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NP Technical Overview

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- Routing Options
- Routing Number Specification
- Routing Testing
- Central Clearinghouse Functional & Operational Requirements
- Porting Process & Interworking with Central Clearinghouse
- Porting System/ Process Requirements
- Implementation of Porting systems into Operator Business Systems/ processes
- Porting Testing
- End-2-End Resting & Launch Readiness Preparations
- Equivalence of Service Delivery Across Operators – review of service delivery mechanisms, ie LLU, fibre to home, Wholesale Line Rental, wireless services etc
- Future-proofing the NP Service

NP – Technically Challenging?



Expensive – Typically costs **multi-million \$** to implement

Complex- Involves every part of the operators business

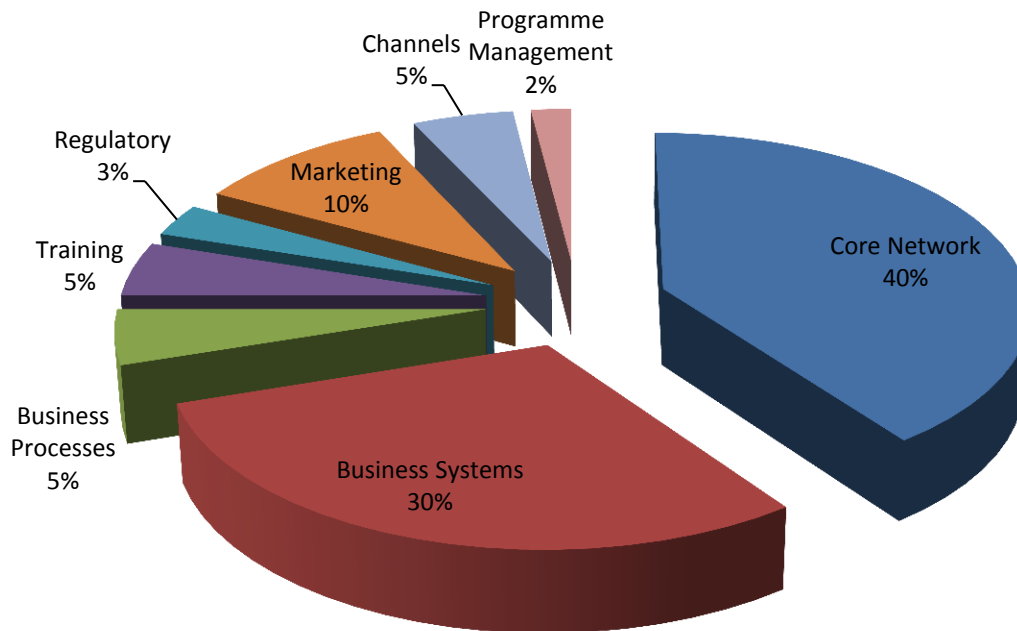
Significant Risks – Fundamental change to Network, Business, Regulatory and Retail systems and processes

Cannot be rushed– Major programme requiring discipline, planning & collaboration

Brand Scrutiny – Reinforces brand if implemented well.... But damages credibility, standing & confidence if implemented poorly

ONE SHOT TO GET NP RIGHT - LIFE WILL NEVER BE THE SAME AFTERWARDS!

Indicative NP Implementation Costs



Routing solution - \$300k to \$5 million

Billing system upgrade - \$50k to \$2 million

Interconnect system upgrade - \$50k to \$250k

Provisioning system automation - \$50k to \$300k

Programme Management – upto 6 man months

Business Process Development – upto 30 man months

Regulatory support – upto 5 man months

Routing & Porting Testing – upto 10 man months

NP Training – 1-8 hours per employee

Fixed & Mobile NP – Operator Implementation Considerations



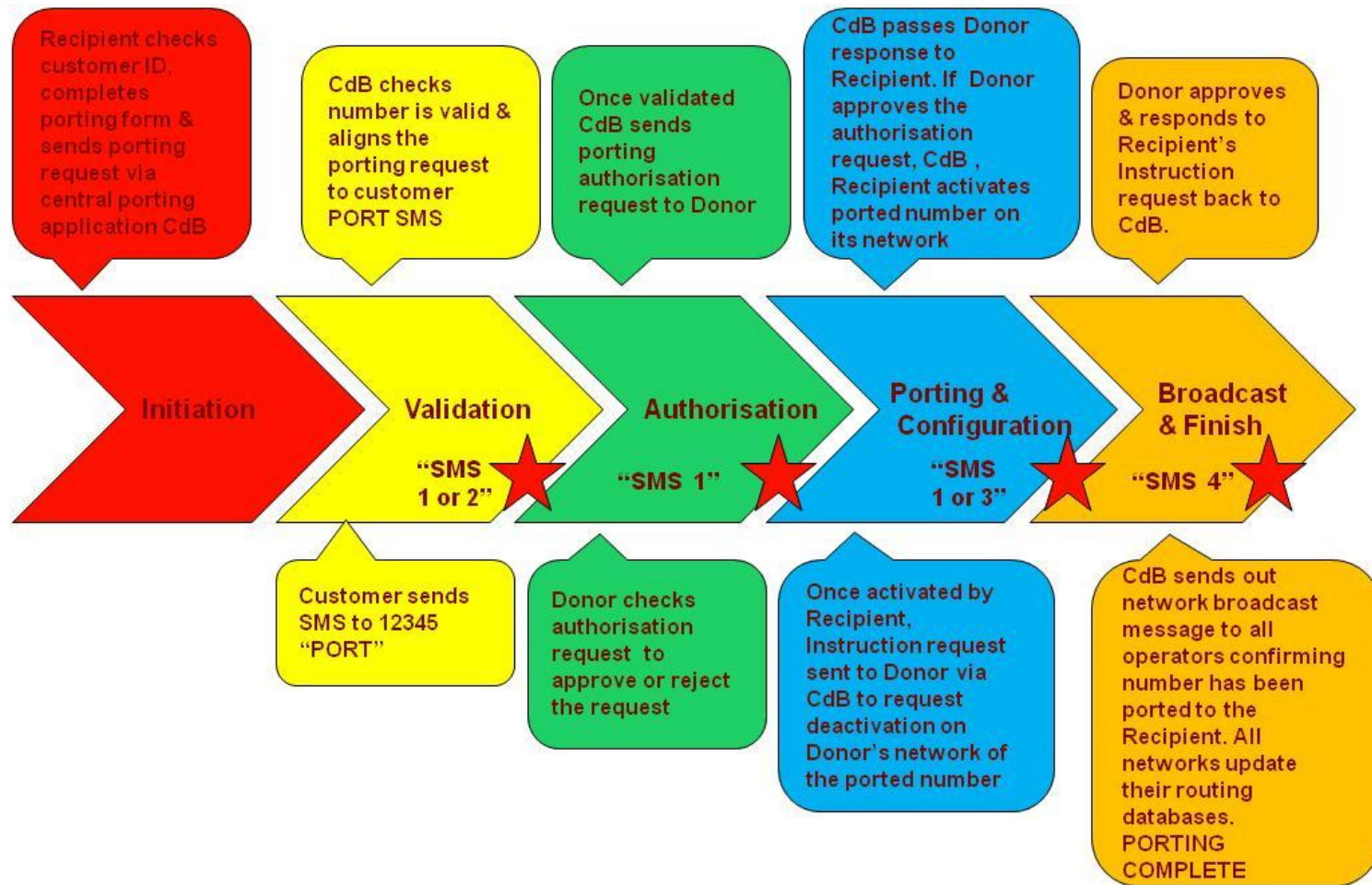
- **Forcing operators to implement & operator separate fixed & mobile NP support systems/ functions?**
 - Core network routing
 - Provisioning systems
 - Mediation/ rating & billing systems
- **Central NP Clearinghouse** – most NP platforms capable of processing fixed & mobile number portability transactions.
 - Changes required to Porting Process Flow, Timers, Validation Requirements, Porting Windows, Reject reasons etc
 - Expansion of central number management database to include fixed number range allocations
 - Additional automated consumer authorisation/ validation mechanism, ie IVR/ PIN etc
 - Development of automated interfaces/ manual GUI porting facilities
- **Routing Approach**
 - Different routing approaches for fixed and mobile NP?
 - Indirect Routing - more appropriate for fixed NP
 - All Call Query Direct Routing – Appropriate for both Mobile & Fixed Number Porting
 - All Call Query Routing and CDR/ Billing System Changes applied to across all core network & business systems

