

Number Portability

Presentation for



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Managing Partner
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1. Overview of Number Portability

Regulator and Operators have to Coordinate Activities for NP Section Heading

Stakeholders Interests

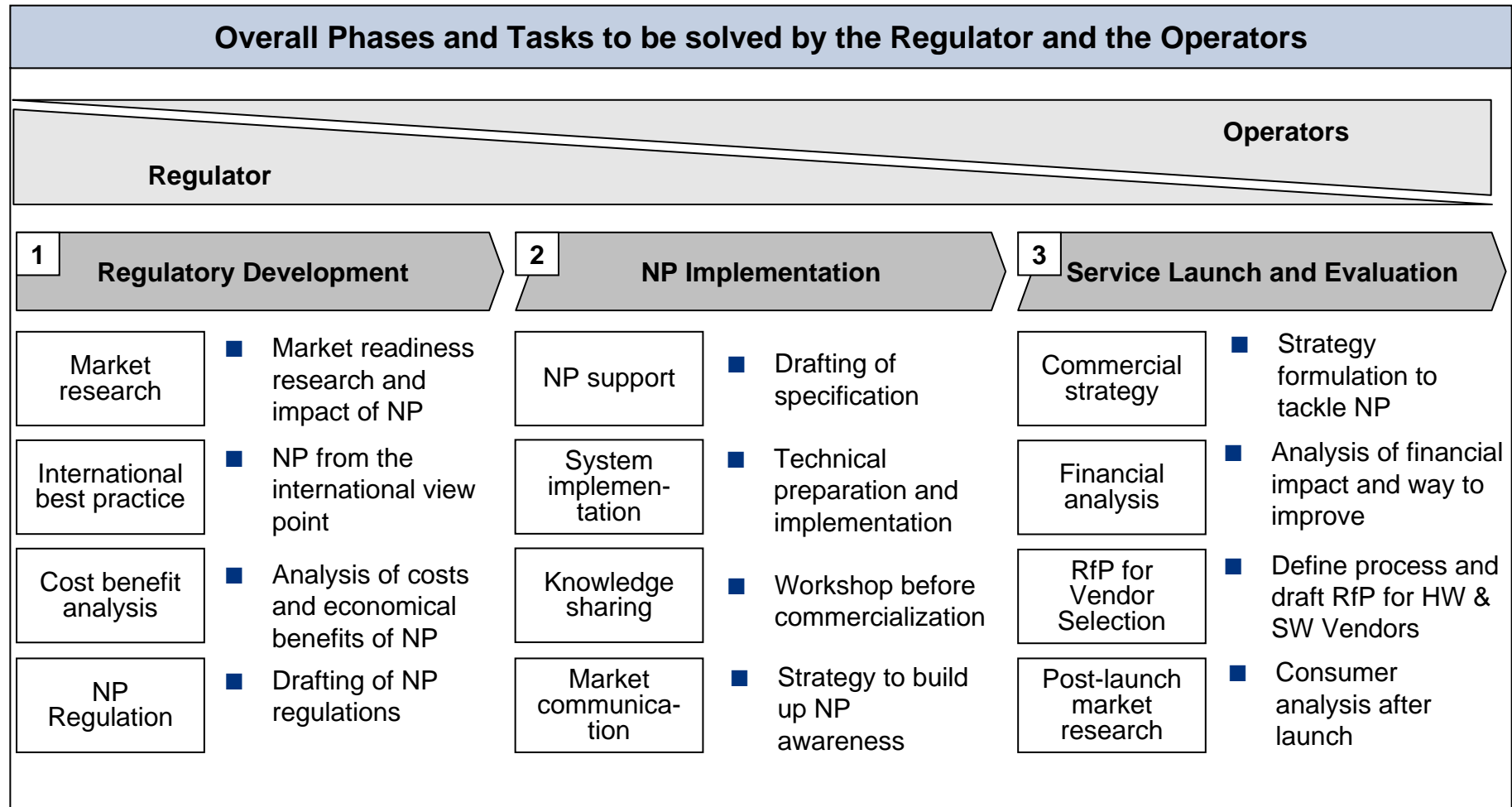
Many Options for Number Portability

Number Portability has Complex Implications

Number Portability is Implemented by Many Countries

Regulator and Operators have to Coordinate Activities for NP

Number portability is a regulatory and an operational task. Both parties have to co-operate and co-ordinate their actions in a project organization manner.



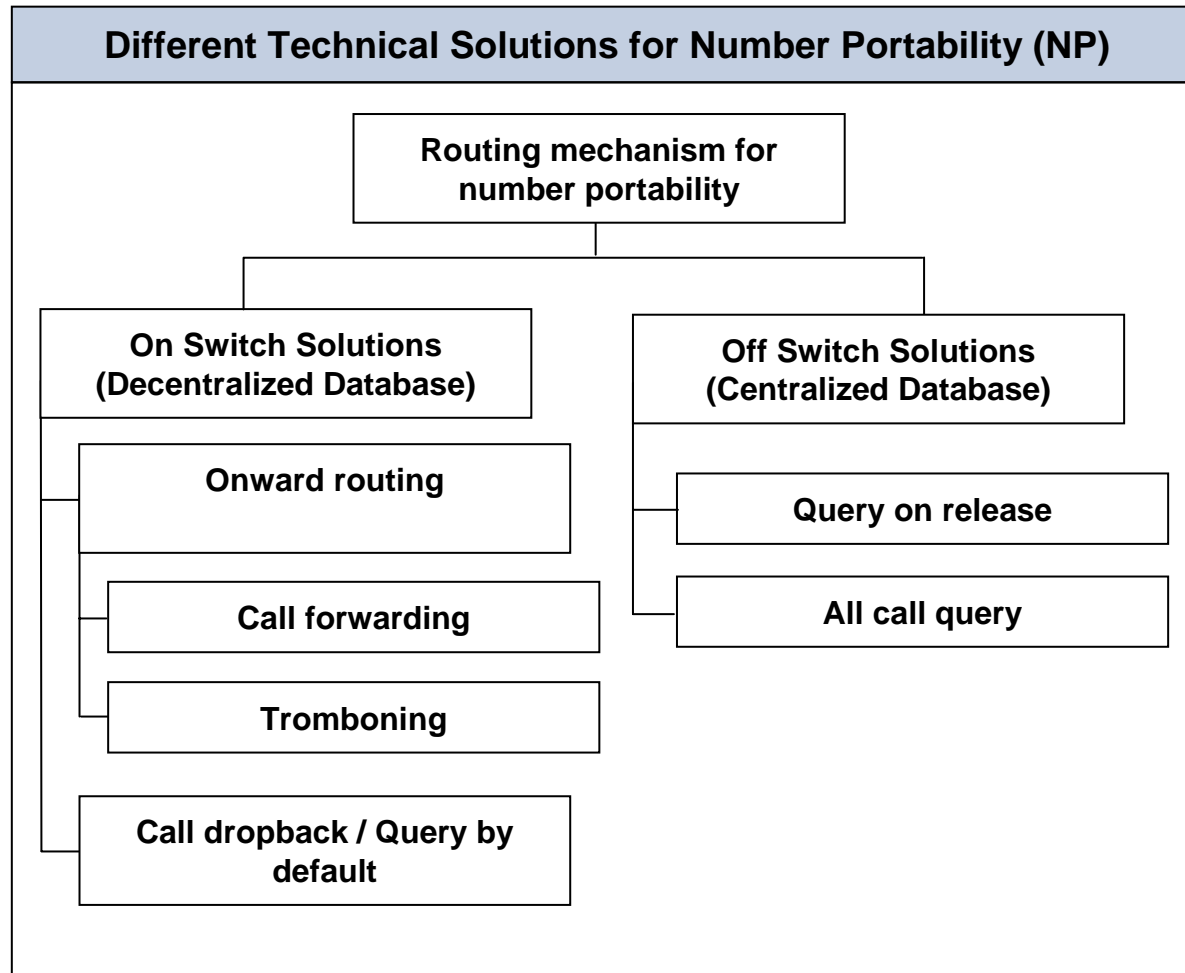
Stakeholders Interests

The point of view of different stakeholder of the telecommunication market differs heavily. New operators welcome NP whereas established operators dismiss NP.

