



Implementation of Wireless Number Portability: Setting a New World-Class Standard

**Key Issues, Strategic Recommendations and
A Comprehensive Implementation Plan**

September 9, 2005

Prepared for:

Canadian Wireless Telecommunications Association
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Implementation of Wireless Number Portability Setting a New World-Class Standard

Limitations, Restrictions and Qualifications

PricewaterhouseCoopers LLP (“PwC”) has been engaged as an independent consultant by the Canadian Wireless Telecommunications Association (“CWTA”) to develop a project plan for wireless NP (“WNP”) in Canada based on our global experience, independent research and input from various stakeholders including, but not limited to, the CWTA, Canadian carriers and the Canadian Radio-television and Telecommunications Commission (“CRTC”). We understand that our report is one of several factors that will be considered by the CWTA and its WNP Task Force Members in formulating their own views on WNP in Canada. The recommendations and conclusions set out in this report are based on the following limitations, restrictions and qualifications; any changes in which could have a significant impact on PwC’s recommendations and conclusions.

1. Unless specific reasons were known to exist to doubt credibility, PwC has relied upon the completeness and accuracy of all the financial information, data, advice, opinions or representations obtained by it from public sources and various stakeholders (collectively, the “Information”), some of which is detailed under the “Scope of Review” section. The recommendations and conclusions are conditional upon such completeness and accuracy of the Information. PwC has not verified independently the completeness and accuracy of the Information.
2. With respect to the anticipated challenges and projected costs associated with implementing WNP, we have assumed that they have been prepared on a reasonable basis reflecting current best assumptions, estimates and judgments of stakeholder management, having regard to the organizations’ plans, operational and financial condition and future expectations.
3. The recommendations and conclusions have been prepared on the basis of market, economic, financial and general business conditions existing on or about the date of our report. Future conditions may change and are beyond the control of PwC.
4. Without limiting the foregoing, in the event that there is any material change in any fact or matter affecting the recommendations and conclusions, which was not known to PwC when we prepared the report, PwC reserves the right to change, modify or withdraw the report. The recommendations and conclusions are given as at the date hereof and PwC is under no obligation to advise any person of any change or matter brought to our attention after such date, which would affect the recommendations and conclusions, and PwC has no obligation to update or revise the report as a result of future events, although PwC reserves the right to update, revise or withdraw the report.
5. In preparing the report, PwC has relied upon a review of the report by the CWTA and WNP Task Force Members. As part of this review, the CWTA and the WNP Task Force Members were specifically asked to confirm that: (i) they had read our draft report dated August 15, 2005 and are not aware of any errors, omissions or misrepresentations of facts, which might have an impact on our recommendations or conclusions therein; (ii) to the best of their knowledge, all of the Information provided orally or in writing to PwC is complete, true and correct in all material respects and does not contain any untrue statements of material fact; (iii) unless disclosed to PwC in writing, the Information does not omit any material fact; (iv) since the Information was provided to PwC, unless disclosed to PwC in writing, no material changes have occurred in the Information, or in factors surrounding the WNP in Canada which would have, or which would reasonably be expected to have, a material effect on our recommendations and/or conclusions.
6. The report must be read in its entirety by the reader, as selecting and relying on only specific portions of the analyses or factors considered by PwC could be misleading.
7. This report has been prepared for use by the CWTA and WNP Task Force Members pursuant to the terms of the engagement letter between the CWTA and PwC. PwC is not liable to any party other than the CWTA for access, use or reliance on, or to, this report, nor is PwC liable to any party for access, use or reliance on, or to, derivative presentations or reports based in part on our report.
8. Our recommendations and conclusions expressed herein are provided for the information and assistance to the CWTA and WNP Task Force Members in connection with developing their own position on implementing WNP in Canada.

Independence

PwC confirms that while the CWTA and many of the Canadian carriers, along with other stakeholders, have been, and most likely will continue to be our clients, PwC has no material ownership in any these parties. We confirm that, to the best of our knowledge, after all due and reasonable inquiry, PwC has disclosed to the CWTA all material facts relating to the WNP Project Plan which could reasonably be considered relevant to PwC’s position for any purposes of this engagement. PwC has also requested that the CWTA advise PwC of any other known or potential conflicts and all other material related facts that could reasonably be considered relevant to PwC’s position for the purposes of this engagement.

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INTRODUCTION

Canada at the Threshold: Defining a New World-Class Standard in WNP Implementation

Across the spectrum of challenges reshaping the competitive environment within Canada's wireless telecommunications industry, few are as complex as NP. Now that the Government of Canada has asked that Wireless NP ("WNP") be implemented and that the wireless carriers of the Canadian Wireless Telecommunications Association ("CWTa") have agreed to implement wireless NP, the focus has shifted to identifying the earliest and most effective means of deploying WNP nationwide with broad consensus and support from WNP stakeholders.

A Complex Undertaking

WNP implementation will not be a simple task for wireless carriers. WNP implementation will impact almost every facet of their operations – from physical and logical networks to critical business processes – and just how smoothly implementation is deployed may have a material impact on their ability to complete other critical business initiatives.

Intermodal WNP has yet to be widely adopted around the world. While many developed countries have advanced wireless telecommunications capabilities, few have implemented intermodal WNP. The United States, for example, is the only country to have implemented intermodal portability so far. Denmark is on track to implement it in 2006. Canada would become the third national market to do so. Japan, perhaps the most innovative wireless nation, has yet to implement mobile NP, though recently has announced plans to do so.

An Opportunity to Set a Global Standard

A well-conceived customer friendly implementation supported by collaboration and coordination among members of the wireless telecommunications industry and the Government of Canada could well be a notable success – a strong follow-up to Canada's successful deployment of commercial local number portability ("LNP") in 1998.

Beyond achievement of WNP implementation objectives on a regional or local basis, we believe that a successful national implementation in Canada would establish a new world-class standard in WNP deployment.

Wireless Number Portability: A Definition

According to the Government of Canada, wireless NP includes wireless-to-wireless capability as well as intermodal capability (wireline-to-wireless and wireless-to-wireline).

In other words, NP will allow customers to keep the same telephone number when changing service providers within the same local service area. Customers will also be able to keep the same number when transferring their landline telephone service to wireless service and vice versa.

Source Letter from the Minister of Industry to CRTC.
March 18, 2005 (Appendix F)

Critical Imperatives that Must Underlie any WNP Approach

Achieving these objectives, however, requires a disciplined approach that must address several critical imperatives. Any implementation plan adopted by the telecommunications industry and presented to the Canadian Radio-television and Telecommunications Commission (hereafter referred to as the “CRTC” or “Commission”) should:

- **Balance the needs of multiple stakeholders** – One of the paramount challenges in devising an implementation plan is balancing the interests of stakeholders – some of whom do not agree on key issues driving the effectiveness of a WNP implementation plan. Some, for example, believe that WNP should be available in a matter of months; with LNP existing today and intermodal WNP already deployed in the United States, they argue, that Canada should be able to implement the capability quickly. Others disagree. Some wireless carriers, for example, propose an implementation date beyond 2007, because the schedule is too aggressive, given the significant number of changes to implement WNP while simultaneously completing other strategic business initiatives.
- **Align regulatory objectives with efficient and effective industry leadership** – Some industry participants see a divergence in interests between regulators seeking to eliminate barriers to switching service providers and carriers wary about assuming costs and operational disruptions for a capability that they feel will just increase customer churn. This isn’t necessarily the case. For one, in markets and jurisdictions where WNP has been introduced, customer requests for it have been quite limited – primarily due to factors such as effective customer retention programs, new service offerings and overall improved customer service. Even more importantly, it is critical that the wireless telecommunications industry assume a strong and vital leadership role in defining the best approach to WNP implementation in a manner that simultaneously serves the purposes of both industry and the CRTC.

WNP is a Major Undertaking for All Industry Stakeholders

- All customer facing business processes and information systems need to be modified for WNP.
- Network elements and call mediation software needs to be upgraded.
- Most marketing and sales programs are affected, with greater emphasis placed on retention campaigns in the period leading up to WNP implementation and shortly thereafter.
- All customer facing personnel need to be trained to address WNP requests from customers.
- Key business processes supporting credit and collections must be amended to compensate for payment inducing leverage lost through the introduction of WNP. Currently, many carriers retain the customer’s wireless number to encourage payment on outstanding accounts.

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- **Incorporate key learning gleaned from the experiences of other countries** – It would be imprudent to overlook the lessons still emerging from the WNP implementation strategies deployed in the United States, the United Kingdom and Australia – especially with respect to tactics and strategies large and small that failed to deliver intended results. The United States, for example, with its regulator-imposed plan, took eight years to develop as legal teams representing United States stakeholders argued over the rules, and fewer than 6% of all American users (and less than one third of users that switched providers) have ported their number for the year following WNP introduction in November 2003. It was also launched in the largest markets during the busiest retail week of the year – frustrating customers assisted by poorly prepared retail personnel. Consider as well Australia’s experience: three out of four Australian wireless carriers have formally referred the fourth’s performance to the regulatory authority for failing to consistently meet number porting service level agreements.
- **Understand that not all Canadian wireless carriers are starting from the same position** – Some wireless carriers today are capable of implementing WNP fairly quickly, while others are only at the planning stage. Additionally, wireless carrier architectures are complicated in that there is no consistency among them in Canada with respect to the technology used for cellular communications, e.g. AMPS, TDMA, CDMA, and GSM. In addition, they tend to use many different equipment vendors in servicing customers. Since these factors contribute to the complexity in development and testing, they need to be considered carefully in mounting an effective WNP implementation plan.

A Brief Overview of the Engagement and Methodology

As a first step toward successful deployment of WNP, the CWTA, through its WNP Task Force, has engaged PricewaterhouseCoopers LLP (“PwC”) to develop an independent, objective and comprehensive project plan for the introduction of wireless number portability nationwide.

This engagement was awarded in early June 2005 with a near-term deadline requiring the presentation of a WNP Project Plan to the Government of Canada in early September 2005. Given the complexity of WNP, the number of stakeholders and the availability of resources over the summer period, this was a very aggressive schedule.

As an independent adviser to most of the largest wireless telecommunications providers in Canada and many market leading wireless telecommunications companies around the world, PwC has had an exceptional opportunity to build insight into both the sector-specific practices and the regulatory mandates that continue to shape the rapidly evolving changes in national, regional and local telecommunications industries worldwide.

In fulfilling this assignment, we tapped into this pool of resources – primarily through the following set of activities:

- We conducted a series of in-depth interviews with key industry stakeholders to gather relevant information, ask pertinent questions and gauge the tenor and strategic implications of a broad and not entirely consistent set of industry concerns and perspectives on WNP-related issues. (*For additional information, see Appendix D: Scope of Review.*)
- We consulted internally and externally – on both a global and national basis – with the various teams of specialists, technicians and business process engineers that comprise or support our dedicated telecommunications industry practice. We asked them for information, insight and

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ideas that would help guide a well-informed approach to WNP implementation specifically within the Canadian wireless telecommunications market. *(For additional information, see Appendix E: Experience and Qualifications of the PricewaterhouseCoopers' Team.)*

- We undertook independent research reviewing authoritative material from around the world on the topic of WNP. This material was used to augment our own internal capabilities and filtered against market-specific characteristics within the Canadian environment. *(For additional information, see Appendix D: Scope of Review.)*
- We evaluated a full complement of strategic, tactical and technical alternatives and options for introducing WNP, including a number of scenarios proposed and discussed during our interviews with both industry and internal experts. *(For additional information, see the section addressed later in the report entitled "Implementation Scenarios Considered".)*

Key Findings: We Recommend a September 2007 Launch

As a result of these inquiries, and the analyses and assessment that we applied to the information we gathered, we believe that the most expedient implementation of intermodal WNP requires:

- a national, common launch date of Wednesday, September 12, 2007;
- a focus on areas where local number portability exists at the time of the launch¹, along with Regina and Saskatoon if not LNP capable at that time;
- implementation of intermodal number portability at launch because it requires limited changes to the local exchange carriers' networks and provides more porting opportunities for a wider range of customers;
- both simple and complex porting to ensure equal access to all classes of carriers and customers (see page 7 for definition of simple and complex ports);
- a target porting interval for simple wireless-to-wireless ports of 2.5 business hours (similar to the United States), recognizing that exceptions could arise that prevent achievement of the 2.5 business hour target. Additionally, being able to port phone numbers seven days/week and from 8:00 a.m. Atlantic to 9:00 p.m. Pacific will need to be accommodated;
- all industry participants to upgrade their networks and systems to accommodate the separation of the Mobile Identification Number ("MIN") and Mobile Directory Number ("MDN"), which is a prerequisite for efficient WNP deployment; and,
- wireless-to-wireless and wireline-to-wireless porting be permitted within local calling areas (whether or not the receiving wireless carrier has a Central Office ("CO") code or point of interconnection in the same exchange as the donor carrier).

¹ For a complete listing of LNP-capable exchanges, consult the CRTC website url:
<http://www.crtc.gc.ca/cisc/eng/Portable.HTM?Print=True>

Scope and Approach of this Report

This report presents our findings in full and the rationale that supports them. First, it provides an overview of the strategic planning principles that we developed at the outset of the project to help guide our analyses and assessment of many different complex variables. This first section also includes a brief overview of the options, avenues and alternatives that we considered over the course of our review.

In the next sections, we present our findings in the form of 31 specific recommendations and outline the plan that we believe is necessary to realize these. Then, we address a number of review items, some of which reside on the critical path to successful WNP implementation and, as such, require timely resolution. Finally, the appendices provide additional documentation and information supporting the conclusions we present in this report.

I. Setting the Stage

Strategic Planning Principles

We know from experience, not just in addressing a full range of initiatives in the telecommunications industry, but also in carrying out complex project implementations, that the success of any WNP plan depends fundamentally upon whether every step along the path from analysis to execution is guided by a clear and comprehensive set of planning principles.

This is especially true in light of the many implementation options and alternatives that were at PwC's disposal in formulating a definitive plan. Armed with first-hand knowledge of the priorities and primary objectives of all the main stakeholders, the first step in our assessment process was to compile a list of strategic planning principles. The project team used this list to identifying the options and alternatives most likely to satisfy the largest number of stakeholders possible. Note that all the Planning Principles were considered in developing the WNP plan with no single principle taking precedence over the others.

Principle #1: Deploy WNP at the Earliest and Most Practical Common Date – The wireless industry has decided to voluntarily implement WNP, assuming a common start date can be agreed, recognizing not only that it is in line with stated public policy but also that customers will ultimately be better served if given the ability to port their numbers when switching wireless service providers. Therefore, a core planning principle that must guide this implementation plan is ensuring that measurable public benefits materialize at the earliest and most practical date. An example of how this principle is applied in this report is the fact that call forwarding is not proposed as an interim solution. Although call forwarding² can be deployed early, it is not considered practical for reasons given later in this report.

Principle #2: Develop an Implementation Plan that is Highly Cost-effective – One of the primary considerations in devising a WNP plan is to ensure that costs are contained to the greatest extent possible. This is seen as desirable by the wireless carriers themselves and their shareholders, as well as by customers to whom the additional costs would eventually devolve. In conformance with this principle, the plan should minimize the duplication of effort, promote the use of existing infrastructure (e.g. NP Administration Centre Service Management System (“NPAC SMS”)) and encourage the pooling of resources, wherever possible. Also, if stakeholders are given a reasonable implementation time frame, they should be able to incorporate WNP requirements into standard development windows. This should not require expedited software and business process development and testing which dramatically increased the costs in the United States.

Principle #3: Balance WNP with other Wireless and Wireline Carrier Priorities – While all of the wireless carrier stakeholders have stated that WNP is a major priority, other significant industry and carrier-specific priorities may need to take precedence. These include institutional, cross-company issues such as the end-of-year freeze³ as well as developments that affect the industry as a whole, such as Electronic Serial Number (“ESN”) exhaust (see Appendix H), MIN/MDN separation, E9-1-1 and VoIP which are using significant industry resources. There is general agreement, one that PwC supports, that

² Call forwarding can be implemented at both a network level, i.e. invoked by the service provider permanently at the request of a customer, and at a customer level, i.e. invoked by the customer directly. Customer call forwarding exists today as an option for customers; however, this is expensive and inefficient on a mass scale.

³ Due to its being the busiest retail season of the year, the last 6 to 8 weeks and first 1 to 2 weeks of the year are set aside by most carriers as a time when no major product launches or system upgrades are implemented.

WNP should be carefully considered in the context of other major industry- and company-specific initiatives.

Principle #4: Do It Once and Do It Right – This is a sentiment heard from all of the stakeholders and it reflects the overarching principle that implementation should be as transparent to customers as possible. This also means that interim solutions such as call forwarding should be avoided the same way they were when wireline portability was introduced. In addition, it means that WNP shortcuts in terms of process development and system testing should not be taken. Developing business processes is time and resource consuming. Process work should be directed to include all intermodal scenarios at one time, versus completing wireless-to-wireless, then wireline-to-wireless, then wireless-to-wireline. Each automated process requires a manual back-up procedure for business continuity purposes. Carriers may need to use the manual process if automation difficulties are encountered.