Fixed Number Portability – Implementation Considerations

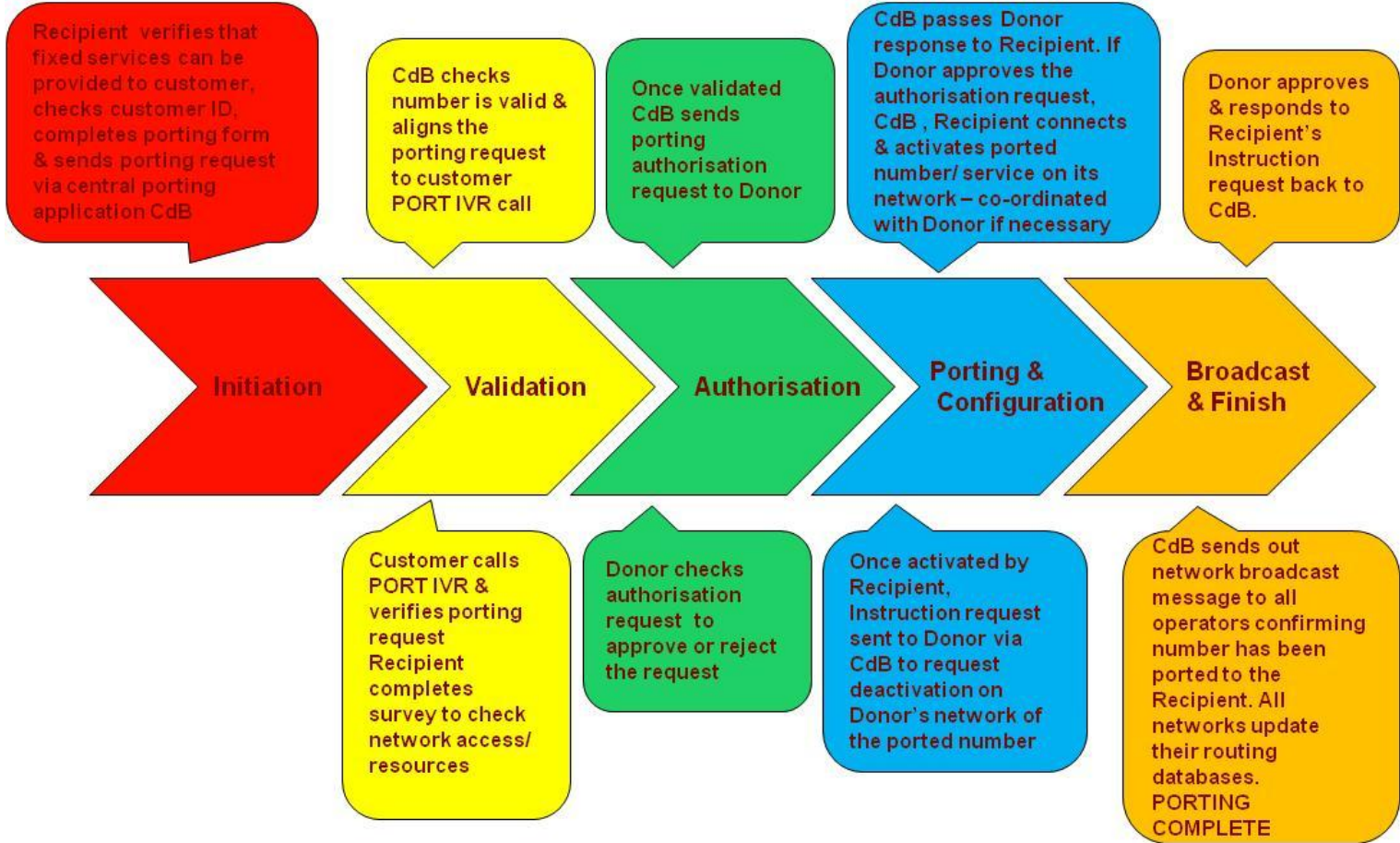


- **Robust and established Wholesale Access Product Frameworks & Inter-operator provisioning processes**
 - **LLU** – requires **significant investment by all parties** in access infrastructure
 - **WLR** – requires regulated commercial and operational frameworks
 - **FWP** – Quick and change to implement and uses existing mobile provisioning approach
 - Inter-Operator provisioning processes, resources and facilities to manage complex transfer of fixed number services – potential out of hours porting for business users
- **Business Rules** – Similar between Fixed & Mobile
- **Consumer Code** – Similar between Fixed & Mobile
- **Regulatory Requirements** – Similar between Fixed & Mobile
 - porting charges, transit charges, porting SLAs -
- **Operational Requirements** – Similar between Fixed & Mobile
 - Inter-operator provisioning interworking processes, changes to bundled package management/ billing, Off/ On Net differential billing, separation of DSL & Voice services

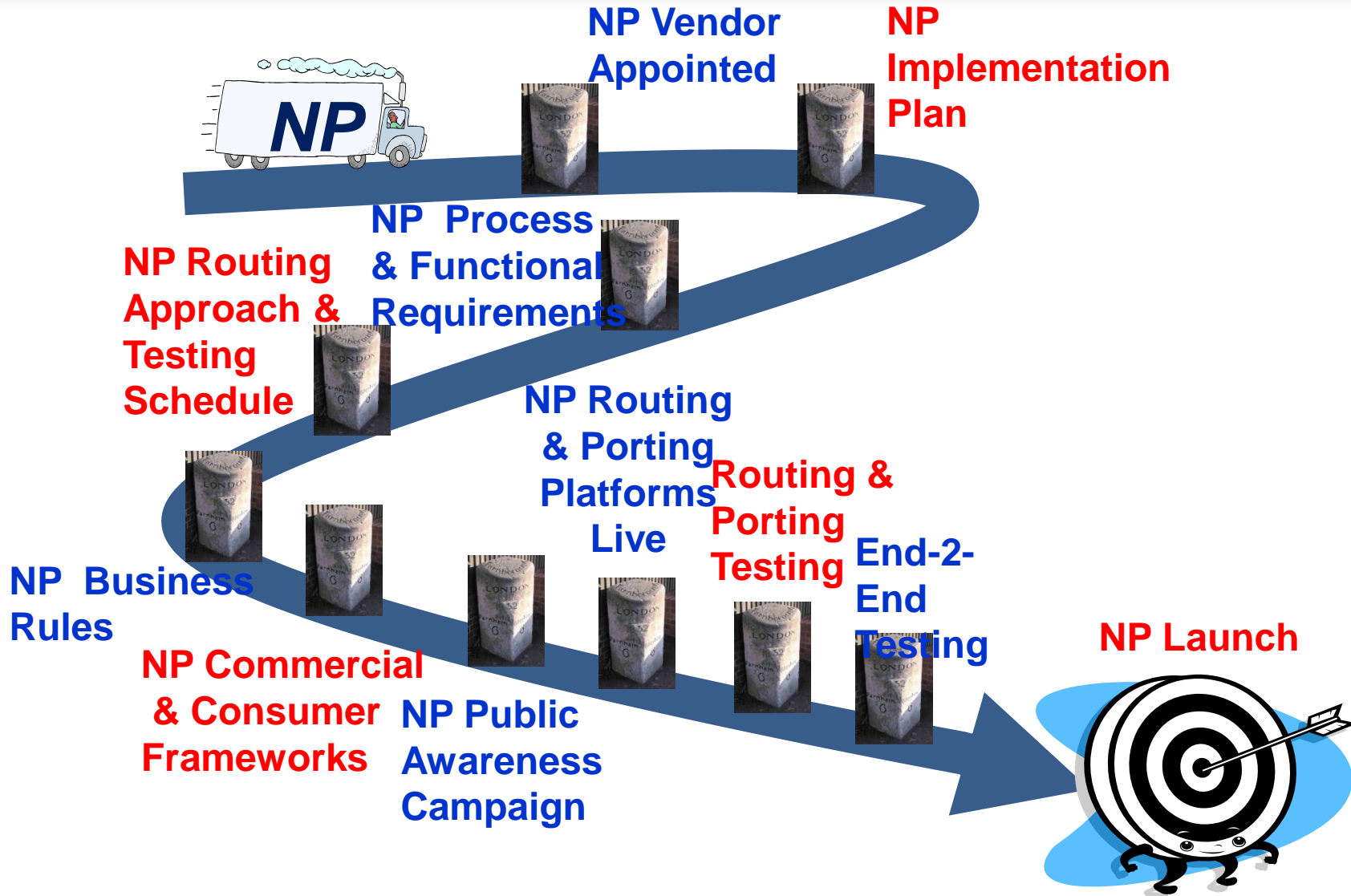
Mobile NP Process



Fixed NP Process



Cross Stakeholder NP Journey



NP Technology Workstream Schedule



Workstream	Activity	Functions Involved	Development					Implementation				Testing			Launch	
			Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Month 13	Month 14
Technology	Development Inter-operator end-2-end test schedule	Regulatory/ Commercial														
Technology	Assessment of impact of Number Portability on business system and processes	Regulatory/ Commercial/ Call Centre/ Provisioning/ Retail/ IT Development & Operations/ Procurement														
Technology	Development & implementation of changes to key business systems	Regulatory/ Commercial/ Call Centre/ Provisioning/ Retail/ IT Development & Operations/ Procurement/ Finance														
Technology	Definition and assignment of Inter-Operator Network Routing Approach and Codes	Regulatory/ Networks														
Technology	Inter-operator technical routing discussions, including development of testing schedule and specification	Regulatory/ Networks														
Technology	Network routing impact assessment, solution definition and procurement	Regulatory/ Networks/ IT Development/ Procurement/ Finance														
Technology	Implementation by each operator of the agreed routing approach solution & infrastructure	Networks/ IT Development/ Procurement/ Interconnect/ Roaming														
Technology	Inter operator testing – dependent on readiness of each operator	Regulatory/ Networks/ IT Development/ Procurement/ Commercial/ Call Centre/ Retail/ Finance														



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Routing options

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Technical LNP vs Administrative LNP?

