R3.3 Change Orders

Update: 0~~4~~7/29~~0~~/05

Apr '04: During the April 2004 APT meeting the group reviewed the fourteen change orders in the APT working document (focusing on the first eight change orders). Since there are additional change orders in the monthly change order summary document, it was agreed that a separate list should be provided of available change orders separate from the fourteen in the APT working document. That is the purpose of this working document.

Categorization/prioritization has NOT been factored into this list. That activity is scheduled to take place in a future LNPAWG meeting.

May '04: During the May 2004 LNPWG meeting, this document was reviewed. The group requested that the APT working document (14 change orders) be added to this document. Service Providers and Vendors should review this document and prepare any questions, as this document will be reviewed during the June 2004 LNPAWG meeting.

SOA/LSMS Vendors should also be prepared to provide a Level-of-Effort on each change order (High, Medium, Low).

The current plan for categorization/prioritization of change orders for the next release package will take place during the July 2004 LNPAWG meeting.

Jun '04: During the June 2004 LNPWG meeting, the change orders in this document were reviewed in three areas:

- NPAC Level-Of-Effort (High, Medium, Low)
- SOA/LSMS Level-Of-Effort (High, Medium, Low)
- Questions about the documented functionality

A second pass through the change orders was done to provide a consensus "*Toss or Keep*" on change orders that would be considered for ranking in the next release.

From the original matrix of 39 change orders, we're down to 31 change orders in consideration for the next release package. Seven were "*Tossed*" from consideration in the next release and will NOT be ranked. One change order was considered "*in the release*" based on direction from NANC (this is change order 375 – Prevent New Service Provider from Removing Conflict Status with Certain Cause Code Values), and will NOT be ranked. Another change order was considered on a "*separate SOW path*", and will be worked independent of this ranking effort (NANC 389 – Performance Test Bed). A new change order (NANC 394 – Consistent Behavior of Five-Day Waiting Period Between NPA-NXX-X Creation and Number Pool Block Activation, and Subscription Version Creation and its Activation) was added as a result of PIM 38, and is now part of the ranking process.

NeuStar provided additional feedback on several change orders based on an internal analysis effort:

- NANC 388 – Un-do a "Cancel-Pending" SV. Instead of the previously documented behavior that would include a new CMIP message (retract SV cancel), the recommendation is to extend the usage of the existing modify SV message to include the ability to modify the status from cancel-pending back to pending. Additional business rules and edits will be added to ensure that only the SP that issued the cancel request is now performing the "un-do" activity.
- NANC 390 – New Interface Confirmation Message – VERSUS – ILL 130 – Application Level Errors. Due to multiple reasons:
    - the extensive amount of changes,
    - the inability to use linked-replies on the new confirmation message from the NPAC,
    - the utilization of a new optional attribute on the existing CMIP messages,
    - the increased performance after the recently implemented technology migration of the NPAC SMS platform,

  the recommendation is to go back to using ILL 130 for enhanced error messaging, and only revisit the confirmation message approach if delayed response messaging becomes an issue. Qwest, the originator of NANC 390, wanted it to be documented that they did not submit 390 with the error code/text functionality, as is currently contained in this change order, so the trade-out addresses two areas of functionality.

This document has been updated. Service Providers should review this document and come prepared with a 1-through-31 ranking (1 is highest priority, 31 is lowest). The rankings of all SPs will be compiled during the July 2004 LNPAWG meeting.

Jul '04: During the July 2004 LNPWG meeting, the group performed a categorization/prioritization of change orders for the next release package. Results were compiled and an average was calculated based on the number of providers submitting a vote/ranking.

The group requested that NeuStar perform a rough estimate analysis prior to the August 2004 meeting in order to "draw a line" in the prioritized list of change order for an idea of changes that could be included in the next package.

The current plan is to discuss this proposed package of change orders during the August 2004 LNPAWG meeting.

Aug '04: During the August 2004 LNPWG meeting, the group discussed the change orders for the next release package. Additional change orders were added (see change bars throughout this document).

This proposed package of change orders will be discussed again during the September 2004 LNPAWG meeting.

M&P change assessment activity is currently being performed by NeuStar personnel.

Sep '04: During the September 2004 LNPWG meeting, the group discussed the change orders in this document. Minor changes have been made throughout this document (see change bars).

This proposed package of change orders will be discussed again during the October 2004 LNPAWG meeting, with the goal of obtaining group approval by the end of the meeting.

Oct '04: During the October 2004 LNPWG meeting, the group discussed the change orders in this document. Approval was obtained after the review. This is the updated version of the document, which will be submitted to the NAPM LLC for request of a Statement Of Work from NeuStar.

Additional comments were received after the October 2004 LNPAWG meeting. These have been incorporated into the 10/18/04 document.

Mar '05: As a result of NeuStar's system design activities, updates have been incorporated (see change bars):

1. NANC 351 – added change to RR6-65, to include SWIM recovery for NPBs. Added Action ID to each response, and expected behavior of sending the action ID on the subsequent request. SWIM and Action id are the only recovery ways for an SP to clear it's SWIM list. Added three new requirements to cover SP-specific tunables for both SOA and LSMS. Added three new requirements to cover NPAC tunable for SOA Max and LSMS Max.
2. NANC 151 – updated req 5, 8 to include AVC notifications. Updated req 7, 10, to change the default value of the TN Attribute Flag Indicator from TRUE to FALSE.
3. NANC 138 – added change to GDMO behavior in cause code attribute (#103) to be consistent with description in FRS.
4. NANC 388 – deleted reqs 4, 6. Existing requirements already cover this restriction (R5-29.4 – Modify Subscription Version - Originating Service Provider Validation).

5. NANC 352 – corrected req 9 to indicate a "service-provider-ID" and not a range. Updated ServiceProviderType to an optional attribute on a SPID recovery response.
6. NANC 383 – deleted req 4. This restriction is too limiting to a Service Provider's SOA. Updated req 9, as it was inconsistent with the documented behavior of NANC 386. New description indicates "accepts" (rather than "rejects") a new association bind request from a SOA.
7. NANC 357 – updated table description to remove "future-use" option. Added new req to cover BDD support of the SP Type field based on SP-specific tunable. Added new req to cover query support of the SP Type field based on SP-specific tunable.
8. NANC 285 – deleted req 4, 5, 6, regional tunable no longer needed. Added three new requirements to cover SP-specific tunables for both SOA and LSMS. Clarified current NPAC behavior.
9. NANC 394 – updated reqs, IIS flows, and GDMO behavior for clarity and understanding on the five-day restriction interval. Added three new requirements to cover NPAC tunable for enabling 394 functionality.
10. NANC 347 – updated reqs, deleted reqs for the range activity. Will use existing range activity timer tunable. Clarified difference between abort behavior and rollup behavior. Clarified current range behavior.

Apr '05: More updates based on NeuStar's System Design and Detailed Design activities.

1. NANC 351 – added change to SWIM recovery response to include error-code and stop-time.
2. NANC 368 – changed default low-water mark from 10 to 75.
3. ILL 130 – req number corrections.
4. NANC 394 – updated reqs references and IIS flow references on changes. Updated GDMO behavior description to incorporate NPA-NXX Live Timestamp, which clarified the behavior under the five-day delay rule.
5. NANC 151 – updated GDMO section to reflect what's in the current GDMO document.
6. NANC 375 – updated req 2 to remove ambiguity between restriction window and tunable application.
7. NANC 299 – updated GDMO behavior text to remove description of prioritization of messages. This is N/A since this heartbeat will only be going across an idle association.
8. NANC 388 – updated reqs to add a region tunable for this functionality. Added a new flow for the un-do of a cancel-pending SV.
9. NANC 347 – reinstated reqs for SV ranges, as the current tunable was not defined in the FRS.
10. NANC 348 – added update for existing req RR3-223.
11. NANC 385 – updated description to reflect start and end maintenance time, rather than a number of additional minutes (i.e., let the software calculate the additional minutes).

Also, added note about the obsolete text that is documented for historical purposes, but is not part of the planned implementation (and therefore could be confusing to the reader).

May '05: More updates based on NeuStar's Detailed Design activities, and industry feedback.

1. NANC 351 – Consistency between actual GDMO and definition in this change order.
2. NANC 138 – Correction to Note as discussed during LNPAWG meeting.
3. NANC 299 – Consistency between actual GDMO and definition in this change order.
4. NANC 388 – Requirements wording clarifications.

Jul '05: More updates based on industry feedback.

1. ILL 130 – New requirements for a separate SP tunable based on discussion of including both ACTIONs and other CMIP primitives (non-ACTIONs).
2. NANC 138 –Added three new requirements to cover NPAC tunable for automatic cause code.
3. NANC 394 – Modified an existing req to account for the suppression of a first port notification as a result of an NPA Split, where there was activity previous activity in the Old NPA.
4. NANC 368 – Modified an existing req to change the default value of the tunable (from 10 to 75).
5. NANC 348 – Modified an existing req to correct typo, and reflect proper sort order.
6. NANC 352 – Combined two existing reqs to reflect correct selection criteria.

Change Order Summary Matrix

LEGEND:

Ranking = Priority ranking by the LNPAWG during the Jul '04 meeting. ~~"Toss" indicates that the change order did not make it through the initial "Toss/Keep" ranking, and is not under consideration for the next release package. Strikethrough was also done to indicate removal. NANC 375 (Mandatory) should NOT be ranked, as this will already be included. NANC 389 (Separate SOW path) also should NOT be ranked, as it's on a separate SOW effort.~~

APT = "*" indicates strongly recommended by the Architecture Team. Had higher ranking by the APT during priority effort for the fourteen Change Orders worked in the APT. Other APT Change Orders do not merit any special consideration.