Principle #5: Develop an Implementation Plan that is Customer Friendly – This principle reflects the view among most of the stakeholders that the buying experience should not change significantly with the implementation of WNP. For instance, the options available today for purchasing wireless services should continue to be available to those wishing to port their numbers, whether online, in-store or over the phone. In addition, just as today a customer's service is activated while in-store or shortly thereafter, a customer porting his or her number to another wireless carrier should be able to expect completion of the port in less than one business day. This interval is comparable to customers' experience now in the United States where simple ports must be completed within 2.5 business hours (and generally occurs within minutes). The experience of customers in the United Kingdom, Australia and elsewhere (where ports can be completed in anywhere from 2 to 37 days) is not deemed acceptable in the context of the Canadian market.

Principle #6: Maintain Current Service Levels and Avoid Service Disruptions – Implementation of WNP is expected to touch every customer-facing Information Technology ("IT") system and all network elements. It is, therefore, of primary importance that the systems, inter-carrier processes and interfaces developed for WNP are thoroughly tested prior to launch. The United States experience is instructive in that testing was not sufficient and WNP was described as unacceptable at launch (see Appendix C). All steps must be taken to ensure that thorough and well thought out test plans prevent a similar experience in Canada.

Principle #7: Maximize Use of Existing LNP Infrastructure and Industry Processes – This principle is the corollary to, and is actually included in Principle #2. However, it is of such importance, we felt it merited a separate statement of its own. We believe that given the number of competing stakeholders' views, some of which prefer a wireless-only solution (supported by a separate database and dedicated processes), a solution incorporating existing LNP infrastructure (including NPAC) and database as well as the current Canadian Local NP Consortium ("CLNPC") arrangements is preferable from a number of perspectives, including time-to-market and cost. Therefore, it forms a fundamental pillar of our plan.

Principle #8: Fair and Just Treatment of Different Classes of Providers – The implementation plan must accommodate the requirements of wireless service provider stakeholders in a manner that avoids creating either a significant advantage or a disadvantage for any single provider or class of providers. For example, regional wireless carriers (e.g. Aliant Mobility, MTS Mobility and SaskTel Mobility) that cannot deploy fully automated processes should be given the latitude to use manual processes (that are required for business continuity), while resellers, whose porting is considered "complex", should be part of WNP on the first day of implementation. As part of this principle, we were asked that the WNP Project Plan reflect a common start date and porting intervals for all carriers. The wireless carriers can resolve amongst themselves, however, the treatment for the Regional and smallest of wireless carriers, such as those listed in Appendix G.

Implementation Scenarios Considered

In developing the WNP Plan, we first considered the key variables that impact the deployment of WNP. These included the following:

- **Type of Porting**
 - Wireless-to-wireless
 - Wireline-to-wireless
 - Wireless-to-wireline
- **Complexity of Porting**
 - Simple
 - Complex
- **Porting Intervals**
 - 2.5 business hours
 - Existing Wireline Port Timer (18 business hours and referred to as 2 business days)
- **Geography and Phases**
 - Existing LNP availability
 - New LNP requirement
 - National vs. Regional
 - 1 or more Phases
- **Classes of Wireless Service Providers**
 - National carriers (Bell Mobility, Rogers Wireless and TELUS Mobility)
 - Regional carriers (Aliant Mobility, MTS Mobility, SaskTel Mobility, and other small wireless carriers)
 - Resellers
- **Process**
 - Existing Local Service Request (“LSR”) Process
 - WICIS-like Process⁴

What is a “Simple Port”?

- Involves an account for a single line only, (Porting a single line from a multi-line account is not a simple port.)
- Does not include switch translations, such as: Centrex, Integrated Services Digital Network (“ISDN”), AIN services, remote call forwarding or multiple services on the loop (DSL, etc.)
- May include advanced features such as: Caller ID, Automatic Call Back or Automatic Redial.
- Does not include a reseller port request.
- A “Complex Port” is any port that is not included in the definition of simple. (similar to the U.S.)

We considered these variables in the context of the strategic planning principles, the Canadian marketplace and the state of industry readiness for WNP. With this in mind, we began to layer timing, looking at many different variable combinations with the intent to develop a WNP Project Plan that was truly world-class. This exercise led to the analyses and refinement of many scenarios ultimately resulting in the recommended plan. A discussion of these variables and our plan development process is included in the following sections.

⁴ WICIS: Wireless Inter-carrier Communications Interface Specification (WICIS) for Local Number Portability. The document, created in the United States, defined the process for porting among industry players.

II. Strategic Recommendations

Balance Early Deployment with Efficient Deployment

Achieving a rapid implementation at the expense of efficiency – or vice versa – is unacceptable. In order to balance these two objectives, speed and efficiency, we make the following recommendations:

- 1. Deploy Wireless Number Portability with a September 12, 2007 implementation date.**
- 2. Ensure that the plan includes four critical phrases: build consensus and plan; IT/Network build and development; testing, including pilot; and launch.**
- 3. Ensure that the launch is geographically-phased. Start with a pilot in London, Ontario, followed by a launch in the locations where LNP exists, which covers the majority of Canadians.**
 - Regina and Saskatoon should be included at launch even if LNP has not been introduced there.
 - For all other locations where LNP does not exist, WNP will be introduced within CRTC-approved notification periods upon wireless carrier notification to the Incumbent Local Exchange Carrier (“ILEC”).
- 4. Introduce intermodal porting at the same time as wireless-to-wireless porting.**
- 5. Use the existing LNP NPAC SMS, with upgrades detailed in #9 below.**
- 6. Ensure that both complex and simple ports are available upon launch.**
- 7. Given that the existing porting interval for wireline portability (2 business days) is inadequate in the context of the wireless market, carry out upgrades to the NPAC SMS to accommodate a shorter porting interval target of 2.5 business hours, for simple wireless-to-wireless ports. For Regional wireless carriers, PwC recommends that best efforts be made to achieve the 2.5 business hour interval. However, an interval not longer than the 18 business hours may be adopted for simple wireless-to-wireless ports at launch with a commitment to achieve industry levels within a period agreed to within the CWTA.**
 - The 2.5 business hour target will be used as an average as opposed to an absolute target for each and every port at launch. Exceptions could include ports during peak activation periods and ports involving a carrier utilizing a manual process. This requires agreement among the carriers.
- 8. Implement 2 business days for intermodal ports, and negotiate intervals for complex ports between carriers, bilaterally or through industry-wide negotiation.**
- 9. Since current LNP NPAC porting availability (i.e. business hours and days of week) does not meet wireless customer expectations, ensure greater availability by updating the LNP NPAC SMS to accommodate the increased demands.**

- 10. Specifically exclude the ability to port handsets between wireless carriers. This is a future consideration for the industry as technology evolves and reduces the complexity associated with this activity.**
- 11. Wireless-to-wireless and wireline-to-wireless porting should be permitted with local calling areas, whether or not the receiving wireless carrier has a CO code or point of interconnection in the same exchange as the donor carrier.**

Ask the CRTC to Move Quickly in Defining the WNP Environment

The CRTC was one stakeholder interviewed as part of the development process. In addition, the CWTA invited CRTC representatives to observe during face-to-face meetings and conference calls with the CWTA. As such, Commission staff had a significant opportunity to provide input throughout the process, including providing comments on a draft of this report. For its part, the Commission staff has asked that this report identify all of the issues which require resolution by the CRTC. This represents our recommendations for areas that require action by the CRTC. See Section V for a more detailed view of these recommendations.

- 12. Permit wireless carriers to directly access the LNP NPAC SMS.**
- 13. Adopt the implementation scenario developed through this plan, and acknowledge that the wireless industry is responsible for resolving all wireless-to-wireless issues.**
- 14. Determine the maximum area within which numbers can be transferred (e.g., local calling area, local interconnection region, municipal boundaries, provincial boundaries, etc.).**
- 15. Determine whether wireless carriers may have access to ILEC Operational Support Systems for the purpose of porting telephone numbers.**
- 16. Task the Business Processes Working Group (“BPWG”) and the Network Working Group (“NTWG”) with examining existing inter-carrier processes and technical arrangements to identify and propose modifications to any processes or arrangements which could be affected by WNP, including but not limited to the transfer of numbers across exchange boundaries, as well as the pre-launch transfer of shared NXXs from the ILECs to the wireless carriers.**
- 17. Mandate the ILECs to make locations not included in the initial launch WNP-capable within CRTC-approved notification periods of a submitted request. Accommodations should be made for circumstances where the number of requests meets a threshold that does not allow a wireline carrier to enable WNP within the mandated interval.**
- 18. Determine the appropriate timing for intermodal porting.**
- 19. Determine whether winback rules apply in cases of ILEC wireline-to-wireless porting.**
- 20. Work with CWTA to develop a WNP public education program and define their respective roles in that program.**

- 21. Formally indicate that the location of the NPAC SMS is outside the scope of WNP implementation.**

CWTA Should Assist LECs and Wireless Carriers with Implementation

One of the most important steps that the CWTA can take, through its WNP Task Force members or otherwise, is to ensure that it is providing all local exchange carriers and wireless carriers, with assistance and reliable advice across a full spectrum of implementation issues. In light of these, we recommend:

- 22. Recognize that some wireless carriers are less prepared than others to implement WNP and that the plan presented in this report takes this into consideration. A September 12, 2007 implementation date will require the full participation and co-operation of the telecom industry, both wireline and wireless, and any delays in that participation could jeopardize the launch date.**
- 23. CWTA should take steps to ensure that its website effectively educates the public about WNP and co-operate with the CRTC to assist with the accuracy and completeness of WNP information on the CRTC's website.**
- 24. Given the size and complexity of WNP implementation and the inter-carrier co-operation needed, move immediately to create a Program Management Office ("PMO"). This PMO will oversee the implementation of WNP through the end of 2007.**
- 25. CWTA should create a working group to develop specifications for the business processes and technical arrangements required for wireless-to-wireless porting. Documents such as the WICIS 3.0 specification and US inter-carrier test plans can be used to expedite the task.**
- 26. Prior to WNP implementation, design and deploy a "fallout" coordination centre to address porting problem activities, in support of the fallout centres within each wireless service provider.**
- 27. Recognize and ensure that all actions taken are planned in accordance with the sequence of WNP business process design, followed by information systems development, testing and implementation, represent the most critical and time-consuming aspects of the project. Also, the business process design is heavily dependent on the consensus building phase.**
- 28. Encourage all wireless service providers to act now to remove any wording from existing customer contracts that would prohibit the customer's porting of their number to a new service provider.**
- 29. Urge wireless carriers who have not yet done so to begin the work of MIN/MDN separation in their network and business systems.**
- 30. Encourage and facilitate wireless carriers planning major changes to their Operations Support System/ Business Support System ("OSS/BSS") in the time frame envisioned for WNP to incorporate WNP OSS/BSS requirements at the same time in order not to delay WNP implementation overall.**
- 31. Facilitate the development of a back up or contingency implementation plan that could be executed should events unfold that jeopardize a national common launch scenario.**

III. The Wireless NP Implementation Plan

Four Critical Implementation Phases

The WNP Project Management Plan is based on the Plan, Build, Test and Launch methodology.

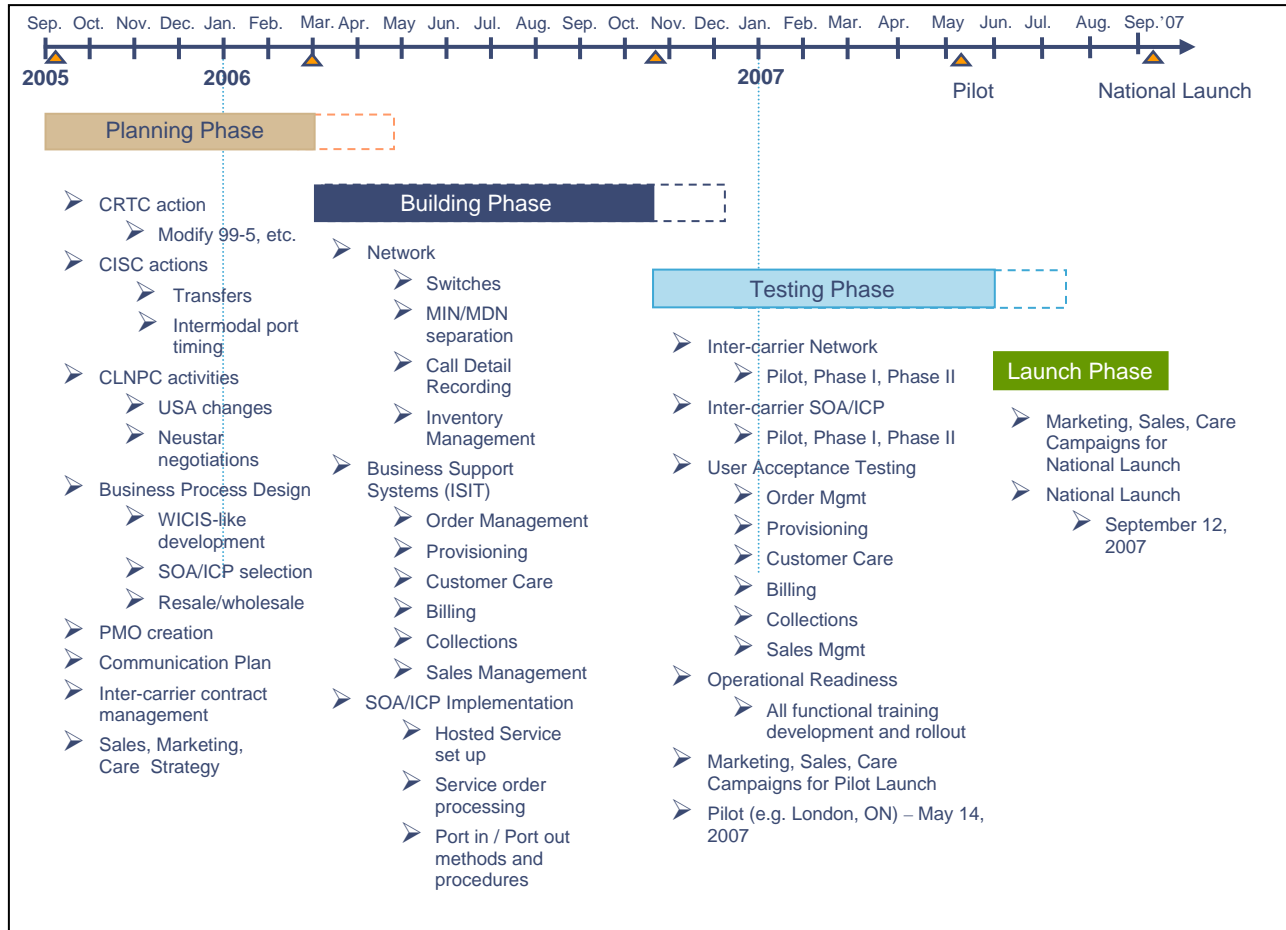
- **Planning Phase** – This phase comprises tasks related primarily to regulatory activities, SOA (Service Order Administration) vendor selection, Neustar agreements, clearinghouse agreement, financial forecasting, inter-carrier processes and contract management, and marketing, sales and customer care/collections strategies necessary to support the implementation.
- **Building Phase** – This phase encompasses tasks in connection with network upgrades, updates to Information System (“IS/IT”) systems and Service Order Activation/Inter-carrier Communication Process (“SOA/ICP”) implementation including training curriculum development.
- **Testing Phase** – This phase is sub-divided into user acceptance testing, defining test standards, inter-operability testing, inter-carrier testing including pilot, and end-to-end operations readiness testing. Testing will need to be conducted in phases, taking into consideration the readiness of different carriers, such as scheduling the national carriers first with a subsequent phase of testing with regional carriers.
 - **Pilot Testing** - consists of activities that are necessary to do a pilot launch in the London, Ontario area involving Bell Mobility, Bell Canada, TELUS Mobility, Rogers Wireless, and any CLECs and wireless resellers that indicate a desire to participate.
- **Launch Phase** – This phase will immediately follow testing. Launch encompasses tasks in connection with updating carrier and stakeholder websites and as well as carrier-specific sales, marketing and customer care activities to support the new capabilities.

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The Master Schedule

Below is a summarized list of activities and timelines associated with WNP implementation plan.

Figure 1 – Implementation Schedule



Description of the Project Plan

Spotlight: Regulatory Issues

A number of regulatory issues have been highlighted in this report. *(For more information on this, please see Section V: Additional Considerations.)*

Spotlight: SOA/ICP Vendor Selection

Wireless carriers need to weigh a number of key factors in selecting a SOA/ICP vendor to implement and manage WNP. These include:

- Volume of porting transactions
- Capacity to handle forecasted growth
- Availability of system development and administration resources
- Costs, both capital (hardware and software platforms) and recurring (maintenance, software upgrades)
- Degree of automation in a provider's operations environment
- Customer care and support capabilities
- Inter-carrier SOA arrangements (agreements, interfaces and communications links)
- Solution availability (especially with the industry timeline for WNP implementation in mind)

Note that it is assumed that WNP will leverage the existing NPAC SMS, the CLNPC and its relationship with Neustar.

