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# 1. Introduction

This document defines the functional requirements of the Number Portability Administration Center Service Management System (NPAC SMS) enabling Service Provider Portability.

This introduction gives readers a brief overview of NPAC SMS functionality. It is intended to prepare you for the detailed sections that follow. If you need more information on any particular area, please consult the applicable detailed sections in the remainder of this document or the *NPAC SMS Interoperable Interface Specification*.

This introduction is also meant to convey the basic course of events that give the best understanding of the system. Alternate courses of events (variants of the basic course or error paths) are described in the detailed sections later in this document and in the *NPAC SMS Interoperable Interface Specification*.

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## 1.1 NPAC SMS Platform Overview

The Number Portability Administration Center Service Management System (NPAC SMS) is a hardware and software platform which contains the database of information required to effect the porting of telephone numbers. In general, the NPAC SMS can receive customer information from both the old and new Service Providers (including the new Location Routing Number), validates the information received, and downloads the new routing information when an "activate" message is received indicating that the customer has been physically connected to the new Service Provider's network. The NPAC SMS also contains a record of all ported numbers and a history file of all transactions relating to the porting of a number. The NPAC SMS shall also provide audit functionality and the ability to transmit LNP routing information to Service Providers to maintain synchronization of Service Provider's network elements that support LNP.

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## 1.2 NPAC SMS Functional Overview

### 1.2.1 Provisioning Service Functionality

The new Service Provider will obtain authorization to port the customer and notify the old Service Provider according to processes internal to the Service Providers. Both the old and new Service Providers can send a notification to the NPAC SMS from their Service Order Administration Systems (SOA). When the NPAC SMS receives the notification(s), it will perform certain validation checks, and attempt to match the notification received from the new Service Provider with a concurring notification that may be sent from the old Service Provider. Assuming the notifications are valid, the two Service Providers will complete any physical changes required. When the new Service Provider due date is reached, the new Service Provider can send an activation notice to the NPAC SMS. The NPAC SMS will broadcast the update out in real time to each local SMS. Upon receiving the update from the NPAC SMS, all Service Providers will update their networks. The NPAC SMS will record any transmission failures and take the appropriate action.

In the case where either the old or new Service Providers did not send a notification to the NPAC SMS, the NPAC SMS will notify the Service Provider from which it did not receive a notification that it is expecting a notification. If it then receives the missing notification and the notifications indicate agreement among the Service Providers, the process proceeds as normal. If it still does not receive a notification and if it is the old Service Provider that failed to respond, the NPAC SMS will log the failure to respond and allow the new Service Provider to proceed with activation when the new Service Provider due date is reached. If it was the new Service Provider that failed to respond, the NPAC will log the failure to respond, cancel the notification, and notify both Service Providers of the cancellation. If there is disagreement among the Service Providers as to who will be providing service for the telephone number, the conflict resolution procedures will be implemented (see Section 1.2.4). Processes for obtaining authorization from the customer to port a number are defined by the Service Providers. The NPAC is not involved in obtaining or verifying customer approval to port a TN.

## **1.2.2 Disconnect Service Functionality**

When a ported number is being disconnected, the customer and Service Provider will agree on a date. The current Service Provider will send an update indicating the disconnect to the NPAC SMS. The NPAC SMS will broadcast the update to all Service Providers based on the disconnect effective date and remove the telephone number from its database of ported numbers. Upon receiving the update, all Service Providers will remove the telephone number from their LNP databases. The NPAC SMS will log the update in history. Calls to the telephone number will be routed as a non-ported number.

## **1.2.3 Repair Service Functionality**

A problem will be detected either by a Service Provider or by a customer contacting a Service Provider.

There will be audit capabilities in the NPAC SMS to aid in isolating problems. If an inaccuracy is found, the NPAC SMS will supply the correct data to any local SMS requesting updates.

## **1.2.4 Conflict Resolution Functionality**

If Service Providers disagree on who will serve a particular line number, the NPAC SMS will place the request in the "conflict" state and notify both Service Providers of the conflict status and the Status Change Cause Code. The Service Providers will determine who will serve the customer via internal processes. When a resolution is reached, the NPAC will be notified and will remove the request from the "conflict" state by the new Service Provider. The new Service Provider can cancel the Subscription Version.

## **1.2.5 Disaster Recovery and Backup Functionality**

If there is unplanned downtime, the NPAC will assess how long the primary machine will be down. The NPAC will notify all of the Service Providers of the situation and planned action by electronic notification and telephone calls to the Service Providers' contact numbers. The Service Providers will attempt to switch to the backup NPAC.

## 1.2.6 Order Cancellation Functionality

If a Create Subscription has been sent by only the new Service Provider, the new Service Provider may send a message to the NPAC SMS to cancel the Subscription Version. If a Create Subscription has been sent by only the old Service Provider, the old Service Provider may send a message to the NPAC SMS to cancel the Subscription Version. If both Service Providers have sent a Create Subscription, either may send a message to the NPAC SMS to cancel the Subscription Version. If both Service Providers concur with the cancellation, the NPAC SMS will set the Subscription Version to canceled and notify both Service Providers that the Subscription Version has been canceled. If cancellation concurrence is not provided by the new Service Provider the Subscription Version is placed in conflict by the NPAC SMS. If cancellation concurrence is not provided by the old Service Provider, the Subscription Version is set to cancel by the NPAC SMS.