Regulator	Incumbents	Challenging Operators	Consumers
<ul style="list-style-type: none"> ■ Improving consumer benefits ■ Removing competitive barriers ■ Conserving and optimizing numbering resources 	<ul style="list-style-type: none"> ■ Minimal benefits but costs for technical solution and loss of customers ■ (M)NP may pose a significant threat in the business customer segment ■ Threat depends on smaller operators aggressiveness in approaching the market with a churn orientated offer. ■ Need to anticipate competitors' moves and prepare counteractions 	<ul style="list-style-type: none"> ■ High benefits from removed barrier to competition ■ An opportunity to win high value (post paid) customers from incumbent, if own subscriber base is less vulnerable to churn. ■ (M)NP needs to be aggressively marketed by new price packages, promotions, special MNP incentives for dealers and service providers. 	<ul style="list-style-type: none"> ■ Values to keep his/her phone number(s) ■ Eases choosing another operator with new services ■ Saves costs, in particular to inform own customers about a new number ■ Less inquiry or misdialing

Many Options for Number Portability

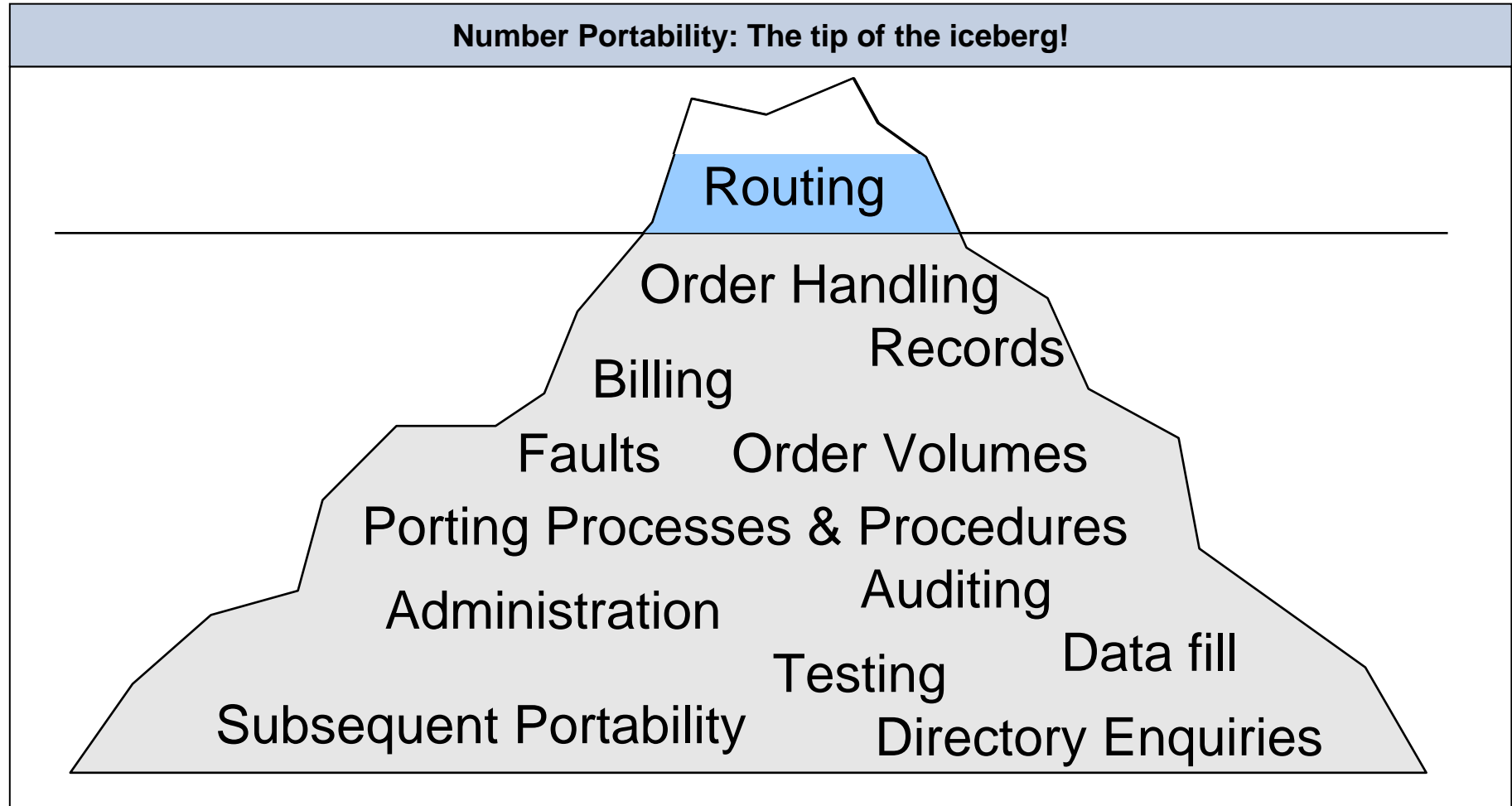
Number portability is a strong regulatory element to increase competitive pressure, but can be defined and implemented in different ways. Which one is optimal for Russia?



- Three Types of NP**
- **Operator Number Portability / Service Provider Portability** describes the ability of a customer to retain the same geographic or non-geographic telephone number when changing from one (fixed or mobile) operator or service provider to another.
 - **Geographic Portability** is the ability of a customer to retain the same geographic or non-geographic number when moving from one permanent physical location to another.
 - **Service Portability** is the ability of a customer to retain the same geographic number when changing from one service to another (e.g. from basic telephony to ISDN).