Spotlight: Financial/Unit Forecasting and Monitoring

Forecasting is necessary in order to:

- Determine operational investments
- Shore up operations in an effort to enhance competitive advantage
- Develop intra- and inter-carrier infrastructures specifically designed to fulfill porting requests
- Assess training and workforce management needs
- Identify needs to upgrade in-store or point-of-sale order management systems
- Determine investment in features and marketing

How This Section is Organized

In this section, Description of the Project Plan, we discuss how the WNP Project Plan will address the following areas:

- Regulatory
- SOA/ICP Vendor Selection & Implementation
- Financial/Unit Forecasting and Monitoring
- Inter-Carrier Management
- Marketing, Sales and Customer Care/Collections Strategy
- Network Upgrade
- WNP Testing
- Update Existing Internal Systems
- Customer Facing Operations

Spotlight: Inter-carrier Management

Although it may not be essential among the CWTA members, PwC recommends that wireless carriers negotiate an operations agreement or bilateral Letter of Agreement (LOA) prior to processing any wireless ports. A sample of the LOA has been provided to the CWTA. This LOA does not relieve the wireless carrier of the obligation to secure and maintain authorization from every customer whose information will be used in the port request.

Spotlight: Marketing, Sales and Customer Care/Collections Strategy

An efficient and effective WNP implementation plan must be supported by a marketing and sales strategy that, at a minimum, engages well-conceived retention programs, sales initiatives and targeted marketing campaigns.

With WNP launch two years away, functional departments have a tendency to modify their strategies closer to launch dates. However, this is fundamentally wrong with WNP. These strategies need to be developed and integrated into business processes that will be agreed to in the first few months of planning. Waiting until User Acceptance Testing or the Pilot to consider these activities will result in a weak implementation by the carrier.

Carriers must expect to revise their marketing, sales, customer care and collections strategies to reflect the introduction of WNP.

Spotlight: Network Upgrade

As part of WNP, separation of the MIN and the MDN⁵ is necessary. As a consequence, service providers use Global Title Translation (“GTT”), based on the MDN for network capabilities and services. With the MIN/MDN separation, there are significant GTT impacts for MDN-based capabilities. Wireless service providers must upgrade all network elements and test all call scenarios and services for subscribers with Mobile Subscriber Identification (“MSIDs”) of a different value than the MDN.

The development of additional software to support the WNP standard must be completed and tested by vendors so that service providers can install, test and integrate the software into their network. Furthermore, porting wireless service providers must integrate this software functionality with their OSSs before deployment. From start to finish, we expect this work to take less than six months to complete.

Not all Canadian wireless carriers are at the same level of preparedness for WNP from a network perspective. These carriers must be encouraged to make the necessary investments of people, capital and testing to make this happen quickly.

⁵ See “A Preliminary Guide to Canadian WNP”, *Syniverse Technology Inc.*, Page 34, for a description of MIN and MDN and why they need to be separated for WNP.

Spotlight: Updating Existing Internal Systems

Service providers are required to modify their existing OSSs to accommodate WNP activity. In particular, changes should address Service Order Entry, call mediation and billing. Service providers may also be required to develop new interfaces for the ICP and SOA. Vendor management will be a critical issue. Service providers will need to ensure that vendors are progressing according to company-specific project timelines.

- **Call Mediation** – In the context of this document, Call Mediation includes editing and reformatting Call Detail Records (“CDRs”) into internal billing records. These functions are performed on switch records, CIBER records, reseller records and CDRs from adjunct systems, i.e. Short Message Service (“SMS”) and Prepay. Call Mediation also includes guiding, rating (local, long distance and miscellaneous toll charges) and re-rating, out-collect processing and calculation of airtime for each call.

Changes will be required to Call Mediation Systems to correctly identify roamers. Currently, wireless service providers are typically assigned full NPA-NXX⁶ codes to use for directory numbers (“DN”). The NPA-NXXs are published by CIBERNET and in technical data sheets exchanged between roaming partners. Call mediation will need to be modified to use the Mobile Subscriber Identification (“MSID”) instead of MDN from the switch CDRs. In all cases, the MSIDs will uniquely identify wireless service providers.

Adjunct service platforms that are tied to call mediation may need to be modified in order to record additional data. These modifications may be necessary for the wireless service providers to correctly identify the MDN and MSID of subscribers registered on the service providers’ networks.

Changes will be required for “service-specific” rating such as mobile-to-mobile calls. It will no longer be possible to determine, based on MDN, if a terminating number is wireline or wireless. It will be necessary to check for the presence of a Location Routing Number (“LRN”) to help determine how a specific call was routed, but even then, the LRN will identify the switch to which the call was routed – not the specific service providers.

As a result of the LNP architecture, additional information is recorded on switch call detail records. Some information, such as the MIN, is required to bill calls correctly, and other information, such as the LRN, is required to determine how a call will be, or was, routed.

Out-collect processing needs to be modified to accommodate the roamer CDRs. These records accommodate the population of WNP data such as MSID and LRN.

- **Provisioning** – For the purposes of this report, SOE includes gathering and entering customer data for provisioning and completing all relevant port information, as well as communicating to adjunct systems. In most cases, the SOE and service order processing areas of the OSS are impacted to the greatest extent. These systems and processes will have to be restructured to be

⁶ NPA NXX: Area code and exchange in the North American Numbering Plan. It is the first six digits of a dialable North American phone number.

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able to assign new MDNs and /or to accommodate ported MDNs. Two number databases will be required – one for MDNs and one for MSIDs. All new customers will be assigned an MSID. All new customers will be assigned a new MDN or retain their ported MDN.

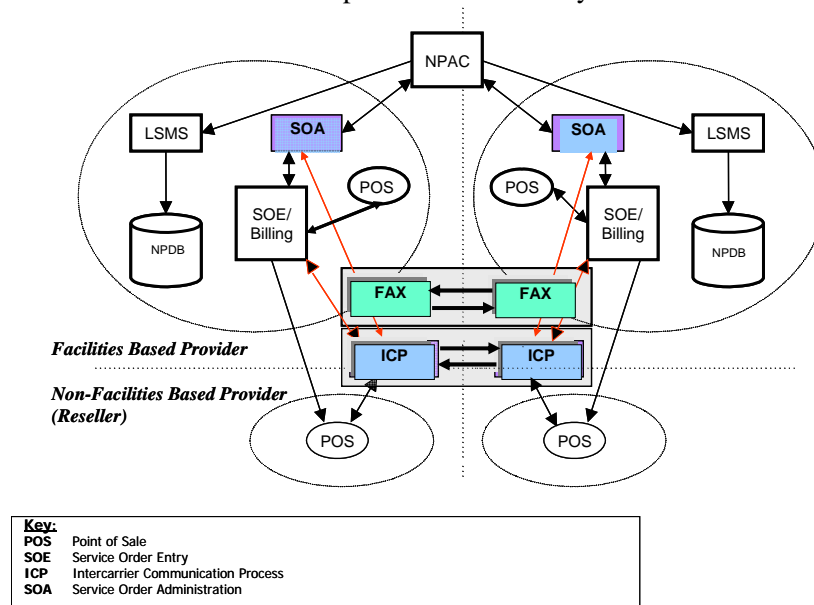
- **Billing** – For the purposes of this document, billing functionality includes the monthly accumulation of airtime usage, identification of allowance or package minutes and deduction of those minutes from the monthly usage, identification of pooled and/or tiered minutes, pricing of airtime usage, bill calculation and bill formatting. There are few, if any, required billing changes to support WNP.
- **MDN/MSID Inventory** – With WNP, wireless service providers need to be able to accept immediate entry of a “foreign” DN into the telephone number inventory. These systems will also need to accommodate the loss of DNs from inventory for those customers who port out to other service providers.

Spotlight: SOA Implementation

Once a SOA vendor has been selected, most of the work involving implementation will be carried out by that vendor. These activities include:

- Installing and configuring hardware
- Setting up connectivity between vendor and wireless carrier
- Installing initial ICP gateway
- Setting up communication with trading partners
- Connecting to other OSS systems

The diagram below best describes the SOA Implementation activity:⁷



⁷ CTIA 3-04, “Wireless to Wireless Porting Process”, a Verisign presentation to the CTIA, March 17, 2004.

Spotlight: WNP Testing

- **Internal Testing** – It is very important that all service providers who have made any NP (“NP” – which includes Local and Wireless) modifications to their systems perform complete internal testing. It is recommended that vendor testing be completed prior to acceptance testing by the service providers. Testing should include:
 - Mobile Switching Centre (“MSC”) upgrades to include the ability to store and record the MSID and MDN in the Visitor Location Register (“VLR”) and in the CDRs;
 - modifications to the Call Mediation System to accept the modified switch CDRs;
 - properly format billing records;
 - potential testing of billing records with roaming clearinghouses where required;
 - the ability to provision both MDNs and MSIDs in the Home Location Register (“HLR”);
 - the continued ability to distinguish between home customers and roamers;
 - the provision of correct information for Call Mediation; and
 - provision of correct Automatic Number Identification (“ANI”).

Service order systems testing should be completed for the following scenarios:

- porting in a MDN;
- porting out a MDN;
- the disconnect of a ported number;
- assignment of “dedicated” MSIDs for specific NPA-NXX⁸- based services (such as Pre-pay); and
- the interfaces between Service Orders Systems, the ICP and SOA.

Call Mediation testing will include:

- the ability to generate and receive billing records (including with the roaming clearinghouse);
- processing switch CDRs;
- generation and delivery of reseller CDRs; and
- generation and delivery of CDRs for adjunct systems.

If the service provider makes any modifications to billing records these will also need to be thoroughly tested.

For the Pilot Launch, the training will consist primarily of training the trainer type activities. The training will be rolled out to a broader audience, including customer care, collections, retention and fraud, as testing is being conducted.

⁸ There are also shared NXXs (i.e. those assigned to LECs but sub-assigned to resellers, wireless service providers, etc.) that will need to be integrated appropriately into the LERG at the start of WNP in Canada to avoid some of the porting issues experienced in the United States at the beginning of WNP. The process of how the database is updated to reflect the sharing of NXXs should be handled by the CISC with the CLNPC as suggested in this report.

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Testing for other interfaces will include:

- SOA interfaces;
 - ICP interfaces; and
 - any other interfaces that may be impacted by WNP modifications.
-
- **NPAC Testing** – As transactions flow between NPAC/SMS and LSMS/SOA (Local Service Management System.), it is required that LSMS/SOA respond correctly to NPAC/SMS interface messaging. The NPAC Test Plan must:
 - provide service support documents that will let participating service providers and their respective SOA and LSMS vendor(s), identify their specific interoperability testing responsibilities;
 - identify the tests that have to be performed; and
 - interpret the results of the tests for follow-on regression testing (if necessary).

Testing can be broken down into several different segments including interoperability, turn-up, regression and round robin. For more information regarding internal testing, please review the WICIS 3.0 Test Documents. The Wireless Testing Sub-Committee (“WTSC”) created the test plan that was used in the United States and can be used for development of a test plan in Canada.

- **Inter-carrier Pilot Testing** – PwC recommends the development of a CWTA sub-committee to coordinate and oversee testing activities. Each service provider will designate coordinators who will attend testing meetings. Intercompany testing will be coordinated through service provider bilateral arrangements. Each service provider will agree to and conduct a set of tests to ensure completeness of porting activities. Participants may choose to run additional tests that address any specific needs, architectures or business arrangements⁹. Inter-carrier testing would also include ensuring SMS and Multimedia Message Service (“MMS”) compatibility through existing arrangements.
- **Phase A Testing** – Phase A Testing will include all LNP-capable exchanges in Bell Canada and TELUS Mobility territories. Resellers such as Primus and Virgin Mobile will also be part of this phase of testing.
- **Phase B Testing** – Phase B testing will include all the remaining service providers and exchanges for the final full launch of WNP.
- **Launch** – Involves testing to ensure that all customer education and sales, ordering, customer care and collections systems are ready to be promoted into production.

Spotlight: Customer-Facing Operations

- **Customer Care** – In addition to the sales operations changes, there will be many “back office” changes for the successful implementation of NP. It is very important that all service providers review customer facing processes to ensure readiness for the new operating environment. Examples include:

⁹ See US WICIS 3.0 Testing Documents for recommended testing schedule

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- hardware upgrades for existing customers in advance of contract expiry;
 - special promotions for customers calling in to ask when their current contracts expire;
 - adjustment and credit policy updates for WNP-related problems; and
 - trouble ticketing procedures may need to be updated and tested where the customer's dialed number is used to track the problem, versus their MIN, as previously done.
- **Collections** – Tighter outstanding balance policies are required in WNP environments where the customer can port their number without the existing wireless service provider being able to block the port for outstanding balance reasons. Examples include:
- dunning notices sooner in the collection cycle; and
 - more aggressive treatment where less customer data may be available to the service provider.

Note: Wireless Service Providers (“WSPs”) expect handset subsidies to be recovered through monthly charges over the term of the subscriber's contract, thus reflecting in any early cancellation fees on termination.

Major Assumptions Supporting the Plan

The plan described above is based on a number of major assumptions – all of which have been agreed to by virtually all stakeholders (including all of the participating wireless and wireline carriers). These are summarized below.

Assumption #1: Full co-operation and participation among the wireless and wireline industry to make the common launch start date is necessary and will be achieved

One reason for the lengthy delay in launching WNP in the United States was that the industry participants could not reach timely agreements on various aspects of the program. With the Minister's letter to the CRTC and the CWTA's commitment to launching WNP, a fundamental assumption of the plan is that the Canadian industry participants will adhere to the launch schedule and do what is necessary to achieve the consensus launch date. The launch schedule would be jeopardized by any undue delay, especially in the first phase (i.e. consensus building) of the plan, which includes process development and CISC work group activities, the main prerequisite to the intensive IS/IT work that the carriers need to complete before testing.

Assumption #2: WNP will apply to wireless services characterized by two-way voice service associated with a 10-digit telephone number

Wireless services subject to WNP will be limited to dialable two-way real-time voice communication services, such as the standard service offerings of the wireless carriers (sometimes referred to as “cellular” or Personal Communication Services (“PCS”), that operate using analog AMPS¹⁰; second generation digital technologies (TDMA, CDMA and GSM); 2.5G and 3G technologies such as GPRS, UMTS and

¹⁰ Customers with AMPS services will be allowed to port their numbers but will not be able to retain their AMPS service

EVDO); and Motorola's ESMR technology (offered by TELUS Mobility) that includes push-to-talk services.¹¹ Telephone numbers associated with both post-paid and pre-paid services will be portable.

Assumption #3: Wireless carriers will be responsible for covering their own costs

The CRTC has ruled in a number of different contexts that carriers must cover their own LNP implementation costs.

- In Telecom Decision CRTC 97-8, May 1, 1997 (the Local Competition Decision), the Commission stated that the carrier-specific costs associated with the implementation of local competition, including LNP, should be borne by the carriers incurring the costs;
- In Order 2000-143, February 23, 2000, the CRTC ruled that the ILECs cannot charge CLECs for porting numbers away from them; and
- In Telecom Order CRTC 2005-255, July 8, 2005, the CRTC denied a Call-Net application to charge a customer transfer processing fee to carriers requesting a customer transfer.

Based on this precedence, it is assumed that each wireless carrier will be responsible for its own WNP implementation and ongoing costs, including switch software. The method by which a carrier recovers its costs (short of charging fees to other carriers) is up to its discretion.

It is assumed the wireline carriers will recover costs via CRTC-approved mechanisms.

Assumption #4: Regulatory hurdles to wireless carrier participation in NP will be removed

There are a number of regulatory hurdles that need to be overcome in order for WNP implementation to begin. The three items that require resolution prior to implementation work beginning in earnest are as follows:

- changing the rules to allow wireless carriers to access the NPAC SMS;
- mandating participation by the Local Exchange Carrier ("LEC"); and
- changing the rules to allow wireless carriers to port across exchange boundaries are essential for WNP to be effective.

These issues are reviewed in detail in Section V.

Assumption #5: SMS and MMS systems will be able to accommodate WNP

In recent years, the wireless industry jointly commissioned gateways for the inter-carrier transmission of SMS and MMS messages. The telephone number is sometimes used to identify and route messages to the wireless carrier of the parties receiving the SMS or MMS messages. In these cases, changes to the existing systems may be necessary.

It is assumed the gateway providers for SMS and MMS will be instructed by the wireless carriers to change their infrastructure to accommodate WNP and that the timing of these changes will coincide with the WNP implementation time frame. The SMS/MMS gateway vendors interviewed during the plan development process indicated that they are prepared to work with the WNP task force members to accommodate WNP.

¹¹ ESMR is comprised of both typical phone service as well as push-to-talk. Customers porting their wireless service cannot keep their push-to-talk service or other enhanced services with their previous carrier.