## 1.2.7 Audit Request Functionality

An audit function will be necessary for troubleshooting customer problems and also as a maintenance process to ensure Subscription Version data integrity across the entire LNP network. Audits will be concerned with the process of comparing the NPAC SMS view of the LNP network's Subscription Version data with one or more of the Service Provider's views of its network. In the case of "on demand" audits, audits may be initiated by any Service Provider who has reason to believe a problem may exist in another Service Provider's network. These audits are executed via queries to the appropriate Service Provider's network, and corrected via downloads to those same networks.

In addition, Local Service Providers will be responsible for comparing database extracts of Subscription data written to an FTP site by the NPAC SMS with their own versions of the same Subscription data.

In a third scenario, the NPAC SMS will select a random sample of active Subscription Versions from its own database, then compare those samples to the representation of that same data in the various Local SMS databases. All three of the methods outlined above are designed to help ensure data integrity across the LNP network.

## 1.2.8 Report Request Functionality

The NPAC SMS supports report generation for pre-defined and ad-hoc reports. The report generation function creates output report files according to specified format definitions, and distributes reports to output devices as requested. The report distribution service supports distribution to electronic files local/remote printers, e-mail and FAX machines.

## 1.2.9 Data Management Functionality

The NPAC SMS will support functionality to manage network, Service Provider, and Subscription Version data.

### 1.2.9.1 NPAC Network Data

The NPAC SMS contains data which defines the configuration of the LNP service and network. This includes such data as: participating Service Providers, NPA-NXXs that are portable, and LRNs associated with each Service Provider.

### 1.2.9.2 Service Provider Data

The Service Provider data indicates who the LNP Service Providers are and includes location, contact name, security, routing, and network interface information.

### 1.2.9.3 Subscription Version Data

The subscription data indicates how local number portability should operate to meet subscribers' needs.

## 1.2.10 NPA-NXX Split Processing

For an impending NPA split, there is no communication between each SOA and the NPAC via an electronic interface (SOA, LSMS, or NPAC Administrative Interface) other than providing the NPAC with the new network data (LRNs and NPA-NXXs), if applicable. The NPAC inputs via the NPAC Administrative Interface the information for the NPA split (the current NPA, the new NPA, and the affected NXXs) plus the beginning and end date of the permissive dialing period. This function of the NPAC Administrative Interface is only available to NPAC Operations personnel. A process will be documented in the M&P document that will define how the NPAC is notified of an impending split. This process should be similar to how the Service Providers are notified of a split today.

**NOTE:** Split information input will not be allowed if there are any partially failed or pending subscription versions associated with the old NPA-NXXs.

The NPAC modifies all of the subscription versions associated with the split to associate the new TN with the subscription version to support the permissive dialing period. No updates or information is sent over the SOA interface or LSMS interface to indicate that a split is occurring.

During the permissive dialing period the NPAC will accept messages with either old or new NPA but broadcasts/downloads with the new NPA only. In addition, all notifications and responses to the SOA system will contain the new NPA only during the permissive dialing period regardless of whether the SOA system is using the old or new NPA in its requests to the NPAC SMS. If a delete request is received, it is broadcast with the new NPA. The subscription version ID that the NPAC SMS is aware of for the TN is used in the messages.

**NOTE:** The subscription version ID does not change during a split.

The NPAC will update its subscription version records when permissive dialing ends to the new NPA. Existing records to the old NPA will be modified so that the NPA is set to the new NPA and the field that held the new NPA during the permissive dialing period is deleted. Any records involved in the split will have any references to the old NPA removed. There are no old or new versions created. An NPA split causes a shift of the data, not creation of a new entity. By definition, NPAC SMS will change identity information for the TN when the NPA is changed. This type of a change would require use of the version ID to find the TN and should not be problematic because the NPAC uses the version ID, not the TN to track subscriptions relative to logs and audit data.

It is incumbent on the LSMS's to recognize that a request for data that is log-related may show TN information that was in effect when the log entry was made (if it was copied into the log, most entries are made by reference to subscription version ID, so this should not be problematic). In essence, the NPAC SMS is performing a modification when doing an NPA split that is a special case because:

1. It is a change to what users consider identity information.
2. The modification occurs over the permissive dialing period.
3. NPAC SMS will recognize both identifiers during the permissive period.

4. NPAC SMS will recognize only the new NPA "shortly" after the end of the permissive period (on the day after the end date, NPAC SMS will perform the operation soon after midnight GMT time).

Based on information from the LERG, the service providers will update their networks/LSMS to accommodate the permissive dialing period and will update the data in their networks/LSMS after permissive dialing ends. There is no communication from the NPAC to cause these updates to occur. No assumptions are made about what the LSMS does during the permissive period to track the NPA-NXX split for a subscription version.

After permissive dialing ends, the service providers can remove any old network data that is no longer valid due to the split (LRNs, NPA-NXXs), if any, via an electronic interface (SOA, LSMS, or NPAC Administrative Interface).

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## 1.3 Background

An industry task force was formed in Illinois in April 1995, pursuant to the Illinois Commerce Commission (ICC) Order on Customers First Plan (Docket 94-0096 dated April 7, 1995), to develop a permanent number portability solution for Illinois. During the year, this task force has made significant progress in defining and resolving the issues related to implementing number portability.

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## 1.4 Objective

The target date for LRN implementation is second quarter 1997.

The objective of this document is to uniquely identify the baseline end-user, functional requirements that define the LNP SMS supporting number portability in LATA 358.

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## 1.5 Assumptions

### **A1-1 Proportional Billing**

The Service Providers will be billed in proportion to their usage of the services provided by the NPAC SMS.

### **AR1-1 Service Provider ID**

All NPAC Customers will obtain a unique Service Provider ID from a proper source.

