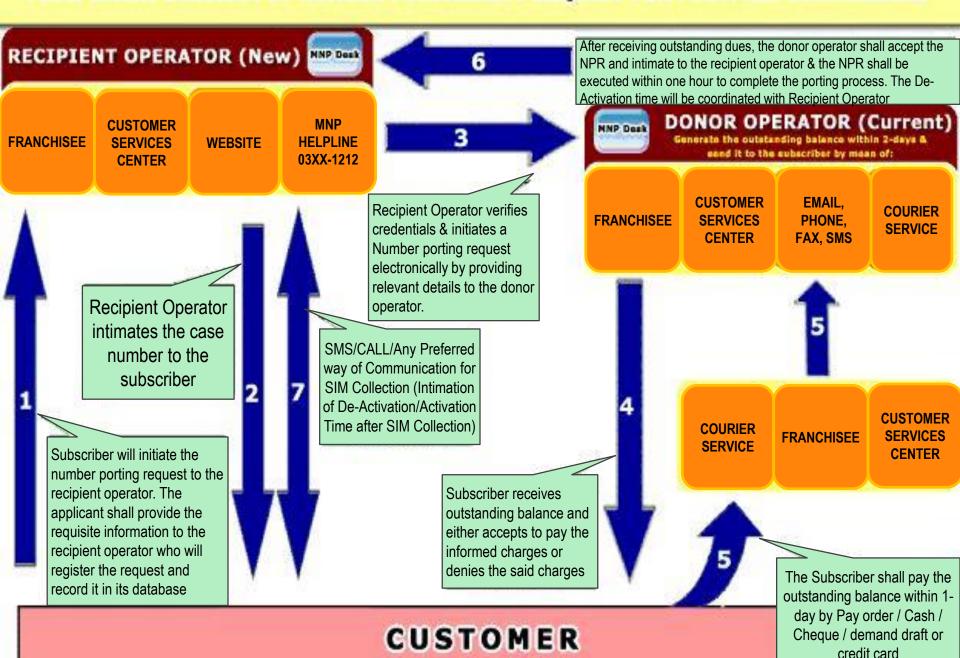
The Donor operator is the operator who number is being ported-out to another network.

#### FLOW CHART DIAGRAM OF NUMBER PORTABILITY REQUEST FOR PREPAID SUBSCRIBERS



#### CUSTOMER

#### FLOW CHART DIAGRAM OF NUMBER PORTABILITY REQUEST FOR POSTPAID SUBSCRIBERS

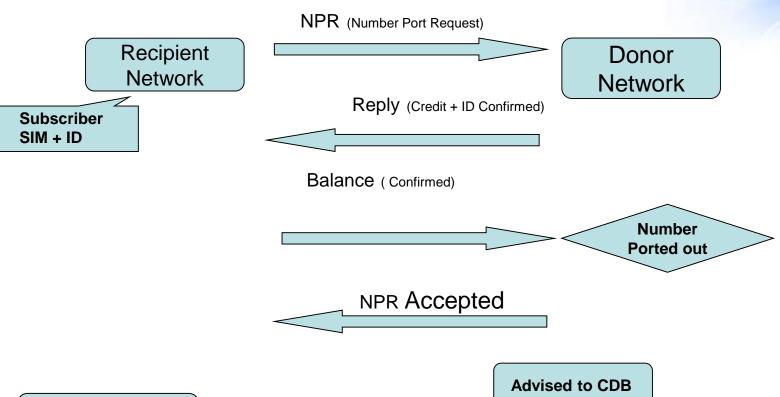


#### **MNP Process Strategy**

**Subscriber Ported** 

Out





MNP CDB

#### **MNP Network Topology Aspects**



- 1. NPDB Configuration/Architecture
  - Centralized MNP Configuration
  - Distributed MNP Configuration
  - Hybrid MNP Configuration
- 2. Technology (Solution)
  - MNP\_SRF Based Solution
  - IN Based Solution
- 3. Routing Schemes
  - Direct Routing
  - Indirect Routing
  - Indirect Routing with Reference to Subscription network

## Number Portability Database (NPDB) Configurations



#### 1. Centralized NPDB Configuration.

 One Central NPDB supplies porting information to all interrogating entities (GMSC/MSC, SMSC, SCP etc.) belonging to all MNP supporting networks.