Assumption #6: Existing slamming rules will apply

Historically, with the advent of long distance competition in 1992, unscrupulous competitors used the newly liberalized environment to fraudulently add customers to their networks. The industry developed customer confirmation processes for long distance services. These rules were subsequently adopted, with changes for local telephone services, and still apply when customers are transferred between LECs. The purpose of the processes is to ensure that customers are made fully aware of the consequences of the transfer and to avoid unauthorized transfers (slams).

With the advent of portability between wireless carriers and between wireline and wireless carriers comes the increased potential for slamming within the wireless industry. All stakeholders believe that it is important to prevent abuse of the NP system to switch customers without consent. It must be noted that there is only a limited potential for slamming within the wireless industry because, in the majority of cases, a new handset is required when switching providers. This is unlike the wireline world where the handset remains the same. In any case, the unanimous sentiment among the stakeholders is that as long as there might be the slightest possibility that slamming could occur, the rules to prevent it should be enacted.

Assumption #7: Existing “express consent” rules will apply

The CRTC has on at least two occasions mandated that the customer’s provide express consent (either when subscribing or at any other relevant instance) regarding issues that may impact the customer’s privacy or security. The subscription procedures for all wireless carriers, ILECs and CLECs contain a clause requesting express consent for providing to third parties (including affiliates) customer information that is considered confidential. In addition, wireless carriers (and now VoIP providers as well) are mandated to provide initial (i.e. at sign-up) and ongoing notification to their customers about the differences between enhanced 9-1-1 services provided by wireline companies and those provided by wireless carriers.

There was unanimous consent among the stakeholders that these rules should be applied when customers are transferred (numbers are ported) between LECs and wireless carriers, and between wireless carriers. In essence, these are new customers; therefore, they should be treated as such. Express consent on confidentiality and 9-1-1 are already part of the process for signing up new customers. The fact that customers port their number in no way removes their right to coverage under statutory regulatory safeguards in place for privacy and security.

Estimating the Plan’s Impact: The First Year and Beyond

Based on how many Americans ported their number when WNP was introduced in the United States, PwC that 850,000 telephone numbers will be ported in the first year of WNP. Of this number, 765,000 ports will be wireless-to-wireless – representing approximately 4.8% of the wireless customers in the country – and 85,000 ports will be wireline-to-wireless.

While the wireline-to-wireless ports represent a relatively small percentage of the wireline base in Canada, there is a potential for this segment to grow in importance, if customers begin to replace wireline service with wireless service.

IV. Assessment of the WNP Plan in the Context of the Strategic Planning Principles

The proposed WNP implementation plan has been developed in tight alignment with the strategic Planning Principles, which serve as the fundamental guideline to addressing all the major activities involved in devising a comprehensive project plan for implementing WNP. Below is a detailed assessment of the proposed WNP implementation plan within the context of each Planning Principle.

Principle #1: Deploy WNP at the Earliest and Most Practical Common Date

It is proposed that the earliest and most practical date for WNP deployment is September 12, 2007. Various scenarios and variables were considered that led to this recommendation. For example, it is PwC's opinion that implementing a call forwarding solution would take substantially less time than the solution that is being proposed in this plan. It is our view (and that of most of the stakeholders), however, that call forwarding is not a "practical" solution, since it tends to be wasteful of resources¹² while not supporting enhanced services (other than voice and SMS) that may be offered by the receiving carrier.

On the other hand, we believe that unless a critical situation exists (such as ESN exhaust), WNP need not take a back seat to other IT and network development work being undertaken by wireless carriers. It could and should be implemented in parallel with other projects to the extent possible in order to realize a launch of wireless portability as soon as practical.

Some stakeholders expressed the expectation that because LNP is already available in Canada and WNP has been introduced in the United States, Canada should implement WNP. This report provides ample evidence that implementing NP is a complex and painstaking undertaking, regardless of its existence in other jurisdictions and other markets. There is simply no escaping the substantial wireless-industry-wide and internal wireline and wireless carrier planning, development and testing that is required to ensure a world-class, customer friendly implementation.

WNP Rollout – Though PwC would like the CWTA to consider a phased approach, the requirement for a common start date is driving the decision for September 12, 2007. A phased rollout for WNP was considered for a number of reasons, as discussed elsewhere in this document. One of the significant reasons, however, is to allow for an earlier launch by the National carriers. The launch of WNP initially will include the LNP-capable exchanges across Canada in the territories of the ILECs, leaving to a later time the exchanges where LNP has not been implemented. Since they represent significant markets and be essential in a national rollout, Regina and Saskatoon should be part of the initial rollout even if they are not LNP – capable by that date.

We are also recommending that locations not included in of the initial rollout be made available for WNP within 30 days (or a CRTC-approved interval) of a wireless carrier request to a LEC for NP, allowing these locations to be brought on line as demand warrants.

Handset Porting – We have recommended that WNP exclude the ability to port handsets between wireless carriers. Wireless carriers use different technologies. For example, Rogers uses GSM and Bell

¹² Under a call forwarding scenario, networks may "trombone" (bouncing between switches before finding the called party.)

Mobility and TELUS Mobility use CDMA supporting different handsets compatible with their respective technologies. Allowing customers to use the same handset when transferring from one wireless carrier to another would be extremely difficult. Permitting customers to use their existing handsets when transferring between wireless carriers using the same technology would be somewhat easier than transferring between providers using different technologies.

In the United States, handset porting is not permitted but has become a focus of attention by consumer groups. The Federal Communications Commission ("FCC") has received complaints about customers' inability to port handsets and the FCC has been asked to mandate handset portability between wireless carriers.

At this time, handset portability is not a practical option and is not anticipated to be practical within the time frame of the WNP implementation plan. Should it become practical at a later date, it may be considered at that time.

Principle #2: Develop an Implementation Plan that is Highly Cost-effective

Apropos to this principle, the WNP implementation plan proposes intermodal implementation at the outset. Cost-effective implementation means, minimizing the amount of duplication in terms of process development, network and IT system deployment and testing. This principle is one of the rationales used to eliminate the option of implementing wireless-only porting first and adding intermodal porting at some later date. The assumption in favour of this alternative is that wireless-only porting can be accomplished much more quickly since, it is assumed, the wireless industry can develop the necessary inter-carrier processes and technical arrangements very quickly outside the context of the Canadian Interconnection Steering Committee ("CISC") groups and without involvement by the wireline carriers.

Implementing wireless-to-wireless WNP first was one of the scenarios we assessed in developing this plan. Assuming PwC's recommendations are adopted, at most three months (if any) would be saved by taking this route. However, even if substantial time were saved, implementing intermodal portability after the fact would entail a significant duplication of effort. For example, the processes devised for wireless carriers would most likely need to be modified to take into account the wireline carriers, while the common SOA, taking into consideration only the requirements of wireless carriers, would most likely need to be upgraded to accommodate wireline company interfaces. These requirements and others, would all occur at a substantial cost to the industry and, eventually, to customers.

Principle #3: Balance WNP with other Wireless and Wireline Carrier Priorities

As PwC gathered information by interviewing various service providers, it was determined that many other events and initiatives such as network and IT/IS upgrades are planned to occur within the time frame under consideration for WNP implementation. Ideally, it should be possible for WNP implementation to coincide with these major initiatives or, in the case of the fourth-quarter freeze, for WNP implementation to occur without mishap during the wireless industry's busiest quarter. But bitter experience in other jurisdictions has already indicated the pitfalls that render such a course of action unwise. Our view is that the risks involved in ignoring such priorities (both in terms of impact on customers and the ability of a carrier to provide services cost-effectively) offset any time that might be gained. As a result, the proposed WNP implementation plan takes into consideration these various factors and time freezes and allocates appropriate duration and times of the year for network- and IS/IT-related activities.

Principle #4: Do It Once and Do It Right

This fundamental principle is reflected in our recommendation that intermodal and complex porting capabilities be implemented at launch.

As noted earlier, some stakeholders supported the idea of wireless-to-wireless number porting initially with the introduction of intermodal capabilities later, if this allowed for an earlier implementation of WNP. In our estimation, while this approach may advance the WNP calendar by a few months (without the benefit of transfers across exchange boundaries or shared NXXs), it would require wireless carriers to carry out internal systems work in at least two phases – an unattractive outcome given that the same effort can be conducted more efficiently and at lower cost in one phase.

Principle #5: Develop an Implementation that is Customer-Friendly

To ensure that WNP implementation meets customer buying expectations, the plan takes into consideration at the outset a targeted porting interval of 2.5 business hours as well the introduction of complex porting. When WNP is launched, all wireless customers in LNP-enabled exchange areas, i.e. the majority of Canadians, will expect to be able to port their numbers. By excluding complex ports from initial launch, many customers may become disenfranchised.

The customer transfer process between wireline carriers usually takes a number of days; therefore, there is no requirement for a porting interval of less than the current two business days.

A customer transfer between wireless carriers, on the other hand, is usually counted in minutes. An 18-hour porting (a.k.a. two business day) interval, therefore, has been deemed unacceptable by the majority of stakeholders. Instead, the industry has developed a consensus around a target porting interval of 2.5 business hours for those wireless carriers that have the ability to develop the automated systems required to effect such an interval. Regional carriers that may not be able to implement these processes cost-effectively have been given the latitude to use manual porting processes instead, as long as they endeavour to meet the interval targets. Manual processes do have be developed and tested as a back-up mechanism or for business continuity.

Some regional wireless carriers argue that they cannot economically automate the porting process due to the anticipated low porting volumes, whereas one national wireless carrier would prefer that all wireless carriers implement an automated porting process in order to facilitate a 2.5 business hour porting interval.

The wireless carriers may also have to invest in the capability to provision cellular services “over the air” so that the customer does not have to take the handset back into a retail or a service location for the new number to be activated on the handset. Over the Air Provisioning (“OTAP”) is not a prerequisite for WNP, however, it will improve the customer experience for those wireless carriers that deploy it. Without OTAP, either the customer will have to come back to the store to have the ported number manually programmed into his/her phone or, in the case that the ported number is programmed at point of sale, the customer will be able to make calls but unable to receive them until the port is complete.

Additionally, customer expectations will be addressed through sales and marketing strategies appropriately supported by customer education programs. We recommend that a well-maintained website be available, under the auspices of the CWTA and/or the CRTC, for the public to consult regarding wireless NP. The site could provide information about the implementation schedule and status of the rollout, an explanation about handset portability and information needed regarding the steps customers must complete to port numbers. The site should be maintained and updated to reflect the most current status of WNP rollout and other relevant developments.

The website could be developed with input from relevant CISC groups (e.g., BPWG). It should also be accessible through hot links found prominently on each of the wireless carriers' websites.

Principle #6: Sustain Level of Service and Avoid Service Disruption

Detailed testing as well as the pilot launch proposed in the WNP implementation plan ensure that the existing level of service will be sustained and any major service disruption will be avoided. This approach is further supported by the lessons learned from the United States implementation which stumbled badly at launch due to inadequate pre-launch testing by some carriers.

The concept of a pilot launch was proposed by CWTA and the task force members to ensure the processes are working before moving to larger-scale deployment. PwC sees merit in the suggestion and, since it does not impact the schedule to a great degree, we have included it in the WNP implementation plan.

Principle #7: Maximize Use of Existing LNP Infrastructure and Industry Processes

In line with this principle, we are recommending that WNP makes use of:

- the existing NPAC SMS;
- the WICIS document developed in the United States as a starting point to develop the inter-carrier processes related to wireless porting;
- existing CISC groups to develop inter-carrier processes and network arrangements that may be required for intermodal porting; and
- CWTA structure to create a working group to address issues that impact only the wireless carriers.

(i) Use existing NPAC SMS

The wireless industry is capable of implementing WNP in a number of ways:

- by using the existing wireline NP system, which comprises the Neustar NPAC SMS;
- by establishing a wireless-to-wireless portability service, independent of the existing LNP database and regulatory framework applicable to local number portability; or
- by developing a different method for implementing WNP.

The third alternative was discounted, since the NPAC system is based on the North American LNP standard and the industry was intent on following the standard – a course of action that we support. The second alternative was mentioned as an option by both Public Interest Advocacy Centre (“PIAC”) and Industry Canada. Industry Canada noted that one of the possible advantages of this approach is wireless-to-wireless porting could be introduced with a reduced set of regulatory issues to be addressed, and may accelerate service introduction. This approach would also provide wireless-to-wireless portability to most communities, even to ones where wireline portability is not available. This option also provides an opportunity to locate the WNP database in Canada, avoiding jurisdictional issues about the access/confidentiality of subscriber records and risks associated with the U.S. Patriot Act.

It is important to note that although a Canadian wireless-only NPAC would achieve the aims outlined above, it would also preclude intermodal porting. Even among these stakeholders, however, the sentiment

is that if a wireless-only database situated in Canada would drive costs significantly higher and delay implementation, it would cease to be the preferred alternative.

The vast majority of stakeholders, on the other hand, believe that the existing NPAC SMS should be used for Canadian WNP. PwC recommends this alternative because we agree with these stakeholders, that using the existing database and processes to the greatest extent possible will reduce costs and speed implementation. In addition, using the existing NPAC will facilitate intermodal porting.

(ii) Use WICIS for simple ports

The purpose of a WICIS document is to define the operational requirements and technical specifications for the exchange of information needed for SOA and ICP in a streamlined fashion to facilitate a reduced porting interval. All of these processes are equally applicable in the Canadian context. The plan includes time for the industry to review WICIS and change it if necessary to suit specific Canadian needs, but assumes that much of the document will be adopted without the need for significant additional development.

(iii) Leverage CISC for intermodal porting issues

CISC has been, and continues to be, an effective means for the CRTC to address and coordinate telecommunication matters that are technical, operational and administrative in nature. To date, CISC and the working groups have focussed almost exclusively on wireline related issues and the wireless carriers have had minimal CISC participation. Some of the issues and questions raised by WNP, especially related to intermodal WNP, will affect both wireline and wireless carriers. CISC, therefore, would be the right forum to resolve questions related to intermodal WNP.

(iv) Use CWTA for wireless to wireless porting issues

As related in (i) above, the wireless carriers are expected to work co-operatively on developing inter-carrier processes for wireless-only porting, with the ultimate aim of establishing standard requirements for SOA/ICP capabilities. We recommend that issues such as these that are exclusive to wireless carriers should be addressed by the wireless industry through the CWTA. It is expected that the industry can assess issues and develop solutions faster than through CISC. This in turn will enable WNP implementation sooner.

Principle #8: Fair and Just Treatment of Different Classes of Providers

The implementation plan assumes that complex ports will be included as part of the initial launch, because it means that wireless resellers will be able to participate from the outset. Delaying complex porting, hence the participation of resellers until the a later stage, could potentially result in a loss of business for resellers, as users who were considering switching to a reseller may put off or even change that decision in favour of another carrier who will be able to port numbers.

In addition, the plan allows regional carriers to use manual methods to achieve the targeted 2.5 business hour simple porting interval. These carriers have indicated they may not be in a position to implement the automated processes required to accommodate the short turnaround time. At the completion of the planning phase, these carriers will be in a better position to judge how they will achieve the targets.

V. Additional Considerations

In this section of the report, we outline and discuss a number of outstanding issues that merit further consideration and require decisive resolution – some of them with a commanding impact on whether the WNP implementation plan can proceed in an efficient manner. To complicate matters, the resolution of some of these issues should be accorded a higher priority than others – a task whose success may depend, at least in part, on the extent to which the issue finds consensus across WNP stakeholders.

Review Items Impacting WNP Implementation:

- **High Priority Items:** High priority items are those that *must* be addressed and resolved as soon as possible. Delays in completing high priority open items will delay WNP implementation.
- **Medium Priority Items:** Medium priority items are those that *must* be completed before WNP implementation and for parallel construction, there is more than sufficient time, before the September 2007 launch, to resolve the open item. However, substantial delays in completing these items may affect WNP implementation.
- **Low Priority Items:** Low priority items are open items that *should* be resolved before implementation and for which there is more than sufficient time, before September 2007 launch, to resolve the open item. However, in our assessment, they are matters which are not difficult to complete and no other steps are contingent upon their completion.

Review Items *Not* Impacting WNP Implementation:

- **High Priority Items:** These open items require early attention and *should* be completed before WNP implementation. However, in our assessment, they will not affect an essential aspect of WNP if not completed until after implementation. If the CRTC or the stakeholders determine that these open items must be addressed before WNP implementation, they should be treated as high priority items impacting LNP implementation and must be completed as soon as possible.
- **Medium Priority Items:** Medium priority items are sufficiently important that they should be given early attention but resources are better focused on higher priority items. Delaying these items will not affect an essential aspect or implementation of WNP.
- **Low Priority Items:** Low priority items were identified through the WNP assessment but do not have a direct impact on WNP implementation or features. Addressing these items can be delayed until resources are available.

Review Items Impacting Implementation of the WNP Plan

1. Timers for WNP

(Priority: High)

Currently for wireline porting in Canada, the interval between the time the acquiring LEC submits an LNP request and the time the number is ported is two business days or 18 business hours¹³. In the United States, the interval between the time when the acquiring wireless carrier submits a WNP request to the time the number is ported from the current wireless carrier is 2.5 business hours. The 18 business hour timer is used for ports between wireline and wireless carriers.