### **A1-2 Resource Accounting**

The resource accounting measurements will not cause degradation in the performance of the basic functions of the NPAC SMS.

**AR3-1 Greenwich Mean Time**

Specific time of day references in the Functional Requirements Specification are assumed to be in Greenwich Mean Time (GMT).

**AR4-1.1 Service Provider ID**

All NPAC Customers will obtain a unique Service Provider ID from a proper source.

**AR5-1 Active Status**

“Active” status refers to Subscription Versions with either an Active or Disconnect Pending status.

**AR5-2 Conflict Resolution Tunable due date value**

The time used for the conflict restriction tunable calculation relies on the time value specified in the New Service Provider due date.

**AR6-1 Range Activations**

A range activate will contain an average of 20 TNs.

**AR6-2 Percent of Range Activations**

20% of all downloads as specified in R6-28.1, R6-28.2, R6-29.1 and R6-29.2 will be processed via range activations.

**A8-1 Service Provider Audits Issued Immediately**

NPAC SMS will process audit requests from service providers immediately.

**AR10-1 Scheduled Downtime**

NPAC initiated downtime as defined in R10-5 does not include downtime needed for software release updates initiated by or collectively agreed to by the Service Providers.

**A10-1**

**DELETE**

**A10-2**

**DELETE**

**A10-3**

**DELETE**

**A11-2 Accounting Measurements Will Not Degrade the Basic System Performance**

The resource accounting measurements will not cause degradation in the performance of the basic functions of the NPAC.

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## **1.6 Constraints**

The following constraints shall be adhered to during the development of the software associated with the requirements within this document.

**C1-1 Real Time Call Processing**

The NPAC SMS is not involved in real time call processing.

**C1-2 Service Provider Activity Tracking**

The NPAC SMS is not involved in facilitating or tracking Service Provider-to-Service Provider activities.

**CN1-1 Service Provider Portability**

Initially, only wireline Service Provider portability will be implemented.

**CN2-1.1.1 Interactions between Service Providers are beyond the scope of the NPAC SMS**

Processes for obtaining authorization from the customer to port a number are defined by the Service Providers. The NPAC is not involved in obtaining or verifying customer authorization. Details of steps in those processes do not involve the NPAC or NPAC SMS, and are beyond the scope of the NPAC SMS functionality.

**CN2-1.3.1 Service provider network change activities are beyond the scope of the NPAC SMS**

Details of steps in the processes that do not involve the NPAC or NPAC SMS, such as physical changes performed in the Service Provider's networks, are beyond the scope of the NPAC SMS functionality.

**CN2-1.4.1 Service provider's internal activities are beyond the scope of this document**

Details of steps in the processes that do not involve the NPAC or NPAC SMS, such as physical changes performed in the Service Provider's networks are beyond the scope of this document.

**CN2.1.5.1 Service Provider's Network Change Validation Activities Are Beyond The Scope Of The NPAC SMS**

Network testing performed by the Service Providers, such as testing of call processing and testing of Service Provider network elements, is beyond the scope of the NPAC SMS.

**CN2-1.6.1 Service provider's internal activities are beyond the scope of this document**

Details of steps in the processes that do not involve the NPAC or NPAC SMS, such as updates to data performed in the Service Providers network elements are beyond the scope of this document.

**CN2-3.3.1 Service provider's repair activities are beyond the scope of the NPAC SMS**

Details of steps in the repair processes that do not involve the NPAC or NPAC SMS, such as the customer's notification of problems, the Service Provider's analysis/troubleshooting activities and the Service Provider's repair activities are beyond the scope of the NPAC SMS functionality.

**CN2.4.2.1. Service provider's conflict resolution activities are beyond the scope of the SMS NPAC**

Details of steps in the processes that do not involve the NPAC or NPAC SMS, such as conflict resolution escalation and arbitration activities are beyond the scope of this document.

**CN2-6.1.1 Interactions between Service Providers are beyond the scope of this document**

Processes for obtaining authorization from the customer to port a number are defined by the Service Providers. The NPAC is not involved in obtaining or verifying customer authorization. Details of steps in those processes do not involve the NPAC or NPAC SMS, and are beyond the scope of this document.

## 2. Business Process Flows

The following process flows indicate how the NPAC SMS is used by the Service Providers in business processes associated with number portability. Specific requirements generated by the process flows are included in the appropriate sections later in the document.

The process flows supported by the NPAC SMS are:

- Service Provisioning
- Service Disconnection
- Service Repair
- Conflict and Conflict Resolution
- Disaster Recovery and Backup
- Service Order Cancellation
- Audit Requests
- Report Requests
- Data Administration Requests

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### 2.1 Provision Service Process

This process flow defines the provisioning flow in which a customer ports a telephone number to a new Service Provider. The service provisioning flow activities are shown in Appendix A, *Flow 2.1 NPAC SMS Provision Service Process*, on page 3.

#### 2.1.1 Service provider-to-service provider activities

The new Service Provider will notify the old Service Provider according to processes internal to the Service Providers.

##### CN2-1.1.1 Interactions between Service Providers are beyond the scope of the NPAC SMS

Processes for obtaining authorization from the customer to port a number are defined by the Service Providers. The NPAC is not involved in obtaining or verifying customer authorization. Details of steps in those processes do not involve the NPAC or NPAC SMS, and are beyond the scope of the NPAC SMS functionality.

#### 2.1.2 Subscription version creation process

The Subscription Version creation flow activities are shown in Appendix A, *Flow 2.1.2 NPAC SMS Subscription Version Creation Process*, on page 4.