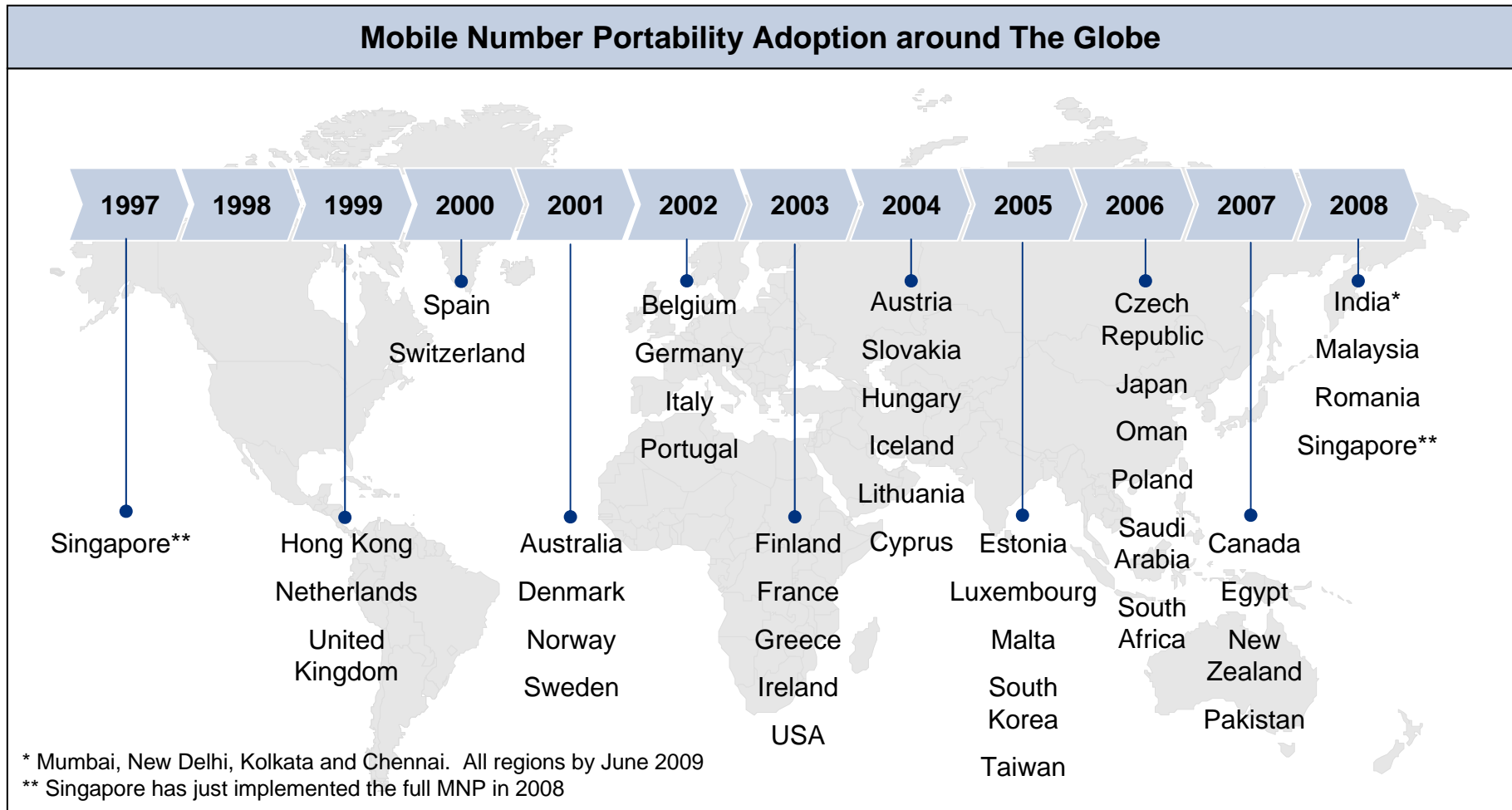
Number Portability has Complex Implications

Number portability has an impact in more or less all functions of a telecommunication operator. The routing issue is only the tip of the iceberg.



Number Portability is Implemented by Many Countries

Mobile Number Portability (MNP) has been introduced in 1997. Since then it has been widely adopted in most developed countries, but very few developing countries.



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2. Technical Aspects of Number Portability