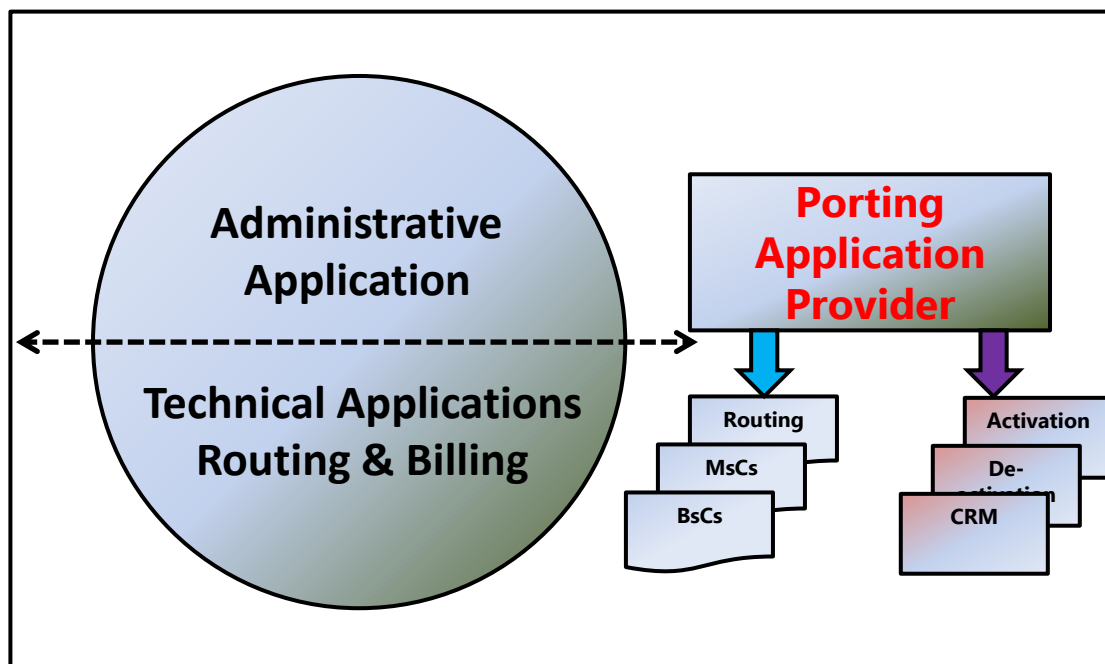


Porting Applications typically ONLY manage :

Processing of porting orders

Management of ported numbers

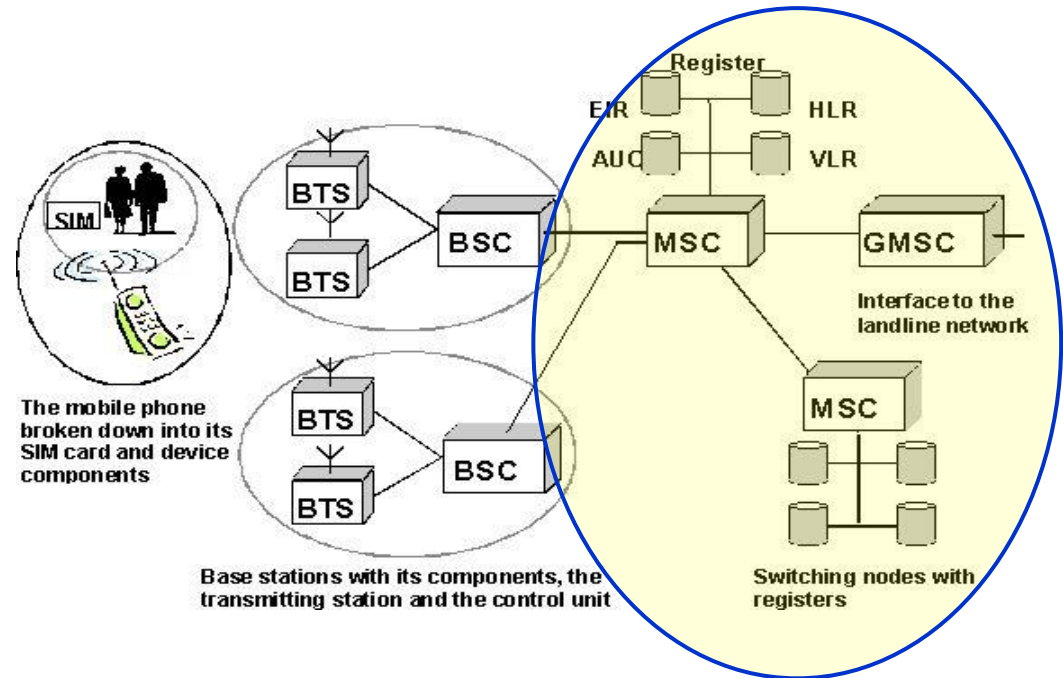
Does NOT provide routing function



NP Core Network - Routing Impact



- NP Routing performed at core level only
- No Impact at access or radio network level
- Routing changes impact
- Voice – fixed & mobile
- SMS/MMS



Which Routing Approach?



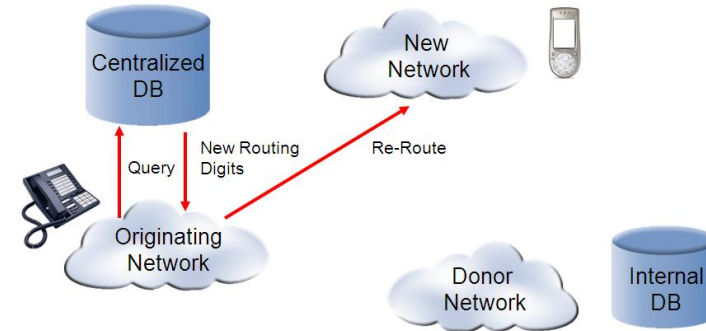
Operational/
Efficiency?

Complexity?

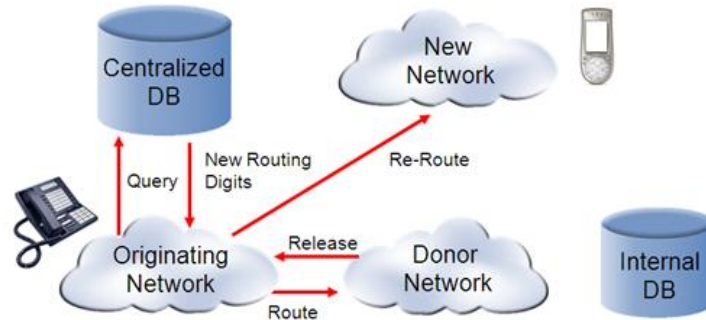
Cost/ Investment?

Impact on the
Subscriber?

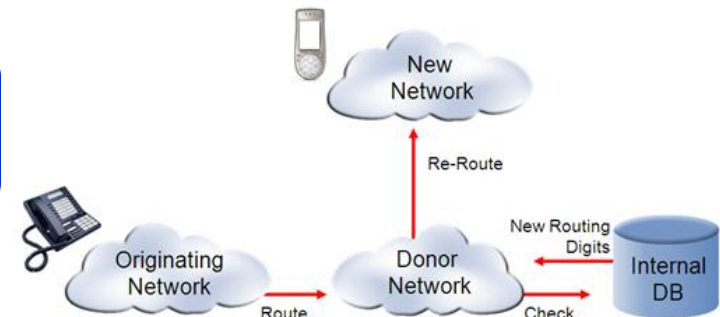
**DIRECT
ALL CALL
QUERY**



**QUERY ON
RELEASE**



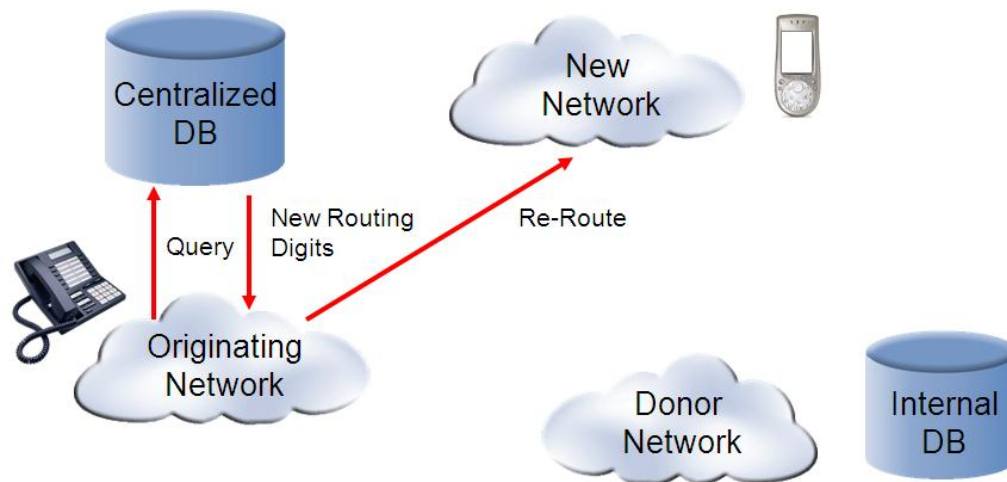
**INDIRECT
ONWARD
ROUTING**



Routing Options – Direct Routing - All Call Query



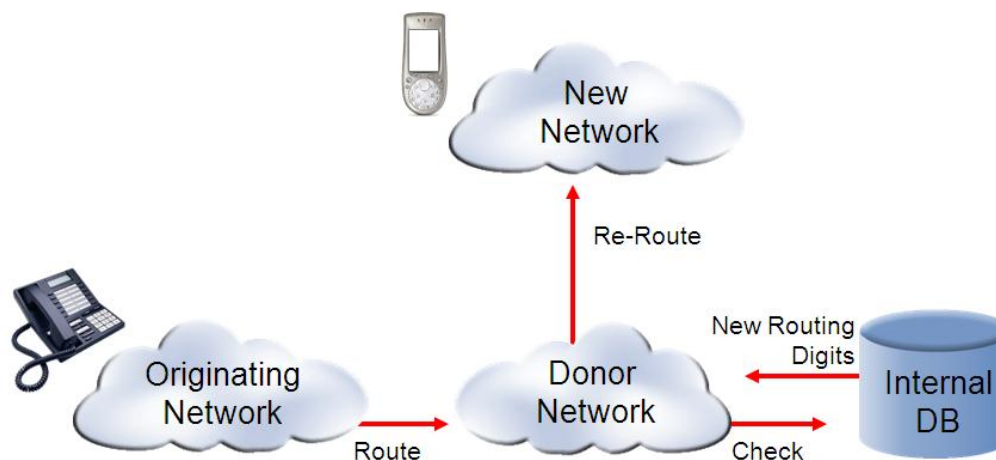
- **All Call Query (ACQ):** Every call is queried during call set up to determine if it is ported or not and if so, what operator/switch to route the call to
 - Pros
 - Network efficient at high volumes
 - All calls handled equally
 - Ported/non-portable numbers treated equally
 - No reliance on donor
 - Cons
 - Requires central database
 - Requires a local query DB – additional routing infrastructure required by Every operator – can be expensive