### 2.1.2.1 Create Subscription Version

When a number is ported, both the old and new Service Providers can send a notification to the NPAC SMS. The NPAC validates the data for each notification and attempts to match the notification with a concurring notification from the other Service Provider. If a notification is missing from either provider after a tunable time period, the NPAC sends a request for the missing notification. If the data provided with the notification is valid, the NPAC SMS creates a pending Subscription Version and awaits the concurring notification. If the data is invalid, the NPAC SMS reports a specific error to the sender of the data and discards the request.

### 2.1.2.2 Request missing/late notification

If concurring notification or explicit non-concurrence from the *old* Service Provider is not received, the process flows to process 2.1.3, as illustrated in Appendix A, *Flow 2.1 NPAC SMS Provision Service Process*, on page 3. If concurring notification or explicit non-concurrence from the *new* Service Provider is not received, the process flows to 2.6 (Cancel).

### 2.1.2.3 Final Concurrence Notification to Old Service Provider

The NPAC will send a final concurrence notification to the Old Service Provider who did not send a concurring notification.

## 2.1.3 Service providers perform physical changes

The two Service Providers involved in the number port will coordinate and perform the physical changes to their respective networks.

#### CN2-1.3.1 Service provider network change activities are beyond the scope of the NPAC SMS

Details of steps in the processes that do not involve the NPAC or NPAC SMS, such as physical changes performed in the Service Provider's networks, are beyond the scope of the NPAC SMS functionality.

## 2.1.4 NPAC SMS "activate and data download" process

The NPAC network data broadcast download flow is shown in Appendix A, *Flow 2.1.4 NPAC SMS Activate and Data Download Process*, on page 5.

### 2.1.4.1 New Service Provider sends activation to NPAC SMS

The new Service Provider sends an activate notification to the NPAC SMS. If the current date is greater than or equal to the new Service Provider due date, the flow continues. Otherwise, broadcast of the activation is rejected.

### **2.1.4.2 NPAC SMS broadcasts network data to appropriate Service Providers**

Upon receipt of the activation notification, the NPAC SMS broadcasts the network update data in real time to the appropriate Service Providers' Local SMSs.

### **2.1.4.3 Failure - notify NPAC**

If the NPAC SMS does not receive positive acknowledgment of the broadcast from all Service Providers, the NPAC SMS will rebroadcast the network data download to the Service Providers that did not acknowledge the original broadcast. The NPAC SMS will perform the rebroadcast a tunable number of times within a tunable time frame.

### **2.1.4.4 Initiate repair procedures**

If the tunable rebroadcast parameters have been exceeded, the NPAC staff will initiate repair processes with the appropriate Service Providers. The NPAC SMS will send the list of Service Providers associated with each failed or partial failure subscription version to the old and new Service Providers.

## **2.1.5 Service providers perform network updates**

Upon receiving the network data download broadcast from the NPAC SMS, all Service Providers' local SMSs will confirm the receipt of the download broadcast, and update their network elements. The Service Providers may also test their network changes.

### **CN2-1.5.1. Service Provider's Network Change Validation Activities Are Beyond The Scope Of The NPAC SMS**

Network testing performed by the Service Providers, such as testing of call processing and testing of Service Provider network elements, is beyond the scope of the NPAC SMS.

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## **2.2 Disconnect Process**

This process flow defines the activities associated with the discontinuance of service for a ported number. The NPAC Disconnect Service flow is shown in Appendix A, *Flow 2.2 NPAC SMS Disconnect Process*, on page 7.

### **2.2.1 Customer notification, Service Provider initial disconnect service order activities**

When a ported number is being disconnected, the customer and Service Provider will agree on a date. The Service Provider will send a notification to the NPAC SMS indicating the date of the physical disconnect of the number and, optionally, the date that the disconnect information is to be broadcast to all Local SMSs (the 'effective release date').

## 2.2.2 NPAC waits for effective release date

The NPAC SMS will send delete actions containing the disconnect information based on the effective release date specified by the Service Provider. If no effective release date is specified on the disconnect request, the NPAC SMS processes the request immediately.

## 2.2.3 NPAC donor notification

The NPAC SMS will broadcast the effective release date and disconnect date to the donor SOA.

## 2.2.4 NPAC performs broadcast download of disconnect data

The NPAC SMS will broadcast the disconnect information to all Service Providers. If the broadcast is not acknowledged, the disconnect information will be resent a tunable number of times within a tunable time frame. If the tunable parameters for the collection of responses have been exceeded, the NPAC staff will initiate repair processes with the appropriate Service Providers (Flow 2.3), and send a list of failed Service Providers to the current Service Provider.

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## 2.3 Repair Service Process

This process flow defines the activities performed when a problem is detected either by the NPAC SMS, a Service Provider, or by a customer who contacts a Service Provider. The repair service flow is shown in Appendix A, *Flow 2.3 NPAC SMS Repair Process*, on page 8.

### 2.3.1-A Service provider receives problem notification from customer

### 2.3.1-B Service provider receives problem notification from another Service Provider

### 2.3.1-C Service provider receives problem notification from NPAC SMS

## 2.3.2 Service provider analyzes the problem

If NPAC SMS intervention is needed to resolve the problem, up to three repair actions may be required before repairs can be initiated.

### **2.3.2-A Subscription data query required**

If a Subscription data query is required to initiate the repair, a query is launched to the Local Service Providers.

### **2.3.2-B Subscription data audit required**

If a Subscription data audit is required before the repair can be initiated, an audit is initiated with the local Service Providers.

### **2.3.2-C Network synchronization required**

If network synchronization is required, the process flows to 2.3.5, Request broadcast of subscription data.