General Options for Database Organization

Switch based Solutions

IN based Solutions

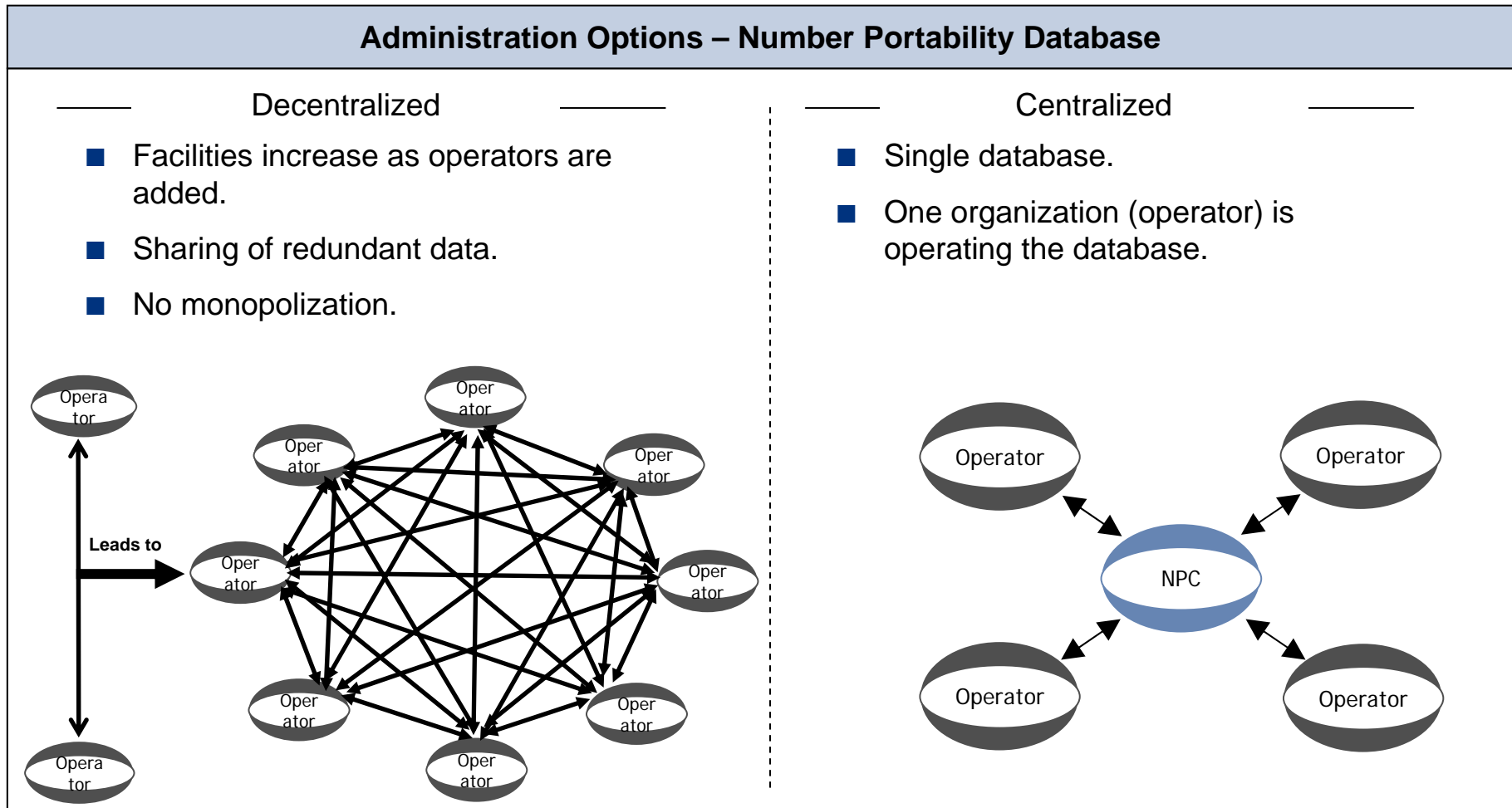
ENUM - Electronic Numbering

Fixed Network Number Portability

Mobile Number Portability

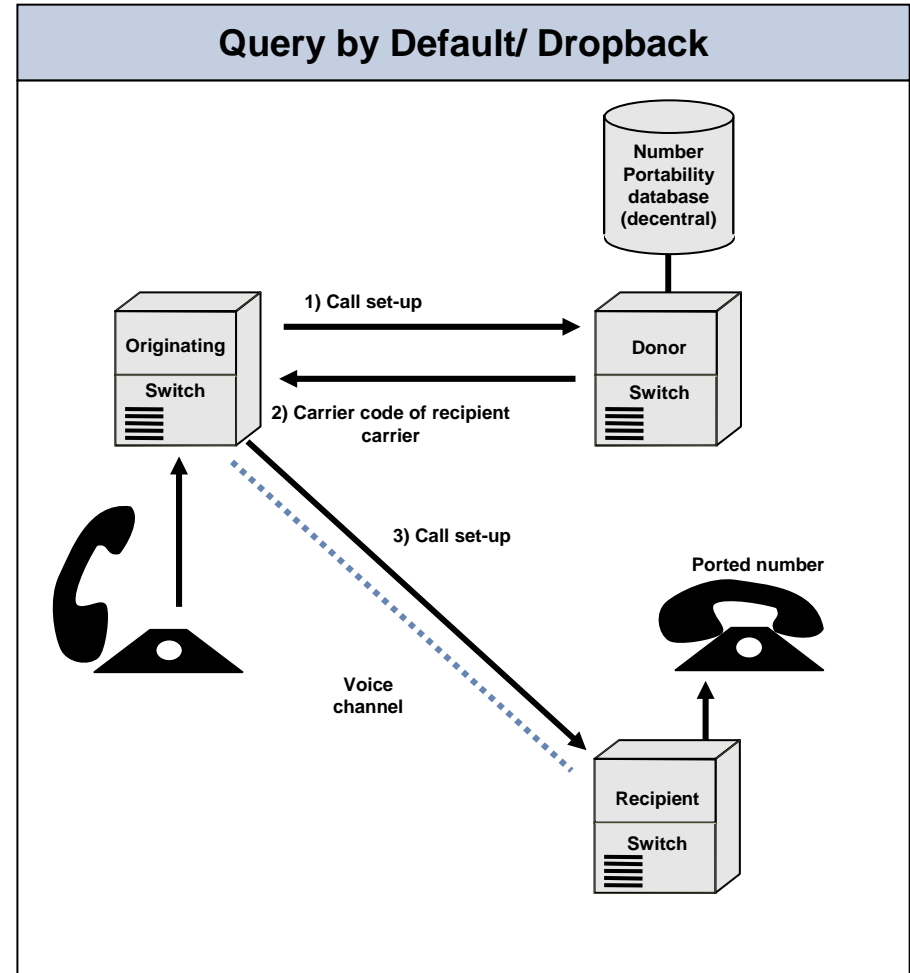
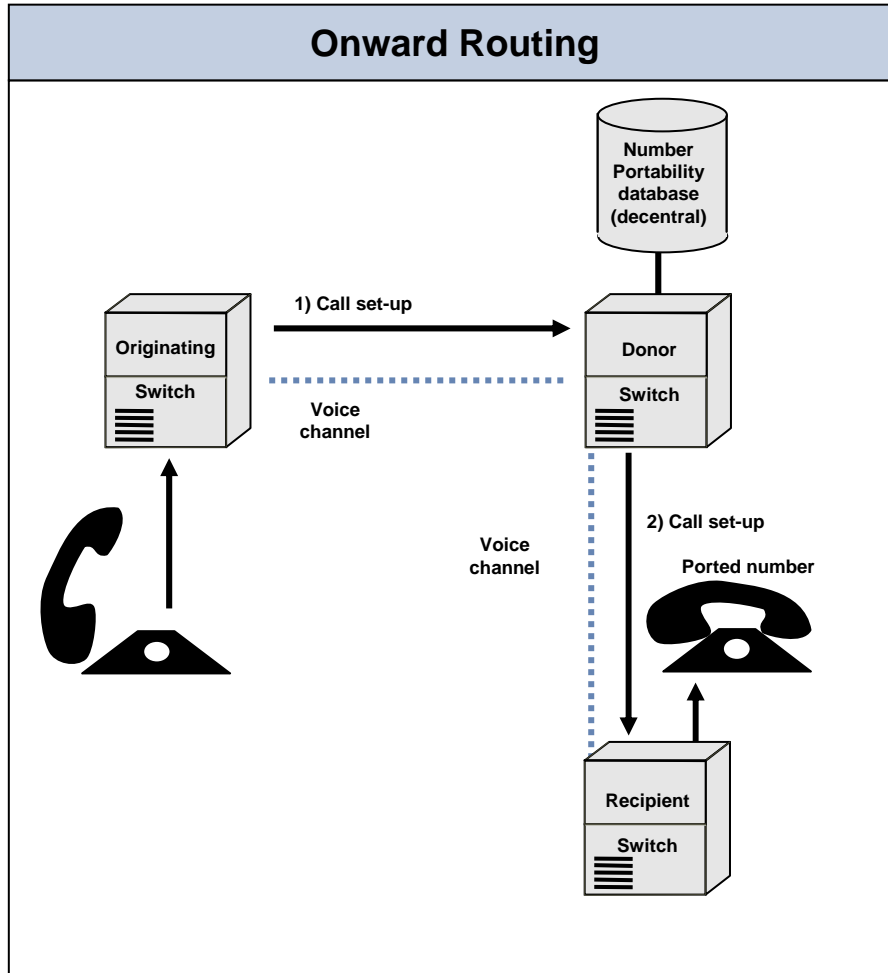
General Options for Database Organization

Two possibilities for a number portability data base exist – centralized (off-switch) or decentralized (on-switch). Centralized is more efficient if many operators exist.