Routing Options.. Indirect Routing – Onward Routing



- **Onward Routing (OR):** Calls default routed according to number (prefix ownership). If a number has ported out donor/assignee operator does NP query to determine current provider and forwards call to that network
 - Pros
 - Can begin without extensive modifications to switches and networks
 - No new network elements to manage
 - No need for a central database
 - Cons
 - Dependent on donor network for call set up
 - Latency and prioritization
 - Network inefficiency – ties up 2 trunks per call
 - Donor network going out of business strands numbers and callers
 - Assignee operator has work to do even if number ports from 1st recipient to 2nd recipient
 - Text messages generally dropped when number ports



Routing Options.. Indirect Routing – Query on Release



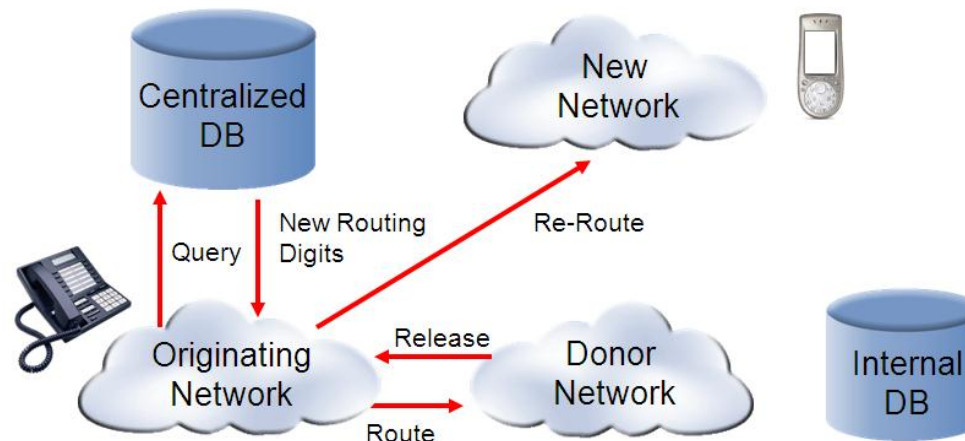
- **Query on Release (QOR):** Calls default routed according to number (prefix ownership) if number has ported out donor/assignee operator returns message in call set up then a NP query is done by originating network

- **Pros**

- Only ported numbers are queried,
- Less overall latency
- But calls to ported numbers have more latency than calls to non-porting numbers

- **Cons**

- Dependent on donor network for call set up
- Requires central database -- additional routing infrastructure required by EVERY operator-- can be expensive
- Requires a local query DB – additional routing infrastructure required by EVERY operator – can be expensive



Sharing the Cost of Routing?



- Centralised Routing
 - Single routing solution/ infrastructure shared across all operators
 - Saves/ minimises industry routing investment/ costs
 - Potential single point of failure impacting all networks – potentially impacting all nationwide traffic
 - Ownership and management of the central routing platform?
 - Interfacing/ interworking with different operator networks and vendors?
- Clearinghouse/ Third Party Routing
 - ACQ routing/ traffic transit provided by third party
 - Reduces operator routing investments/ costs
 - Potential single point of failure impacting served networks
 - Potential regulatory issues – imbalance of routing investment, routing charges etc
 - Technical & interworking issues



- Mobile Number Portability – 2 approaches
 - Signalling relay function (SRF) - a triggerless solution
 - The triggerless method intercepts the GSM/IS41 call delivery messages that are already flowing in the network, so that the switches need not be equipped with IN capabilities.
 - Intelligent network (IN) triggering - a triggered solution.
 - The triggered approach requires the switch to be equipped with IN triggering capabilities. The triggered solution can be used in either fixed or mobile environments.
- Fixed Number Portability – 2 Approaches
 - North America Markets
 - A triggered solution is commonly used in North America to support fixed number
 - Non North American Markets (ITU)
 - An ISUP-based triggerless solution is used to support fixed number portability.
- ITU-T Q. series specifies the functional requirements for supporting number portability, applicable to mobile and fixed networks.

Different Triggered & Triggerless Routing Approaches



- **SRF-based Mobile Number Portability (MNP):**
 - Triggerless solution applicable to GSM operators to support fixed-line NP and mobile NP.
- **• ANSI-41 Mobile Number Portability:**
 - Triggerless solution applicable to CDMA and TDMA operators to support fixed-line NP and mobile NP.
- **• INAP-based Number Portability:**
 - Triggered solution applicable to GSM and ITU based fixed-line operators to support fixed-line NP and mobile NP.
- **• ANSI-41 Number Portability (AINPQ):**
 - Triggered solution applicable to TDMA and CDMA operators to support fixed-line NP and mobile NP.
- **• Triggerless ISUP-based Number Portability (TINP):**
 - Triggerless solution applicable to wireline operators to support fixed-line NP and mobile NP.
- **• IS-41 to GSM Migration:**
 - Triggerless solution supports portability when an operator migrates its TDMA/CDMA-based network to a GSM based network and vice versa.
- **• Local Number Portability (LNP):**
 - Triggered solution applicable to North American (excluding Mexico) fixed-line and mobile (GSM, TDMA and CDMA) operators to support fixed-line and mobile NP.



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Routing Number Specification

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- All configurations which rely on number range will need to be changed
 - Routing Number
 - IMSI
 - Service Number
- Core Switch – Fixed & Mobile
- Voicemail
- SMSC
- VAS platforms
- Mediation
- Rating
- Billing/ IN



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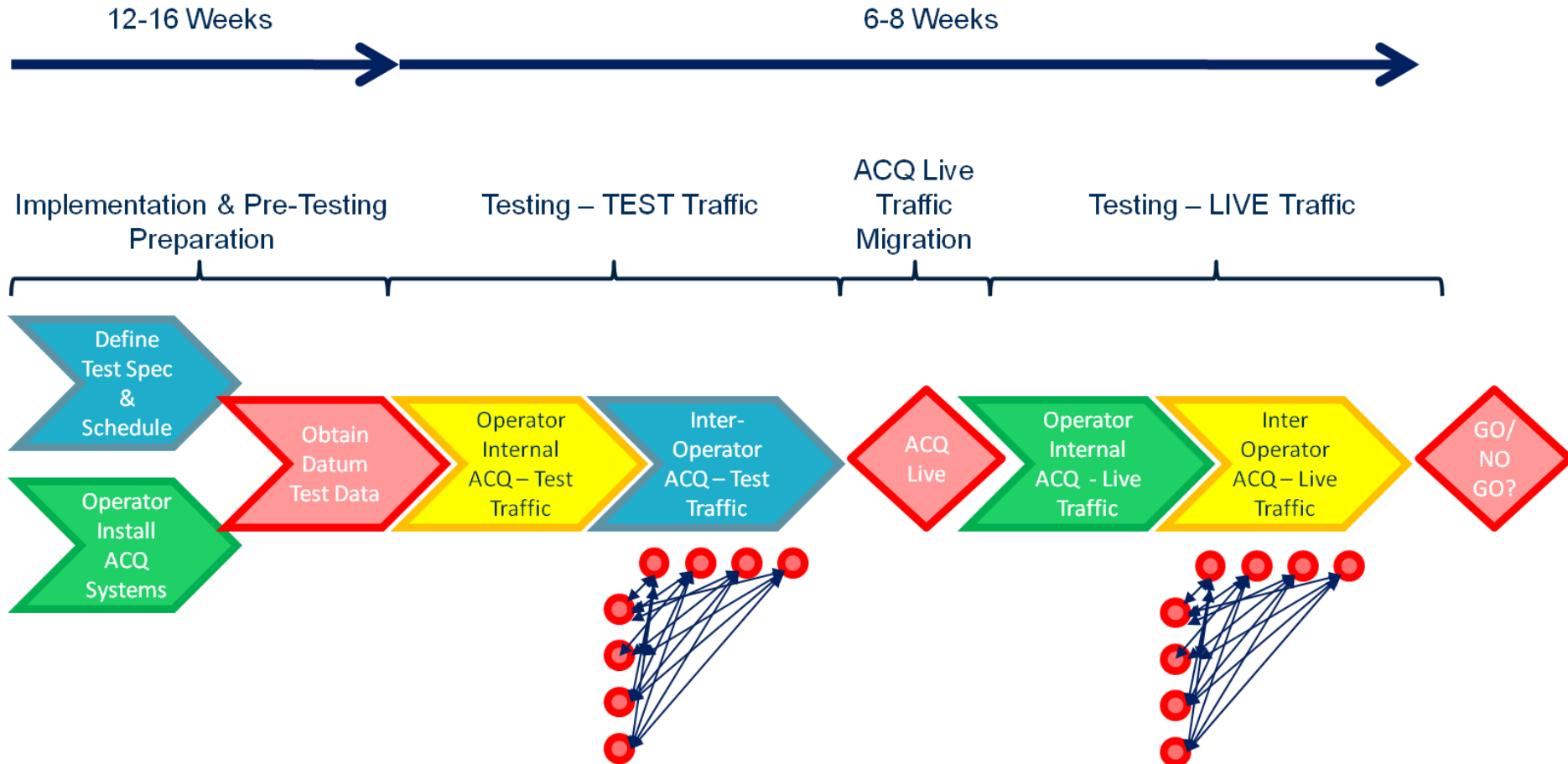
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NP Routing Testing Approach





Comprehensive Test Plan & Schedule

Defined Testing Approach & Specification

- Core Voice/ SMS scenarios
- Local Fixed & Mobile Traffic
- Roaming & International Traffic
- VAS Products/ Services