## **2.3.3 Service provider performs repairs**

There will be audit capabilities in the NPAC SMS to aid in isolating problems.

### **CN2-3.3.1 Service provider's repair activities are beyond the scope of the NPAC SMS**

Details of steps in the repair processes that do not involve the NPAC or NPAC SMS, such as the customer's notification of problems, the Service Provider's analysis/troubleshooting activities and the Service Provider's repair activities are beyond the scope of the NPAC SMS functionality.

## **2.3.4 Request broadcast of subscription data**

There will be audit capabilities in the NPAC SMS to aid in isolating problems. A Service Provider may request a download of subscription data to assist in the repair process, if necessary.

## **2.3.5 Broadcast repaired subscription data**

If inaccurate routing data is found, the NPAC SMS will broadcast the correct subscription data to any involved Service Provider's networks to correct inaccuracies.

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## **2.4 Conflict Process**

This process flow defines the activities performed when Service Providers disagree on who will serve a particular customer. The conflict flow is shown in Appendix A, *Flow 2.4.1 Conflict Process*, on page 9.

## 2.4.1 Subscription version in conflict

A Subscription Version may be put into a conflict state either by the old Service Provider (assuming certain conditions are true), or as a result of a failure to acknowledge a Subscription Version in Cancel-Pending state by the new Service Provider (see *Figure 11-7* in Appendix A). Subscription Versions set to either conflict or cancel initiate the creation of an entry in the Subscription Cause Code field identifying the cause of the status change.

### 2.4.1.1 Cancel-Pending Acknowledgment missing from new Service Provider

If the new Service Provider has not yet acknowledged a Subscription Version in Cancel-Pending state, the Subscription Version is put into Conflict, and the Cause Code is updated accordingly.

### 2.4.1.2 Old Service Provider requests conflict status

If the old Service Provider requests that a Subscription Version be put in conflict, it must be the first time the request has been made (a request to put a Subscription Version in conflict can only be made once by the old Service Provider), and the request must be received in the NPAC a tunable number of hours prior to 12:00 A.M. of the new Service Provider due date. If either one of these conditions has not been satisfied by the old Service Provider, the Subscription Version cannot be put into conflict.

### 2.4.1.3 Change of status upon problem notification

Subscription version's conflict status "on" is achieved when a Service Provider notifies NPAC SMS personnel of a disagreement between the new and old Service Providers as to whether or not a TN may be ported. The old Service Provider can only place a "pending" Subscription Version in "conflict" one time.

### 2.4.1.4 Change of status upon Old Service Provider non-concurrence

A Subscription Version creation with authorization set to "False" from the Old Service Provider causes the NPAC SMS to place the Subscription Version in conflict during the "Create Version" process (2.1.2).

### 2.4.1.5 Change of status upon New Service Provider non-concurrence

Non-concurrence from the New Service Provider causes the NPAC SMS to cancel the Subscription Version during the "Create Version" process (2.1.2).

## 2.4.2 New Service Provider coordinates conflict resolution activities

The New and Old Service Providers use internal and inter-company processes to resolve the conflict. If the conflict is resolved, the new Service Provider sets the Subscription Version status to pending. If the conflict is not resolved

with the tunable maximum number of days, the NPAC SMS cancels the Subscription Version, and sets the Cause Code for the Subscription Version.

### **2.4.2.1 Cancel pending notification**

The new Service Provider may also cancel the Subscription Version, effectively taking it out of the conflict state. If the Subscription Version was previously in a cancel-pending state **AND** the Service Provider requesting the cancellation did **NOT** provide concurrence for that cancellation request, then that request will be accepted and the Subscription Version will be placed in cancel-pending. Otherwise, the request will be rejected.

**CN2.4.2.1. Service provider's conflict resolution activities are beyond the scope of the SMS NPAC**

Details of steps in the processes that do not involve the NPAC or NPAC SMS, such as conflict resolution escalation and arbitration activities are beyond the scope of this document.

## **2.4.3 Subscription version cancellation**

If the Subscription Version status has been set to conflict "on" for 30 days [tunable parameter] and no resolution has occurred, the NPAC SMS will cancel the Subscription Version, set the Cause Code for the Subscription Version, and notify both the old and new Service Providers of the cancellation.

## **2.4.4 Conflict resolved**

When both Service Providers agree to resolve the conflict, the new Service Provider will send a request to the NPAC SMS to change the Subscription Version status to pending.

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# **2.5 Disaster Recovery and Backup Process**

This process flow defines the backup and restore activities performed by the NPAC and the Service Providers. The disaster recovery flow is shown in Appendix A, *Flow 2.5 NPAC SMS Disaster Recovery Process*, on page 10.

## **2.5.1 NPAC personnel determine downtime requirement**

If there is planned downtime for the NPAC SMS, the NPAC SMS will send an electronic notification to the Service Providers' SOAs that includes information on when the downtime will start, how long it will be, and if they will be required to switch to the backup or disaster recovery machine. Downtime is considered planned when the NPAC can provide notification to the Service Providers at least 24 hours in advance.

If there is unplanned downtime, the NPAC will assess how long the primary machine will be down. The NPAC will notify all of the Service Providers by electronic notification and telephone calls to the Service Providers' contact numbers. The notification will describe the situation and the planned action. The Service Providers will attempt to switch to the backup NPAC.

## **2.5.2 NPAC notifies Service Providers of switch to backup NPAC and start of cutover quiet period**

The NPAC Service Providers will switch to the backup or disaster recovery machine as indicated in the notification.