Change Order = Assigned Change Order Number

Title = Name of Change Order

Benefits = Brief description of Change Order benefits

NPAC LOE = NPAC Development Level Of Effort (High, Medium, Low)

SOA LOE = SOA Development Level Of Effort (High, Medium, Low)

LSMS LOE = LSMS Development Level Of Effort (High, Medium, Low)

Ranking	APT	Change Order	Title	Benefits	NPAC LOE	SOA LOE	LSMS LOE
Mandatory		NANC 375	Prevent New Service Provider from Removing Conflict Status with Certain Cause Code Values	Alleviates inadvertent porting under certain missing LSR/FOC and WPR/ WPRR situations	Low	Low	N/A
1 (5.67)	*	NANC 351	Recovery Enhancements – SWIM Recovery	NPAC tracking of unsuccessful messages, recovery of previously unsuccessful messages	High	High	High
2 (7.25)	*	NANC 368	Out-Bound Flow Control	Fewer problems with congestion, fewer partial failures, more efficient message buffer management	Low	Med-High	Med-High

Ranking	APT	Change Order	Title	Benefits	NPAC LOE	SOA LOE	LSMS LOE
3 (7.45)	*	NANC 388	Un-do a "Cancel-Pending" SV	"Un-cancel" a cancel-pending SV by the Service Provider that originally sent the cancel	Low	Low-Med	N/A
4 (7.50)	*	NANC 347/350	CMIP Interface Enhancements – abort behavior	Fewer partial failures, less time in recovery	Med	Low	Low
5 (7.83)	*	NANC 348	BDD for Notifications	Notifications based on date/time range, useful for notification recovery, completes BDD functionality	Med	Med	Med
6 (7.92)	*	NANC 393	NPAC Performance Requirements	NPAC processing capabilities to meet performance levels defined in the NFG	High	Low-High	Low-High
7 (8.31)		NANC 321	Regional NPAC NPA Edit of Service Provider Network Data – NPA-NXX Data	Better data integrity on NPA-NXXs residing in the correct NPAC region	Med	N/A	N/A
8 (8.75)		NANC 227/254	Exclusion of Service Provider from an SV's Failed SP List	Ability to perform subsequent SV activity when a failed SP list exists, by doing a fake "resend" to the failed LSMS, which will remove the SP from the failed list	Med	N/A	Low
9 (9.75)	*	NANC 385	Timer Calculation – Maintenance Window Timer Behavior	Allow NPAC Maintenance Windows to be entered as "downtime", timer expiration calculation uses these entries, provides accurate timer expiration when Maintenance Window overlaps business hours	Med	N/A	N/A
10 (10.62)		NANC 299	NPAC Monitoring of SOA and LSMS Associations via Heartbeat	Additional method of detecting a downed/missing association, through the use of an Application level heartbeat message	Med	Med-High	Med-High
11 (12.50)		ILL 130	Application Level Errors	Enhanced error messages, English-like text	High	High	High
12 (13.64)		NANC 394	Consistent Behavior of Five-Day Waiting Period Between NPA-NXX-X Creation and Number Pool Block Activation, and Subscription Version Creation and its Activation	More efficient NPAC processing capabilities, removal of the five-day waiting period between NPA-NXX-X Creation and Number Pool Block Activation, and SV Creation and Activation, only in situations where the first port notification had previously been sent out for an SV or a different NPB	Med	TBD	N/A

Ranking	APT	Change Order	Title	Benefits	NPAC LOE	SOA LOE	LSMS LOE
13 (14.00)		NANC 300	Resend Exclusion for Number Pooling	(same as 227/254, but for NPBs) Ability to perform subsequent NPB activity when a failed SP list exists, by doing a fake "resend" to the failed LSMS, which will remove the SP from the failed list	Med	Med-Low	Med-Low
14 (14.27)		NANC 352	Recovery Enhancements – Recovery of SPID	Provides recovery of SPID data, completes recovery functionality	Med	Med-Low	Med-Low
15 (15.45)	*	NANC 383	Separate SOA Channel for Notifications	Notifications don't contend with other SOA requests/responses, better throughput	Med	Med	N/A
16 (15.83)		NANC 151	TN and Number Pool Block Addition to Notification	TN and NPB values included in notifications sent from the NPAC	Low	High	N/A
17 (16.36)		NANC 138	Definition of Cause Code	Distinct Conflict Cause Code when SV goes into conflict as a result of a cancel request	Low	Low	N/A
Additional change orders added during the Aug '04 LNPAWG meeting are listed below.							
25 (20.75)		NANC 386	Single Association for SOA/LSMS	Closes a requirements gap that allows multiple associations from the same provider (same bit mask)	Low	Low	Low
20 (17.83)		NANC 357	Unique Identifiers for wireline versus wireless carriers (long term solution)	SP attribute that indicates SP type, rather than the current interim solution that appends an indicator at the end of the SP name	Low	Med-Low	Med
22 (19.92)		NANC 358	Change for ASN.1: Change SPID Definition	Consistent definition/characteristics of the NPAC's SPID attribute to be in line with the OCN (Operating Company Number) definition at OBF	Low	Low	Low

Ranking	APT	Change Order	Title	Benefits	NPAC LOE	SOA LOE	LSMS LOE
23 (20.55)		NANC 346	GDMO Change to Number Pool Block Data Managed Object Class (Section 29.0) and Documentation Change to Subscription Version Managed Object Class (Section 20.0)	Resolves an error in the current GDMO where the activation timestamp was not replaceable (for SVs, it's defined as replaceable, and the text behavior is modified to reflect this as well).	N/A	Low	Low
26 (21.18)		NANC 392	Removal of Cloned Copies of SVs and NPBs	Removal of un-needed copies of SVs and NPBs (this is non-broadcast data).	Med	N/A	N/A
19 (17.08)		NANC 285	SOA/LSMS Requested Subscription Version Query Max Size	Allows a requesting SOA/LSMS to retrieve more data than the maximum size using a "*send me more*" request, similar to the NPAC GUI's "More" button	Low	Med-High	Med-High

Table of Contents

Backwards Compatibility Definition

There are two areas of Backwards Compatibility. These are defined below:

- Pure Backwards Compatibility – implies that interface specification has NOT been modified and therefore, no recompile is necessary. Also, no behavior on the NPAC SMS has been modified to provide any change to the previously existing functionality accessible over the interface.
- Functional Backwards Compatibility – implies that the interface may have been modified, however the changes are such that only a recompile is necessary to remain backward compatible. Any new functionality is optionally implemented by accessing the newly defined features over the interface. Also, no changes may be made to any existing interface functionality that will require modifications to SOA and/or LSMS platforms.

The general guideline is that subsequent releases of a major release (e.g., 2.0, 2.1, 2.1.1, etc.) must support Pure Backward Compatibility. Also, major releases should support at least one version of Functional Backward Compatibility (i.e., R3.0 should be Functional Backward Compatible to R2.0). The objective is that all releases remain Functional Backwards Compatible, if possible.

Origination Date: 11/27/02 (resubmitted: 12/31/03)

Originator: Verizon

Change Order Number: NANC 375

Description: Prevent New Service Provider from Removing Conflict Status with Certain Cause Code Values

Cumulative SP Priority, Weighted Average: Mandatory

Functional Backwards Compatible: NO

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y	Y	Y		Low	Low	N/A

Business Need:

Customers have been taken out of service inadvertently because the New Service Provider fails to resolve the Conflict indicated by the Old Service Provider and instead ports the customer at the expiration of the conflict resolution window timer.

When the Old Service Provider receives a SOA notification from NPAC that another service provider has issued a CREATE message to NPAC in order to schedule a port-in of the Old Service Provider's customer, the Old Service Provider checks to see that a matching Local Service Request (LSR) or Wireless Port Request (WPR) has been received from the New Service Provider regarding that specific TN. If no matching LSR or WPR is found, the Old Service Provider may place the port into Conflict status with a Cause Value set to "LSR Not Received" (Cause Value 50). In some instances, the New Service Provider is waiting for the 6 hour Conflict Resolution New Service Provider Restriction Tunable Parameter timer to expire, and is proceeding with porting the number. This has led to a number of customers being inadvertently ported and taken out of service from a terminating call perspective because the wrong TN was entered in the original CREATE message sent by the New Service Provider to NPAC.

This proposed Change Order, as did PIM 22 accepted by the LNPA, seeks to prevent instances where customers are taken out of service inadvertently because the New Service Provider continues with a port that had been placed into Conflict by the Old Service Provider. In these cases, the port was placed into Conflict Status by the Old Service Provider because of indications that the New Service Provider may be porting the wrong TNs.

Jun '04 LNPAWG, in order to track Old Service Provider usage of this new feature, it has been requested that a new report be added.

Description of Change:

The current Cause Values indicating why the Old Service Provider has placed a port into Conflict are as follows (NANC 391 documentation-related updates in blue):

50 – LSR/WPR Not Received
51 – Initial Confirming FOC/WPRR Not Issued
52 - Due Date Mismatch
53 - Vacant Number Port
54 – General Conflict

This Change Order proposes that the LNPA revisit the philosophy that led to enabling the New Service Provider to remove a Subscription Version from Conflict status after a specified period of time without first resolving the original conflict with the Old Service Provider. NPAC requirements and functionality should be modified such that only the Old Service Provider is able to remove Conflict status and move a Subscription Version to Pending status when the Conflict Cause Value is set to 50, which signifies that the Old Service Provider has not received a matching Local Service Request (LSR) or Wireless Porting Request (WPR) for the telephone number received in the New Service Provider CREATE notification from NPAC, or when the Conflict Cause Value is set to 51 (Firm Order Confirmation or Wireless Port Request Response not issued).

Subscription Versions should be placed into Conflict with a Cause Value set to 50 only when the Old Service Provider cannot match an LSR or WPR with the New Service Provider CREATE notification and is reasonably confident that the wrong number is about to be ported. Also, Subscription Versions should be placed into Conflict with a Cause Value set to 51 only when the Old Service Provider has a legitimate reason for withholding the Firm Order Confirmation. A Cause Value of 50 or 51 should not be used in lieu of any other appropriate Conflict Cause Value in order to inappropriately prevent the New Service Provider's ability to remove Conflict status.

Apr '04 LNPAWG, the group discussed this change order, and agreed to the following:

- No conflict timer will be associated for Cause Code Values 50 and 51.
- Only the Old Service Provider can remove Conflict on Cause Code Values 50 and 51.
- Housekeeping is business as usual.
- SVs remaining in Conflict longer than 30 days will be removed.

Requirements:

Req 1 Conflict Resolution Subscription Version – Restriction for Cause Code Values

NPAC SMS shall restrict the resolution of a Subscription Version with a status of conflict and a cause code value of 50 or 51, to only allow resolution by the Old Service Provider.