Agreed Test Numbers & SIM exchange

Collection of Datum pre-NP Test & CDR data

Comprehensive Internal Testing – Test & Live Traffic Scenarios

Staged Inter-operator Testing – Test & Live Traffic Scenarios

Revenue Assurance Validation

Cross Party Sign-Off – ACQ Live Migration Go/ No Go

- Big Bang vs Phased Approach?
- Well planned & strong stakeholder coordination, co-operation & communication
- Roll back contingency planning

Sample Routing Testing Template



A-PARTY	B-PARTY	DATE-TIME	A-NUMBER		B-NUMBER		CDR FORMAT/RN VERIFICATION	EXPECTED RESULTS	OBSERVATION
			MSISDN	IMSI	MSISDN	IMSI			
MobilePrepaidNon-Ported	Non-Ported-HOME								
MobilePrepaidNon-Ported	Ported-Out-HOME								
MobilePrepaidNon-Ported	Non-Ported-OLO								
MobilePrepaidNon-Ported	Ported-In-OLO								
MobilePrepaidNon-Ported	Ported-In-Prepaid-Roaming								
MobilePrepaidNon-Ported	Ported-In-Postpaid-Roaming								
MobilePrepaidNon-Ported	Non-Ported-Prepaid-Roaming-HOME								
MobilePrepaidNon-Ported	Non-Ported-Postpaid-Roaming-HOME								
MobilePrepaidNon-Ported	Fixed-Line-HOME								
MobilePrepaidNon-Ported	International								
MobilePrepaidPorted-In	Non-Ported-HOME								
MobilePrepaidPorted-In	Ported-Out-HOME								
MobilePrepaidPorted-In	Non-Ported-OLO								
MobilePrepaidPorted-In	Ported-In-OLO								
MobilePrepaidPorted-In	Ported-In-Prepaid-Roaming								
MobilePrepaidPorted-In	Ported-In-Postpaid-Roaming								
MobilePrepaidPorted-In	Non-Ported-Prepaid-Roaming-HOME								
MobilePrepaidPorted-In	Non-Ported-Postpaid-Roaming-HOME								
MobilePrepaidPorted-In	Fixed-Line-HOME								
MobilePrepaidPorted-In	International								
MobilePostpaidNon-Ported	Non-Ported-HOME								
MobilePostpaidNon-Ported	Ported-Out-HOME								
MobilePostpaidNon-Ported	Non-Ported-OLO								
MobilePostpaidNon-Ported	Ported-In-OLO								
MobilePostpaidNon-Ported	Ported-In-Prepaid-Roaming								
MobilePostpaidNon-Ported	Ported-In-Postpaid-Roaming								
MobilePostpaidNon-Ported	Non-Ported-Prepaid-Roaming-HOME								
MobilePostpaidNon-Ported	Non-Ported-Postpaid-Roaming-HOME								
MobilePostpaidNon-Ported	Fixed-Line-HOME								
MobilePostpaidNon-Ported	International								
MobilePostpaidPorted-In	Non-Ported-HOME								
MobilePostpaidPorted-In	Ported-Out-HOME								
MobilePostpaidPorted-In	Non-Ported-OLO								
MobilePostpaidPorted-In	Ported-In-OLO								
MobilePostpaidPorted-In	Ported-In-Prepaid-Roaming								
MobilePostpaidPorted-In	Ported-In-Postpaid-Roaming								
MobilePostpaidPorted-In	Non-Ported-Prepaid-Roaming-HOME								
MobilePostpaidPorted-In	Non-Ported-Postpaid-Roaming-HOME								
MobilePostpaidPorted-In	Fixed-Line-HOME								
MobilePostpaidPorted-In	International								
FixedPrepaidHOME	Non-Ported-HOME								
FixedPrepaidHOME	Ported-Out-HOME								
FixedPrepaidHOME	Non-Ported-OLO								
FixedPrepaidHOME	Ported-In-OLO								
FixedPrepaidHOME	Ported-In-Prepaid-Roaming								
FixedPrepaidHOME	Ported-In-Postpaid-Roaming								
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FixedPostpaidHOME	Non-Ported-Prepaid-Roaming-HOME								
FixedPostpaidHOME	Non-Ported-Postpaid-Roaming-HOME								
FixedPostpaidHOME	Fixed-Line-HOME								
FixedPostpaidHOME	International								

Routing - 600 tests per phase - 4 phases

Revenue Assurance – 2000 tests

Example VAS/ Ancillary Testing



Call Ring Back Tones

Money Transfer/ Mobile Banking

Call Forwarding

SMS Service Notifications

USSD Services

USSD Notifications

Recharge Functions

Friends & Family – CUG

Voicemail

Blackberry Services

Loyalty Management Systems – Bonus/
Reward

Premium Rate SMS/ VAS services

Service & Short Code Access

Negative balance/ Credit overdraw

Home Zone/ Cell Zone services

Fixed Wireless Products & Services

International Roaming – CAMEL

Corporate Hybrid Services

SMS Blacklist/ Whitelist Management/
Screening



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Central NP Clearinghouse Functional & Operational Requirements

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Central NP Clearinghouse Functional & Operational Requirements



- Management of Central Number Database
- Routing broadcast update to operator local routing databases – Real-time update
- Management of inter-operator NP porting process
 - Initial validation – customer/ system
 - Onward Porting Restrictions
 - Progress communication with customers
- Management of porting history
- Safeguarding of Porting & Routing data
- Return to Block Operator Number Management Process
- Local Routing Database Synchronisation
- NP performance management and reporting
- Helpdesk support to stakeholders



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Porting Process & Interworking with Central Clearinghouse

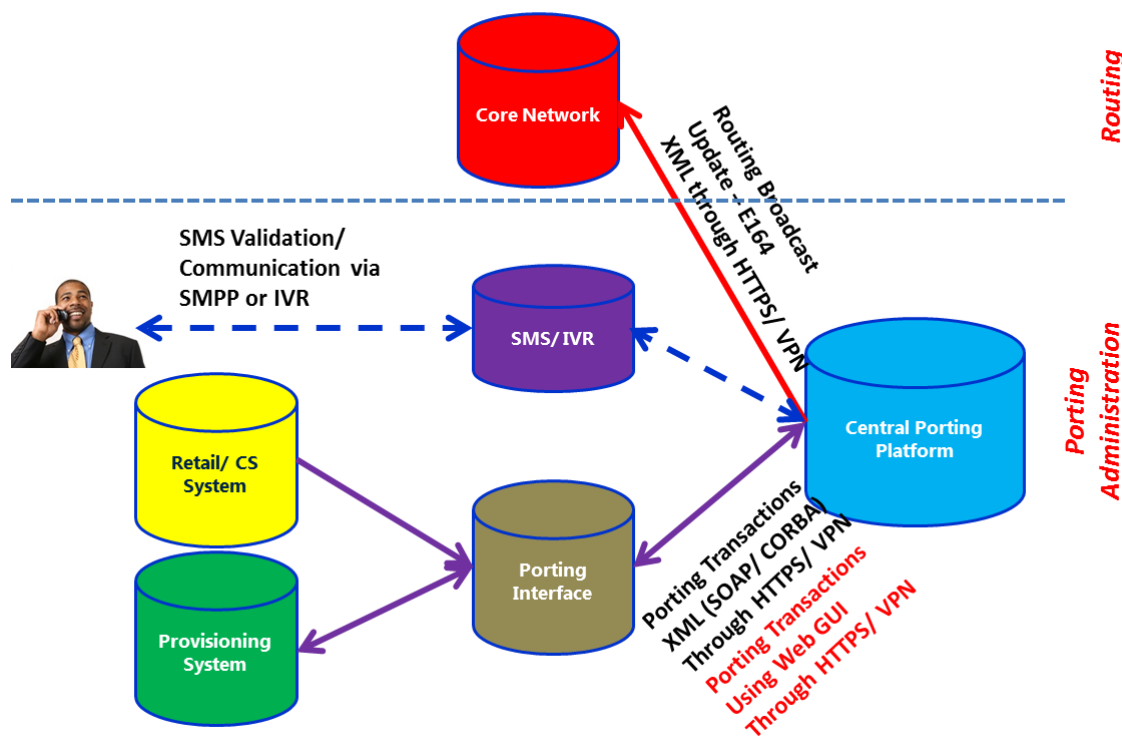
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Operator Connectivity to the Central Porting Platform



- Receive Routing Updates & Automatically Process within Local Routing Database – Real Time
- Transmit customer validation & communication SMS (Mobile)
- Connect to IVR validation platform & process customer email updates (Fixed)
- Transmit, Receive & Process Porting Messages
 - Manually – via GUI
 - Automatically – via XML etc
 - Port IN
 - Port Requests
 - Port Activation
 - Port OUT
 - Port Approval
 - Port Deactivation



NP – Fixed vs Mobile ?