## **2.5.3 Service providers connect to backup NPAC**

The Service Providers must use an alternate connection route to the backup NPAC and establish associations with the backup NPAC application.

## **2.5.4 Backup NPAC notifies Service Providers of application availability and end of cutover quiet period**

When the backup NPAC application and database are on-line, processes will proceed as normal. The backup NPAC application will be at the same version level as the primary NPAC application. The NPAC SMS database will also contain the same routing information as the primary database.

## **2.5.5 Service providers conduct business using backup NPAC**

The Service Provider should continue to process as normal when connected to the backup NPAC. If a Service Provider does use internal processes to request updates to SCPs while waiting to be able to send them to the backup machine, the Service Provider will still resend the updates when the backup NPAC can begin processing them in order to ensure that every Service Provider and the NPAC SMS receive the update.

## **2.5.6 Backup NPAC notifies Service Providers of switch to primary NPAC and start of cutover quiet period**

When the primary machine is brought back up, the backup NPAC will advise the Service Providers of the timing of their switch back to the primary machine. At this time the backup NPAC will stop taking updates.

## **2.5.7 Service providers reconnect to primary NPAC**

The Service Providers re-establish associations with the primary NPAC application using their normal connections.

## **2.5.8 Primary NPAC notifies Service Providers of availability and end of cutover quiet period**

When the primary NPAC is available, NPAC personnel will notify Service Providers of the end of the cutover quiet period.

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## 2.6 Service Order Cancellation Process

This flow defines the process performed when a Service Provider cancels a service order. The service order cancellation flow is shown in Appendix A, *Flow 2.6 Cancellation Process*, on page 11.

### 2.6.1 Service Provider issues service order cancellation

From the time both Service Providers have sent a valid notification of a new Subscription Version to the time the Subscription Version is activated, either Service Provider may send a message to the NPAC SMS to cancel the Subscription Version. If this occurs, the NPAC SMS will notify both Service Providers that the Subscription Version is in a cancel-pending state.

### 2.6.2 Service provider cancels an un-concurred Subscription Version

If a Service Provider issues a cancel on a Subscription Version that was created by that Service Provider and not concurred to by the other Service Provider involved in that port, or if the Subscription Version was initiated, then subsequently canceled by the NPAC, the Subscription Version will be canceled immediately and a notification will be sent to both Service Providers.

### 2.6.3 NPAC requests missing acknowledgment from Service Provider

When notified that a Subscription Version has been set to cancel-pending, both Service Providers must concur by returning a cancel-pending acknowledgment to the NPAC SMS within 18 hours [tunable parameter]. If the NPAC does not receive acknowledgment in the allowable time from one of the Service Providers, a request is sent to that Service Provider for a cancel-pending-acknowledgment. If the missing cancel-pending-acknowledgment is not received within a tunable time frame, the Subscription Version status is set to "conflict" if it is the new Service Provider that failed to acknowledge, but is set to cancel if the old Service Provider failed to acknowledge. In either case, the Cause Code is then set for the Subscription Version, and both Service Providers are then notified of the Subscription Version status change.

### 2.6.4 NPAC cancels the Subscription Version and notifies both Service Providers

When acknowledgment is received from both Service Providers, within the allowed time frame the NPAC SMS will set the Subscription Version to canceled in its database, update the Cause Code for the Subscription Version, and notify both Service Providers that the Subscription Version has been canceled. All canceled Subscription Versions are purged from the NPAC database after a tunable period.

## **2.7 Audit Request Process**

This process flow defines the activities performed by the NPAC when Service Providers request audits of LNP data. The audit request flow is shown in Appendix A, *Flow 2.7 Audit Process*, on page 12.

### **2.7.1 Service provider requests audit**

Any Service Provider can request an audit of another Service Provider's LSMS.

### **2.7.2 NPAC SMS issues queries to appropriate Service Providers**

Upon receipt of an audit request, the NPAC SMS queries the appropriate Service Provider's Local SMS databases.

### **2.7.3 NPAC SMS compares Subscription Version data**

The NPAC SMS compares its own Subscription Version data to the data it finds in the targeted Local SMS Subscription Version databases.

### **2.7.4 NPAC SMS updates appropriate Local SMS databases**

The NPAC SMS updates Subscription Version information in the appropriate Local SMS databases.

### **2.7.5 NPAC SMS sends report of audit discrepancies to requesting SOA**

### **2.7.6 NPAC SMS sends report of audit results to requesting SOA**

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## **2.8 Report Request Process**

This process flow defines the activities performed by the NPAC when the Service Providers request report generation and delivery. The report request flow is shown in Appendix A, *Flow 2.8 Report Process*, on page 12.

## **2.8.1 Service provider requests report**

## **2.8.2 NPAC SMS generates report**

## **2.8.3 Report delivered via NPAC Administrative or SOA Low-Tech Interface, Email, electronic file, fax, printer**

---

# **2.9 Data Administration Requests**

This section defines the activities performed by the NPAC when Service Providers make a manual request for data administration.

## **2.9.1 Service provider requests administration of data by NPAC personnel**

Service provider personnel are able to contact NPAC personnel to request data administration activities.

## **2.9.2 NPAC SMS personnel confirms user's privileges**

Before NPAC personnel fulfill the data administration request, they will confirm the user's privileges and validate the request.

## **2.9.3 NPAC SMS personnel inputs user's request**

Upon validation of the request, NPAC personnel will input the request.

## **2.9.4 NPAC SMS performs user's request**

The NPAC SMS processes the request.