Req 2 Conflict Resolution Subscription Version –Conflict Resolution New Service Provider Restriction Tunable Application

NPAC SMS shall apply the Conflict Resolution New Service Provider Restriction Tunable only for a Subscription Version with a status of conflict and a cause code value NOT EQUAL TO 50 or 51.

Req 3 Conflict Resolution Subscription Version – Restricted Cause Code Notification

NPAC SMS shall send an error message to the New Service Provider if the Subscription Version status is conflict AND the cause code value is 50 or 51, upon attempting to set the Subscription Version to pending.

Req 4 Logging Cause code usage by SPID Reporting

NPAC SMS shall log the following information when an Old Service Provider places a Subscription Version into conflict: date, time, New SPID, Old SPID, cause code value.

Req 5 Cause Code Usage Log Report via OpGUI

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to generate the Cause Code Usage Log Report on cause code usage log data for conflict situations.

Req 6 Cause Code Usage Log Report Monthly Generation

NPAC SMS shall produce a monthly Cause Code Usage Log Report on cause code usage log data for conflict situations.

Req 7 Cause Code Usage Log Report Sort Criteria

NPAC SMS shall separate out the Cause Code Usage Log Report into two sections when generating the Cause Code Usage Log Report on cause code usage log data for conflict situations. The first section will use sort criteria of Old SPID (primary) and New SPID (secondary), the second section will reverse the order and use sort criteria of New SPID (primary) and Old SPID (secondary).

Req 8 Cause Code Usage Log Report Selection Criteria

NPAC SMS shall use selection criteria of month and year when generating the Cause Code Usage Log Report on cause code usage log data for conflict situations.

Req 9 Cause Code Usage Log Report Display

NPAC SMS shall display the Cause Code Usage Log Report data with headers as specified in the example below. A page break will separate out every change of SPID that is in the primary sort.

Cause Code Usage Log Report for July 2004

Old SPID: 1111

New SPID	**# of Conflicts**	**Cause 50, 51**	**% 50, 51**
2222	10	4	40%
3333	20	16	80%

4444	25	5	20%

<page break>

Old SPID: 1200

New SPID	# of Conflicts	Cause 50, 51	% 50, 51
2222	1	1	100%
3333	2	1	50%
4444	1	0	0%

End of Old SPID sort order.

<page break>

Cause Code Usage Log Report for July 2004

New SPID: 1111

Old SPID	# of Conflicts	Cause 50, 51	% 50, 51
2222	50	20	40%
3333	2	0	0%
4444	3	2	67%

End of New SPID sort order.

Req 10 – Regional Prevent Conflict Resolution 50/51 Tunable

NPAC SMS shall provide a Regional Prevent Conflict Resolution 50/51 tunable parameter which is defined as an indicator on whether or not the prevention of conflict resolution for cause codes 50 or 51 by the New Service Provider is supported by the NPAC SMS for a particular NPAC Region.

Req 11 – Regional Prevent Conflict Resolution 50/51 Tunable Default

NPAC SMS shall default the Regional Prevent Conflict Resolution 50/51 tunable parameter to TRUE.

Req 12 – Regional Prevent Conflict Resolution 50/51 Tunable Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Regional Prevent Conflict Resolution 50/51 tunable parameter.

RX9-6 Log File Reports

NPAC SMS shall support the following log file reports for NPAC personnel using the NPAC Administrative Interface:

22. History Report
23. Error Report
24. Service Provider Notification Report
25. Subscription Transaction Report
26. Service Provider Administration Report
27. Subscription Administration Report
28. Cause Code Usage Log Report

IIS

Minor text changes to flow B.5.5.2 (Subscription Version Conflict Removal by the New Service Provider SOA) to indicate that an error will be returned for an SV with a Cause Code of 50 or 51, when an attempt is made to remove the conflict.

A subscription version exists on the NPAC SMS with a status of conflict.

The new service provider SOA personnel take action to remove the subscription version from conflict.

1. The new service provider SOA sends the M-ACTION subscriptionVersionNewSP-RemoveFromConflict specifying the subscription version TN or subscription version ID of the subscription version in conflict.
2. If the request is valid, the NPAC SMS will set the status to “pending”.
   The request will be denied and an error returned if the subscriptionOldSP-Authorization was set to conflict by the old service provider and the conflict restriction window has not expired. The request will also be denied and

an error returned if the subscriptionOldSP-Authorization was set to conflict by the old service provider with cause code values of 50 or 51, regardless of the conflict restriction window.

GDMO

Behavior text changes to indicate that an error will be returned to the New Service Provider for an SV with a Cause Code of 50 or 51, when an attempt is made to remove the conflict.

Behavior text changes to indicate that only the Old Service Provider can change the status of an SV that is in conflict, when the Cause Code values are either 50 or 51. This is accomplished via a modify-pending request.

```
subscriptionVersionRemoveFromConflictBehavior BEHAVIOUR
    DEFINED AS !
      When a Subscription Version is in a conflict status , with Cause Code values of
50 or 51, then only the Old Service Provider can send a RemoveFromConflict Action  to
the NPAC to change from a conflict status back to a pending status.  The NPAC verifies
that the Old Service Provider is sending the modify message to the NPAC (otherwise
return an error).
```

ASN.1

No change required.

Origination Date: 4/12/02

Originator: NeuStar

Change Order Number: NANC 351

Description: Recovery Enhancements – SWIM Recovery

Cumulative SP Priority, Weighted Average: 1, (5.67)

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y	Y	Y	Y	High	High	High

Business Need:

The NPAC SMS and Service Provider SOA/LSMS exchange messages and a response is required for each message. The current NPAC architecture requires a response to every message within a 15-minute window, or the requestor will abort the association.

If a Service Provider fails to respond to an NPAC message, the NPAC aborts that specific association and the Service Provider must re-associate in recovery mode, request a "best guess" time range of missed messages from the NPAC, receive and process all missed messages, then start processing in normal mode until they are totally caught up with the backlog of messages.

One problem of the current "best guess" approach is the trial-and-error recovery processing that a Service Provider must perform in certain circumstances (e.g., when there is too much data to send in a response to a single request). This can create unnecessary workload on both the NPAC and the Service Provider.

A better method is to implement the *"Send What I Missed"* approach (SWIM). Service Providers can optionally use this new message to perform the recovery function. This improves the efficiency of recovery processing for the NPAC and Service Providers because guesswork is eliminated.

Description of Change:

Create a new process that incorporates the ability for a Service Provider to request that the NPAC send *missed* messages. In order to accomplish this, the NPAC will need to keep track of messages that were both "*not sent*" and "*not responded to*" from the NPAC to the SOA/LSMS.

The behavior of the *"Send What I Missed"* recovery request (SWIM), which will be initiated by a SOA/LSMS, is the same as the current recovery process (i.e., request from the SP, response from the NPAC includes the recoverable data). The implementation would use the existing recovery message, and incorporate a new attribute (SWIM, to go along with time range). When this is received, the NPAC would send back a SWIM Response, which contains the *missed*

messages. With the new SWIM attribute, the NPAC would use the same Blocking Factor tunables as used in 187-Linked Replies in order to send data to the SOA/LSMS in "chunks".

Major points/processing flow/high-level requirements:

1) This recovery enhancement will use the current recovery process and ASN.1 definitions. Any exceptions will be noted.
2) This recovery enhancement will implement a new download criteria/parameter in the current recovery ACTION messages (lnpDownload, lnpNotificationRecovery). Both of these are optional functionality.
   a) Add a new *Send What I Missed* criteria (SWIM). This new criteria is initiated by a recovering SOA/LSMS, and allows for the recovery of network, subscription, number pool block, and notification data. The NPAC will reply back to the originating SOA/LSMS with the missed data, by using linked replies. This message can only be sent when the SOA/LSMS is in recovery.
   b) The recovering SP will be required to submit SWIM requests for the different types of data, e.g., SWIM for network data, then SWIM for SV data, then SWIM for notification data.
   c) An action ID will be added. This will be generated by the NPAC and sent in the SWIM response linked replies for each data type. Upon completion of each type of data, the requesting SOA/LSMS will respond back with the action ID (for each type of data, using an ACTION with the action ID corresponding to the request for that data type). Upon receipt, the NPAC will remove the SP from the failed list and the "missed" list.
      May '03 – Action ID is an optional attribute in the linked replies. When used in SWIM recovery, it will be sent in the last message with data for that data type (then followed by an empty reply). A separate M-EVENT-REPORT will be sent back by the SP with the Action ID for that data type to indicate the replies were successfully processed. This is similar to the current behavior for range activates.
      Feb '05 – Action ID will be added to every request. The requesting system should leave this blank/absent in the first request. Any subsequent requests for the same data type should include the action ID that was provided in the response to the previous request. The separate action IDs allow the clearing of messages from the SWIM list on an intermediate basis, rather than waiting until the end. It is only through SWIM recovery and the Action ID where the SWIM list will be cleared.
3) No reports are required for this recovery enhancement.
4) NPAC regional tunables.
   a) For SWIM requests, the existing 187 Blocking Factor and Maximum tunables will be used by the requesting SOA/LSMS.
   b) Two new "SWIM Maximum" tunables (one for SOA, one for LSMS) will be added that will allow a larger number of missed messages than the current 187 Maximum. However, these will need to be recovered in separate requests. A new M&P will be added to inform an SP when they reach 80% (tunable value) of this SWIM Maximum.
      May '03 – In the scenario where a SOA/LSMS reaches the maximum ("crit-too-large"

msg), the NPAC would clear out the list, and set some indicator that they can't recover using this mechanism anymore. Additionally, have functionality to be able to reset the collection mechanism, and start capturing missed messages again.
Move this to regular working group.
Next month start on reqs for fleshing out the mechanism to drill down into this.

c) A new "continuation" indicator will be added to the 187 functionality to inform the requesting SOA/LSMS that they exceeded the 187 maximums and need to perform an additional request(s).

5) Two new SP profile flags (SOA, LSMS) are added to define whether or not an SP supports the SWIM message set. Once the flag is set to TRUE, history data will be stored that allows for the implementation of SWIM.

6) Service Providers can continue to use the existing recovery mechanism/messages (lnpDownload, lnpNotificationRecovery) to recover missed data between the SOA/LSMS and the NPAC, using the current Time Range or TN Range criteria.