The CWTA has recommended that the *target* porting interval for simple wireless-to-wireless ports should be 2.5 business hours, recognizing that exceptions could arise that prevent achievement of the 2.5 business hour target. In cases where Regional wireless carriers utilize a manual process, the porting interval should be targeted for 2.5 business hours.

There is no consensus among the wireless carriers concerning the interval for intermodal ports. Some CWTA members believe the porting interval should be the wireline 2 business day interval, while other members believe the telecom industry should standardize on the wireless-to-wireless 2.5 business hour interval.

The BPWG indicated that a 2.5 business hour interval could have significant impacts on the existing processes applied to porting between wireline and wireless carriers. If the BPWG is responsible for developing process for WNP between wireless carriers and the 2.5 business hour interval is used, the BPWG indicated that creating the processes to accommodate this interval could be difficult. The CLNPC indicated that Neustar systems in place can support the 2.5 business hour interval but the CLNPC Operations Group should review the processes to determine whether other modifications are necessary. Each of the wireless carriers indicated that a 2.5 business hour interval would have significant implications for existing customer-interfacing processes and for the development of new WNP processes. The software to support a 2.5 business hour interval has already been developed, however, it is not yet deployed in the Canadian installation.

In this report, PwC recommends a target of 2.5 business hours for simple wireless-to-wireless ports, 18 business hours for intermodal ports, and that intervals for complex ports should be negotiated between the wireless and wireline carriers, bilaterally or through industry-wide negotiations. For regional carriers, PwC recommends that a target 2.5 business hour be set, but consideration should be given for a longer (not more than 18 business hour) interval until they can economically achieve the industry target.

Related Questions and Issues

(1) Question: *What interval (timer) should be used for intermodal ports?*

(2) Question: *Could the wireless-to-wireless porting interval be adopted for wireline-to-wireline ports?*

¹³ When a message (subscription) is received at the NPAC from either the donor carrier or the receiving carrier, the first (T1) timer, of 9 business hours, begins. If the donor carrier or the receiving carrier does not send a matching message to the NPAC before the T1 timer expires, the T2 timer (9 business hours) begins and runs 9 business hours. If there is no matching message from the donor carrier and the T1 and T2 timers have expired, the receiving carrier may complete the port without any additional involvement by the donor carrier. The time from beginning to completion of the port is the “porting interval”.

(3) Question: *What accommodations should be made, if any, for regional wireless carriers that may not have the resources or porting volumes for a 2.5-hour timer? Would it be appropriate to substitute the electronic processes used between larger carriers with manual processes used by regional wireless carriers?*

(4) Question: *Would an industry clearinghouse be required to achieve these porting intervals?*

2. Implementation Coordination

(Priority: High)

As described in this report, there are many activities that need to be completed by all of the wireless carriers before WNP is available. Each carrier must complete a large number of tasks, some of which are complicated and resource-consuming. The implementation plan described in this report is achievable but requires the focused attention of each of the wireless and wireline carriers, a concern that has been raised by more than one stakeholder.

It is possible however, that implementation by at least one of the carriers will slip. While it is not possible to identify the circumstances in advance, it is useful to consider the possibility of a delay and potential responses. The CWTA indicated that, since it is not possible to identify the causes for a delay in advance, solutions to a hypothetical problem are not useful or necessary.

To mitigate any potential delays, PwC is recommending the CWTA facilitate a Program Management Office (“PMO”) that would oversee the implementation of WNP. The PMO would coordinate and communicate implementation issues and escalate to the appropriate governing structure for resolution of schedule-impacting issues.

Related Questions and Issues

(1) Question: *What happens if all but one wireless carrier is ready to implement on the planned date. Do the others proceed? Is there a delay until the carrier catches up?*

(2) Question: *Should a wireless carrier be permitted to implement wireline to wireless before the other carriers?*

(3) Question: *Should a wireless carrier be permitted to introduce WNP with a wireline affiliate before the scheduled WNP implementation date?*

(4) Question: *Should a carrier allow its customers to port between its own wireline and wireless operations before WNP is generally available?*

3. Shared NXX

(Priority: High)

For many years after the introduction of wireless services in Canada, the wireless carriers could not obtain their own numbers directly, but had to lease telephone numbers from the ILECs with whom they interconnected for the purposes of accessing the Public Switched Telephone Network (“PSTN”). The CRTC mandated the ILECs to provide numbers under a tariff. Under the terms of the ILEC tariffs, numbers were available in blocks of 1, 10, 100, and 1,000 numbers. (These tariffs still exist but are used only rarely, i.e. where a full NXX is unavailable or unwarranted.) The holder of record for these numbers, in both the NPAC SMS and the CNA database, is the ILEC that leases the numbers to the wireless carrier.

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Under the status quo, porting a number within a 1,000 block (for instance) between two wireless carriers would require two steps: the new wireless carrier would first send a request to the number holder (i.e. the ILEC) who, in turn, either would pass the request on to the old wireless carrier, who then would deal directly with the new wireless carrier, or act as the conduit for the information (much as reseller's underlying carrier would). Neither of these scenarios would be acceptable since the porting interval for ports involving ILECs (2 business days) is much longer than the one that involves only wireless carriers (2.5 business hours).

To resolve the problem, it is clear that the number blocks in question must be transferred to the wireless carriers so that they could be identified properly in the NPAC SMS as holders of those numbers. This will ensure that porting requests are sent to the right carrier the first time. In the United States, this was accomplished through a process agreed upon between wireless and wireline carriers, which may or may not be applicable in Canada¹⁴. The process is one of essentially migrating blocks within shared codes to wireless carriers, which entails, at least in the U.S. scenario, somewhat more than simply porting the numbers but also upgrading the technical interconnection arrangements between the carriers. We would recommend that the CRTC direct the CISC working groups (either NTWG and/or BPWG) to develop a solution to the shared NXX issue using the U.S. process as a starting point, if applicable.

For a discussion on the impact on resellers, please refer to the Reseller Status section below.

Related Questions and Issues

(1) Question: *Is the process used in the U.S. applicable in the Canadian context? Are there other solutions that are more appropriate to Canada?*

(2) Question: *What would be the regulatory implications of such a solution? Would the wireless carriers be required to continue leasing these numbers from the telephone companies or would they be considered as assigned to the wireless carriers? Where does this distinction lie?*

4. Transfers across Exchange Boundaries

(Priority: High)

Wireline carriers are required under CRTC regulation to have at least one Central Office ("CO") code¹⁵ unique to each exchange where service is offered. Wireless carriers do not operate under this requirement and use a single CO code to provide service to customers in multiple exchanges. A wireless carrier's CO code(s) is typically associated with an exchange where the wireless carrier has a Point of Interconnection ("POI") with the ILEC.¹⁶ This POI enables a wireless carrier to exchange traffic with an ILEC for an area covering many exchanges.

Under existing LNP arrangements, location porting is not permitted outside of an exchange. In other words, telephone numbers with a CO code associated with one exchange, may not be ported for use in other exchanges. In the wireline context, a customer can change service providers and even change

¹⁴ See "LNPA Working Group Report on the Migration of Numbers Associated with Type 1 Interconnection Arrangements" which describes the process used in the U.S. for migrating blocks within shared NXXs between a wireline carrier and the wireless carrier with which it shares the NXX.

¹⁵ The CO code is the first three numbers in a seven-digit telephone number. For example, 654 is the CO code in the following telephone number 654-3210.

¹⁶ In Telecom Order CRTC 97-1572, the CRTC recognized that wireless CLECs may use numbers associated with one exchange in another exchange. In addition, in the context of local competition, the CRTC determined that retaining the current ILEC system of assigning a unique NXX for each ILEC exchange in which a LEC provides service is the most prudent approach to maintaining the integrity of the network.

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locations, as long as the new location is within the same exchange as the original location. Unlike a wireline customer, a wireless customer's service location cannot be used to determine whether or not the ported number remains within an exchange. As a result, the concept of wireline geographic porting cannot readily be applied to wireless services and WNP.

Wireless service, by nature, is not limited to the ILEC exchange boundaries and porting a number to another wireless carrier could violate the CRTC's current restriction that "location portability should only be permitted for a number previously ported between service providers where the new location is within the original telephone company exchange or rate centre".¹⁷

If the CRTC's directive prevents the porting of a number to a wireless POI, wireless switch, and/or customer billing address located outside of the original exchange, many customers could be prevented from transferring their numbers from wireline to wireless service or between wireless carriers. On the other hand, if no restrictions are in place, customers could transfer numbers across municipalities or provinces or even across the country. However, the appropriate location identifier for a number transferred between carriers would have routing and rating implications for the industry, particularly for LECs and IntereXchange Carrier ("IXC") carriers.¹⁸

The Canadian Number Administrator ("CAN") and CLNPC did not identify any insurmountable technical problems associated with porting across exchange boundaries however, the CNA did identify that the LECs would have significant concerns with the geographic porting of telephone numbers for the reasons identified in the proceeding related to Decision 97-8. The BPWG and the NTWG each said that it would be important to examine existing intra- and inter-carrier processes to identify and modify any existing which might be affected. The NTWG also indicated that there may be technical impediments to WNP location portability.

This topic has been the subject of much discussion by both wireless carriers and the LECs. All participating parties are agreed that changes would be required to enable transfer of numbers across exchange boundaries. In the context of this document, "porting across exchange boundaries" refers to the ability to port a number from a CO code existing within an ILEC exchange area boundary to a wireless carrier who wishes to use the ported number in another exchange with the proviso that the ported number retains all the donor CO code attributes related to rating, routing and dialling patterns required for calls to this number. Geographic porting is often understood to imply that the ported number would take on all of the above attributes associated with the receiving exchange; this is not being contemplated here.

While technically feasible, the scope of these changes is not known. In addition, some WNP Task Force members have asserted that such changes could be both extensive and complex. Others believe that in certain circumstances, there will be little or no impact on routing and rating.

PwC and CWTA task force members are agreed, however, that this issue should be addressed via CISC where all affected stakeholders, including wireless carriers, ILECs, IXCs, CLECs, small ILECs and any others can participate in discussions to address the matter.

¹⁷ Letter from the Secretary General of the CRTC *Re: Telecom Public Notice CRTC 95-48: Implementation of Regulatory Framework - Local NP and Related Issues* (Public Notice 95-48), dated October 25, 1996.

¹⁸ The FCC determined that LECs must port numbers to wireless carriers, "provided that the porting-in carrier maintains the number's original rate center designation following the port". *Memorandum Opinion and Order and Further Notice of Proposed Rulemaking*, released November 10, 2003, CC Docket No. 95-116, paragraph 22.

Related Questions and Issues

(1) Question: *Should a number transferred between carriers to a wireless POI, wireless switch, and/or customer billing address located outside of the original exchange be treated as location portability? If not, under what circumstances, if any, should a number transferred to a wireless carrier be considered location portability?*

(2) Question: *In a letter dated October 25, 1996, the CRTC determined that “location portability should only be permitted for a number previously ported between service providers where the new location is within the original telephone company exchange or rate centre”. If numbers transferred to a wireless carrier to a wireless POI, wireless switch and/or customer billing address located outside of the original exchange is considered location portability, what conditions and modifications, if any, are needed to the CRTC's location portability restriction to accommodate WNP?*

(3) Question: *What are the implications for the rating of calls when a number is ported to another exchange for: (a) calls that are originated by wireless customers and calls that are received by wireless customers; and (b) calls that are originated by a wireline customer to a wireless customer and calls received by a wireline customer from a wireless customer? Are the rating implications significant enough to require special consideration?*

(4) Question: *If the WNP entails location portability, should the location portability rules be reviewed and amended to accommodate location portability between wireline carriers?*

(5) Question: *What existing inter-carrier processes and/or technical arrangements, if any, require modification resulting from the introduction of WNP and the transfer of numbers across exchange boundaries?*

5) Telephone Directories and Operator Services

(Priority: Medium)

A wireline customer's number is published in a telephone directory, unless the customer requests an unpublished number. Some LECs charge for unpublished numbers. Currently, a wireless customer's number is not published in a telephone directory, unless the customer requests a published number. Wireless carriers pay a tariffed rate, usually to an ILEC, to add a customer's number to the directory and, in turn, typically charge the customer. Wireline customers who port numbers to wireless carriers may expect that their numbers will remain in the telephone directories and available for operator services.

The CWTA has indicated that existing treatment for wireless telephone numbers is appropriate whether the customer is transferring service from a wireline service or wireless service or is acquiring a new wireless service. More generally, the CWTA said that the LEC obligations, pursuant to Decision 97-8 and subsequent decisions, should not be imposed upon wireless carriers.¹⁹

The Coalition for Competitive Telecommunications (“CCT”) recommended that the customers be informed of the option to have their numbers published but that publishing should not be the default course of action. The PIAC did not express any views. The BPWG did not have any concerns but indicated that the existing processes should be reviewed to determine if changes are needed, whether or not wireless customers' numbers are published or used for operator services. Industry Canada indicated

¹⁹ Telecom Decision CRTC 97-8, *Local Competition*.

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that consumer's choice should be maximized so that a customer porting a number from wireline to wireless service is given the option for his or her name and number to continue to appear in the directory. (See discussion in the "Reseller Status" section following).

Related Questions and Issues

- (1) Question:** *What is the appropriate treatment for wireless customers' numbers for use in directories and for operator services?*
- (2) Question:** *Should there be a distinction between customers porting from a wireline to wireless service and customers porting between wireless carriers?*

6. High Volume Porting

(Priority: Medium)

Over the first two to three weeks following WNP implementation, there could be a large volume of porting activity. To ensure the most customer-acceptable and competitive-neutral transition to WNP, it is important that the telecommunications industry be aware of and prepared for additional porting volumes.

The volume that emerges will depend, in part, on the rollout schedule. If, for example, WNP is initially available in all provinces on a specific date, the porting volumes will be greater than if the rollout is phased in, as proposed in this report.

The CWTA recognized the possibility of high initial porting volumes and the importance of having individual wireless carriers plan for this possibility. BPWG indicated that it will need to consider the inter-carrier implications for LECs of large volume porting activity in the early period of WNP implementation. Whether internal carrier resources are sufficient is a separate issue, outside the scope of the BPWG work and should be addressed by the individual carriers.

Related Questions and Issues

- (1) Question:** *Should the Commission, CISC or the CWTA coordinate estimates of initial porting volumes on behalf of the industry?*
- (2) Question:** *What role should CISC play in preparing for the impact of potentially high porting volumes on inter-carrier arrangements?*
- (3) Question:** *What role should the CLNPC and Neustar play to determine the nature of the processes that may be needed to accommodate for high volume wireless porting?*

7. Grounds to Refuse Porting

(Priority: Medium)

Under the existing wireline arrangements developed by the CISC BPWG²⁰, a number must be ported unless there is a customer-initiated disconnection, or LEC-initiated service suspension or disconnection. Working telephone numbers must be ported. In the United States, the FCC requires wireless carriers to port telephone numbers unless a number is suspended or disconnected.

²⁰ BPPE025a, Porting of Suspended or Disconnected Telephone Numbers.

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Wireless carriers frequently have one to three-year contracts with their customers that include significant handset subsidies. Since the porting of telephone numbers associated with wireless service would require termination of service with the donor wireless carrier, significant early termination charges could apply. Some customers requesting number porting may also have substantial outstanding amounts owing. One option is for the wireless carrier to refuse a port until any associated early termination charge or outstanding amount is paid.

The CWTA indicates that telephone numbers should not be ported until customer accounts are current and that the wireless industry will develop the porting rules that apply between wireless carriers. In discussions with the CRTC staff, there was concern raised on this perspective.

Related Questions and Issues

(1) Question: *Are the local number porting rules, with respect to status of wireline customer accounts, appropriate for wireless carriers given the differences between wireline and wireless offerings such as rate structures and associated monthly charges?*

(2) Question: *Should the current carrier be permitted to refuse or delay a port until the customer has paid off: (a) penalty fees associated with early termination; (b) overdue amounts related to the wireless service; (c) accrued but not overdue amounts, or d) amounts associated with other services not related to wireless services?*

(3) Question: *If a request to port a number is refused or delayed, what notification should the donor carrier provide to the carrier requesting the port?*

(4) Question: *Would it violate a carrier's policy or privacy restrictions if the donor carrier notified the carrier that the customer has amounts owing?*

(5) Question: *If a port is denied because of an outstanding balance, should the port be automatically re-initiated once the customer pays the outstanding amount, or is it the responsibility of the requesting carrier to restart the process?*

8. Access to ILEC Operational Support Systems ("OSSs")

(Priority: Low)

The CRTC recently directed the ILECs to make the following OSS database information accessible to CLECs: (i) customer status information; (ii) an indication whether or not a customer is served from a remote location or CO; and (iii) repair status information²¹. The CRTC decided that allowing CLECs to access the ILEC's customer status information would virtually eliminate LSR rejections and would reduce the average time for providing local services to CLEC customers. If wireless carriers use the existing processes for porting numbers from an ILEC, LSRs must provide the same type of information submitted by CLECs. Wireless carriers would, therefore, likely benefit from access to the same customer information accessed by CLECs.