## **2.9.5 NPAC SMS personnel logs request denial if user's privileges are not validated**

If the user's privileges are not confirmed, or the request cannot be validated, the NPAC personnel log the activity and end the process.

## 3. NPAC Data Administration

### 3.1 Overview

The NPAC SMS manages the ported TN information associated with Service Provider portability for the LNP service. This section describes the high level requirements associated with managing ported telephone numbers from an operations perspective. Figure 3-1 illustrates the logical data model associated with the data elements for the NPAC SMS, and the relationship between NPAC Customer data and other data tracked or created by the system.

#### AR3-1 Greenwich Mean Time

Specific time of day references in the Functional Requirements Specification are assumed to be in Greenwich Mean Time (GMT).

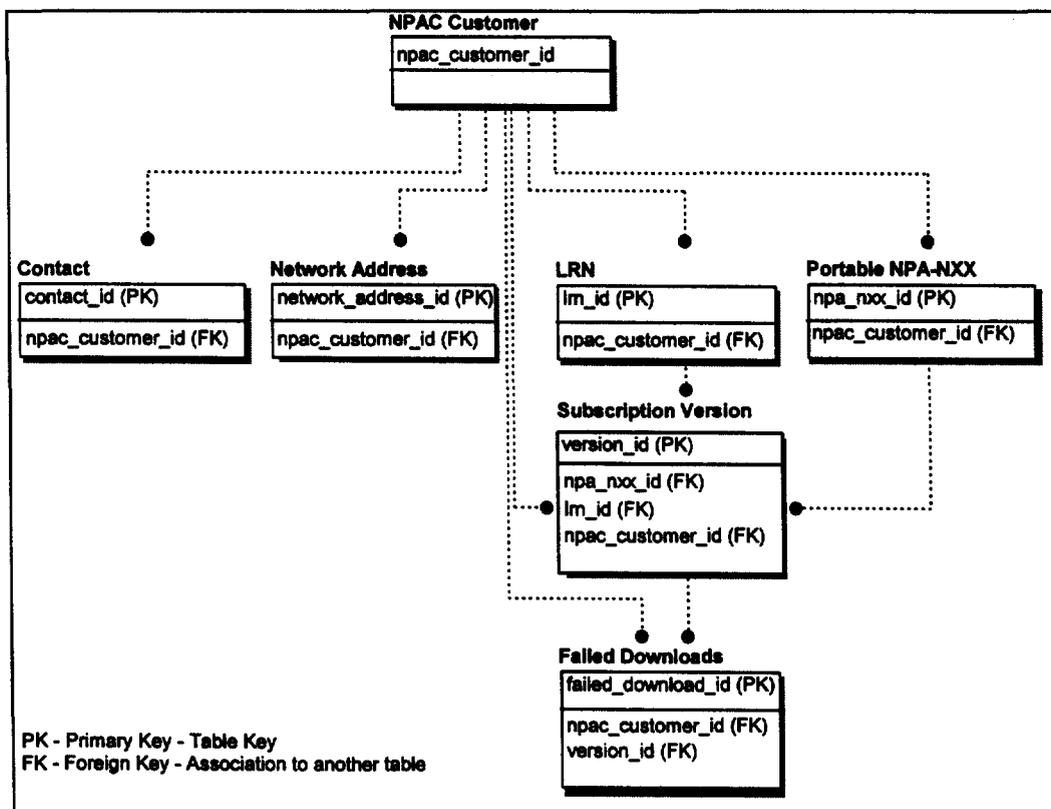


Figure 0-1 Entity Relationship Model

### 3.1.1 Data Type Legend

The following table describes the data types used in the data models.

DATA TYPE LEGEND	
Data Type	Description
Address	Network Address: raw binary data stored as unformatted bytes.
B	Boolean (True or False) indicator.
C	Character or Alphanumeric strings.
E	Enumeration.
M	Bit Mask comprised of one or more bytes.
N	Numeric data (up to 32 bit integer, numeric data that can be arithmetically manipulated).
N(x)	Character string of "x" digits only.
T	Timestamp: month, day, year, hour, minute, and seconds.
TN	Telephone Number: 3-digit NPA, 3-digit NXX, 4-digit Station Number.

Table 0-1 Data Type Legend

### 3.1.2 NPAC Customer Data

NPAC Customer Data contains information about NPAC customers participating in the LNP service. The data items that need to be administered by NPAC Customer Data Management are represented in Table 3-2, Table 3.3, and Table 3-4.

**NOTE:** A check in the "Required" column means that this attribute must exist in the record before the record is considered usable.

NPAC CUSTOMER DATA MODEL			
Attribute Name	Type (Size)	Required	Description
NPAC Customer ID	C (4)	√	An alphanumeric code which uniquely identifies an NPAC Customer.

NPAC CUSTOMER DATA MODEL			
Attribute Name	Type (Size)	Required	Description
NPAC Customer Name	C (40)	√	A unique NPAC Customer Name.
NPAC Customer Allowable Functions	M	√	Each bit in the mask represents a boolean indicator for the following functional options: <ul style="list-style-type: none"> <li>• SOA Management</li> <li>• SOA Network Data Management</li> <li>• LSMS Network Data Management</li> <li>• LSMS Data Download</li> <li>• LSMS Queries/Audits</li> </ul>