#### 2. <u>Distributed NPDB Configuration.</u>

 Each network operator maintains its own NPDB(s) to query for porting information before routing the call/SMS/MMS to other mobile numbers.

#### 3. <u>Hybrid NPDB Configuration</u>.

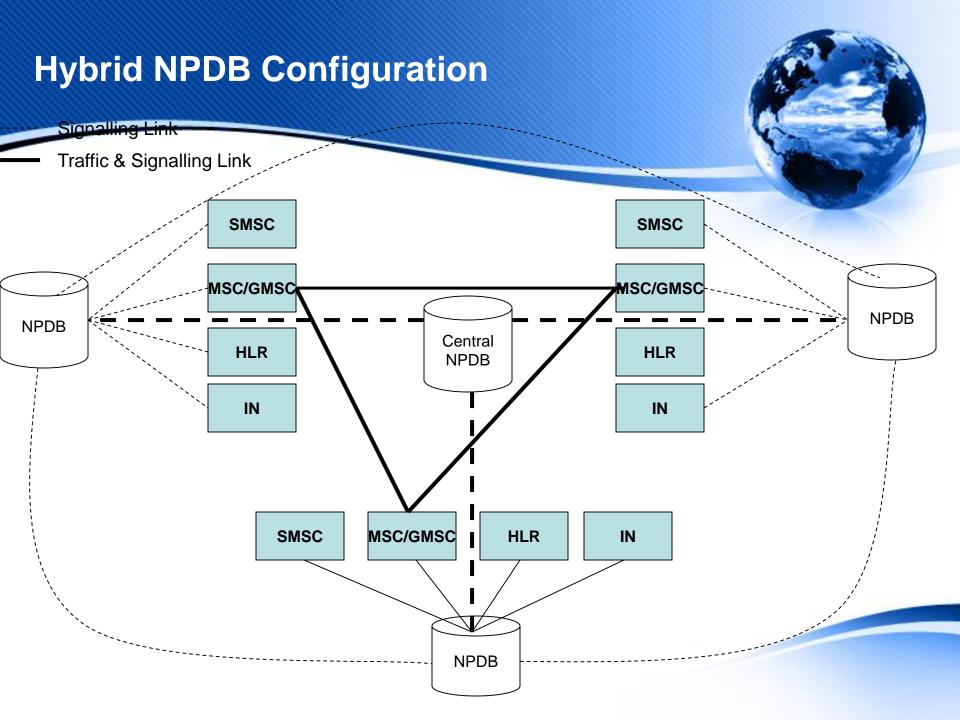
 Each network operator maintains its own NPDB(s) which are updated by a Central MNPDB. Each network operator queries its own NPDB before routing calls/SMS/MMS to other mobile numbers.

### **Centralized NPDB Configuration** Signalling Link Speech & Signalling Links **NPDB SMSC SMSC** MSC/GMSC MSC/GMSC **HLR** HLR IN IN **SMSC** MSC/GMSC HLR IN

### **Distributed NPDB Configuration** Speech & Signalling Link **SMSC SMSC** MSC/GMSC MSC/GMSC **NPDB NPDB** HLR HLR IN IN MSC/GMSC **SMSC** HLR IN **NPDB**