- **Service availability between Operators - Key Pre-requisites**
 - Direct Interconnection – Fixed to Fixed & Fixed to Mobile
 - Network Access – Fixed – LLU etc – need for pre-order audit etc
- **Operational delivery**
 - Mobile – transfer/ provisioning completed at core network level – simple & quick
 - Fixed – transfer can be complex, involving audit, exchange jumpering, Wholesale Access Product Framework (LLU/ WLR etc) customer premises line provisioning & engineer co-ordination
- **Porting Timescales**
 - Mobile – less than 2 working hours
 - Fixed – typically 2 to 5 working days (aligned to existing provisioning timeframes)
- **Porting Windows**
 - Mobile – aligned to retail opening hours
 - Fixed – extended since business customers require out of hours porting to minimise disruption to business activities

Fixed vs Mobile – Porting Process Differences



Porting Stage	Mobile Number Portability	Fixed Number Portability
Initiation	<p>Confirm customer ownership of number</p> <p>Check customer ID</p>	<p>Confirm customer ownership of number</p> <p>Check customer ID</p> <p>Confirm services can be provided & by what means?</p>
Validation	<p>CdB checks validity of porting request</p> <p>Customer sends PORT sms</p> <p>CdB aligns & validates Port sms to port request</p>	<p>CdB checks validity of porting request</p> <p>Customer calls PORT IVR</p> <p>CdB aligns & validates Port IVR to port request</p> <p>Donor may complete survey to confirm network availability & resources</p>
Authorisation	<p>Donor validates porting request against agreed checks</p>	<p>Donor validates porting request against agreed checks</p>
Porting & Configuration	<p>Recipient activates number/ services</p> <p>Activation confirmed via CdB</p>	<p>Recipient arranges engineer/ exchange provision of services</p> <p>Activation confirmed via CdB</p> <p>Recipient co-ordinate engineer/ exchange activity with Donor if necessary – separate to CdB</p>
Broadcast & Finish	<p>Donor deactivates/ disconnects services</p> <p>CdB sends E164 broadcast to all operators to update local copies of routing CdB</p> <p>Port Closed</p>	<p>Donor deactivates/ disconnects services</p> <p>CdB sends E164 broadcast to all operators to update local copies of routing CdB</p> <p>Port Closed</p>

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Porting System Requirements

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Operator Porting System/ Process Requirements



- Single/ Multiple/ Block Port Transactions
 - Port In
 - Port Out
- Real Time Approval of Porting Requests
 - Checking Billing/ Customer Services/ Provisioning/ Core Network systems
- Multi-channel Retail Access
- On Demand Pre Pay SIM provisioning
- Accurate & Real-Time Verification of Service Availability - Fixed
- Real Time Service Activation/ Deactivation
- Co-ordination of Field Engineers/ Truck Rolls with OLOs
- Separation of Voice & ADSL Services
- Return to Block Operator/ Number Range Holder – Quarantining Ported Numbers
- Separation of Customer Accounts
- Real-time generation of Final Bills



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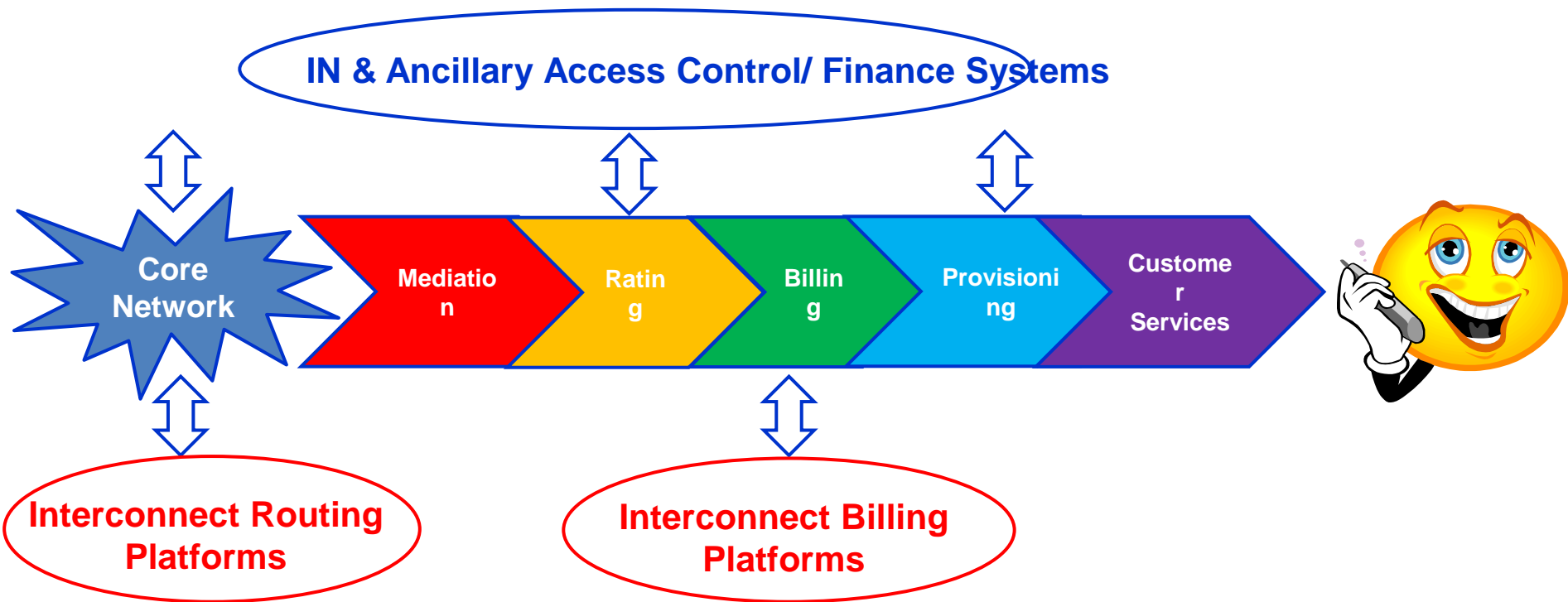
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Implementation of porting systems into Operator business systems/ processes

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Business Systems Impacted by NP

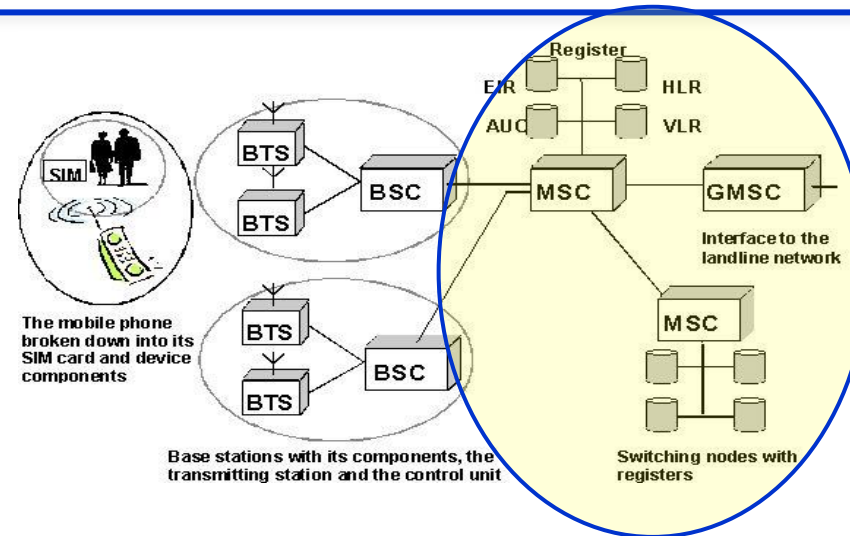


NP– Impact on Business Systems



System Type	Impact	Change Required	Nature of Change
Customer Relationship Management	High	Very Likely	Validate Port-Out requests. Segregate Ported Out services/ customers
Retail Billing	High	Very Likely	On/ Off Net billing can no longer be processed by number range. Presentation of differential on/ off net billing
Mediation	Critical	Mandatory	Ability to collect & process pre-fixed CDRs
Rating	Critical	Mandatory	Ability to rate CDRs for On/ Off Net traffic
Interconnect Billing	Critical	Mandatory	On/ Off Net processing and billing of On/ Off Net Interconnect traffic
Network Routing	Critical	Mandatory	CdB look-up and prefixing/ routing of traffic to ported numbers. Integration to receive porting updates from porting application. On/ Off Net call differentiation. Changes to HLR/ Roaming configurations
Pre Pay Mobile	High	Very Likely	Provisioning of ported numbers with non block number ranges. Pre Pay usage & Roaming management for Ported IN & Out numbers
Post Pay Mobile	High	Very Likely	Provisioning of ported numbers with non block number ranges. Pre Pay usage & Roaming management for Ported IN & Out numbers
Service Activation/ Provision – Fixed/ Mobile	Critical	Mandatory	Interaction/ coordination with the central Porting Application & other operators. Verification of service provision to ported users

NP Core Network Considerations



Simple or Complex Core Network architecture

Single or Multiple Core Network Vendors?

Integrated Core Network Platforms? HLR/ IN etc

NP requires either onward routing or local look-up database/ addition of a Routing Number – Options include :-

- STP (Signal Transfer Point) – upgrade or additional
- Central Services Database Platform
- Activation of NP functionality on existing MSC/ HLR

Routing update Interfacing/ Interworking with central porting clearinghouse/ database

- Existing Core Network Vendor
- In-House Development
- Central porting vendor
- Third Party

NP Core Network Impact Assessment



ALL number range network settings/ configurations WILL change

Most routing issues caused by inadequate impact assessment of MNP on call flows. Vendors assume operators are experts & vice versa

Risk analysis & planning critical to ensure smooth migration to pre-fixed traffic routing across the networks – staged approach

- Call Flow, Services & Scenario Analysis

Development & agreement of detailed test plans covering all possible scenarios, including In & Out roaming

- Internally
- Inter-Operator

NP Core Network Impact Assessment



Routing prefixing – format and configuration

Routing number requirements for individual network elements

Differential processing of pre-pay/ post pay and SMS traffic

Collection & presentation of differentiated Off Net/ On Net CDRs

ACQ processing of SMS traffic - enum

Compatibility issues between different operators' networks

On Net/ Off Net Notification approach?