The NPAC will keep track of messages destined for a SOA/LSMS that were NOT successfully responded to by the SOA/LSMS, once the SP Profile Flag is set to TRUE, and as long as it remains TRUE. If modified from TRUE to FALSE, the NPAC will no longer maintain a "missed messages" list for that SOA/LSMS.

7) SOA/LSMS associates to the NPAC and uses SWIM criteria. The NPAC:

   a) Determines the messages missed by the requesting SOA/LSMS

   b) Uses SP Profile flags for ranges, notification types, EDR

   c) Applies appropriate NPA-NXX filters

   d) Packages up and sends the maximum data given the different variables and tunable settings (NPAC SWIM Response to SOA/LSMS Recovery Request message). The recovering SOA/LSMS processes each SWIM Response message (separate messages by type of data, and possibly multiple messages for any given type of data). This process continues until all missed data has been sent to the requesting SOA/LSMS.

   e) Updates status/failed SP list, and sends notifications to SOAs

8) Upon completion of recovery, SOA/LSMS sends an lnpRecoveryComplete message (current functionality) indicating the end of the missed data. At this point in time, processing between SOA/LSMS and NPAC continues in normal mode.

9) If implemented in conjunction with or after NANC 352 (Recovery of SPID), then that functionality will also be included in this change order.

Note: If NANC 352 is implemented at the same as this change order, changes will need to be made to this documented functionality to support SWIM recovery of SPID data.

Requirements:

Modify section 1.2.13 Recovery Functionality to incorporate SWIM functionality.

Modified Requirements:

RR6-43 Network Data Recovery – Network Data Criteria

NPAC SMS shall support the following choices for network data download criteria:

- ~~Time-range (optional)~~
- Single Service Provider or all Service Providers ~~(required)~~ with optional time range
- SWIM (**S**end **W**hat **I** **M**issed)

RR6-58 Subscription Data Recovery – Subscription Data Choices

NPAC SMS shall require an LSMS to specify one of the following choices in a subscription data recovery request:

- time-range
- TN
- TN-range (NPA-NXX-XXXX) – (YYYY)
- SWIM (**S**end **W**hat **I** **M**issed)

RR6-65 Number Pool Block Holder Information Resynchronization – Block Criteria

NPAC SMS shall accept criteria for Block data, of either Time Range in GMT, ~~or~~ Block Range entry fields, or SWIM, where the Time Range in GMT includes the starting time in GMT and ending time in GMT based on the Activation Start Timestamp/Disconnect Broadcast Timestamp/Modify Broadcast Timestamp, and the Block Range includes the starting Block and ending Block. (Previously B-691)

Note: If the Block Range was 303-242-2 through 303-355-6, the range would contain all Blocks within the TN Range of 303-242-2000 through 303-355-6999.

New Requirements:

Req 0.5 Notification Recovery – Notification Data Criteria

NPAC SMS shall require a SOA/LSMS to specify one of the following choices for notification data recovery criteria:

- Time-range
- SWIM (**S**end **W**hat **I** **M**issed)

Req 1 – SWIM Recovery Tracking

NPAC SMS shall provide functionality that tracks messages not sent to, and acknowledged by, a Service Provider SOA/LSMS for SWIM Recovery purposes.

Req 2 – Service Provider SOA SWIM Recovery Indicator

NPAC SMS shall provide a Service Provider SWIM Recovery Indicator tunable parameter which defines whether a SOA supports SWIM recovery.

Req 3 – Service Provider SOA SWIM Recovery Indicator Default

NPAC SMS shall default the Service Provider SOA SWIM Recovery Indicator tunable parameter to FALSE.

Req 4 – Service Provider SOA SWIM Recovery Indicator Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Service Provider SOA SWIM Recovery Indicator tunable parameter.

Req 5 – SOA SWIM Maximum Tunable

NPAC SMS shall provide a SOA SWIM Maximum tunable parameter which is defined as the maximum number of messages that will be stored by the NPAC for Service Providers that support SWIM recovery.

Req 6 – SOA SWIM Maximum Tunable Default

NPAC SMS shall default the SOA SWIM Maximum tunable parameter to 50,000.

Req 7 – SOA SWIM Maximum Tunable Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the SOA SWIM Maximum tunable parameter.

Req 8 – Service Provider LSMS SWIM Recovery Indicator

NPAC SMS shall provide a Service Provider SWIM Recovery Indicator tunable parameter which defines whether an LSMS supports SWIM recovery.

Req 9 – Service Provider LSMS SWIM Recovery Indicator Default

NPAC SMS shall default the Service Provider LSMS SWIM Recovery Indicator tunable parameter to FALSE.

Req 10 – Service Provider LSMS SWIM Recovery Indicator Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Service Provider LSMS SWIM Recovery Indicator tunable parameter.

Req 11 – LSMS SWIM Maximum Tunable

NPAC SMS shall provide an LSMS SWIM Maximum tunable parameter which is defined as the maximum number of messages that will be stored by the NPAC for Service Providers that support SWIM recovery.

Req 12 – LSMS SWIM Maximum Tunable Default

NPAC SMS shall default the LSMS SWIM Maximum tunable parameter to 50,000.

Req 13 – LSMS SWIM Maximum Tunable Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the LSMS SWIM Maximum tunable parameter.

Add new tunables to Appendix C.
Name = SOA SWIM Maximum
Default Value = 50,000
Units = Objects
Valid Range = 10,000-100,000.

Name = LSMS SWIM Maximum
Default Value = 50,000
Units = Objects
Valid Range = 10,000-100,000.

IIS

Modify section 5.3.4 Recovery to incorporate SWIM functionality. Add the behavior description listed in this change order (Major points/processing flows/high-level requirements).

GDMO

```
lnpDownloadBehavior BEHAVIOUR

    DEFINED AS !

          Downloading data using the SWIM criteria

           A Service Provider might request that the NPAC send missed
messages.  In order to accomplish this, the NPAC keeps track of messages that
were either not sent and/or not responded to from the NPAC to the SOA/LSMS, or
not responded to from the SOA/LSMS back to the NPAC.


The Send What I Missed (SWIM) functionality in the lnpDownload message allows
for the recovery of these missed messages.  If there is data to be recovered,
the NPAC sends back a reply to the lnpDownload action which contains the
missed messages using linked replies.  An action ID is generated by the NPAC
and is added in the last SWIM response linked repliesreply.  Upon receiving
the empty ACTION response, For each ACTION response, the requesting SOA/LSMS
must respond back with the action ID in the next lnpDownload action.  This
indicates the replies were successfully processed, and the NPAC removes the
messages associated with the previous ACTION response from the missed list for
the associated type of data.  For the last ACTION response for each type of
data, the requesting SOA/LSMS must respond back with the action ID –by sending
a separate M-EVENT-REPORT to indicate the replies for each that type of data
were successfully processed (SOA/LSMS sends swimProcessing-RecoveryResults
NOTIFICATION). Upon receipt, the NPAC removes clears the Service Provider's
from missed message list for that type of data and the failed list and the
missed list.  In the case where the Service Provider's SWIM indicator was
changed from ON to OFF (SOA SWIM Recovery Indicator, LSMS SWIM Recovery
```

Indicator), the SwimProcessing-RecoveryResponse will include a stop-date, which indicates the time of the last SWIM entry onto the SWIM list.

!;

lnpNotificationRecoveryBehavior BEHAVIOUR

DEFINED AS !

Recovery of Notifications Using The SWIM criteria

A Service Provider might request that the NPAC send *missed* notifications. In order to accomplish this, the NPAC keeps track of notifications that were ~~both~~ either *not sent* and *not responded to* from the NPAC to the SOA/LSMS, and *not responded to* from the SOA/LSMS back to the NPAC.

In order to use the notification recovery reply functionality, the Service Provider needs to provide a time range. The sequence should include a startTime and stopTime, as well as the SWIM ~~indicator~~criteria of notification-download. The startTime and stopTime will be ignored.

The Send What I Missed (SWIM) functionality in the lnpNotificationRecovery message allows for the recovery of these missed messages. If there is data to be recovered, the NPAC sends back a reply to the lnpNotificationRecovery action which contains the missed messages using linked replies. An action ID is generated by the NPAC and is added in the ~~last~~ SWIM ~~reply~~ response linked replies. For each ACTION response, the requesting SOA/LSMS must respond back with the action ID in the next lnpNotificationRecovery action. This indicates the replies were successfully processed, and the NPAC removes the messages associated with the previous ACTION response from the missed list. For ~~Upon receiving~~ the ~~empty~~ last ACTION response, the requesting SOA/LSMS must respond back with the action ID by sending a separate M-EVENT-REPORT to indicate the replies were successfully processed (SOA/LSMS sends swimProcessing-RecoveryResults NOTIFICATION). ~~This is similar to the behavior for range activates by LSMS.~~ Upon receipt, the NPAC ~~removes~~ clears the Service Provider's ~~from the~~ missed notification list. In the case where the Service Provider's SWIM indicator was changed from ON to OFF (SOA SWIM Recovery Indicator, LSMS SWIM Recovery Indicator), the SwimProcessing-RecoveryResponse will include a stop-date, which indicates the time of the last SWIM entry onto the SWIM list.

!