### Comparison Between Centralized & Distributed NPDB Configurations

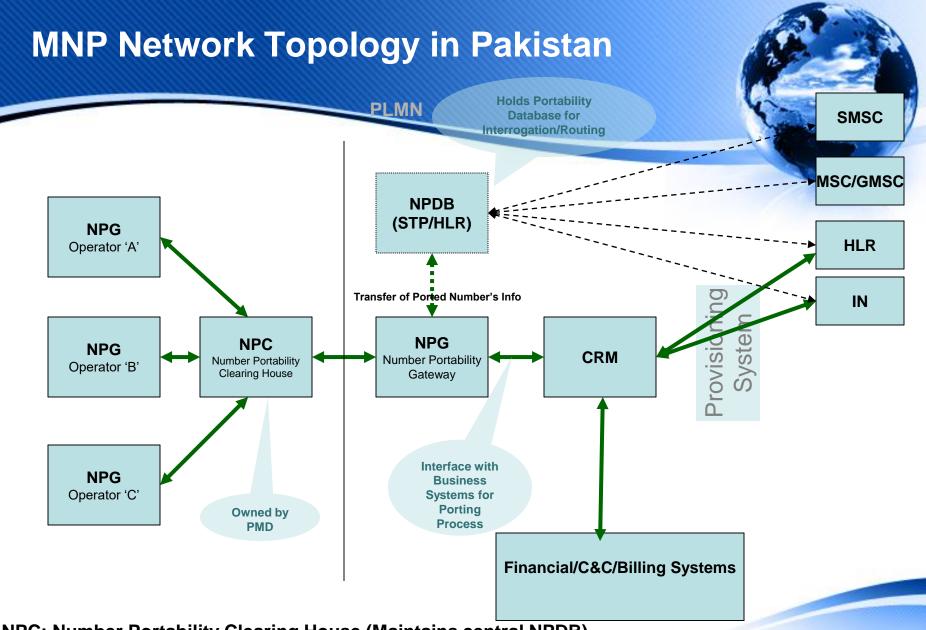
	Advantages	Disadvantages
Centralized NPDB Configuration	CAPEX savings (Only one pair of NPDB required).  Synchronization problem (between NPDBs belonging to different operators) avoided.	Outage of NPDB or degradation/outage of link to NPDB affects all mobile originating (MO) and mobile terminating (MT) calls in ACQ option.  Integration issues: All network operators need to comply to the interfacing standard supported by the NPDB.  More operational (leased line and/or transaction charges) expenses may be incurred on interrogating the Central NPDB.
Distributed NPDB Configuration	Outage of a single NPDB (pair) has less impact on the overall mobile originated and terminated call connectivity.  More control of Network operator over integration Issues between Local NPDB and other network nodes.	More CAPEX required (Each operator needs to maintain its own NPDB.  Integration issues between NPDBs belonging to different operators.  Problems in reconciliation of porting data in the absence of a single server (synchronization issue).



#### **MNP Implementation in Pakistan**

#### Hybrid NPDB Configuration

- Central MNP Database is maintained by Pakistan MNP Database (Guarantee) Ltd (PMD). PMD's BOD comprises of representatives from all six Cellular Mobile Operators.
- Each network operator maintains its own Number Portability Gateway (NPG) and NP Database(s) for storing porting information.
- Call/SMS Routing Mechanism
- Direct Call/SMS Routing model adopted.
- However, onward routing is allowed if mutually agreed between the Number Range Holder network and non-MNP compliant network operators. Onward Routed calls are charged by the Number Range Holder network.



NPC: Number Portability Clearing House (Maintains central NPDB).

NPG: Number Portability Gateway (Interfaces NPC with Operators business systems and local NPDBs)

#### **Communication Between NPG and NPDB**

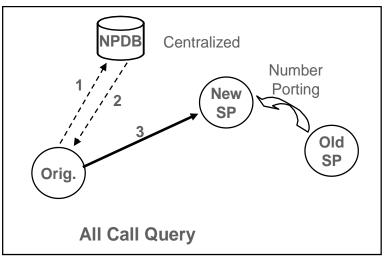


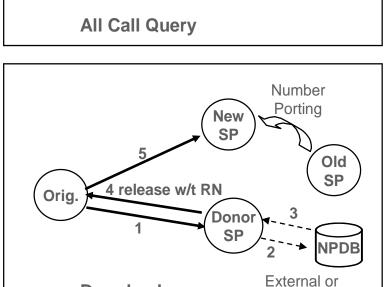
 Generally TCP/IP Link is used for communication between NPG (Number Portability Gateway) and NPDB (Number Portability Database) residing with a network entity (STP/HLR). The interface protocol (e.g. CORBA, SOAP, PDBI etc.) is dependent on the NPDB application used by the Network Operator.