The CWTA members agreed that wireless carriers may need access to the ILEC's wireline OSSs for the purpose of reducing failed ports. Access should be available only if required and only to the extent necessary to achieve the reduction in failed ports. Where an ILEC other than Bell Mobility or TELUS

²¹ Telecom Decision CRTC 2005-14, Competitive local exchange carrier access to incumbent local exchange carrier operational support systems.

Mobility believes that wireless carrier access to its OSS is not economically prudent, it can seek relief from the CRTC.

Related Questions and Issues

(1) Question: *Should wireless carriers be permitted access to the ILEC's OSS systems?*

(2) Question: *If so, is it necessary for the CRTC to issue an order authorizing access by wireless carriers?*

(3) Question: *What changes, if any, are needed to accommodate wireless carriers' access to the ILEC's OSS?*

Review Items Not Impacting Implementation of the WNP Plan

1. Winback Restrictions

(Priority: High)

ILEC winback restrictions currently apply when a customer is transferred from an ILEC to a CLEC. With the introduction of WNP, it is expected that some customers will transfer wireline service from an ILEC to service from a wireless carrier.

Generally, wireless carriers with an ILEC affiliation opposed applying the winback restrictions to customer transfers from an ILEC to a wireless carrier, while one national wireless carrier favoured the restrictions. Other stakeholders who were interviewed expressed no opinion.

Related Question and Issues

(1) Question: *Should the winback restrictions apply to customers who port numbers from an ILEC to a wireless carrier?*

2. Reseller Status

(Priority: Low)

Wireless resellers could port numbers in one of two ways²². The first option is for wireless resellers to parallel port numbers the same way that wireless carriers will port numbers. This would entail joining the CLNPC, signing agreements with Neustar, which administers the porting system for Canada, and connecting directly to NPAC. This would give wireless resellers all of the benefits and attendant costs of fully participating in WNP. However, access to the existing NPAC SMS may require additional changes to the CLNPC Unanimous Shareholders' Agreement and to the relationship with Neustar.

The second option is for wireless resellers to parallel port numbers is through their respective underlying wireless carriers. This would entail providing the underlying carrier with the necessary porting information, perhaps in the required format. The information would include the customer's name, address and telephone number. The underlying carrier would then input the information into the WNP system and complete the porting process on behalf of the reseller. This process adds an additional step that introduces

²² A third possibility is that wireless resellers are prohibited from porting numbers altogether. This seems an unnecessary prohibition and contrary to the spirit of WNP implementation. None of the stakeholders suggested that wireless resellers be prohibited from porting numbers.

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the possibility of delays and errors. On the other hand, from a wireless reseller's perspective, WNP can be implemented quicker and at a lower cost.

Under the CRTC's existing regulations, wireline resellers do not have the full benefits available to CLECs. Particularly relevant for this assessment is that wireline resellers are prohibited from directly accessing the LNP system. Instead, they use a method of LNP comparable to the second option described above. While wireline resellers are not required to port numbers into their systems, the CRTC requires that they release numbers when reseller customers want to port numbers from resellers to other competitors.

Virgin Mobile and Primus Telecommunications were interviewed in preparation for this report. Virgin Mobile expressed the view that it should be permitted to directly participate in the WNP system, as would a wireless carrier. Primus Telecommunications indicated that it would be content to access the WNP system through its underlying wireless carrier.

Industry Canada noted that wireless service providers can already access to LNP facilities and processes if they operate as wireless CLECs or gain indirect access through LECs which have access to the NPAC SMS. Changes to the existing regulatory framework, including those which provide non0CLECs with access to the NPAC SMS, would require decisions by the CRTC.

For the purpose of the WNP implementation plan, PwC has assumed that resellers will not have direct access to the NPAC SMS.

Related Questions and Issues

(1) Question: *Should wireless resellers be permitted to port numbers directly through the NPAC, as would a wireless carrier, or through their respective underlying wireless carriers?*

(2) Question: *If resellers are permitted to port numbers through the NPAC, should they be permitted/required to join the CLNPC?*

(3) Question: *If resellers are permitted to port numbers through the NPAC, will it be necessary for them to obtain CO codes directly from the CNA? If so, is this a policy change that requires the CRTC's approval?*

3. Location of Number Portability Database

(Priority: Low)

Appendix B of this report provides a short history and description of events leading to the implementation of local NP in Canada, it is noted that industry LNP groups were created to consider such matters as the selection of a vendor for the supply of the LNP NPAC SMS. In June 1996, the members of the working groups were invited by the Director General, Telecommunications Policy branch (DGTP) of Industry Canada to provide comments on the implications of locating the LNP master database and its administrator outside of Canada. In September 1996, Industry Canada sent a letter to the Executive Director at the CRTC stating, among other things, that "considering the policy, sovereignty and jurisdictional issues that are likely to arise from locating the LNP master database outside of Canada, we are of the belief that the database and its administrator should reside in Canada from the outset".

For a number of reasons, the industry did not find it feasible to heed Industry Canada's advice. In LNP Report 23 to the CRTC, the Local Number Portability Switching & Signaling Industry Work Group indicated that "while a Canadian solution would, all things being equal, be preferable, obtaining the best

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solution at the best cost is considered to be the primary objective”. Currently, the LNP master database and its administrator are located in the United States.

The LNP database associates telephone numbers with location routing numbers (“LRNs”), used for the routing of call in the network. The database does not contain any customer-specific information.

The CWTA has indicated that the location of WNP master database should not be regarded as an issue. PIAC identified the location of the WNP database outside of Canada as an issue. The primary concern is that, under the United States Patriot Act, access to customer information contained in the WNP database could be inappropriately disclosed. PIAC was of the view that even if the database does not hold confidential customer information, use of the data in the WNP database combined with other data could produce information that should be treated as confidential.

For a number of reasons, Industry Canada believes that it would be in the public interest to have the wireless number portability database located in Canada, including the following:

- At the time that wireline LNP was being contemplated, the Assistant Deputy Minister of Industry wrote a letter, dated September 3, 1996, to the Executive Director at the CRTC, providing his view that the database and its administrator should reside in Canada.
- With the passage of the United States Patriot Act and its implications on the privacy of Canadians, there is great incentive to keep the database on Canadian soil.
- The introduction of the Personal Information Protection Act, in Canada, expresses the Legislature’s policy to keep personal information about Canadian citizens confidential;
- The Treasury Board’s Comprehensive Assessment of Risks Related to the United States Patriot Act, found that a database maintained and processing conducted by United States based company in United States constitutes a “high risk”.
- The importance of the wireless industry to Canada’s economy is significant. Ensuring that control of Canadian wireless resources remain in Canadian hands is therefore an important public policy goal.
- It is expected that ports involving wireless numbers will outstrip pure wireline ports, which argues for perhaps another look at how best to manage wireless porting.
- While at the time that wireline portability was implemented the technology was new and innovative, it is no longer necessarily so. The availability of seasoned database management companies in Canada presents an opportunity for cost-effective provision of such services by Canadian providers.

However, having made these observations, Industry Canada also indicated that if a Canadian-made solution turns out to be much more expensive, it would not be a suitable option. In that case, a hybrid model may be worth looking at, where a United States company provides the database but locates it in Canada.

As explained in this report, it is assumed and recommended that the wireless carriers use the existing LNP database and associated processes for the purpose of WNP.

Related Questions and Issues

(1) Question: *Should the WNP master database for numbers ported in Canada be located in Canada for security reasons?*

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- (2) Question:** *What information in the WNP database is properly treated as confidential?*
- (3) Question:** *What data, if any, from the master database, when used in conjunction with other data, could be used to derive confidential customer information?*
- (4) Question:** *What are the implications for local NP and the existing processes and arrangements?*
- (5) Question:** *How should the location of the NPAC SMS be addressed and is it a matter of urgent attention?*

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Summary of Review Items

	Items Which Affect the WNP Implementation Schedule	Priority	Consensus Within CWTA*
1	Timers for WNP Porting	High	No
2	Implementation Coordination	High	Yes
3	Shared NXXs	High	Note 1
4	Transfer across Exchange Boundaries	High	Note 2
5	Telephone Directories and Operator Services	Medium	Yes
6	High Volume Porting	Medium	Yes
7	Grounds to Refuse Porting	Medium	Yes
8	Access to ILEC Operational Support Systems	Low	Yes
	Items Which Do Not Affect the WNP Implementation Schedule	Priority	Consensus Within CWTA*
1	Winback Restrictions	High	No
2	Reseller Status	Low	Yes
3	Location of WNP Database	Low	Yes

* One or more of the CWTA members have expressed a dissenting opinion on the premise within the issue statement.

Note 1: This issue has not yet been reviewed widely with the CWTA WNP Task Force for consensus consideration. It is anticipated that there would be consensus to have this resolved prior to launch.

Note 2: The CWTA feels that this issue should be resolved by CISC.

Regulatory Issues Requiring Prompt Resolution

To facilitate reference by key stakeholders (the CRTC and others), this section provides a synopsis of the issues that will require prompt attention by the CRTC. These issues require resolution as a prerequisite to carriers undertaking work on the major elements that are on the plan's critical path. For a complete list of related items, including those that can be addressed over a longer period of time in parallel with other major phases of the plan, please see Section II: *Strategic Recommendations*.

Non-LEC Participation in LNP – CRTC Order 99-5

Background: In Telecom Order CRTC 99-5, January 8, 1999 ("Order 99-5"), the CRTC ruled on a question it itself posed in a letter to the industry in July 1997 regarding the appropriateness of non-LEC participation in LNP. In that letter, the CRTC sought comments regarding whether non-LECs should be allowed to port numbers and, if so, whether certain CLEC obligations should apply to these entities. In Order 99-5, the CRTC ruled in the negative, stating that:

"...extending the privilege of access to the NPAC/SMS to non-LECs to provide, among other things, portability between LECs and non-LECs, in the absence of the corresponding obligations of a LEC would alter the terms of the framework established for local competition in Decision 97-8 in a manner contrary to the public interest."

Action Required: It is assumed that the CRTC will deal with Telecom Order 99-5 in a way that will permit wireless carriers to directly access the NPAC SMS without the requirement to become CLECs. Wireless carriers are undertaking WNP implementation voluntarily under the assumption that their regulatory status (as wireless carriers vs. CLECs, which comes with additional obligations) will not change. Thus, they view a directive from the CRTC permitting wireless carrier access to the NPAC SMS as a prerequisite to the commencement of the work entailed in WNP implementation.

It is likely that the CRTC will require some sort of process before issuing such a directive. The length of time a proceeding takes depends highly on what is included in the process (i.e. comments, reply, interrogatories, hearings, etc.). In our plan, we assume that the CRTC will dispose off this issue within seven weeks of the issuance of the report.

Intermodal Timer

Background: See Review Item #1 for a full description of the issues surrounding intermodal porting intervals. The CRTC will be asked to resolve these issues.

Impact: As noted in Review Item #1, any change to the intermodal port timing interval will necessitate additional effort by Neustar and also require substantial changes to the porting processes used today between wireline companies. This, in turn, will drive considerable work within the BPWG, the result of which will comprise a very significant part of the back office and IT system changes that wireless carriers will have to complete within their networks. On the other hand, if the intermodal interval remains unchanged, the BPWG effort will be one of reviewing the existing processes to ensure that they can accommodate wireless porting. In either case, wireless carriers need to know which process to use in order to incorporate it into their OSS/BSS systems changes. In line with the strategic planning principles 2 and 4 ("Develop an Implementation Plan that is Highly Cost-Effective" and "Do it once and do it right"), our plan considers the completion of the BPWG efforts

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as a prerequisite for the wireless carriers to implement the necessary IT and back-office system changes.

Action Required: The CRTC's role will be to provide the BPWG with clear direction regarding the work it needs to accomplish at the earliest possible opportunity. This can be done in the context of the proceeding that we suggest above for permitting wireless access to the NPAC SMS, in which case, the BPWG could have its directives within seven weeks of the release of this report. This is our working assumption.

Shared NXX

Background: See Review Item #3 for a full description of the issues surrounding Shared NXXs. The CISC should be asked to resolve this issue.

Impact: As noted in Review Item #3, not addressing the Shared NXX issue before launch will negatively impact the porting process.

Action Required: The Commission's role will be to provide the BPWG/NTWG with clear direction regarding the work it needs to accomplish at the earliest possible opportunity. This can be done in the context of the proceeding that we suggested above.

Transfer across Exchange Boundaries

While technically feasible, the scope of the changes required to effect transfers across exchange boundaries is not fully known.

Action Required: The Commission should direct CISC to determine the methods for transferring numbers across exchange boundaries.

Wireline Company Participation in Intermodal Porting

This issue is not in dispute. The wireline carriers gave no indication that they are opposed to it and the wireless carriers have all stated that they would support it. The Government of Canada has made it clear that intermodal porting is to be part of the scope of WNP in Canada²³. All that is required, therefore, is an indication from the CRTC that intermodal porting is a requirement. Because the proceeding that we propose for shortly after the release of this report includes the issue of intermodal timers, the question of general LEC participation would fit well within the scope of that proceeding.

²³ See Appendix D Letter from the Minister of Industry (Minister Emerson) to Chairperson, CRTC dated March 18, 2005.

CONCLUSION

A Measured and Well-structured Plan Can Help Canada Set a New Global Standard for Implementing Wireless Number Portability

In addition to the technical complexity, the biggest obstacle to a successful WNP implementation is the challenge of balancing a kaleidoscope of overlapping and competing interests across the national pool of stakeholders. Stakeholder support is critical to plan development and implementation, which must be recognized as effective, efficient and fair.

As outlined in this report, we believe that the earliest and most expedient national common launch date for WNP is Wednesday, September 12, 2007. The capability would be launched in exchanges where LNP exists at the time and cover simple and complex ports and resellers. It will be built upon the infrastructure and processes used for LNP today, but modified to accommodate the needs of wireless customers, both consumer and business. All stakeholders who have had input to this plan have committed to keeping the customer experience as a focal point for decision making. WNP would be rolled out to those non-LNP exchanges in conjunction with a CRTC-approved process for opening new wireline areas.

What gives us a high level of confidence in the integrity of these recommendations is more than just the breadth and depth of our inquiry process in conducting interviews with key industry stakeholders; consulting with the internal and external specialists and professionals that comprise the PwC telecommunications practice; reviewing independent research on WNP from around the world; and evaluating a full complement of strategic, tactical and technical alternatives for introducing WNP in Canada.

What also gives us the ability to stand behind each of these recommendations with confidence is that our arriving at these conclusions in an independent and objective manner disciplined by the crucial set of strategic planning principles. At each step of the process, we went to great lengths to apply these planning principles rigorously and methodically to our analyses of all alternatives and options.

Finally, we believe that if these recommendations are used to support a consensus-based, customer-friendly WNP implementation, Canada will have established itself in a position to define a new world-class standard in WNP implementation not perhaps, as a stated goal in and of itself, but as a natural outcome of a well-conceived, stakeholder-supported and industry-led initiative.

APPENDIX A

GLOSSARY OF RELEVANT TERMS

AIN: Advanced Intelligent Network. A switched voice and data network consisting of a variety of network elements. It refers to open interfaced, multi-vendor, telecommunications capabilities that let phone companies create and customize their service offerings. Also, often used as shorthand for the next-generation intelligent networks.

AMPS: Automatic Message Processing System. Any organized assembly of resources and methods used to collect, process and distribute messages largely by automatic means.

ANI: Automatic Number Identification. A service that provides the telephone number of an incoming call. ANI is used for a variety of functions – by receiving the incoming telephone number, telephone companies can direct a call to the proper long distance carrier's equipment; it can help identify the caller's address to speed response time to 9-1-1 calls; and it can route an 800 call to the nearest vendor.

BPWG: Business Process Working Group. Canadian working group that reports to the CISC with responsibility for billing and ordering, customer transfer, data interchange and network operations.

BSS: Business Support System.

CCT: Coalition for Competitive Telecommunications. Established in 2003 to ensure that the voice of business and institutions is heard in the Telecom policy and CRTC regulatory channels.

CDMA: Code-Division Multiple Access. A coding scheme, used as a modulation technique, in which multiple channels are independently coded for transmission over a single wideband channel.

CDR: Call Detail Records. A Record containing data unique to a specific call.

Centrex: A service offered by Bell Operating Companies that provides functions and features comparable to those provided by a PBX or a PABX. Note: "Centrex® C.O." indicates that all equipment, except the attendant's position and station equipment, is located in the central office. "Centrex® C.U." indicates that all equipment, including the dial switching equipment, is located on the customer's premises.

CISC: Canadian Interconnection Steering Committee. A set of public working groups mandated by the CRTC, which resolves business, technical and operational issues between carriers. Within the CISC there are many working groups.

CLASS: Custom Local Area Signaling Service. One of an identified group of network-provided enhanced services. A CLASS group for a given network usually includes several enhanced service offerings, such as incoming-call identification, call trace, call blocking, automatic return of the most recent incoming call, call redial and selective forwarding and programming to permit distinctive ringing for incoming calls.