-- 999.0 LNP SWIM Processing Recovery Results

```
swimProcessing-RecoveryResults NOTIFICATION
    BEHAVIOUR  swimProcessing-RecoveryResultsBehavior;
    WITH INFORMATION SYNTAX LNP-ASN1.SwimProcessing-RecoveryResults
    AND ATTRIBUTE IDS
        actionId actionId,
        status swimResultsStatus,
        time-of-completion resultsCompletionTime,
        accessControl accessControl;
    WITH REPLY SYNTAX LNP-ASN1.SwimProcessing-RecoveryResponse;
    REGISTERED AS {LNP-OIDS.lnp-notification 999};
```

```
swimProcessing-RecoveryResultsBehavior BEHAVIOUR
    DEFINED AS !
        This notification contains the recovery results of a SWIM
        lnpDownload action or SWIM lnpNotificationRecovery action
        from a Service Provider.  It contains the id of the swim action,
        the success or failure of the action, and the completion time.

        NPAC populates the error-code and stop-date in the
        SwimProcessing-RecoveryResponse with the reason and timestamp, when
        stopping SWIM data collection.  This occurs when the service provider
        exceeds the SWIM accumulation maximum tunable.

        NPAC populates the error-code in the SwimProcessing-RecoveryResponse
        with the reason, when the recovery request encounters an error
        situation.
    !;


-- 2.0 LNP Local SMS Managed Object Class

lnpLocalSMS MANAGED OBJECT CLASS
    CHARACTERIZED BY
        lnpLocalSMS-Pkg;
    CONDITIONAL PACKAGES
        swimProcessing-RecoveryResultsPkg PRESENT IF
            !present if the SP LSMS supports SWIM Recovery!;
    REGISTERED AS {LNP-OIDS.lnp-objectClass 2};


-- 27.0 LNP SOA Managed Object Class

lnpSOA MANAGED OBJECT CLASS
    CHARACTERIZED BY
        lnpSOA-Pkg;
    CONDITIONAL PACKAGES
        swimProcessing-RecoveryResultsPkg PRESENT IF
            !present if the SP SOA supports SWIM Recovery!;
    REGISTERED AS {LNP-OIDS.lnp-objectClass 27};



-- 999.0 LNP Log Record for the SWIM Processing Recovery Results
--       Notification

lnpLogSwimProcessing-RecoveryResultsRecord MANAGED OBJECT CLASS
    DERIVED FROM "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 :
1992":eventLogRecord;
    CHARACTERIZED BY
        lnpLogSwimProcessing-RecoveryResultsPkg;
    REGISTERED AS {LNP-OIDS.lnp-objectClass 999};

lnpLogSwimProcessing-RecoveryResultsPkg PACKAGE
    BEHAVIOUR
        lnpLogSwimProcessing-RecoveryResultsDefinition,
        lnpLogSwimProcessing-RecoveryResultsBehavior;
    ATTRIBUTES
```

```
        actionId GET,
        swimResultsStatus GET,
        resultsCompletionTime GET,
        accessControl GET;
    ;

lnpLogSwimProcessing-RecoveryResultsDefinition BEHAVIOUR
    DEFINED AS !
        The lnpLogSwimProcessing-RecoveryResultsRecord class is the managed
        object that is used to create log records for the
        swimProcessing-RecoveryResults Notification.
    !;

lnpLogSwimProcessing-RecoveryResultsBehavior BEHAVIOUR
    DEFINED AS !
        This log record can be used by any CME wanting to log the
        swimProcessing-RecoveryResults Notification.
    !;


-- 999.0 SWIM Processing Package

swimProcessing-RecoveryResultsPkg PACKAGE
    BEHAVIOUR swimProcessing-RecoveryResultsPkgBehavior;
    NOTIFICATIONS
        swimProcessing-RecoveryResults;
    REGISTERED AS {LNP-OIDS.lnp-package 999};

swimProcessing-RecoveryResultsPkgBehavior BEHAVIOUR
    DEFINED AS !
        This package provides for conditionally including the
        Swim Processing notification.
    !;
```

ASN.1

```
DownloadAction ::= CHOICE {
    subscriber-download [0] EXPLICIT SubscriptionDownloadCriteria,
    network-download [1] NetworkDownloadCriteria,
    block-download [2] BlockDownloadCriteria,
    swim-download [3] SwimDownloadCriteria
}

SwimDownloadCriteria ::= CHOICE SEQUENCE {
    subscriber-download [0] NULL,
    network-download [1] NULL,
    block-download [2] NULL
    data-type [0] SwimDownloadDataType,
    actionId  [1] INTEGER OPTIONAL
}

SwimDownloadDataType ::= CHOICE {
```

```
    subscriber-download    [0] NULL,
    network-download       [1] NULL,
    block-download         [2] NULL
}

SwimNotificationCriteria ::= SEQUENCE {
    actionInfo [0] EXPLICIT CHOICE {
        actionId           [0] INTEGER,
        no-value-needed [1] NULL
    }
}

TimeRange ::= SEQUENCE {
    startTime [0] GeneralizedTime,
    stopTime [1] GeneralizedTime,
    swim-download [2] ~~NULL~~ SwimNotificationCriteria OPTIONAL
                      -- startTime and stopTime ignored when swim is provided
}

NetworkNotificationRecoveryReply ::= SEQUENCE {
    status ENUMERATED {
        success (0),
        failed (1),
        time-range-invalid (2),
        criteria-to-large (3),
        no-data-selected (4),
        swim-more-data (5)
    },
    system-choice CHOICE {
         -- no changes needed
     },
        actionId  [0] INTEGER OPTIONAL
}

DownloadReply ::= SEQUENCE {
    status ENUMERATED {
        success (0),
        failed (1),
        time-range-invalid (2),
        criteria-to-large (3),
        no-data-selected (4),
        swim-more-data (5)

    },
    downloaddata CHOICE {
        subscriber-data [0] SubscriptionDownloadData,
        network-data [1] NetworkDownloadData,
        block-data [2] BlockDownloadData
    } OPTIONAL,
        actionId  [0] INTEGER OPTIONAL
}

SwimResultsStatus ::= ResultsStatus


SwimProcessing-RecoveryResponse ::= SEQUENCE {
    status [0] SwimResultsStatus,
```

```
    error-code [1] LnpSpecificErrorCode OPTIONAL, -- present if status not
success
    stop-date [2] GeneralizedTime OPTIONAL, -- present if SWIM data collection
turned off
    additionalInformation [3] AdditionalInformation OPTIONAL
}


SWIMProcessing-RecoveryResults ::= SEQUENCE {
    actionId [0] INTEGER,
    status [1] SwimResultsStatus,
    time-of-completion [2] GeneralizedTime,
    accessControl [3] LnpAccessControl
}


AuditTN-ActivationRange ::= TimeRange -- swim value NOT applicable


BlockDownloadCriteria ::= CHOICE {
    time-range [0] TimeRange, -- swim value NOT applicable
    block-npa-nxx-x [1] NPA-NXX-X,
    block-npa-nxx-x-range [2] NPA-NXX-X-Range
}


NetworkDownloadCriteria ::= SEQUENCE {
    time-range [0] TimeRange OPTIONAL, -- swim value NOT applicable
    chc1 [1] EXPLICIT CHOICE {
        service-prov [0] ServiceProvId,
        all-service-provs [1] NULL
    },
    chc2 [2] EXPLICIT CHOICE {-- A decision was made by
                              -- NANC to leave this structure a CHOICE of
                              -- CHOICEs instead of using one CHOICE to
                              -- simplify tagging
        npa-nxx-data [0] EXPLICIT CHOICE {
            npa-nxx-range [0] NPA-NXX-Range,

           all-npa-nxx [1] NULL
        },
        lrn-data [1] EXPLICIT CHOICE {
            lrn-range [0] LRN-Range,
            all-lrn [1] NULL
        },
        all-network-data [2] NULL,
        npa-nxx-x-data [3] EXPLICIT CHOICE {
           npa-nxx-x-range [0] NPA-NXX-X-Range,
           all-npa-nxx-x [1] NULL
        }
    }
}


SubscriptionDownloadCriteria ::= CHOICE {
    time-range [0] TimeRange, -- swim value NOT applicable
    tn  [1] PhoneNumber,
```

```
    tn-range [2] TN-Range
}


NPAC-SMS-Operational-Information ::= SEQUENCE {
    down-time TimeRange, -- swim value NOT applicable
    npac-contact-number PhoneNumber,
    additional-down-time-information GraphicString255,
    access-control LnpAccessControl
}


NPAC-SMS-Operational-InformationRecovery ::= SEQUENCE {
    down-time TimeRange, -- swim value NOT applicable
    npac-contact-number PhoneNumber,
    additional-down-time-information GraphicString255
}
```

Origination Date: 10/18/02

Originator: NeuStar

Change Order Number: NANC 368

Description: Out-Bound Flow Control

Cumulative SP Priority, Weighted Average: 2, (7.25)

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y	Y			Low	Med-High	Med-High

Business Need:

During the Oct '02 LNPAWG meeting, a discussion took place surrounding out-bound flow control, and the merits of changing the flow control of messages from the receiving end to the sending end. The current implementation of flow control between the NPAC and SOA/LSMS systems is completely determined by the receiving end of the CMIP connection. This approach works, but it allows the large buffers between the sender and the receiver to act as a queue when the receiver can't keep up with the sender. These buffers allow for, in some cases, hundreds of messages to be backed up between the sender and the receiver before the sender gets a congestion indication. In some cases, the queue that builds up cannot be processed in 5 minutes, thereby causing departure times to expire and the association to be aborted.

Another negative impact of the current flow control approach is the lack of ability to correctly prioritize outbound messages. In the LNP systems, the sender, not the OSI stack, manages the priority that is assigned to a message. Once a large backlog of low priority messages is built up, any subsequent high priority message must wait for all those messages ahead of it in the queue. If the sender carefully manages the outbound queue, then high priority messages won't have to wait as long to be sent by the receiving system.

Refer to the Oct '02 LNPAWG meeting minutes for a full recap of the discussion items regarding this topic.

Description of Change:

By implementing out-bound flow control on the sender system, the various buffers in the OSI stack would not fill up as done currently. It would be the sender's responsibility to detect that (n) number of messages have been sent without receiving a response. In this case, the sender should stop sending until the number of non-responsive messages drops below a threshold (t). If implemented on both ends (NPAC and SP), out-bound flow control would prevent congestion because neither side would fill the buffers between the 2 systems.

The following is the expected behavior of the sending system in an Out-Bound Flow Control condition:

- Stop initiating new CMIP requests.
- Continue sending in CMIP responses.

Oct '02 LNPAWG, out-bound flow control could be implemented at the NPAC without impacting Service Provider systems. Service Providers are not required to implement this feature concurrently with NPAC.

Nov '02 LNPAWG, Out-bound Flow Control would be set up for every connection to the NPAC. Message processing speed and message prioritization for each SP is independent of other SPs (just like today, where one slow SP doesn't mean others are directly affected), regardless of each SP's setting. Move to accepted. Start working on detailed requirements.

Feb '03 APT Meeting, need to consider how the implementation of Out-bound Flow Control would affect SLRs 2, 3, 4, and 5.