- When provisioning the Porting data, NPG may also send the Portability type information to the NPDB:
- Portability types
  - Ported In
  - Own number Ported Out
  - Cross Ported between other network operators (Foreign Ported to Foreign Network)

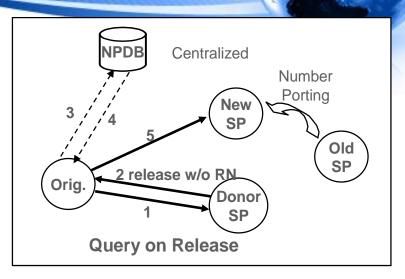
#### Call Routing for Ported Numbers

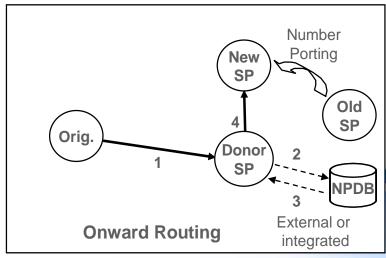
integrated





**Drop back** 





#### Database architectures for ported numbers

Each operator signs a service delivery contract with the central DB provide

Queries are individually carried out for each operator

Operators

Administration
Centralized
DB

B - MNP model

B.1 MNP – Database models

Direct administration

Single and centralize d system for all

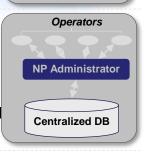
**Distributed** 

No DB

Operators

Indirect administration

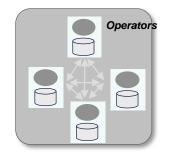
- Operators appoint a legal entity as Administrator
- NP Administrator holds contracts with operators for service delivery
- Only NP Administrator queries the Central DB



DB model

Ported users routing number

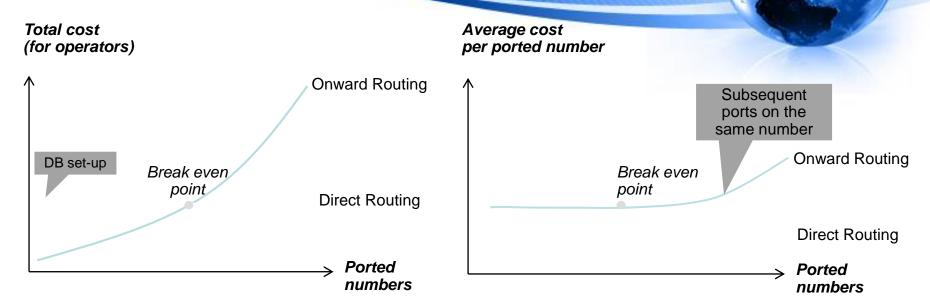
- Each operator has its own database, periodically aligned with those of the other operators
- Individual, direct and multilateral agreements are necessary to synchronise portability data



- No Database is used
- Each operator only knows where its numbers have been ported the first time

Structure compatible with onward routing only Direct Routing requires higher set up costs, but guarantees constant variable costs, Onward is more suitable for small ports volumes

Direct Routing vs Onward Routing



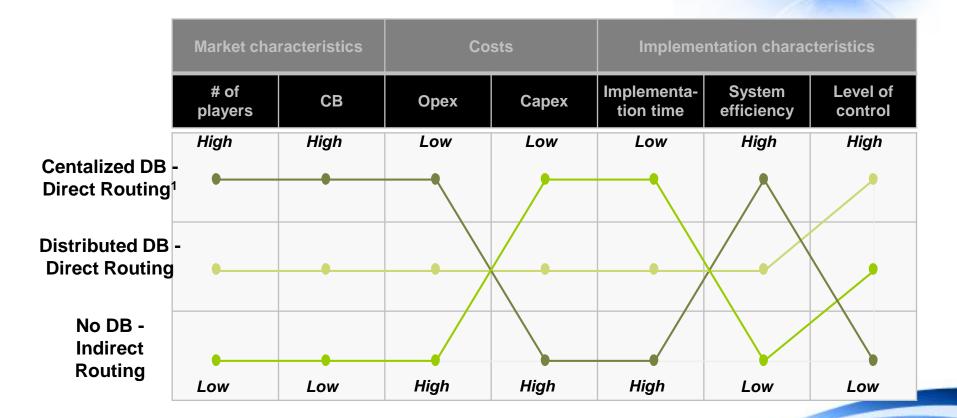
#### Comments and key implications

- **Direct Routing** needs a **significant initial investment**, especially for centralized DBs, with constant and comparably lower variable costs per ported number
- Onward routing has almost no set-up costs, but higher and increasing variable costs (multiple ports of same number)
- Onward Routing appears to be a solution more suitable in case of time constraints and in small markets