CLEC: Competitive Local Exchange Carrier. A telephone company that competes with an incumbent local exchange carrier ("ILEC").

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CLNPC: Canadian Local NP Consortium. A consortium formed by order of the CRTC for the purpose of facilitating the development and provision of a NP system for use by Canadian carriers. CLNPC administers the NPAC SMS contract with the Minister. Within the CLNPC there exists an operations team.

CNA: Canadian Number Administrator. Provides a numbering administration service to the Canadian Numbering Administration Consortium Inc. under the regulatory oversight of the CRTC. Functions include central office code administration, the processing of applications for NANP resources and other telecommunications numbering resources and Canadian Steering Committee on Numbering (“CSCN”) secretarial duties.

CO: Central Office. In telephony, a CO is a telecommunications office centralized in a specific locality to handle the telephone service for that locality. Telephone lines are connected to the CO on a local loop. The CO switches calls between local service and long-distance service.

CRTC: Canadian Radio-television and Telecommunications Commission. An independent agency responsible for regulating Canada’s broadcasting and telecommunications systems.

CTIA: Cellular Telecommunications and Internet Association. An association for United States wireless carriers.

CWTA: Canadian Wireless Telecommunications Association. An association for Canadian wireless carriers.

DGTP: Director General Telecommunications Policy. A branch of Industry Canada.

DN: Directory Numbers.

DSL: Digital Subscriber Line. A family of digital telecommunications protocols designed to allow high speed data communication over the existing copper telephone lines between end-users and telephone companies.

E911: Enhanced 9-1-1. A location technology advanced by the FCC that will enable mobile or cellular phones to process 9-1-1 emergency calls and enable emergency services to locate the geographic position of the caller.

ESWG: Emergency Service Working Group.

ESN: Electronic Serial Number. A unique, unchangeable number that is embedded in or inscribed on the microchip in a wireless phone by the manufacturer and is transmitted by the phone as a means of identifying itself within the system.

FCC: Federal Communications Commission. Regulating body in the executive branch of the United States government that oversees the licensing of wireless carriers and interstate telecommunications.

Foreign DN: Foreign Directory Number. A telephone number that exists in other service provider’s network.

GPRS: General Packet Radio Service. A GSM data transmission technique that does not set up a continuous channel from a portable terminal for the transmission and reception of data, but transmits and receives data in packets. It makes very efficient use of available radio spectrum.

GSM: Global System for Mobile Communications. One of the leading digital cellular systems. GSM uses narrowband TDMA, which allows eight simultaneous calls on the same radio frequency.

GTT: Global Title Translation. The routing within an Integrated Service Digital Network (“ISDN”) is termed the point code. GTT’s identify end terminals that may be beyond the ISDN network. To route information the GTT is translated into a point code; this is typically conducted at a signalling transfer point.

HLR: Home Location Register. A database that contains information about subscribers and their preferences and their current location.

ICP: Inter-carrier Communications Process.

ILEC: Incumbent Local Exchange Carrier. An ILEC is a telephone company that was providing local service when the Telecommunications Act (Canada) of 1996 was enacted. Compare with CLEC, a company that competes with the already established local telephone business.

IMSI: International Mobile Station Identifier. A 15-digit, non-dialable identifier associated with a specific carrier’s network, country code and handset. IMSI is used in GSM systems in place of MINs.

IS: Information System.

IT: Information Technology.

ISDN: Integrated Services Digital Network. An integrated digital network in which the same time-division switches and digital transmission paths are used to establish connections for different services. ISDN services include telephone, data, electronic mail and facsimile. The method used to accomplish a connection is often specified, for example, switched connection, nonswitched connection, exchange connection or ISDN connection.

IXC: Inter-Exchange Carrier. Service provider specializing in long-distance transport services across multiple local exchanges.

JIA: Joint Interconnection Agreement. An agreement between two carriers that spells out how they will work together to port numbers between each other. It usually indicates methods, procedures and service levels.

LEC: Local Exchange Carrier. The incumbent carrier that operates the public switched network in a given area. Wireless carriers are usually interconnected to all of the major LECs in their service area.

LOA: Letter of Agreement.

LNP: Local NP. NP for wireline carriers.

LRN: Location Routing Number. A number that uniquely identifies the carrier to whom a mobile directory number or landline telephone number belongs.

LSMS: Local Service Management System. This element receives the NPAC’s number porting updates and passes them to the carrier’s designated SCP/NP database. The LSMS is owned and operated by either the wireless carrier or by a service bureau on behalf of the carrier.

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LSR: Existing Local Service Requested.

MBI: MIN Block Identifiers. The MIN is a 10-digit NANP-like number. It is divided into a 6-digit prefix, known as the MIN Block Identifier (“MBI”) followed by a 4-digit Mobile Subscriber Number (“MSN”).

MDN: Mobile Directory Number. The 10-digit dialable number of a wireless phone that is dialed to place a call to that subscriber. This is the number that is ported.

MEID: Mobile Equipment Identifiers.

MIN: Mobile Identification Number. An unpublished number programmed into the handset or mobile station by the service provider, it is used to uniquely identify each subscriber and the carrier serving the subscriber. When a number is ported, the subscriber’s new carrier assigns a new MIN; the original carrier may recycle the old MIN. The MIN matched the dialable number before porting but it now does not necessarily equal the MSN.

MMS: Multimedia Message Service. Allows for non-real-time transmission of various kinds of multimedia contents, such as images, audio, and video.

MNP: Mobile NP.

MSC: Mobile Switching Centre. A telephony switch used by wireless carriers to connect and administer their mobile callers with external networks, such as the public switched telephone network. The MSCs are established regionally so that one MSC will connect to many cell towers and provide the mobile telephone service to callers over a large area, such as a large metropolitan area or part of a state/province.

MSID: Mobile Subscriber Identification. In an LNP environment, mobile subscribers require two types of numbers: a MDN and a MSID. The MSID is non-portable and non-dialable. The MSID can be formatted as a 15-digit IMSI or a 10-digit MIN.

NANP: North American Numbering Plan.

National Carrier: In this context, national carrier refers to Rogers Wireless, Bell Mobility and TELUS Mobility.

NP: NP.

NPAC-SMS: NP Administration Centre Service Management System.

NPA NXX: Area code and exchange in the NANP. It is the first 6 digits of a dialable North American phone number.

NTWG: Network Working Group. Canadian working group that reports to the CISC with responsibility for addressing network issues.

OSS: Operations Support System. A complex of databases and systems used by a carrier to turn up service, initiate billing, provision and feed the directory assistance database.

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OTAP: Over the Air Provisioning. The ability to provide cellular service “over the air” so that a customer does not have to bring the handset in for service.

PAC: Port Authorization Certificate.

PIAC: Public Interest Advocacy Centre. PIAC is a non-profit organization that provides legal and research services on behalf of consumer interests, and, in particular, vulnerable consumer interests, concerning the provision of important public services.

PCS: Personal Communication Services.

PMO: Program Management Office.

POI: Point of Interconnection.

PSAP: Public Safety Answering Point. Physical location where 9-1-1 emergency telephone calls are received and then routed to the proper emergency services.

PwC: PricewaterhouseCoopers LLP.

Product Solution: An existing commercial offering from a service provider that fits a customer need.

PSAP: Public Safety Answering Point.

Regression Testing: A quality control measure to ensure that the newly modified code still complies with its specified requirements and that unmodified code has not been affected by the maintenance activity.

Round-Robin Testing: The sequence of testing between participants in a group. For example, if there are four carriers in a test group, six round-robin tests will be performed to ensure completeness among the group.

Service Bureau Approach: Outsourcing the management of NP queries to a service bureau or ASP that serves many carriers and paying a small fee for each LRN query.

Slamming: Historically, with the advent of telecom competition in 1992, when the long-distance market was opened up to competition, unscrupulous competitors used the newly liberalized environment to fraudulently add customers to their networks. This practice was referred to as “slamming”.

SOA: Service Order Administration. The software that sits between a billing/customer care SOE system and the NPAC that facilitates communication with the NPAC. Among other functions, it is the vehicle used to establish a ported number entry in the NPAC.

SOE: Service Order Entry. A focal point where requests from multiple users are funneled to pass to the SOA. This may be the billing/customer care SOE system or another delivery point that would provide the funnel from multiple system(s) locations. This architecture needs to be designed.

SOHO: Small Office Home Office.

SMS: Short Message Service.

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Trading Partner: Another wireless carrier with which a carrier might sign a JIA and exchange numbers by porting, usually by a mechanized (automatic) interface.

TIA: Telecommunications Industry Association.

TN: Telephone Number.

Turn-up Testing: The execution of a pre-planned test matrix at the initial operation of a new network element.

UMTS: Universal Mobile Telecommunications System. Broadband, packet-based transmission of text, digitized voice, video and multimedia at data rates up to and possibly higher than 2 megabits per second, offering a set of services to mobile computer and phone users no matter where they are located in the world.

VLR: Visitor Location Register. Functioning in much the same way as the Home Location Register (“HLR”), the VLR simply identifies roamers or visitors on the network.

VoIP: Voice over Internet Protocol. Transmission of voice signals over the Internet or IP network.

WICIS: Wireless Inter-carrier Interface Specifications. WICIS defines the operational requirements and technical specifications for the exchange of information needed for the Inter-carrier Communication Process (“ICP”).

WNP: Wireless Number Portability. Interchangeable with LNP, but often used when pointing out differences between the landline and wireless porting processes.

WNP Task Force Members: CWTA, Bell Mobility, Rogers Wireless, TELUS Mobility, SaskTel Mobility, MTS Mobility.

WTSC: Wireless Testing Sub-committee.

WSP: Wireless Service Provider.

APPENDIX B

Competition and Culture: An Overview of Number Portability in Canada

Canada has been familiar with NP since July 1998 when the first commercial ports took place in Vancouver and Calgary. NP is a huge success story for the Canadian telecommunications industry. With very few exceptions, the implementation and maintenance of local NP has been successful since its inception. In fact, it is often held up as a useful model for other competitive industry ventures. The implementation of LNP was accomplished with a minimum of regulatory involvement and in large part the success was attributable to the original cooperative spirit and subsequent role of CLNPC.

The implementation of NP in Canada is also the genesis of CISC. CISC is the industry forum that handles matters of the technical, operational and administrative nature within specialized industry groups, open to public participation and run under the auspices of the CRTC.

Work on NP began after the CRTC released a milestone decision in 1994. The purpose of the proceeding was to investigate improved ways of regulating the telecommunications industry. The review of the regulatory framework was needed because, two years previously, the CRTC opened the long-distance market to competition. In its 1994 landmark decision, the CRTC announced that “restrictions on entry into the local market should be removed”. Although it took almost four years before local competition became evident, the decision initiated a series of interrelated events that produced the rules for local competition in Canada, including local NP.

The industry already had some familiarity with NP. As a result of the Commission’s decision in 1992 to permit long-distance competition, 800-NP eventually became available for long-distance competitors.

In a Commission report to the Government of Canada entitled “Competition and Culture on Canada’s Information Highway” in 1995, the CRTC recognized NP as a key matter to be addressed to facilitate local competition. The CRTC subsequently commenced a number of initiatives to examine NP implementation. One of the most pressing issues was the trade-off between the desire for early implementation and the best technical solution. On this matter, the CRTC said that it was desirable for customers to be in a position to obtain some form of NP by early 1997 (approximately 17 months) and noted that implementation of a long-term solution would likely require three to five years. The CRTC also said that a long-term portability solution would “most likely involve a database administered by a neutral party”.²⁴

The CRTC’s pronouncements were followed by an industry meeting, chaired by the Commission, in June 1996. At this meeting, the first CISC groups were formally created, including the industry group that would eventually implement NP. Much like the process leading to this report, the relevant industry players met frequently to identify NP issues and resolve them by consensus.

²⁴ Public Notice CRTC 95-48.

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From these early beginnings, the industry, with the oversight of the CRTC, created NP sub-working groups, which among other things:

- created a Request for proposals for an NPAC SMS;
- created an industry consortium for selecting and negotiating with the vendor;
- developed a local NP rollout plan; and
- coordinated testing of the NPAC SMS, field trials and a commercial launch.

Local NP trials commenced in Montréal in November 1997. Delays were encountered because the chosen vendor, Perot Systems, withdrew its NPAC SMS early in 1998. Lockheed Martin was subsequently contracted to provide an NPAC SMS, delaying completion of the trials to August 1998.

Despite the delays in the trial and the fact that not all business processes had been tested, the industry agreed to go into commercial service with the Lockheed Martin NPAC system on July 31, 1998 in Calgary and Vancouver. The first two commercial ports occurred on July 31, in Calgary and Edmonton, between TELUS Mobility and MetroNet. These were followed on August 31, 1998 by commercial ports in Montréal and Toronto between Bell Canada and MetroNet.²⁵

If the introduction of wireless NP in the United States is any indication of what may happen in Canada, the volume of ported numbers will double within 12 months.

²⁵ LNP Field Trial Report, TP98B, October 8, 1998.

APPENDIX C

Trial and Error: A Review of WNP Implementation in Other Jurisdictions

In most countries around the world, the telephone numbering system is different for wireline and wireless operations, rendering intermodal porting impossible (except through inefficient call-forwarding schemes). Three countries, however – the United States, the United Kingdom, and Australia, have launched a WNP implementation. This section provides a brief overview of the implementation in these three countries as well as a fourth jurisdictional initiative, the migration of ESNs to Mobile Equipment Identifiers (“MEIDs”), a five-year effort underwritten by the Telecommunications Industry Association (“TIA”).

<u>Country</u>	<u>Scenarios Available</u>
Australia	1 & 2 only
Austria	1 & 2 only
Belgium	1 & 2 only
Denmark	1, 2 now, 3, 4 by year-end 2006
Finland	1 & 2 only
France	1 & 2 only
Germany	1 & 2 only
Greece	1 only
Hong Kong	1 & 2 only
Ireland	1 & 2 only
Italy	1 & 2 only
Japan	Currently none
Netherlands	1 & 2 only
New Zealand	Currently none
Pakistan	Currently none
Portugal	1 & 2 only
Sweden	1 only
United Kingdom	1 & 2 only
United States	1, 2, 3, 4

- 1 - b/w wireline carriers
- 2 - b/w wireless carriers
- 3 - from wireline carriers to wireless carriers
- 4 - from wireless carriers to wireline carriers

Source: PwC Research 2005

United States

As Canada and the United States share the same numbering scheme, the United States experience is perhaps the most relevant to the Canadian implementation of WNP. Planning for the introduction of intermodal WNP in the United States began in 1996 with an original launch target date in December 31, 1998. As a result of several court challenges launched by various stakeholders within the industry, however, a partial implementation on November 23, 2003 was followed six months later with a full implementation in May 2004.

In a press release dated November 23, 2004, FCC Chairman Powell confirmed that 8.5 million ports had taken place in the first 12 months immediately following the deployment of NP. This was substantially less than the 39 million ports predicted by United States industry specialists²⁶. PwC has researched and identified several reasons that explain this result. These include the following:

- Consumers did not understand – before NP was made available – that handsets would not be portable and that they would be required to purchase a new handset and sign a new two- to three-year service contract.
- Consumers had expected the new carrier to absorb the costs associated with transferring service to the new providers. However, when the new carrier made it clear that they would not be paying for the termination charges associated with ending contract terms early, consumers decided to wait until contract expiry before switching.
- Many new customer retention programs were initiated by all service providers that enticed customers to stay with their existing provider.
- Initial problems with number porting influenced consumers to wait until the process was sufficiently proven.
- Migrating national accounts because of the mix of corporate-paid and personal-paid sub-accounts was problematic and more trouble than the benefit perceived by switching.

As part of the research undertaken in preparing the WNP Project Plan, PwC has determined an estimated breakdown by percentage of the porting activity involving wireless service in the first year of WNP in the United States. This data is as follows:

- Wireless-to-wireless: 90%
- Wireline-to-wireless: 10%
- Wireless-to-wireline: <1%

Information emerging from the vendor interviews indicates that the percentage of porting activity for wireline-to-wireless ports dropped substantially after year 1. While one explanation for this observation involves the possibility that pent-up demand initially existing at the time of the United States launch was quickly satisfied, PwC has been unable to obtain definitive research in this area.

For greater insights into WNP in the United States market, please refer to the documents highlighted in the reference section of the Appendices.

²⁶ TMNG press release proclaiming 39 million ports within first year of availability. June 18, 2003.

United Kingdom

The United Kingdom began Mobile NP (“MNP”) in 1999, initially with a call-forwarding scheme that both consumers and carriers found inefficient and ineffective. Although the scheme was replaced in 2001 with a system with true porting capability between mobile operators, intermodal service is not planned due to the distinct numbering system and call-charging regimes used in that country.

The United Kingdom system requires the customer to approach its existing service provider and obtain a Port Authorization Certificate (“PAC”). The service provider then has up to seven days in which to provide the PAC to the customer. The PAC can be withheld for several reasons – primarily when outstanding account balances remain unpaid. When the customer has received the PAC, he or she must present it to his/her new service provider within 30 days from the date the PAC was issued. The original and new service providers then work behind the scenes to technically complete the porting request.