Major points/processing flows/high-level requirements:

1. Flow Control will be implemented on the NPAC side of the CMIP interface. It is an optional implementation by the SOA/LSMS.
2. The implementation of Flow Control by the sending system is independent of any implementation by the receiving system. However, there is a clear benefit to having both sides implement this functionality.
3. Flow Control is applicable on a per association basis.
4. Flow Control activity and behavior applies to both normal mode and recovery mode.
5. Flow Control activity is applicable for the following types of data: SP, network, NPB, SV, notification.
6. No reports are required for Flow Control.
7. NPAC tunables for Flow Control include:
    a. Flow Control Upper Threshold Tunable, unit = messages, range = 50-500, default = 100, definition = Number of non-responsive messages sent to a SOA/LSMS before Flow Control is invoked, on a per association basis.
    b. Flow Control Lower Threshold Tunable, unit = messages, range = 1-500, default = 75, definition = Number of non-responsive messages sent to a SOA/LSMS that is in a Flow Control state before normal processing is resumed, on a per association basis.
8. The NPAC sends messages to the associated SOA/LSMS.
    a. Under normal conditions where the SOA/LSMS is able to keep up with the NPAC, Flow Control is not encountered.

   b. Under some load conditions, the SOA/LSMS is not able to keep up with the messages sent from the NPAC. In this situation, Flow Control is encountered.
      i. NPAC implements a real-time flag indicating whether a SOA/LSMS is in a Flow Control state.
      ii. When getting ready to send a request to a SOA/LSMS, NPAC checks this flag to determine if it's OK to send this message.
         1. If the flag is false, the message is sent.
         2. If the flag is true, the message is held/queued.

9. For a SOA/LSMS that is **currently in a normal state (not in Flow Control)**, the NPAC monitors the number of outstanding non-responsive messages sent to that SOA/LSMS.
   a. If the number of outstanding non-responsive messages is equal to the Flow Control Upper Threshold, the NPAC sends the current message it is handling, and sets the Flow Control flag to true. Since the check is performed on a per message basis, the Upper Threshold number will not be exceeded, just equaled.
   b. If the number of outstanding non-responsive messages is less than the Flow Control Upper Threshold, NPAC sends the current message it is handling, and continues with normal processing.
10. For a SOA/LSMS that is **currently in a Flow Control state**, the NPAC monitors the number of outstanding non-responsive messages sent to that SOA/LSMS.
   a. If the number of outstanding non-responsive messages is greater than the Flow Control Lower Threshold, no action is taken.
   b. If the number of outstanding non-responsive messages is less than or equal to the Flow Control Lower Threshold, the NPAC resumes sending messages (whether queued or normal).
11. A SOA/LSMS that is in a Flow Control state will have outstanding non-responsive messages.
   a. For all outstanding non-responsive messages that were sent, NPAC response timers and abort behavior will apply.

For all messages not sent but held because the Flow Control flag is set to true, NPAC response timers and abort behavior will NOT apply.

May '03 – FIFO of messages remains the same. (within priority groups)

Requirements:

Req 1 – Out-Bound Flow Control Upper Threshold Tunable

NPAC SMS shall provide an Out-Bound Flow Control Upper Threshold tunable parameter which is defined as the number of non-responsive messages sent to a SOA/LSMS before Out-Bound Flow Control is invoked, on a per association basis.

Req 2 – Out-Bound Flow Control Upper Threshold Tunable Default

NPAC SMS shall default the Out-Bound Flow Control Upper Threshold tunable parameter to 100 messages.

Req 3 – Out-Bound Flow Control Upper Threshold Tunable Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Out-Bound Flow Control Upper Threshold tunable parameter.

Req 4 – Out-Bound Flow Control Lower Threshold Tunable

NPAC SMS shall provide an Out-Bound Flow Control Lower Threshold tunable parameter which is defined as the number of non-responsive messages sent to a SOA/LSMS that is in a Flow Control state before normal processing is resumed, on a per association basis.

Req 5 – Out-Bound Flow Control Lower Threshold Tunable Default

NPAC SMS shall default the Out-Bound Flow Control Lower Threshold tunable parameter to ~~10~~75 messages.

Req 6 – Out-Bound Flow Control Lower Threshold Tunable Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Out-Bound Flow Control Lower Threshold tunable parameter.

Add new tunables to Appendix C.

Name = Out-Bound Flow Control Upper Threshold Tunable
Default Value = 100
Units = Messages
Valid Range = 50-500.

Name = Out-Bound Flow Control Lower Threshold Tunable
Default Value = 75
Units = Messages
Valid Range = 1-500.

IIS

None. This change order does not impact interface messaging, just documentation behavior.

Other IIS Updates.

The behavior description listed in this change order (Major points/processing flows/high-level requirements), will be added to the IIS Part I, Chapter 5 – Secure Association Establishment, within sub-section 5.4 – Congestion Handling, new section 5.4.x – Out-bound Flow Control.

GDMO

No Change Required

ASN.1

No Change Required

Origination Date: 9/17/03

Originator: Nextel

Change Order Number: NANC 388

Description: Un-do a "Cancel-Pending" SV

Cumulative SP Priority, Weighted Average: 3, (7.45)

Functional Backwards Compatible: NO

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y		Y	Y	Low	Low-Med	N/A

Business Need:

Currently there are no requirements in the NPAC that allow a Subscription Version (SV) to be manually changed from "Cancel Pending" status to "Pending" status. Without any "un-do" functionality, both Service Providers (SPs) must wait for the Cancellation-Initial Concurrence Window and the Cancellation-Final Concurrence Window to expire (nine hours each), let the SV go to Conflict, and then resolve the Conflict or wait for the Conflict Restriction timer (six hours) to expire in order for it to return to "Pending" (when the Cancel Request was initiated by the Old SP). Alternatively, both SPs could send in cancel requests to the NPAC, at which point the SV would immediately go to "Canceled", then they could initiate the porting process again.

The current NPAC functionality for a concurred port (where both SPs have sent in Create Requests and the SV is in "Pending" status), then one of the two SPs has sent in a Cancel Request (SV is now in "Cancel Pending" status) is as follows:

1. The New SP initiates the Cancel. The Old SP concurs with the Cancellation-Initial or the Cancellation-Final Concurrence Requests. The status will be changed to "Canceled" upon receipt of the cancel concurrence. Both SPs would have to re-initiate the porting process for this TN.
2. The New SP initiates the Cancel. The Old SP does not concur with the Cancellation-Initial or the Cancellation-Final Concurrence Requests, the status will be changed to "Canceled" at the expiration of the Final Concurrence expiration. Both SPs would have to re-initiate the porting process for this TN.
3. The Old SP initiates the Cancel. The New SP concurs with the Cancellation-Initial or the Cancellation-Final Concurrence Requests. The status will be changed to "Canceled" upon receipt of the cancel concurrence. Both SPs would have to re-initiate the porting process for this TN.
4. The Old SP initiates the Cancel. The New SP does not concur with the Cancellation-Initial or the Cancellation-Final Concurrence Requests, the status will be changed to "Conflict" at the expiration of the Final Concurrence expiration. The Old SP and New SP

must then resolve the conflict, or wait for the Conflict Restriction Window to expire (six hours) for the SV to be eligible to be changed back to "Pending" by the New SP.

In case #4, the porting process could continue after the expiration of the Cancellation Concurrence timers (18 hours), and either the resolution of the conflict (0-6 hours) or waiting for the Conflict timer to expire (6 hours).

Jun '04 LNPAWG, instead of the previously documented behavior that would include a new CMIP message (retract SV cancel), the recommendation is to extend the usage of the existing modify SV message to include the ability to modify the status from cancel-pending back to pending. Additional business rules and edits will be added to ensure that only the SP that issued the cancel request is now performing the "un-do" activity.

Description of Change:

The recommendation is for a change to the NPAC functionality, such that an SP that sent up a Cancel Request in error, could "un-do" the request by sending a "*modify request*" message (using a Subscription Version Modify Action) to the NPAC.

This message would allow the SV to change from a "Cancel Pending" status back to a "Pending" status. The NPAC would verify that the SP sending the "*modify request*" message to the NPAC is the same SP that initiated the Cancel Request (otherwise return an error).

There would not be any restriction on when this new message could be sent (i.e., during the 18 hour window that the SV is in Cancel Pending).

No backwards-compatibility flags needed. The change in status (from Cancel Pending back to Pending) can be handled with the existing Status Attribute Value Change. However, SPs should verify with their SOA vendors that an SAVC that is updating a Cancel Pending SV to a Pending SV will not be rejected.

In order to use this new functionality, an SP would need to implement a change in their SOA.

Nov '03 LNPAWG, discussion:

Explained the current functionality, and provided an overview of the desired change. Vendor action item will be in the LNPAWG action items list. We will also investigate and discuss the question on the status change after a second cancel request from the Old SP.

Jun '04 LNPAWG, additional business rules and edits will be added to ensure that only the SP that issued the cancel request is now performing the "un-do" activity using the existing modify SV message.

Major points/processing flow/high-level requirements:

1. An SV is in cancel-pending status.
2. The Service Provider that issued the cancel message to the NPAC, requests the NPAC to "un-do" the cancel request:
    a. The Service Provider sends a Subscription Version Modify Action message to the NPAC for an SV in a cancel-pending state.

b. The NPAC validates the message is from the Service Provider that issued the cancel request.

i. If yes, continue.

ii. If no, return an error to the requesting Service Provider, and exit the process.

3. The NPAC changes the status of the SV to pending.
4. The NPAC sends a Status Attribute Value Change notification to the involved Service Providers:

a. New Service Provider receives Status Attribute Value Change notification updating the status to pending.

b. Old Service Provider receives Status Attribute Value Change notification updating the status to pending.

Requirements:

Req 1 – Un-Do a Cancel-Pending Subscription Version – Notification

NPAC SMS shall inform both Old and New Service Providers when the status of a Subscription Version is set from cancel-pending back to pending for an Inter-Service Provider port.

Req 2 – Un-Do a Cancel-Pending Subscription Version – Request Data

NPAC SMS shall receive the following data from ~~a requesting~~ the Old or New Service Provider to identify a Subscription Version to have a cancel request retracted:

Ported TN (or a specified range of numbers)

Subscription Version ID

Version Status (if TN or TN range is specified, should be cancel-pending).