# Alternative models are differently placed along the key dimensions and must be evaluated specifically in each country

B - MNP model

#### Architectural models positioning along main dimensions



<sup>1.</sup> Central DB with Indirect Routing is also possible, with higher opex than the direct and applicable when expected MNP are low

Different combinations are possible with alternative database architectures and routing models

B - MNP model

#### **MNP** system combinations

**Direct Routing** 

**Indirect Routing** 

Centralized	All calls Direct	All calls Third Party	Onward Routing	Calls on release	Calls drop back	Resolutio n & transit
DB direct	$\checkmark$			$\checkmark$		$\checkmark$
Centralized DB Indirect						
Distributed DB	<b>√</b>			<b>√</b>	<b>√</b>	
NO Database						

### Governance relates to all phases of MNP implementation, from consultation to launch & ongoing operations

B - MNP model



#### Regulatory path to MNP implementation

Main phases		Development	Implementation	Launch and operations	ot
Duration range <sup>2</sup>		6-12 months	6-15 months	1-3 months 19-48 months	
Involved parties Main	<ul> <li>activities)</li> <li>Operators</li> <li>Eventual service vendors (DB management, number provisioning)</li> </ul>	<ul> <li>NRA</li> <li>Eventual PMO</li> <li>Operators</li> <li>Eventual vendors interacting with MNO</li> </ul>	<ul> <li>PMO/ NRA</li> <li>Operators</li> <li>Eventual DB provider</li> <li>Eventual Service contractors</li> </ul>	Operators     PMO/NRA	
activities  1. National Regul	<ul> <li>Consultation issuing</li> <li>Contribution collection</li> <li>Eventual public         hearings and results         publication</li> <li>Regulatory impact         assessment</li> </ul>	<ul> <li>Detailed definition of MNP models and activation process</li> <li>NP requirements definition</li> <li>Eventual Vendor selection</li> <li>Guidelines production and stakeholders alignment</li> </ul>	<ul> <li>Development and implementation of relevant changes: <ul> <li>Routing</li> <li>Provisioning</li> <li>Retail process</li> <li>Communication flows</li> <li>…</li> </ul> </li> <li>Pilot deployment</li> </ul>	<ul> <li>Promotional activities and communication</li> <li>Sales channels (or other enabled) activation for requests</li> <li>Internal change management</li> </ul>	
2. Indicative figure	es based on country experiences Associates, A.T. Kearney analysis		Systems testing		

### MNP activation process define activities, requirements and actors involved in each step

#### MNP activation process overview

Residual credit management

C N	in activation process on	erview
_	Process steps	Description
tion/	Order processing	Customer submission of MNP request and order processing
subscription initiation	Authentication	Customer identification and verification of ID matching with number
MNP sul init	Port initiation	Communication of the MNP request to interested parties and technical process initiation
<b>8</b>	Port provisioning	<ul> <li>Network Operator/Service Provider provisioning on its Network, OSS, BSS and other systems</li> </ul>
orting	Port notification	Port notification to other Network Operators and other involved parties
Technical porting	Port validation	MNP request validation or rejection
	Inter-operator communication	Coordination between Network Operators for "cut-over" date provisioning and NP Database alignment
	Routing	De-activation on Donating network and activation on Recipient Network with new routing number provisioning
		Management of the residual customer credit (restitution/ transfer etc.)

Effectiveness of MNP implementation is driven by levers to be managed on a tailored approach on a country by country basis