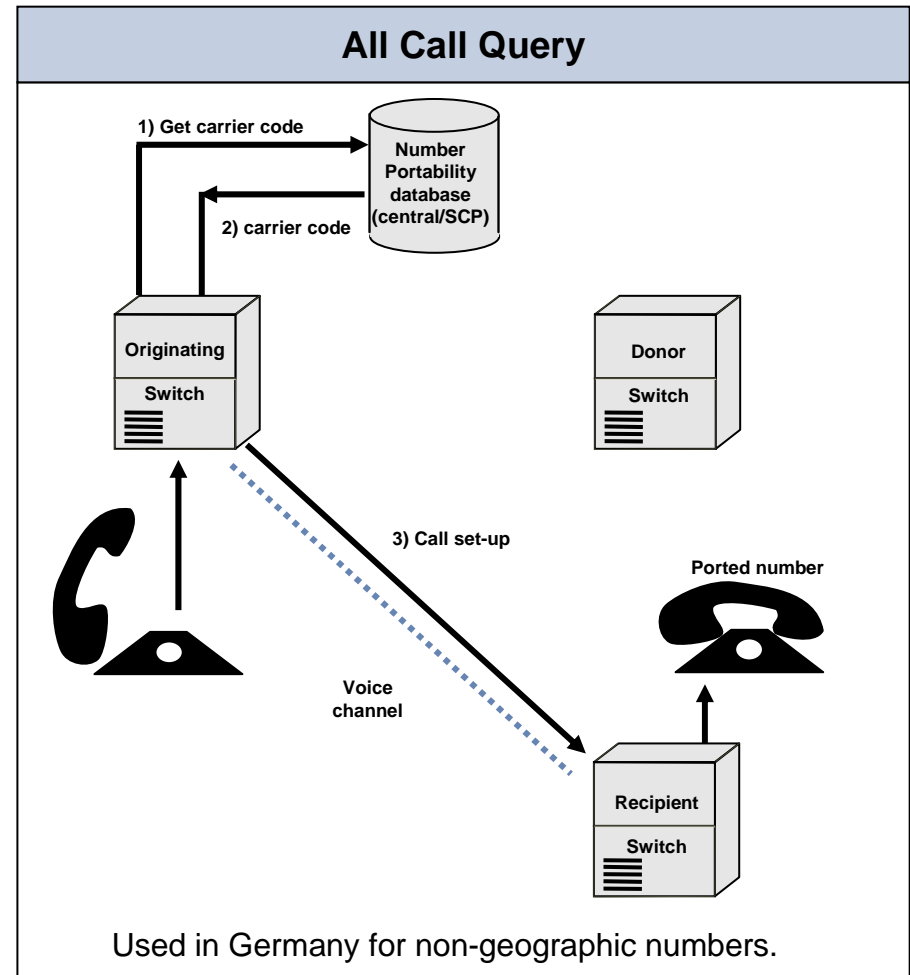
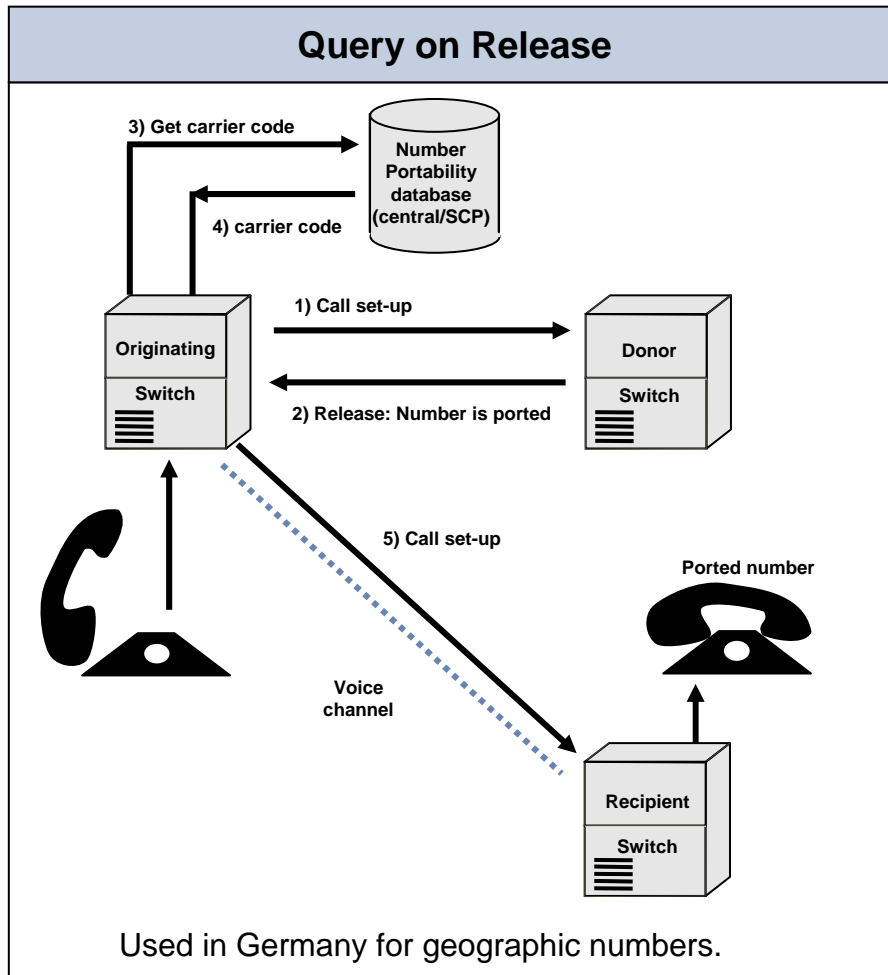
Switch based Solutions

Switch based solutions imply that the switch has its own local database. In a switch solution the switch only "knows" what it absolutely must know.



IN based Solutions

IN based solutions imply that the switch has access to a common database via a SS7 link and the INAP protocol. Thus a switch has access to all portability data.



ENUM - Electronic Numbering

ENUM is an address service that can be used for number portability.

Principle
<ul style="list-style-type: none">■ ENUM has the potential to radically change the role of the telecommunications service provider.■ In its simplest form, ENUM can be used as a number portability database.■ The principle behind ENUM is that a dialed digit string, such as the author's office phone number +49 228 700 2971, is converted to a format called a Uniform Resource Identifier.■ This is done by reversing the full international number, inserting full-stops between each digit, and appending the text sting ".e164.arpa".■ So the directory number +49 228 700 2971 is converted to the URI 1.7.9.2.0.0.7.8.2.2.9.4.e164.arpa■ The URI is then passed to the ENUM system which returns the entry found belonging to this URI.

Principle
<ul style="list-style-type: none">■ ENUM entries are not limited to handling telephone calls.■ ENUM is a mechanism for using an E.164 (a public telephone number) to access data that is stored in the ENUM database.■ Every time we "surf" the Internet and type a Web site name such as www.detecon.com in to a Web browser we are triggering a request to the world-wide database system (DNS) to translate the URL, in this case www.detecon.com, in to a binary IP address.■ ENUM is an extension of the DNS concept (of translating between URLs and IP-addresses).■ ENUM translates Directory Numbers (in the form of a Uniform Resource Identifier) into a logical address at which the Directory Number can be accessed.■ This can only work if the target Directory Number is available via Voice over IP.

Fixed Network Number Portability

The technical solution which is implemented for number portability differ within the European Union.

	Finland	France	Germany	Netherlands	Sweden	UK
1. Service offered (date)	Yes (October 1998)	Yes (January 1998)	Yes (January 1998)	Yes (April 1999)	Yes (July 1999)	Yes (April 1996)
2. Technical solution implemented (or planned)	Advanced call forwarding. IN solution seen as long term solution	Onward routing for geographic number portability. IN solution used for non-geographic number portability	Onward routing call drop-back, IN. No specific long term solution	IN solution. This seen as long term solution	Onward routing (short term solution) and All Call Query (long term IN solution)	For geographic number portability, the current solution is transparent call forwarding with call drop back. (IN for NGNP)
3. Responsibility for choosing technical solution	NRA together with operators and manufacturers	Industry working group with NRA	Industry working group (NRA with operators)	Industry working group (NRA with operators)	All operators	Industry working group
Note: Finland mandates direct routing (not through number range owner) from 31.3.2006						

Technical Aspects of Number Portability

Mobile Network Number Portability

Also in the mobile environment no unique technical realization for number portability exists.

Country	How calls are routed from a fixed network to a mobile network	How calls are routed from a mobile network to another mobile network
Belgium	All call query ¹	All call query & query on release ¹
Denmark	All call query	All call query
Finland	All call query (1.10.05-)	All call query
France	Phase 1: onward routing Phase 2: all call query	Phase 1: onward routing Phase 2: all call query
Germany	Onward routing & all call query	All call query
Hungary	All call query & query on release	Phase 1: all call query & query on release
Ireland	Onward routing	All call query
Italy	All call query ²	All call query
Netherlands	All call query ³	All call query ²
Norway	All call query	All call query
Sweden	Onward routing & all call query	Onward routing & all call query
Switzerland	Onward routing	Onward routing
United Kingdom	Onward routing	Onward routing

1. The minimum legal requirement is for onward routing. / 2. Queries could be outsourced to other operator. / 3. Queries are outsourced by one operator to the incumbent operator.