Prevention of Call Loop Back during the port activation phase

“On Demand” provisioning of SIMs/ Services

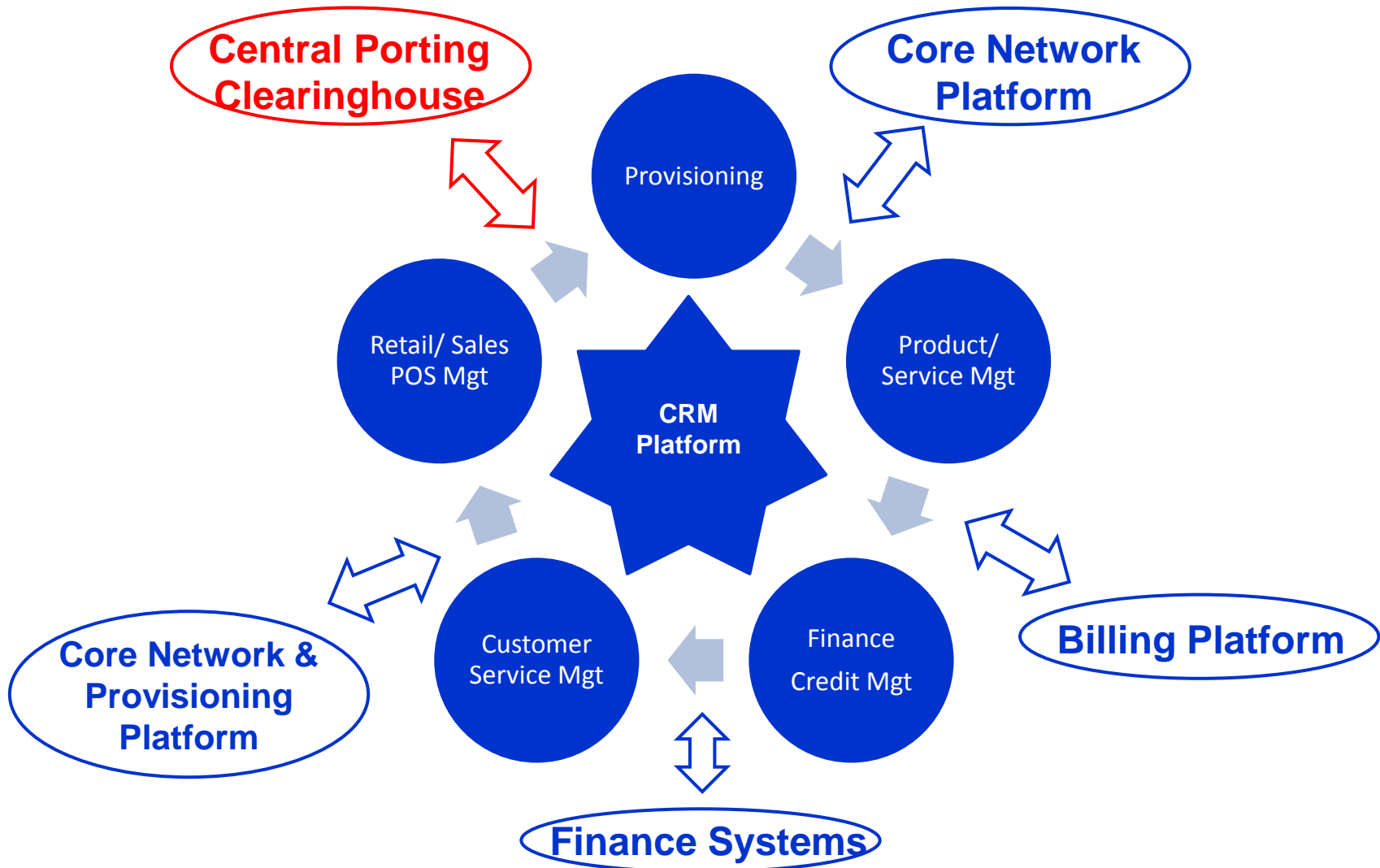
Separation of ADSL from Voice Services

Out of Hours porting of corporate/ enterprise fixed services

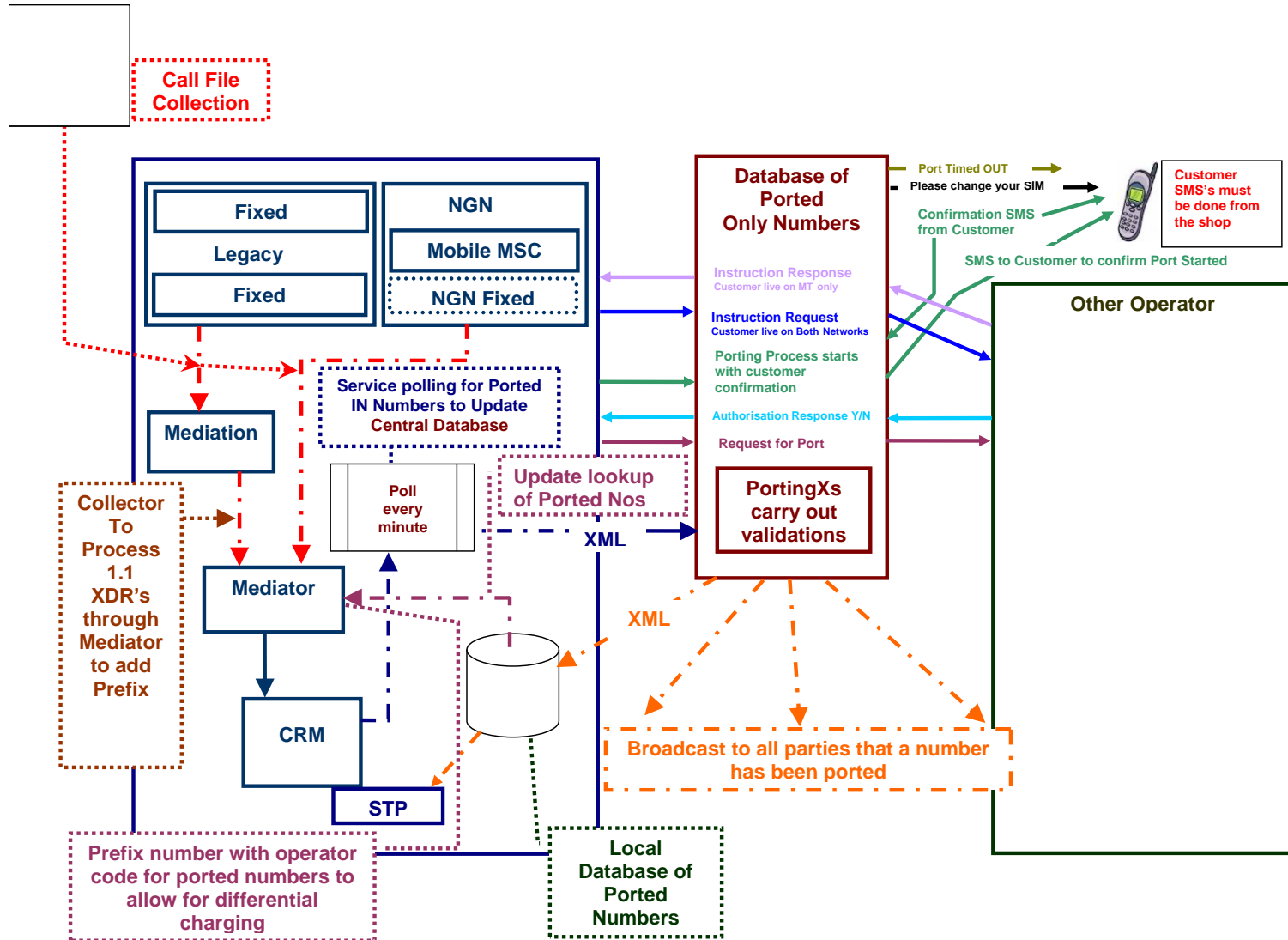


- **Why?**
 - **Customers no longer able to tell whether a call is On Net or Off Net by the number pre-fix**
 - **Protect customers & regulators from “Bill Shock” complaints**
- **Reality – Unnecessary & Dangerous**
 - **Customers only call limited numbers & soon identify a ported number – very few Bill Shock complaints**
 - **Tones/ message etc cause irritation & confusion to customers**
 - **Can cause major disruption & damage to core networks**
 - **Involves significant engineering activity & cross stakeholder co-ordination**
- **Differential ring tone – conflicts with VAS CRBT**
- **Off Net Tone – Causes customer irritation and confusion**
- **Off Net Message – Causes customer irritation**
- **SMS/ Web Look Up – Better Option – Less Intrusive – Can be Provided by Central Clearinghouse provider**
- **Recommendation – Avoid or make optional**

Business Systems Impacted by NP



Example NP Systems Architecture



Routing is just part of the story?



Critical to be able to rate & bill calls/ SMS correctly & in real-time

Collection & presentation of differentiated Off Net/ On Net CDRs

Differential processing of pre-pay/ post pay and SMS CDRs

Correct rating against CUG/ Friends & Family services

Accurate processing of Pre-Pay decrement, bonus and top-up services for ported numbers

Processing of Roaming CDRs for ported numbers

Interconnect CDR processing & billing

Treatment of debt – credit management

Separation of multiple/ bundled services to support porting – Voice/ ADSL/ Mobile

Prevention of accidental Winback – Multiple services

NP Process Impact Assessment



Process efficiency ? – meeting regulatory NP timeframes

Capacity issues? – scalable to meet peak demands

Security – Safeguarding subscriber integrity and meeting data protection requirements

Flexibility – Supporting Fixed & Mobile, Pre-Pay & Post Pay, Retail & Business?