#### **Key levers for MNP implementation – analysis framework**

#### Endogenous Key levers areas



- 1. Architectural model
- 2. MNP scope

- 3. Governance
- 4. Penalties and compensations

management



**Customer** acquisition

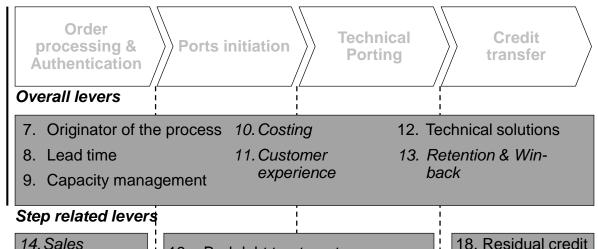
- 5. Communicatio
- 6. Promotion

#### Activation process

channels

15. Authentication

requirements



16. Bad debt treatment

management

17. KO

Italic = regulatory and commercial lever

Normal = regulatory lever

## There are 17 Regulatory levers to be influenced

#### Key levers for MNP implementation - analysis framework





- 1. Architectural model
- 2. MNP scope

- 3. Governance
- 4. Penalties and compensations

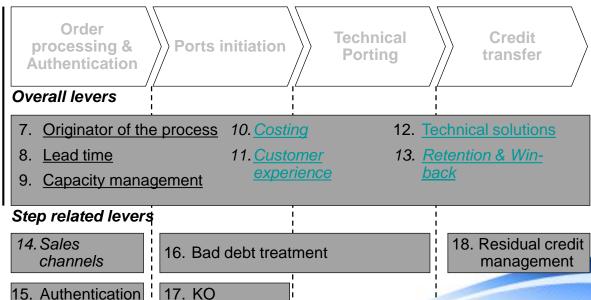


**Customer** acquisition

- 5. Communicatio
- 6. Promotion

#### Activation process

requirements



management

Italic = regulatory and commercial lever

Normal = regulatory lever

MNP architecture is set aside from promoter/defens approach needs to be evaluated case by case along several dimensions

#### MNP Model key levers - 1. Architectural model

#### Key dimensions to be considered

#### Description

Market characteristics **Number of** players

- Number of Operators competing in the country
- Number of potential new entrants

Market CB

- Actual and prospective market CB size and characteristics
- Expected number of portability requests

Costs

Capex

- Investment to set up central or distributed Database
- Investments for upgrades and integration of operators' systems

Opex

- Variable cost related to on-going routing services (termination fees, look-up) fees, central administration)
- Operative costs related to operators' system alignment (for each portability) and **periodical updates** (additional integration for new entrants)

• Time for system regulatory definition (i.e. meeting for technical specification

and vendor selection) + Time for technical implementation of selected MNP

**Implementation** characteristics

**Implementation** time

**System** 

- system System on-going call routing performance
- System security (data back up, recovery, assurance etc.)

Level of control

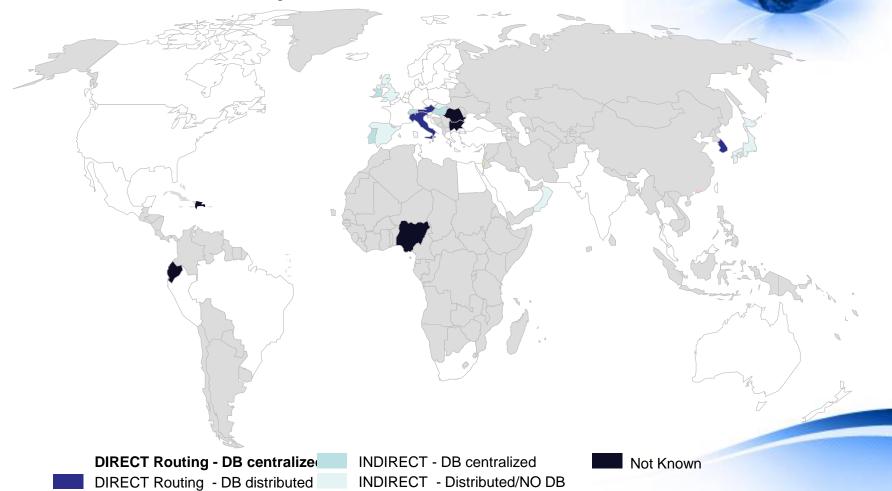
efficiency

- Control over sensible and relevant ported numbers data storage
- Control over flows (i.e. call transit through the donor network in indirect models)

Thanks to its higher long term efficiency, most countries opted for a centralized direct routing model

B - MNP mode

#### Architectural models implemented in the world - 2011



Source: ITU (2011) GSMA

#### MNP has been introduced in most EU and American markets and is being implemented in emerging countries

#### MNP global timeline

- Netherlands (1999)
- Germany (2002) Italy (2002)
- Greece (2004) Hungary (2004)
- · Latvia (2006) Poland (2006)