Table 0-2 NPAC Customer Data Model

NPAC CUSTOMER CONTACT DATA MODEL			
Attribute Name	Type (Size)	Required	Description
NPAC Customer Contact ID	N	√	A unique sequential number assigned upon creation of the Contact record.
NPAC Customer ID	C (4)	√	An alphanumeric code which uniquely identifies an NPAC Customer.
Contact Type	C (2)	√	The type of NPAC Customer Contact Organization. Valid values are: <ul style="list-style-type: none"> <li>• BI - Billing</li> <li>• CF - Conflict Resolution Interface</li> <li>• LI - Local SMS Interface</li> <li>• NC - NPAC Customer</li> <li>• NF - Network and Communications Facilities Interface</li> <li>• OP - Operations</li> <li>• RE - Repair Center Contact Organization</li> <li>• SE - Security</li> <li>• SI - SOA System Interface</li> <li>• UA - User Administration</li> <li>• WI - Web Interface</li> </ul>

## NPAC CUSTOMER CONTACT DATA MODEL

Attribute Name	Type (Size)	Required	Description
Contact	C (40)	√	Name of NPAC Customer Contact Organization.
Contact Address Line 1	C (40)	√	Contact Organization address Line 1.
Contact Address Line 2	C (40)	√	Contact Organization address Line 2.
Contact City	C (20)	√	Contact Organization city.
Contact State	C (2)	√	Contact Organization state.
Contact Zip	C (9)	√	Contact Organization zip code or postal code.
Contact Country	C (2)	√	Contact Organization country.
Contact Province	C (2)		Contact Organization province.
Contact Phone	TN	√	Contact Organization phone number.
Contact Fax	TN		Contact Organization Fax phone number.
Contact Pager	TN		Contact Organization Pager phone number.
Contact Pager PIN	C (10)		Contact Organization Pager Personal Identification Number (PIN).
Contact Email	C (60)		Contact Organization E-mail address.

Table 0-3 NPAC Customer Contact Data Model

## NPAC CUSTOMER NETWORK ADDRESS DATA MODEL

Attribute Name	Type (Size)	Required	Description
NPAC Customer Network Address ID	N	√	A unique sequential number assigned upon creation of the Network Address record.
NPAC Customer ID	C (4)	√	An alphanumeric code which uniquely identifies an NPAC Customer.
Network Address Type	C (1)	√	Type of Network Address. Valid values are: <ul style="list-style-type: none"> <li>• S - SOA interface</li> <li>• L - Local SMS interface</li> </ul>

NPAC CUSTOMER NETWORK ADDRESS DATA MODEL			
Attribute Name	Type (Size)	Required	Description
NSAP Address	Address (20)	√	OSI Network Service Access Point Address
TSAP Address	Address (4)		OSI Transport Service Access Point Address.
SSAP Address	Address (4)	√	OSI Session Service Access Point Address.
PSAP Address	Address (4)	√	OSI Presentation Service Access Point Address.
Internet Address	Address (12)		Internet address of the Service Provider Web interface.

Table 0-4 NPAC Customer Network Address Data Model

### 3.1.3 Subscription Version Data

Subscription Version Data consists of information about the ported TNs. The data items that need to be administered by Subscription Version Data Management functions are identified in Table 3-5:

SUBSCRIPTION VERSION DATA MODEL			
Attribute Name	Type (Size)	Required	Description
Version ID	N	√	A unique sequential number assigned upon creation of the Subscription Version.
LRN	TN	√	The LRN is an identifier for the switch on which portable NPA-NXXs reside.
Old Service Provider ID	C (4)	√	Old Service Provider ID.
New Service Provider ID	C (4)	√	New Service Provider ID.
TN	TN	√	Subscription Version telephone number.
Local Number Portability Type	E	√	Number Portability Type. Valid enumerated values are: <ul style="list-style-type: none"> <li>• LSSP - Local Service Provider Portability (0)</li> <li>• LISP - Local Intra-Service Provider Portability (1)</li> </ul>
Status	E	√	Status of the Subscription Version.  The default value is P for Pending.  Valid enumerated values are:

## SUBSCRIPTION VERSION DATA MODEL

Attribute Name	Type (Size)	Required	Description
			<ul style="list-style-type: none"> <li>• X - Conflict (0)</li> <li>• A - Active (1)</li> <li>• P - Pending (2)</li> <li>• S - Sending (3)</li> <li>• F - Failed (4)</li> <li>• PF - Partial Failure (5)</li> <li>• DP - Disconnect Pending (6)</li> <li>• O - Old (7)</li> <li>• C - Canceled (8)</li> <li>• CP - Cancel Pending (9)</li> </ul>
CLASS DPC	N (9)	√	DPC for 10-digit GTT for CLASS features.
CLASS SSN	N (3)	√	CLASS SSN for the Subscription Version.
LIDB DPC	N (9)	√	DPC for 10-digit GTT for LIDB features.
LIDB SSN	N (3)	√	LIDB SSN for the Subscription Version.
CNAM DPC	N (9)	√	DPC for 10-digit GTT for CNAM features.
CNAM SSN	N (3)	√	CNAM SSN for the Subscription Version.
ISVM DPC	N (9)	√	DPC for 10-digit GTT for ISVM features.
ISVM SSN	N (3)	√	ISVM SSN for the Subscription Version.
New Service Provider Due Date	T	√	The due date planned by the new Service Provider for Subscription Version Transfer.
Old Service Provider Due Date	T	√	The due date planned by the old Service Provider for Subscription Version Transfer.
Old Service Provider Authorization	B		A boolean indicator set by the old Service Provider to indicate authorization or denial of Transfer of Service for the Subscription Version to the new Service Provider.
New Service Provider Create Time Stamp	T		The date and time that the New Service Provider authorized Transfer of Service of the Subscription Version.
Old Service Provider Authorization Time	T		The date and time that the old Service Provider authorized Transfer of Service for the Subscription Version.