Less than 3% of new service activations in the United Kingdom involve the porting of numbers²⁷ primarily due to the difficulty of the process.

Australia

Australia has had mobile NP since 2001. As in the United Kingdom, intermodal porting is not planned due the distinct nature of the numbering schemes between landline and mobile numbers.

In Australia, the process begins with the customer approaching their new service provider and requesting that his or her old number be ported to the new service. The mobile operators attempt to achieve the following service level agreements:

- Port requests completed within 24 business hours: 90%
- Port requests completed within 3 business days: 99%

If the customer is part of a complex national account or there is some other technical reason for the port being difficult to complete, it can take longer than three days.

There are four major mobile operators in the Australian market. Three of the carriers have taken the fourth carrier (Vodafone) to the Australian regulator (ACA)²⁸ in order to get them to improve their service level performance. Vodafone reportedly consistently misses their service level performance. In the two months following MNP introduction, 90,000 ports of mobile numbers took place.

²⁷ The Verisign MNP Report.

²⁸ Australia: Regulator Investigates Vodafone Over MNP Complaints

Vodafone Australia is under fire from some of its competitors for allegedly failing to comply with its obligations under the mobile NP rules (MNP). Vodafone has been warned by the Australian Communications Authority (ACA) that it has been breaching the MNP code of practice, which obliges carriers to swap users’ mobile phone numbers when they change provider within specified time limits. Vodafone claims that the problem it has in changing the numbers is a technical one. Vodafone faces considerable fines if it is found to have been deliberately blocking portability, or has been slow in getting to the bottom of the problem. As a result, the ACA will investigate the performance of carriers in delivering MNP to consumers and has also formally directed Vodafone to comply with the MNP code. According to the ACA, “Based on all available information, including advice from Vodafone, the ACA is satisfied that Vodafone is continuing to contravene the MNP industry code”. Source: *The Independent*, December 26, 2004.

APPENDIX D

Scope of Review

In preparing the final report, PwC has reviewed and relied upon, among other information, the following:

- 1- Face-to-face and/or teleconference meetings with:
 - a. CISC Groups, namely BPWG, Emergency Service Working Group (“ESWG”) and NTWG
 - b. Non-CISC Groups, namely CRTC, CLNPC, and Industry Canada
 - c. All WNP Task Force members namely, CWTA, Rogers Wireless, TELUS Mobility, Bell Mobility (also representing Bell Canada, Aliant, and Aliant Mobility), SaskTel Mobility and MTS Mobility
 - d. Resellers, namely, Primus and Virgin Mobile
 - e. Other stakeholders, namely, PIAC, Public Safety Answering Point (“PSAP”) Toronto, PSAP Vancouver, PSAP Montreal and Sogetel
 - f. Vendors, namely, Neustar and Verisign;
- 2- WNP Technical, Operational and Implementation Requirements – Phase II Version 1.7. North American Wireless NP Subcommittee Report on WNP;
- 3- North American Numbering Council Local NP Administration Working Group 3rd Report On Wireless Wireline Integration, September 30, 2000;
- 4- North American Numbering Council Local NP Administration Working Group 2nd Report On Wireless Wireline Integration, June 30, 1999;
- 5- LNP Administration Working Group – Decision Recommendation Matrix, August 11, 2003;
- 6- CTIA Critical Issues Forum Rural Wireless NP, September 11, 2003 – Whiteaker Bennet & Bennet, Washington, D.C.;
- 7- WNP and 911 CTIA WNP Critical Issues Forum, Washington, D.C., September 11, 2003 – National Emergency Number Association;
- 8- Neustar NPAC WNP Readiness CTIA Critical Issues Forum, September 11, 2003;
- 9- Local Wireless NP Challenges. CTIA Critical Issues Forum, September 11, 2003;
- 10- Wireless Local NP – Generic Operations Agreement (United States version);
- 11- Wireless Inter-carrier Communications Interface Specification (WICIS) for Local NP Version 3.0.0 by Alliance for Telecommunications Industry Solutions;
- 12- U.S. WICIS 3.0 Testing Documents;
- 13- WNP Inter-carrier Test Specifications System Upgrades and WICIS Version 3.0.0 Regression Testing. Revision 2.0, February 28, 2005;
- 14- Decision CRTC 98-60;

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- 15- Letter from the Secretary General of the CRTC Re: Telecom Public Notice CRTC 95-48: Implementation of Regulatory Framework – Local NP and Related Issues (Public Notice 95-48), dated October 25, 1996;
- 16- NP Administration Centre Service Management System Between Neustar, Inc. And Canadian LNP Consortium Inc.;
- 17- 2005-2006 Industry Canada Spending Plans and Estimates: Report on Plans and Priorities;
- 18- A Preliminary Guide to Canadian WNP. First Edition, June 2005 by Syniverse Technologies Inc.;
- 19- Letter from the Ministry of Industry (Minister Emerson) to Chairperson, CRTC, March 18, 2005;
- 20- Other industry and market information, investigation and analyses as PwC considered necessary or appropriate in the circumstances.

APPENDIX E

Experience and Qualifications of the PricewaterhouseCoopers' Team

In addressing this project, PricewaterhouseCoopers LLP ("PwC") relied upon a set of well-differentiated capabilities that help the firm provide a full range of advisory services to many telecommunications stakeholders in Canada and in countries around the world. At the heart of these capabilities lie the following:

- A track record as a trusted advisor – providing guidance on an objective basis, independent of any interest in a particular technology or pre-determined outcome.
- A global pool of telecommunications specialists, technicians and business process engineers with sector-specific knowledge about the challenges inherent in coping with transformational change in the telecommunications industry; the WNP implementation tactics taken that have paid off in other jurisdictions; and the missteps than can undermine a WNP initiative.
- A sustained commitment to continually understand, engage and advance innovation in a number of areas, two of which bear directly on the success of WNP implementation in Canada: 1) how telecommunications-specific technology issues impact the achievement of industry business objectives and 2) how a collaborative partnership between industry and government can most effectively and efficiently deliver the strongest set of benefits to the broadest set of stakeholders.

Key Members of the PwC Team

Evan Kelly **Partner**

Evan Kelly is a Partner in our Advisory Services practice and serves as the national leader for our Information and Communication industry practice area for all lines of service, a position he has held since 2000. Since 1987, he has been active in advisory assignments relating to financing, acquisitions, divestitures and business valuations for public and private companies in a variety of industries, but specializing in telecommunications and technology. Evan has worked in both Canada and Australia and was admitted to the partnership in 1996 and has over 17 years of related industry experience.

David Craig **Senior Vice President** **Advisory Services**

David Craig is a Senior Vice President within the Advisory group at PwC. He has been in this position since November 2004. He is responsible for providing independent and trusted advice to PwC clients within the Canadian telecom and utility markets. Prior to joining PwC, David was Vice President and General Manager – Global Markets for a U.S. telecom management consultancy, TMNG Inc. He was stationed in Toronto, Canada; London, England; and New York, United States; where he helped United Kingdom and U.S. wireless carriers implement capabilities to support WNP, including Nextel.

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David has over 21 years of telecommunications experience. Before TMNG Inc., he was with AT&T Canada and Bell Canada. At AT&T, he held a number of executive management positions including VP of Customer Assistance and Revenue Management, VP – Business Customer Service and VP – Network Operations. At Bell Canada, David was the Staff Engineer for the Product Management group.

David is a graduate of the University of Waterloo where he obtained his Bachelor of Applied Science in Engineering. He also has his Masters of Business Administration from the Ivey School of Business at the University of Western Ontario in London, Canada. He is a member of the Professional Engineers of Ontario.

Ramona Price
Director
WNP Plan Development Leader

Ramona Price is a Co-Chair of the Alliance for Telecommunications Industry Standard Ordering and Billing Forum Sub-Committee (Strategic Advisory Group Technical Forums and Opportunities) and a participant in the Billing and Wireless Committee. She has also represented companies on the Wireless Testing Sub-Committee and U.S. Local Number Portability Working Group, which was designated by the FCC for developing the work plan and guidelines for Wireless Number Portability in the U.S.

Ramona has over 17 years of telecommunications experience. Prior to working for PwC, Ramona was a Director of Network Cost and Billing where she developed and managed processes to validate network related invoices and Internet businesses of that company. Ramona has led several PwC engagements requiring an extensive knowledge of network planning, provisioning, traffic engineering and circuit validation for Incumbent, Competitive, Long Distance and Wireless Carriers. She has also assisted in the development and implementation of a Wireless NP project plan. Ramona has a B.S. and an MBA from Long Island University.

Usman Mahmood
Senior Associate

Usman Mahmood is a Senior Associate within our InfoComm Advisory Services Group. Prior to joining PwC, Usman worked as a consultant at Ernst & Young LLP (Kansas City, United States) and as a Senior Professional Services Consultant and Sales Engineer at Intec Telecom Systems (Atlanta, United States). Through his professional career, Usman has developed a detailed understanding of business process re-engineering, operational and business systems analysis, enterprise software implementation, revenue assurance and technical sales. He holds a Bachelor of Science degree in Information Systems from Arizona State University and an MBA in Marketing and Business Strategy from McGill University. He is a member of the Project Management Institute (“PMI”) – Lakeshore Chapter and recently received his PMP certification.

Arthur Gottlieb
The Gottlieb Group Inc. (Consulting to PwC)

Arthur Gottlieb has 17 years of experience in telecommunications comprised of network and systems engineering, inter-carrier relations, regulatory and government affairs, business planning and market analysis. He is President of The Gottlieb Group Inc., which advises industry and government on business, regulatory and government affairs strategy. Clients include CRTC, wireline and wireless carriers, cable companies, ISPs, incumbents and new entrants. Prior to the creation of The Gottlieb Group Inc. in 1999, Mr. Gottlieb was Vice President, Government Affairs at AT&T Canada, held progressive positions in

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engineering and regulatory affairs at Rogers Wireless Inc. and worked in Systems Engineering at Nortel, where he began his career.

David McKeown

View Communications Inc. (Consulting to PwC)

David McKeown has 25 years of experience in business planning, inter-carrier negotiations, regulatory matters, and policy development in the telecommunications industry. He is President of View Communications Inc., which provides telecommunications consulting services in areas dealing with business planning, competitive entry, inter-carrier relations, regulation and government policy and business processes. Clients include cable companies, CLECs, Inter-Exchange Carrier (“IXCs”), service bureaus, software companies and start-ups. Prior to the creation of View Communications Inc. in 1998, Mr. McKeown was Vice President, Regulatory at Rogers Network Services, and held progressive positions at Unitel Communications (now MTS Allstream).

APPENDIX F

Minister's Letter to the CRTC Chairman Referencing WNP

Minister of Industry



Ministre de l'Industrie

David L. Emerson
Ottawa, Canada K1A 0H5

MAR 18 2005

Mr. Charles M. Dalfen
Chairperson
Canadian Radio-television and
Telecommunications Commission
Central Building, Les Terrasses de la Chaudière
1 Promenade du Portage
Gatineau, Quebec K1A 0N2

Dear Mr. Dalfen:

I am writing with regard to the Budget Plan tabled in Parliament on February 23, 2005, by the Honourable Ralph E. Goodale, Minister of Finance.

The Budget Plan made reference to the importance of the telecommunications sector to Canada's future well-being and the need for a modern policy framework. It referred to several key initiatives in this respect, including the creation of a panel of eminent Canadians to review Canada's telecommunications policy and regulatory framework, as well as a plan to table amendments to the *Telecommunications Act* in order to provide the Canadian Radio-television and Telecommunications Commission (CRTC) with direct fining authority. The Task Force on Spam was also asked to report quickly so that Canada will be in a position to determine how best to control spam and spyware.

It is the government's intention to launch the telecommunications review very shortly. The Government of Canada is also mindful of the many important telecommunications issues currently before the CRTC and I can assure you that the government has no wish that progress on these issues be delayed pending completion of the review.

The Budget Plan also made reference to the Government of Canada's intention to request that the CRTC move expeditiously to implement wireless number portability (WNP). I note that consideration of WNP is already included in the Commission's three-year plan under the work program for the 2005-2006 period, and I am therefore confident that you will deal with this matter in an

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expeditious manner. The Government of Canada understands that WNP includes wireless-to-wireless, wireline-to-wireless and wireless-to-wireline number portability.

I believe that progress in telecommunications is best accomplished by moving forward as quickly as possible on some of the well-defined issues while we take the time to study those which are not quite so urgent. I look forward to continuing to work with you and your colleagues on these important initiatives.

Sincerely,

A handwritten signature in black ink, appearing to read 'D. L. Emerson', with a long horizontal flourish extending to the right.

David L. Emerson

APPENDIX G

CWTA Press Release on WNP

OTTAWA - April 21, 2005 - The Canadian Wireless Telecommunications Association (CWTA) is pleased to announce that Canada's wireless carriers* have agreed to implement NP in Canada, and have begun the planning efforts required to achieve this result.

NP will enable Canada's wireless customers to keep the same phone number when changing service providers within the same local serving area. Consistent with the Government of Canada's definition of wireless NP, customers will also be able to keep the same phone number when transferring their landline phone service to wireless service and vice versa.

"In support of the recent Federal budget directive to move expeditiously to implement wireless NP, the CWTA will contract an independent consultant to complete a comprehensive project plan outlining specific milestones for this process," said CWTA President and CEO Peter Barnes. "It is expected that the plan will be completed by September 1, 2005." Upon approval of the plan and agreement on a common start date, it is the intention of CWTA and the wireless carriers to begin the implementation of the plan.

The implementation of NP is a massive and complex undertaking. This initial planning stage is critical to ensure that Canadians are not burdened with the significant implementation challenges that were faced by customers in other countries. Government representatives will be invited to observe this process and to assist where appropriate.

The wireless industry looks forward to continuing to provide Canada's 15 million wireless phone subscribers with the world class services they have come to expect from Canada's wireless carriers.

Canadian Wireless Telecommunications Association (CWTA)

CWTA is the authority on wireless issues, developments and trends in Canada. It represents cellular, PCS, messaging, mobile radio, fixed wireless and mobile satellite carriers as well as companies that develop and produce products and services for the industry.

* Aliant Mobility, Bell Mobility, Bruce Municipal Telephone System, MTS Mobility, Rogers Wireless (including Fido), SaskTel Mobility, Sogetel Mobilité, Télébec Mobilité, TBayTel Mobility and TELUS Mobility.

APPENDIX H

Electronic Serial Numbers (“ESN”) and Mobile Equipment Identifiers (“MEID”)

After a five-year effort by the Telecommunications Industry Association (“TIA”), Electronic Serial Numbers (“ESNs”) as well as, MEIDs will be seen in systems. This change could have an impact on wireless carrier networks, back-office billing and fraud systems and roaming capabilities starting in 2006.

An ESN is a 32-bit number, originally invented for AMPS, that is “burned” into handsets. In addition to authenticating handsets, ESNs are typically used by service providers for critical applications relating to areas such as billing, fraud detection, inventory management and activation. ESNs are a global resource originally assigned by the Federal Communications Commission (“FCC”) and administered by TIA on behalf of the FCC since 1997. TIA continues to administer ESN resources and is also the MEID administrator.

As a result of the growth in the wireless industry and the shortened life cycles for handsets, available ESNs will be soon be exhausted. With the need for more numbering resources to accommodate future subscriber growth beyond the finite ESN pool, the wireless industry developed a next-generation 56-bit MEID numbering resource. The MEID’s larger 56-bit structure should allow for enough serial numbers to last well into the future. Through global cooperation with industry bodies including the Third Generation Partnership Projects (3GPP, 3GPP2) and the formation of a Numbering Joint Experts Meeting (JEM) in April 2002, it was ensured there would be compatibility with 3G terminals for multi-technology devices (GSM, CDMA, W-CDMA, TIA-136-E).

As it has come to be known, the “ESN exhaust” is conservatively estimated to occur as soon as the first quarter of 2006, although conservation guidelines developed by TR-45 ESN/UIM/MEID AHG, chaired by Gary Pellegrino, have been implemented by the ESN Administrator to help the industry plan for a smooth migration. The ESN assignment and MEID assignment process will be done in parallel to ensure a smooth migration from ESNs to MEIDs. Once ESNs are exhausted, only MEIDs will be assigned. For more information regarding the migration, please check <http://www.tiaonline.org/standards/esn> where information on MEIDs is available including a MEID FAQ.

TIA is urging wireless carriers to carefully review their back-office systems and determine how the migration to MEIDs will affect their technical and process infrastructure. In particular, software for these systems may need to be updated and tested in advance of MEID-capable handsets being deployed. It is recommended that carriers investigate all internal uses of ESN application (in areas such as fraud, revenue assurance, IT, repair and customer service, network, roaming and service contracts). In addition, carriers need to check with their infrastructure vendors for system updates that may be necessary. Carriers should also make sure that their rating and billing clearinghouse vendors are MEID-capable.