- UK (1999)
- Spain (2000)
- Portugal (2002) Finland (2003) • France (2003)
- Croatia (2005)
- Slovak Republic (2004) Bulgaria (2008) Luxembourg (2008)

- Switzerland (2000) **Denmark** (2001)
- Norway (2001)
- Ireland (2003) Austria (2004)
- Lithuania (2005) Slovenia (2005)

Estonia (2005)

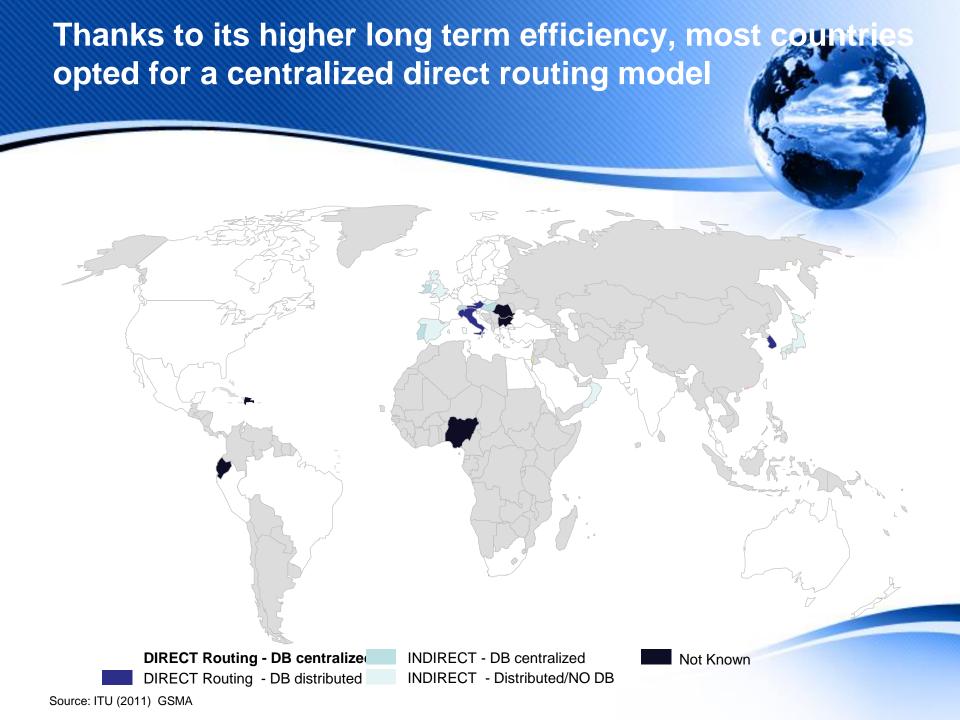
 Macedonia (2008) Romania (2008)

- Sweden (2001) Belgium (2002)
  - Cyprus (2004)
- · Czech Republic (2006)
- Turkey (2008)

- USA (2003)
- Canada (2007)
- Brazil (2008)
- Mexico (2008)
- Dominican Republic (2009)
- Ecuador (2009)
- Peru (2011)

- Oman (2006)
- Saudi Arabia (2006)
- Israel (2007)
- Egypt (2008)
- Jordan (2010)
- Nigeria (2011)

- Hong Kong (1999)
- Australia (2001)
- Macau (2001)
- South Korea (2004)
- Taiwan (2005)
- Japan (2006)
- New Zealand (2007)
- Pakistan (2007)
- Malaysia (2008)
- Singapore (2008)
- India (2011)
- Thailand (2011)



#### **Impact of MNP on Operators**

### Telecom Network Part

- Decision to deploy stand-alone STP or to use the joint STP feature of switch (operator dependant);
- Choice of NPDB is operator dependant and based on network size and cost of implementation;
- Addition of NPDB Node(s);
- Configuration updates on switches for Triggering NP Queries, SW upgrades on switches for enabling Query Mechanism, Change in Routing Tables and Change in Digit Analysis Algorithms;
- Change in Call flow;
- Addition of Signaling interfaces on Switches and Core Network DB e.g. IN systems, SMSC, HLR etc
- Additional Processor Load for executing NP Queries

#### - Continued -



### **Business Systems**

- New SOP for Porting in and out Processes and their integration into the Business workflow;
- Define and integrate new Backend processes for executing NP requests;
- Introduction of NP Administrative Process for acquisition and release of a customer.;
- Setting up interface with Business Systems for Pushing, Changing and Deleting Routing information from NPDB;
- Changes in CDR to include porting information for correct charging. Update to Real Time Charging and Billing Systems;
- Setting up of back office to handle and process NP requests;
- Training of call centre staff, customer services front end staff and franchise operations;
- Additional Business Reporting and Analysis.