New Version Status (can be only pending)

Req 2.5 – Un-Do a Cancel-Pending Subscription Version – New Status Specified Error

NPAC SMS shall send an appropriate error message to the originating user that requests a cancellation retraction for a subscription version, if the new version status specified in the request is not pending.

Req 3 – Un-Do a Cancel-Pending Subscription Version – Version Status Error

NPAC SMS shall send an appropriate error message to the originating user that requests a cancellation retraction for a subscription version, if the current version status is not cancel-pending.

~~Req 3.5 – Un-Do a Cancel-Pending Subscription Version – New Status Error~~

~~NPAC SMS shall send an appropriate error message to the originating user that requests a cancellation retraction for a subscription version, if the new version status is not pending.~~

Req 5 – Un-Do a Cancel-Pending Subscription Version – Timestamp

NPAC SMS shall set the Subscription Version ~~cancellation retraction~~ modification date and time to current upon setting the Subscription Version status back to pending.

Req 7 – Un-Do a Cancel-Pending Subscription Version – Missing Cancel Error

NPAC SMS shall return an error if a Service Provider sends a cancellation retraction for a subscription version that has not been cancelled by that Service Provider.

Req 8 – Un-Do a Cancel-Pending Subscription Version – Status Change

NPAC SMS shall set the subscription version status to Pending upon receiving a cancellation retraction from either the Old or New Service Provider for a subscription version with a cancel-pending status (both Service Providers have done a create) for an Inter-Service Provider or Port to original port.

Req 9 – Un-Do a Cancel-Pending Subscription Version Tunable

NPAC SMS shall provide an Un-Do a Cancel-Pending Subscription Version tunable parameter which is defined as the support for providing this functionality within the NPAC SMS.

Req 10 – Un-Do a Cancel-Pending Subscription Version Tunable Default

NPAC SMS shall default the Un-Do a Cancel-Pending Subscription Version tunable parameter to TRUE.

Req 11 – Un-Do a Cancel-Pending Subscription Version Tunable Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Un-Do a Cancel-Pending Subscription Version tunable parameter.

SV Status Change Diagram:

Change the diagram to add an arrow from Cancel-Pending to Pending. Update table to describe this new arrow.

IIS

No Change Required

A new flow for the NPAC will be added in section B.5, Subscription Version. New flow is shown below:

B.5.x Un-Do Cancel-Pending SV Request

This scenario can only be performed when the subscriptionVersionStatus is cancel-pending.

Old SOA	New SOA	NPAC SMS	
	→ Modify Request (Un-Do)		1
		internal M-SET →	2
		internal M-SET ←	3
		← Modify Response (Un-Do)	4
		← M-Event-Report SAVC	5
	→ M-Event-Report SAVC		6
		← M-Event-Report SAVC	7
→ M-Event-Report SAVC			8

GDMO

```
subscriptionVersionModifyBehavior BEHAVIOUR
    DEFINED AS !
      An SP that sent up a Cancel Request in error, can un-do the cancel
request by setting the Subscription status to pending.
This allows the Subscription Version to change from cancel-pending back to
pending.  The NPAC verifies that the SP sending the modify to the NPAC is the
same SP that initiated the Cancel Request (otherwise return an error).
There is no restriction on when the modify can be sent during the tunable
period of time that the SV is cancel-pending.

!;
```

ASN.1

```
SubscriptionModifyData ::= SEQUENCE {
    subscription-lrn [0] LRN OPTIONAL,
    subscription-new-sp-due-date [1] GeneralizedTime OPTIONAL,
    subscription-old-sp-due-date [2] GeneralizedTime OPTIONAL,
    subscription-old-sp-authorization [3] ServiceProvAuthorization OPTIONAL,
    subscription-class-dpc [4] EXPLICIT DPC OPTIONAL,
    subscription-class-ssn [5] EXPLICIT SSN OPTIONAL,
    subscription-lidb-dpc [6] EXPLICIT DPC OPTIONAL,
    subscription-lidb-ssn [7] EXPLICIT SSN OPTIONAL,
    subscription-isvm-dpc [8] EXPLICIT DPC OPTIONAL,
    subscription-isvm-ssn [9] EXPLICIT SSN OPTIONAL,
    subscription-cnam-dpc [10] EXPLICIT DPC OPTIONAL,
    subscription-cnam-ssn [11] EXPLICIT SSN OPTIONAL,
    subscription-end-user-location-value [12] EndUserLocationValue OPTIONAL,
    subscription-end-user-location-type [13] EndUserLocationType OPTIONAL,
    subscription-billing-id [14] BillingId OPTIONAL,
    subscription-status-change-cause-code [15]
        SubscriptionStatusChangeCauseCode OPTIONAL,
    subscription-wsmsc-dpc [16] EXPLICIT DPC OPTIONAL,
```

```
    subscription-wsmsc-ssn [17] EXPLICIT SSN OPTIONAL,
    subscription-customer-disconnect-date [18] GeneralizedTime OPTIONAL,
    subscription-effective-release-date [19] GeneralizedTime OPTIONAL,
     new-version-status [20] VersionStatus OPTIONAL
}

SubscriptionModifyInvalidData ::= CHOICE {
    subscription-lrn [0] EXPLICIT LRN,
    subscription-new-sp-due-date [1] EXPLICIT GeneralizedTime,
    subscription-old-sp-due-date [2] EXPLICIT GeneralizedTime,
    subscription-old-sp-authorization [3] EXPLICIT ServiceProvAuthorization,
    subscription-class-dpc [4] EXPLICIT DPC,
    subscription-class-ssn [5] EXPLICIT SSN,
    subscription-lidb-dpc [6] EXPLICIT DPC,
    subscription-lidb-ssn [7] EXPLICIT SSN,
    subscription-isvm-dpc [8] EXPLICIT DPC,
    subscription-isvm-ssn [9] EXPLICIT SSN,
    subscription-cnam-dpc [10] EXPLICIT DPC,
    subscription-cnam-ssn [11] EXPLICIT SSN,
    subscription-end-user-location-value [12] EXPLICIT EndUserLocationValue,
    subscription-end-user-location-type [13] EXPLICIT EndUserLocationType,
    subscription-billing-id [14] EXPLICIT BillingId,
    subscription-status-change-cause-code [15]
          EXPLICIT SubscriptionStatusChangeCauseCode,
    subscription-wsmsc-dpc [16] EXPLICIT DPC,
    subscription-wsmsc-ssn [17] EXPLICIT SSN,
    subscription-customer-disconnect-date [18] EXPLICIT GeneralizedTime,
    subscription-effective-release-date [19] EXPLICIT GeneralizedTime,
    new-version-status [20] EXPLICIT VersionStatus
}
```

Origination Date: 3/6/02

Originator: NeuStar

Change Order Number: NANC 347/350

Description: CMIP Interface Enhancements – abort behavior

Cumulative SP Priority, Weighted Average: 4, (7.50)

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y	Y			Med	Low	Low

Business Need:

Note: During the Nov '02 LNPAWG meeting, it was decided by the industry to consolidate NANC 347 and 350 into a single change order that would capture abort behavior. All parties will also consider how these changes relate to the elimination of aborts (all or just time-related) and out-bound flow control. The expectation is that Service Providers would implement similar abort processes/procedures on their systems, such that "*sender"* and "*receiver*" can be used to indicate either NPAC or SOA/LSMS for abort behavior.

15 minute abort behavior.

The NPAC SMS and Service Provider SOA/LSMS exchange messages and a response is required for each message. The current NPAC architecture requires a response to every message within a 15-minute window, or the requestor will abort the association.

If a Service Provider fails to respond to an NPAC message, the NPAC aborts that specific association and the Service Provider must re-associate in recovery mode, request, receive and process all missed messages, then start processing in normal mode until they are totally caught up with any backlog of messages. During the recovery timeframe, the NPAC must "hold" all messages destined for that Service Provider, and only send them once the Service Provider has completed the recovery process. This only further delays the desired processing of messages by both the NPAC and the Service Provider. Additionally, any SV operations except range activate will remain in a sending status until the Service Provider has completed recovery.

With the current NPAC implementation based on the requirements, especially during periods of high demand with large porting activity, a Service Provider that falls more than 15 minutes behind will get aborted by the NPAC, thus exacerbating the problem of timely processing of messages. This occurs even though that Service Provider is still processing messages from the NPAC, albeit more than 15 minutes later.

With this change order, the audit behavior in the 15-minute window of the NPAC would not adversely impact a Service Provider that falls behind, but is still processing messages.

The business need for efficient transmission of messages will only increase as porting volumes increase.

60 minute abort behavior.

With the changes described above, the audit behavior in the 60 minute window of the NPAC would allow a Service Provider to fall behind, but put a cap on how far behind (i.e., 60 minutes). This enhancement could assist a Service Provider in the area of timeliness of updating network data due to a lessening of aborts, customer service, and fewer audits for troubleshooting purposes.

Description of Change:

15 minute abort behavior.

Change the 15-minute abort timer (tunable by region, defaulted to 15 minutes) to "credit" the Service Provider for responding to some traffic, even if they don't respond to a specific message within the 15-minute window.

1. This would allow Service Providers that have fallen behind to keep processing the backlog, instead of getting aborted and having to re-associate to the NPAC in recovery mode, which in turn increases workload for both the NPAC and the Service Provider.

2. If the Service Provider fails to respond to ANY of the outstanding message during that 15-minute window, the NPAC would abort the association as is currently done (i.e., at the end of the 15 minute window).

This change applies to both single and range SV broadcasts.

60 minute abort behavior.

Create a new "60" minute window (tunable by region, defaulted to 60 minutes). Use this new window the same way that the 15-minute window is used in Release 3.1 (i.e., abort the association for a lack of a response to an individual message from the NPAC).

1. This would allow Service Providers that have fallen behind to keep processing the backlog, instead of getting aborted and having to re-associate to the NPAC in recovery mode, but would put a limit on the amount of time allotted for slower Service Providers.

2. If the Service Provider fails to respond to a given outstanding message during that new 60-minute window, the NPAC would abort the association. So with this change the Service Provider gets an additional 45 minutes to respond beyond the current 15-minute window.