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3. **Number Portability and the Regulatory Framework**

Regulatory Challenges of Number Management

Number Portability and the Regulatory Framework in the EU

Despite a common Regulation Implementation was different in the EU

Regulatory Challenges of Number Management

Numbering management is important for competition in telecom markets. Number portability as a key element still does not exist in Russia.

Numbering Regulation

- **Number regulation is important for competition in telecom markets.** An inefficient number management is hindering the development of innovative services in the telecom market. Lacking number portability creates costs in particular for business customers (to inform communication partners) and thus demand side barriers to switch to new operators.
- To ensure **effective competition**, the following main objectives must be assured :
 - Sufficient capacity of numbers for current and future demand, in particular for call-by-call selection of operators
 - Neutrality and non-discrimination in respect of competition by the regulator or any other national number administrator
 - Guarantee technical transition to number portability and fair economic conditions between operators
 - Availability of “Vanity Numbers” for Personnel Numbers, VPNs, toll-free services, shared toll services and premium services
 - Regulatory obligations for mandatory services (e.g. inquiry services, emergency services,...)
- Close monitoring enables the regulator to know who is using which numbers and number blocks and where number shortages could appear.
- The Regulator needs to implement and adjust a national numbering plan. In a national numbering plan, the regulator specifies for each **numbering room the number format, subdivision in number areas, purpose of use of number areas, assignment conditions for direct assignments, number blocs to operators and general assignments.**



Number Portability and the Regulatory Framework in the EU

Most issues regarding to number portability are arranged in the EU Universal Service Directive. Operators have freedom regarding the used technology.

	<u>Description of EU Requirement</u>
1 Date for introduction	<ul style="list-style-type: none">NP has to be introduced at the earliest possible date in each member state.
2 Obligation to provide Number Portability	<ul style="list-style-type: none">All fixed and mobile public operators have to support NP. The national regulator cannot allow for exceptions.
3 Technical Type of Number Portability	<ul style="list-style-type: none">Every member state can choose his own technical solution (off switch or on switch).
4 Number Range	<ul style="list-style-type: none">NP is required for geographic and non geographic numbers, including mobile and VAS.Exception: NP is not mandatory between fixed and mobile operators.
5 Charging Principles	<ul style="list-style-type: none">Pro- competitive, transparent, cost orientated, reasonable, in the interest of all users, economic efficient
6 Tariff Information	<ul style="list-style-type: none">Facilitate appropriate tariff transparency as part of the implementation of number portability

Despite a common Regulation Implementation was different in the EU

Several EU member countries implemented NP in quite different ways. Also the market effects have been quite different.

Target maximum porting period	
Germany	4 working days + 2 further days
Portugal	5-20 working days
United Kingdom	2 working days + 1 calendar week
France	30 days

Type of ported mobile number database	
Germany	Centralised
Portugal	Centralised
Malta Cyprus	Distributed
France	Centralised

Annualised Churn in % (3months period)	
NTT DoCoMo	8%
China Unicom	29%
T-Mobile UK	35%
Orange France	21%

Net Gain or loss in 1 st five years of MNP (Spain)	
Orange	-1 060 000 ported customers
Telefonica Moviles	375 000 ported customers
Vodafone	770 000 ported customers

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4. Cost of Number Portability

Principles of Cost Allocation- Technical solutions and types of costs

Costs incurred in the provision of NP Off Switch Solution

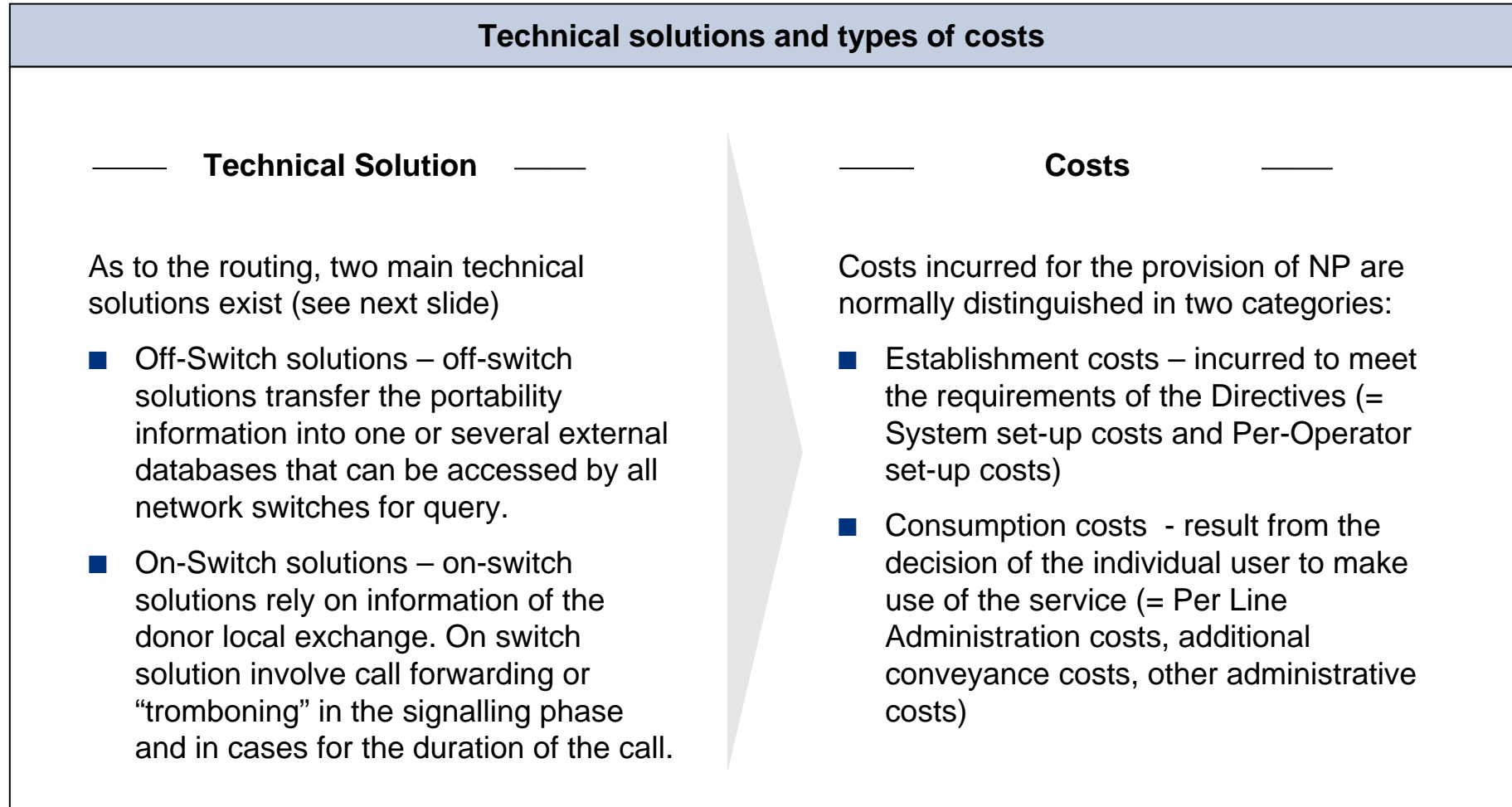
Costs incurred in the provision of NP On Switch Solution Section Heading

Comparison of Cost Principles for NP in selected countries

Benchmark Results

Principles of Cost Allocation- Technical solutions and types of costs

The costs of number portability depend on the technical realization.