Consolidated Rejection Stats	From 01 to 30 Ap	•	From 01 to 31 May	•
Total NPRs	80	,366	91,	503
Total Ported	39,170	48.74%	66,843	73.05%
CONTROLLABLE REJECTIONS				
R05A (Name Mismatch)	497	0.62%	389	0.43%
R05B (NIC-CNIC Mismatch)	445	0.55%	528	0.58%
R05C (SIM# Mismatch)	685	0.85%	929	1.02%
Controllable Rejections total	1,627	2.02%	1,846	2.02%



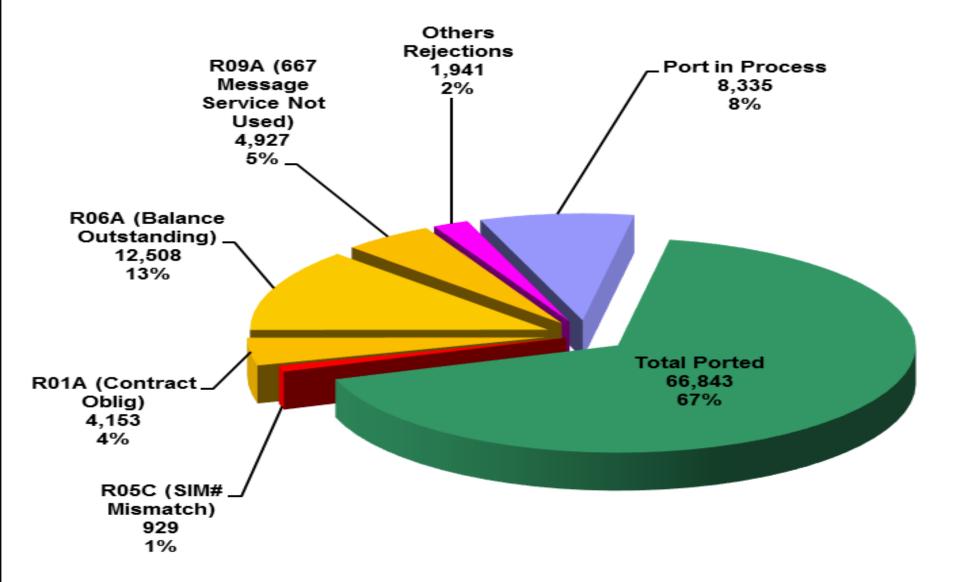
				4400
	From 01 Ap	r 15 to 30	From 01 Ma	y 15 to 31
Consolidated Rejection Stats:	Apr 15		May 15	
UNCONTROLLABLE REJECTIONS				
R01A (Contract Oblig)	1,209	1.50%	4,153	4.54%
R02A (Not a Primary #)	95	0.12%	1	0.00%
R03A (Disconnected #)	22	0.03%	36	0.04%
R04A (Blocked SIM)	465	0.58%	309	0.34%
R06A (Balance Outstanding)	6,642	8.26%	12,508	13.67%
R07A (MSP)	539	0.67%	154	0.17%
R08A (Pending Action - MSISDN Change/Litigation)	14,395	17.91%	214	0.23%
R08B (Pending Action - Change of Ownership)	8,517	10.60%	310	0.34%
R09A (667 Message Service Not Used)	5,612	6.98%	4,927	5.38%
Uncontrollable Rejections total	37,496	46.66%	22,612	24.71%
Total Rejections	39,123	48.68%	24,458	26.73%
NPRs in Process	8,133	10.12%	8,335	9.11%
NPRs Processed of Last Month	6,060		8,133	



#### Porting Requests in Processing Ported Numbers

Agregate Rejections having %age < 1







# Thank You