Availability – Geographically – bringing porting to the consumer – multiple channels? Time – complying with regulatory requirements

Reliability & Stability – Providing a consistent and quality porting experience

Impact on existing operations – Retail/ Channel footfall, provisioning capacity etc

Level of Automation - CAPEX investment vs OPEX resourcing, system capabilities etc



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Key Objectives of Porting Testing



Verify central porting application conforms with specified NP process requirements

Test Port-In and Port-Out Functionality , Stability & Usability– GUI & API

Test ALL porting scenarios

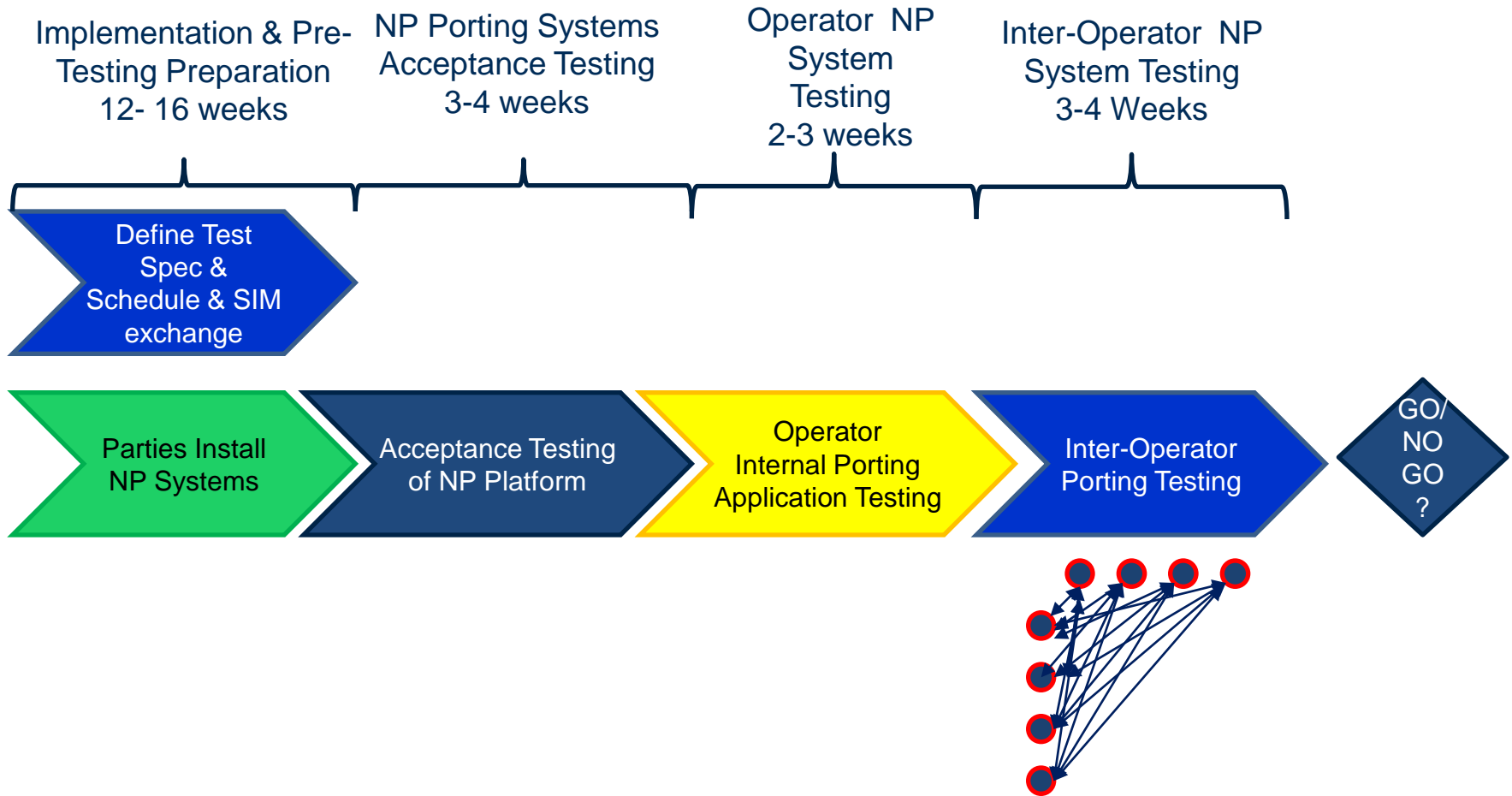
Test porting fault finding & fixing

Testing completed with allocated & managed test accounts using exchanged SIMs

Driven by comprehensive inter-operator test specification and schedule

Carefully managed through phased and co-ordinated approach

NP Porting Testing Approach





Provisioning

- Systems
- Processes
- Variations in Delivery Mechanisms – Fixed

Field Operations – Fixed

- Service Availability – Efficiency & Accuracy of Survey Activities
- Coordinating Field Resources

Validation mechanisms are Appropriate, Reliable & Consistent

- Data Transfer/ Checking – Accurate & Reasonable
- SMS/ IVR – Consistent, Stable & Reliable

Stability of Inter-operator Links & Interfaces

- Stress Testing – Porting Volumes
- Consistent Response Times
- “Fool Proof” Resistance
- Monitoring & Fault Fixing Performance



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End-2-End testing & launch readiness preparations

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NP Testing Approach



Comprehensive & Exhaustive Testing is Critical



Ensure that NP implementation does NOT impact

- Customer Services Provisioning & Migration
- Core Network Routing
- Service/ VAS Product Delivery
- Revenue & Financial Integrity
- Retail Systems & Processes



Takes a minimum of 6-8 weeks

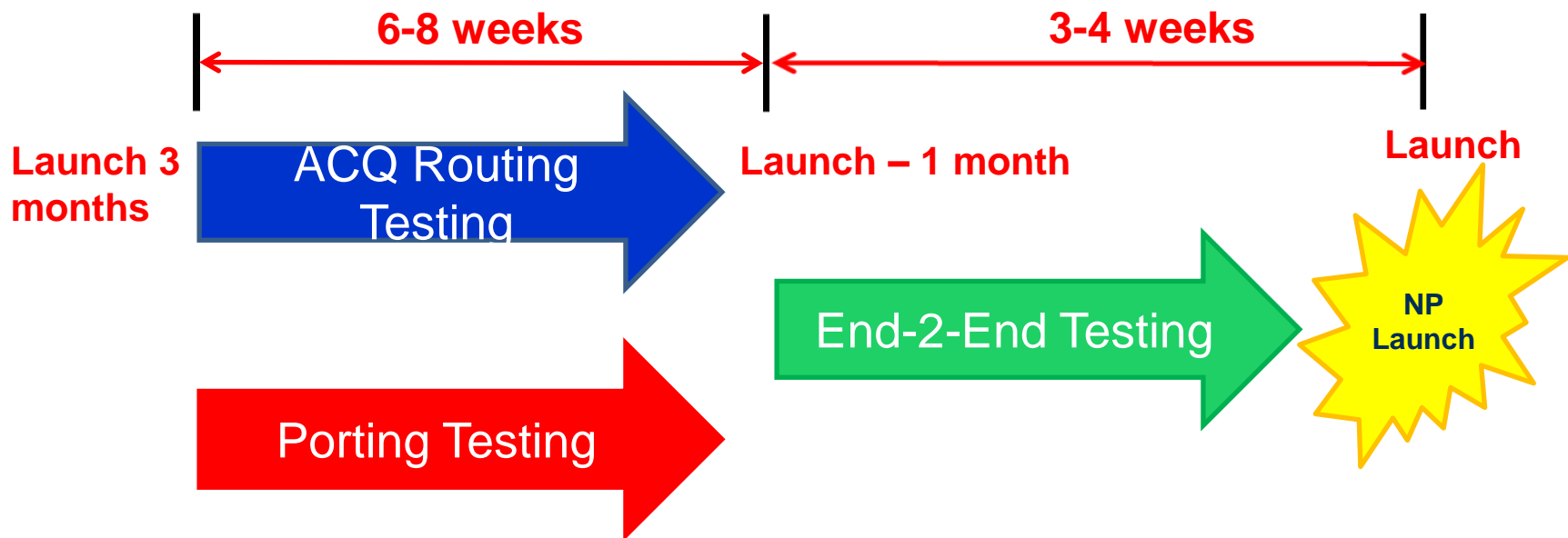


Parallel Internal and Inter-Operator Routing & Provisioning Testing Programmes



Final Integrated End-2-End & Readiness Testing Phase

Staged NP Testing Programme



Carefully structured and managed test schedule

Test & verify ACQ and Porting separately

End-2-End testing checks all elements

End-2-End testing can include verification of retail systems, processes & training ahead of launch

Depends on readiness of all parties and close collaboration between operators

Minimum test period – 6 to 10 weeks – depending on readiness

Effective Testing Progress Tracking & Collaboration are Key



Agreed testing objectives & approach

Clearly defined & realistic testing milestones

Nominated testing owner within each stakeholder

Comprehensive defined testing management framework

Regular & structured progress reviews

Positive commitment & collaboration between the Stakeholders

Openness & honesty between all parties



Final key stage – typically last 3-4 weeks

Verifies all constituent elements & processes are working correctly

- ACQ routing
- Porting systems/ process
- Retail training
- Revenue Assurance
- Porting fault finding – inter stakeholder

Involves multiple functions across ALL operators & stakeholders

Mystery shopping between operators can be useful to identify operational issues & verify uniform & positive porting experience

- Identify porting process anomalies defect & assess training issues & verify uniform porting experience across operators

Final stage before the KEY All Party Launch Go/ No Go decision milestone – signed off at CEO level



Who Should Drive Testing?

- Operators or Regulator?
 - Regulator – Driver, Participant or Observer?

Launch on target or when ready?

Critical tool for tracking and verifying readiness and compliance

Testing is not just a Technical Process – Testing should challenge every aspect of NP



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Future evolution of NP services and functions

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- Any service which involves a numeric unique identifier and can be offered by different competitors can be ported
- Telecoms
 - VoIP
 - DNS
 - Enum
 - Non-conversational services based on MSISDN – BBM/IM
 - Least cost routing of International calls
 - IP-IP – IP interconnect
- Non –Telecoms
 - Bank Accounts
 - Credit Cards
 - Utility Services
 - Health Insurance etc



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Thank you

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