Costs incurred in the provision of NP Off Switch Solution

The system set-up costs are the main cost driver of the number portability service for off switch solutions.

Costs incurred in the provision of NP Off Switch Solution					
	System Set-up cost	Per-operator set-up costs	Per-line administration costs	Additional conveyance costs	Other administration costs
Costs involved	Intelligent Network set-up costs; Adoption of information systems; Creation of inter-operator management tools and procedures; Creation of maintenance and customer support procedures	Initial programming of switches; Access to national NP database	Modification of subscriber data	Additional conveyance of IN query	Management of a national ported numbers database; Allocation of non-geographic numbers
Significance of costs	Very significant	Some significance	Very small	Negligible	Very small

Costs incurred in the provision of NP On Switch Solution

Where additional conveyance costs are negligible for off switch realizations the additional conveyance costs can be high for the on switch realization.

Costs incurred in the provision of NP On Switch Solution					
	System Set-up cost	Per-operator set-up costs	Per-line administration costs	Additional conveyance costs	Other administration costs
Costs involved	Software evolution in switches; Adoption of information systems; Creation of inter-operator management tools and procedures; Creation of maintenance and customer support procedures	Initial programming of switches	Modification of subscriber data	Non-optimal routing of calls	Allocation of non-geographic numbers
Significance of costs	Significant – the bulk of costs will fall on the incumbent	Small proportion	Very small	Varies depending on the technical solution – can be high on the donor operator	Negligible

Comparison of Cost Principles for NP in selected countries

Prices of number portability are cost oriented in most European countries.

Comparison of Cost Principles						
	Finland	France	Germany	Netherlands	Sweden	UK
Costs that each operator must bear itself	System Set-up costs	System Set-up costs	System Set-up costs and additional conveyance	System Set-up costs	System Set-up costs investment costs for additional conveyance	System Set-up costs and additional conveyance costs
Principles used by NRA	Cost orientation and reasonable costs	Cost causation and cost orientation	Cost causation and cost orientation	Cost orientation	Cost orientation and cost minimization	Cost causation, cost minimization, distribution of benefits, effective competition

Benchmark Results

Within Europe there is no unique picture regarding to the issue who covers the costs of number portability.

Benchmark Results
<ul style="list-style-type: none">■ As a general rule, in European countries no <u>charges are imposed on consumers</u> with respect to porting.<ul style="list-style-type: none">● Donor operators may not charge customers who port away from them.● In some countries, the recipient operator charges the user for porting.■ Each operator bears its own <u>set up costs</u>.■ In several countries operators have agreed a charge for <u>transaction costs to be paid by the receiving operator</u> to the donor operator, without regulatory intervention.■ Usually the regulator intervenes only in cases where there is strong evidence that charges are not cost oriented.■ The <u>originating network pays any additional conveyance costs</u>. This rule applies to originating operators who are fixed operators as well as mobile operators.■ The donor operator charges the recipient operator for the cost of the <u>porting procedure</u>, these charges being subject to approval by Regulator.

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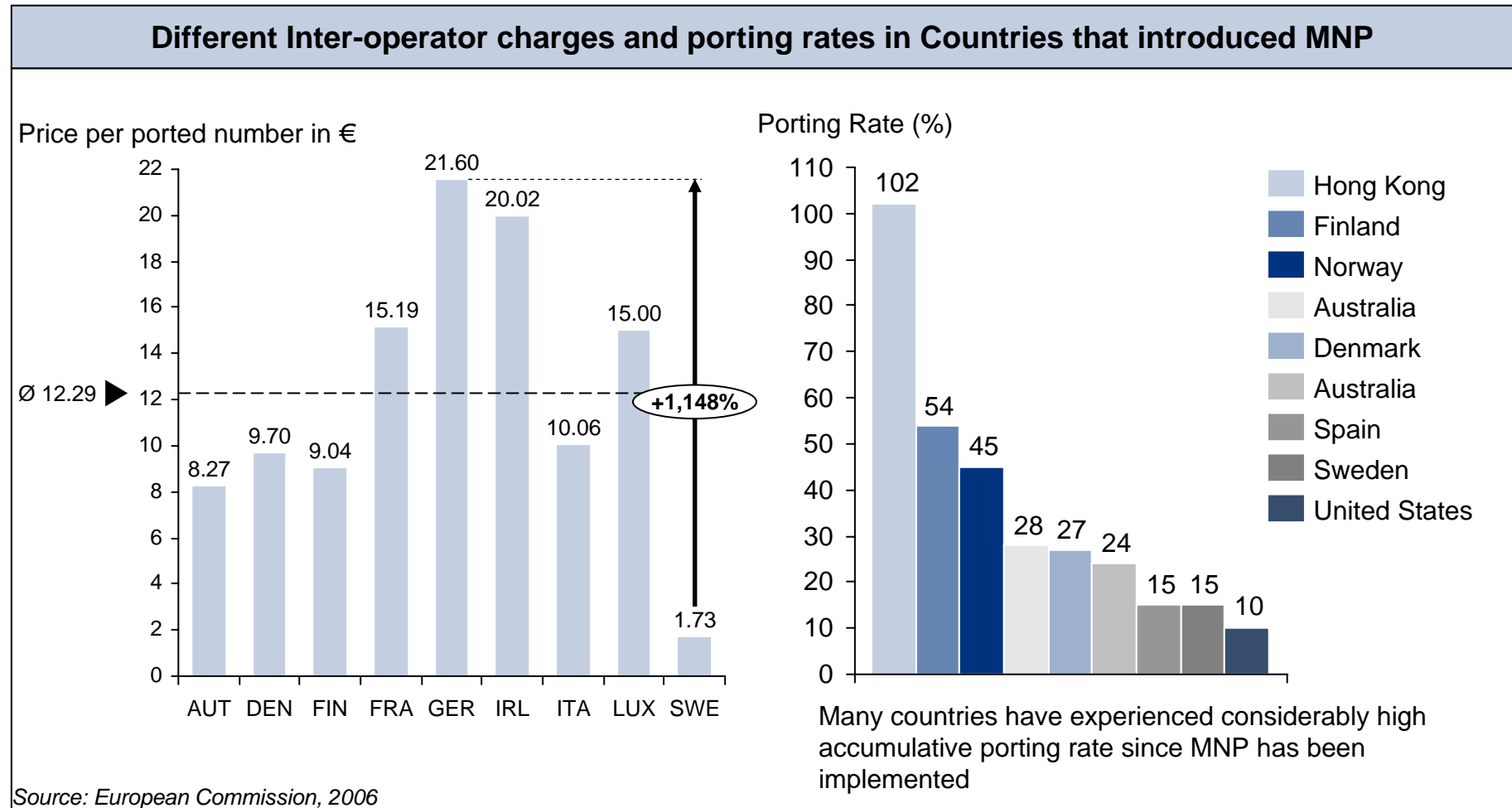
5. Market Impact

Mobile Number Portability had Different Market Impact

MNP Impact depends on Bundling with other Marketing Measures

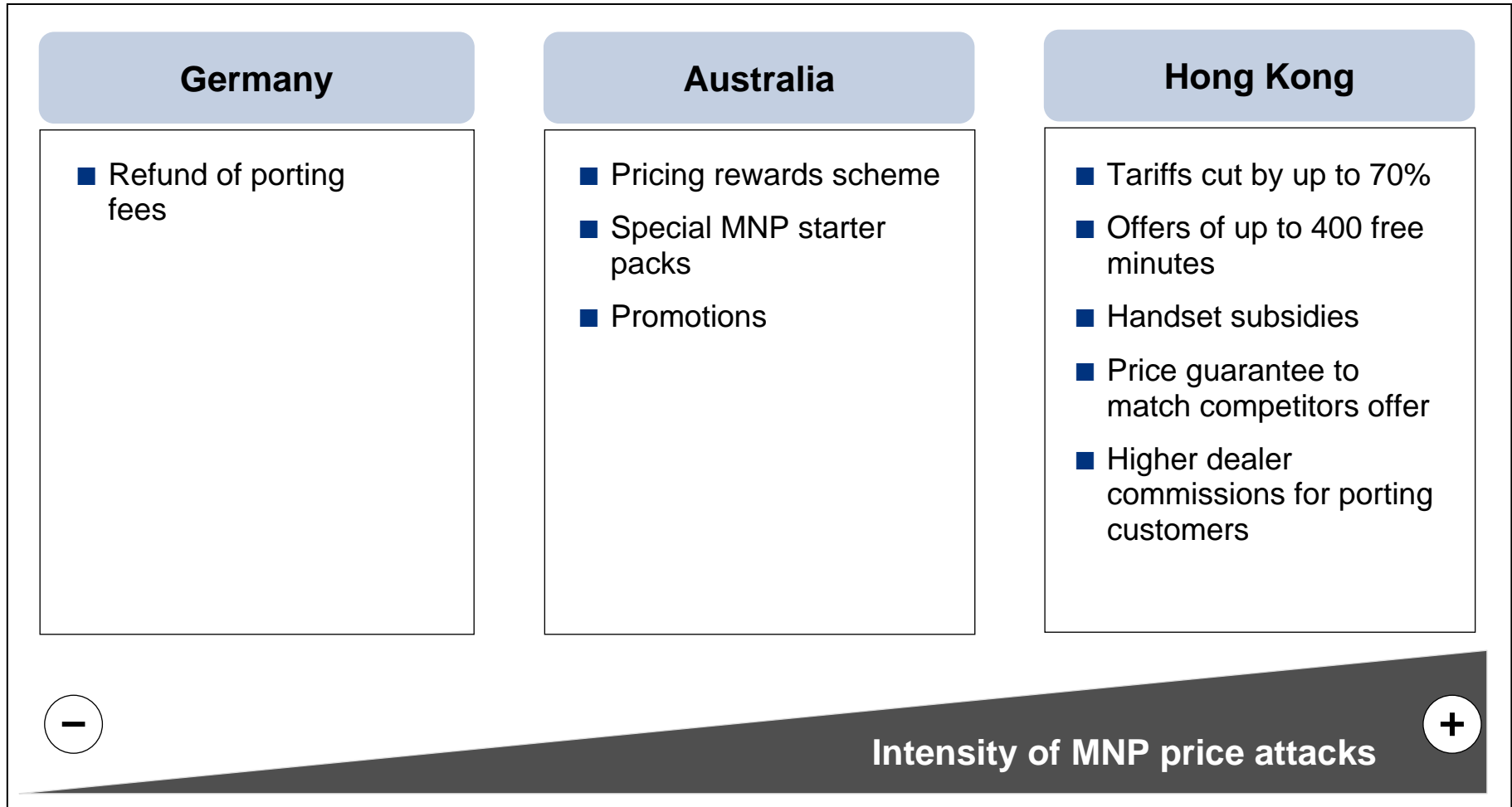
Mobile Number Portability had Different Market Impact

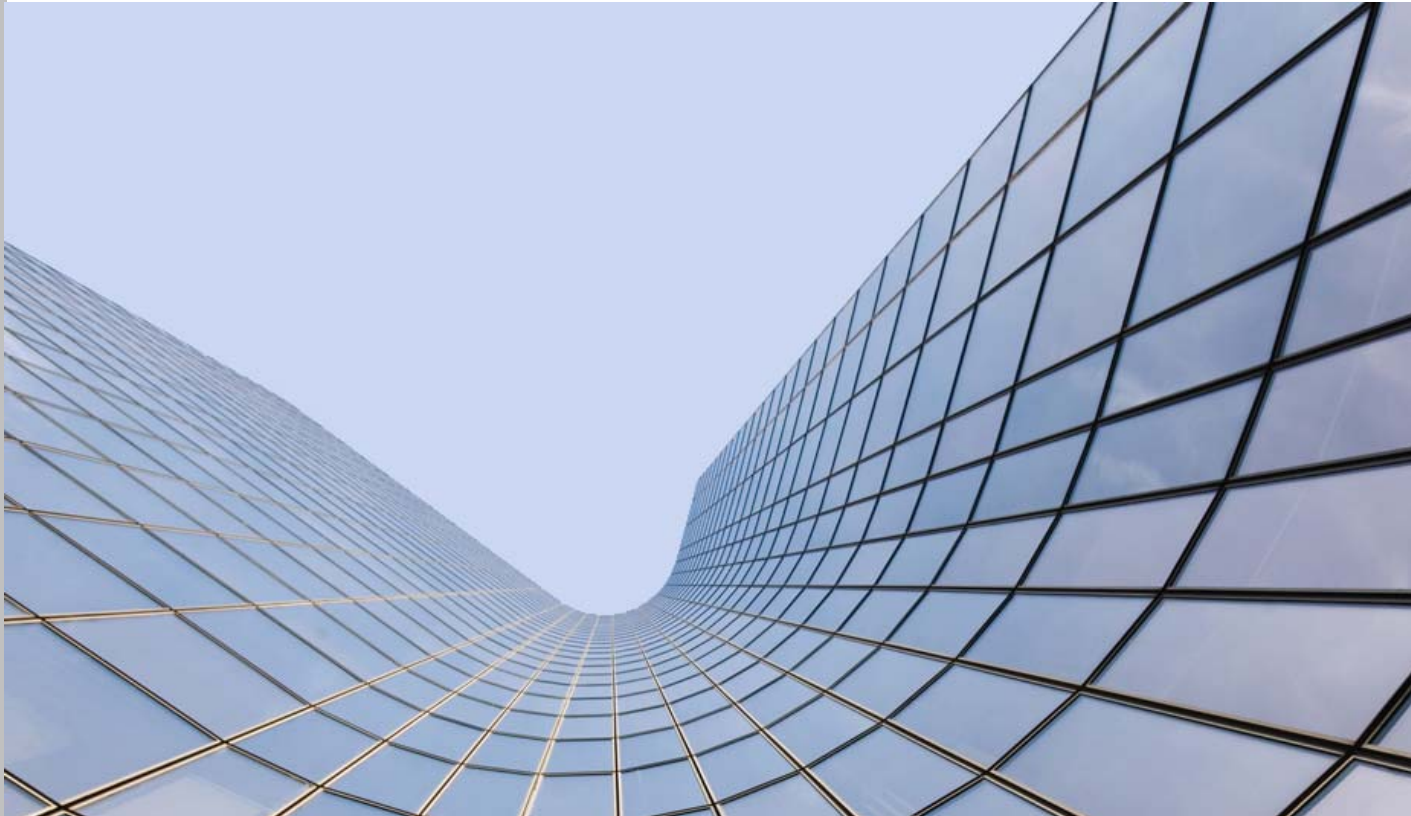
Depending on the regulatory, technical and market framework number portability introduction had very different costs and very different adoption by customers.



MNP Impact depends on Bundling with other Marketing Measures

The relatively high MNP effects in Hong Kong resulted in particular from aggressive price attacks.





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