The logic representation is shown below:
IF the slow Service Provider responds to this message within 60 minutes:
NPAC updates the appropriate data
NPAC sends appropriate notification to the SOAs
(in an example of a partial failure activate request, the SV would go from PF to active status and the Service Provider would be removed from the failed list)
ELSE,
NPAC aborts the association
the Service Provider must re-associate to the NPAC
the Service Provider goes through recovery processing.

This change applies to both single and range SV broadcasts.

Rollup Behavior.

The NPAC "rolls-up" downloaded data (e.g., SV activate to LSMSs) to reflect the status of porting activity. Abort behavior and rollup behavior are separate items, but often confused because both can happen at the same time when a timer expires. With this change order, rollup behavior is as follows:

1. Single SV Rollup happens at the end of the tunable rollup time for singles (e.g., 15 minutes).
2. Range SV Rollup happens at the end of the tunable rollup time for ranges (e.g., 60 minutes).

In the example of a slow SP, the roll-up of a single SV activate happens at the end of 15 minutes, to obtain closure on this porting activity. The SV would be in partial-failure status, and a notification would be sent to both the activating SOA and old SOA. The new timer allows the NPAC to separate association abort/monitoring and event completion.

The rollup flow for SV range activates is a response to the range event (M-EVENT-REPORT response) within 60 minutes (same as today). With this change order, the rollup of all range activity (activate, modify-active, disconnect) will use the range rollup tunable.

<u>Major points/processing flow/high-level requirements:</u>

1. The NPAC exchanges messages with the SOA/LSMS. For every request from the NPAC, a response is required from the SOA/LSMS.
2. A SOA/LSMS that fails to respond to a message is subject to Abort Processing Behavior (APB).
3. A new Roll-Up Activity Timer (RAT) allows for the separation between the completion of events and association abort/monitoring. There will be separate timers for single SV broadcasts versus range broadcasts.
4. APB applies to normal mode, not recovery mode.
5. RAT applies to both normal mode and recovery mode.
6. APB is applicable for the following types of data: SP, network, NPB, SV, notification.

7. No reports are required for APB.
8. NPAC tunables for APB allow for the separation between the completion of events and association abort/monitoring. Separate timers apply to singles versus ranges.
    a. RAT tunable for SV singles, unit = minutes, range = 5-60, default = 15, definition = Number of minutes before roll-up activity is initiated for an event involving a single SV.
    b. RAT tunable for SV ranges, unit = minutes, range = 5-60, default = 60, definition = Number of minutes before roll-up activity is initiated for an event involving a range of SVs.
    c. APB Upper Threshold Tunable, unit = minutes, range = 10-1440, default = 60, definition = Number of minutes before an NPAC abort will occur for a SOA/LSMS that has at least one outstanding message with a delta between the origination time and the current time that is equal to or greater than the tunable window, regardless of whether the SOA/LSMS has incurred any other activity (request or response).
9. No SP specific tunables are required for APB or RAT.
10. SV broadcast information from NPAC to LSMS.
    a. For a single SV broadcast:
        i. The existing retry functionality applies. This is designed to perform existing retry behavior, and to provide the initial check for invoking an association abort of the LSMS. At the completion of the "X by Y" window, a failure to either initiate a request, or respond to any outstanding messages, results in an abort.
        ii. The single SV RAT Tunable applies. This is designed to capture roll-up activity.
        iii. The Upper Threshold Tunable applies. This will provide the secondary check for invoking an association abort of the LSMS.
    b. For a range SV broadcast:
        i. The existing retry functionality applies. This is designed to perform existing retry behavior, and to provide the initial check for invoking an association abort of the LSMS. At the completion of the "X by Y" window, a failure to either initiate a request, or respond to any outstanding messages, results in an abort.
        ii. The range SV RAT Tunable applies. This is designed to capture roll-up activity.
        iii. The Upper Threshold Tunable applies. This will provide the secondary check for invoking an association abort of the LSMS.
11. The NPAC sends messages to the associated SOA/LSMS. For every message sent, abort behavior is initiated, and a RAT (response timer or event timer) is started. The initial abort timer is based on the existing retry functionality. The RAT uses either the single SV RAT tunable value or range SV RAT tunable value based on 10a and 10b above. The secondary abort timer is a new timer and it uses the Upper Threshold tunable window. The NPAC allows a SOA/LSMS to fall behind in processing messages. However, the limit is defined by this new abort timer. The response from the SOA/LSMS is one or more of the options below, based on the tunable settings:

a. All SOAs/LSMSs responds before the end of the retry window and RAT window.
    i. The NPAC expires the RAT for that event.
    ii. With a successful response, the NPAC considers the responding SOA/LSMS as "successful" to the request (i.e., not on failed SP list).
b. All SOAs/LSMSs do NOT respond before the end of the retry window (i.e., end of the "X by Y" window).
    i. The retry timer has expired based on the applicable retry value.
    ii. For both a single SV and range SV, NPAC determines if any messages/responses were received from this SOA/LSMS during the retry window. The NPAC allows a SOA/LSMS to fall behind in processing messages. Only in the case, where NO activity is registered during the retry window, will abort processing be invoked.
        1. If at least one message/response received, processing continues.
        2. If no message/response received, the SOA/LSMS association is aborted.

c. All SOAs/LSMSs do NOT respond before the end of the RAT window.
    i. The RAT has expired based on the applicable value (either single or range).
    ii. The NPAC performs "roll-up" activities for all messages sent to SOAs/LSMSs on this event (status is set, notifications to SOAs).
d. SOA/LSMS responds to request AFTER the expiration of the RAT window.
    i. The NPAC updates status/failed SP list, and sends notifications to SOAs.
e. SOA/LSMS does NOT respond before the end of the secondary abort window.
    i. The NPAC aborts the association to the SOA/LSMS.
    ii. SOA/LSMS must re-associate to the NPAC.
    iii. SOA/LSMS goes through recovery processing (recovery based on SOA/LSMS linked replies indicator).
    iv. The NPAC updates status/failed SP list, and sends notifications to SOAs.

Requirements:

NOTE: Roll-up activity is defined as the consolidation/closure of a broadcast event in the NPAC, and feedback (responses, non-responses) from each Service Provider, such that the status and failed-list for an SV or NPB will be updated.

Req 1 – Roll-Up Activity-Single Tunable

NPAC SMS shall provide a Roll-Up Activity Timer – Single tunable parameter which is defined as the number of minutes before roll-up activity is initiated for an event involving a single SV.

Req 2 – Roll-Up Activity-Single Tunable Default

NPAC SMS shall default the Roll-Up Activity Timer – Single tunable parameter to 15 minutes.

Req 3 – Roll-Up Activity-Single Tunable Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Roll-Up Activity Timer – Single tunable parameter.

Req 4 – Roll-Up Activity-Range Tunable

No longer needed. Currently handled via existing range tunable (LocalSMSAsyncBroadcastResponseWindow). New name will be: Rollup_Activity_Timer_Expire_SVRange. May ’05 reinstated this req because the existing range tunable was not documented.
NPAC SMS shall provide a Roll-Up Activity Timer Expire SVRange tunable parameter which is defined as the number of minutes before roll-up activity is initiated for an event involving a range of SVs.

Req 5 – Roll-Up Activity- Range Tunable Default

No longer needed. Currently handled via existing range tunable (LocalSMSAsyncBroadcastResponseWindow). New name will be: Rollup_Activity_Timer_Expire_SVRange. May ’05 reinstated this req because the existing range tunable was not documented.
NPAC SMS shall default the Roll-Up Activity Timer Expire SVRange tunable parameter to 60 minutes.

Req 6 – Roll-Up Activity- Range Tunable Modification

No longer needed. Currently handled via existing range tunable (LocalSMSAsyncBroadcastResponseWindow). New name will be: Rollup_Activity_Timer_Expire_SVRange. May ’05 reinstated this req because the existing range tunable was not documented.
NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Roll-Up Activity Timer Expire SVRange tunable parameter.

Req 7 – Abort Processing Behavior Upper Threshold Tunable

NPAC SMS shall provide an Abort Processing Behavior Upper Threshold tunable parameter which is defined as the number of minutes before an NPAC abort will occur for a SOA/LSMS that has at least one outstanding message with a delta between the origination time and the current time that is equal to or greater than the tunable window, regardless of whether the SOA/LSMS has incurred any other activity (request or response).

Req 8 – Abort Processing Behavior Upper Threshold Tunable Default

NPAC SMS shall default the Abort Processing Behavior Upper Threshold tunable parameter to 60 minutes.

Req 9 – Abort Processing Behavior Upper Threshold Tunable Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Abort Processing Behavior Upper Threshold tunable parameter.

Add new tunables to Appendix C.
Name = Roll-Up Activity-Single Tunable
Default Value = 15
Units = Minutes
Valid Range = 1-60.

Name = Roll-Up Activity-Range Tunable
Default Value = 60
Units = Minutes
Valid Range = 1-60.

Name = Abort Processing Behavior Upper Threshold Tunable
Default Value = 60
Units = Minutes
Valid Range = 1-180.

IIS

None. This change order does not impact interface messaging, just documentation behavior.

Other IIS Updates.

The behavior description listed in this document Major Points/processing flow/high-level requirements section above, will be added to the IIS Part I, Chapter 5 – Secure Association Establishment, new section 5.x – Abort Processing Behavior.

GDMO

No Change Required

ASN.1

No Change Required

Origination Date: 3/6/02

Originator: NeuStar

Change Order Number: NANC 348

Description: BDD for Notifications

Cumulative SP Priority, Weighted Average: 5, (7.83)

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y	N	N	N	Med	Med	Med

Business Need:

Service Providers use Bulk Data Download (BDD) files to recover customer, network, block, and subscription data in file format. This occurs when automated recovery functionality is either not available or not practical (e.g., too large of time range) for the data that needs to be recovered.

The current requirements do not address BDD files for notifications. In order to provide more complete functionality for a Service Provider to "replay" messages sent by the NPAC, the ability for the NPAC to generate a BDD file for a time range of notifications would potentially reduce operational issues and the work effort required for a Service Provider to get back in sync with the NPAC, by providing the Service Provider with all information that they would have received had they been associated with the NPAC. Additionally, this would be needed for LTI users transitioning to a SOA, or SOA users that need to recover notifications for more than the industry-recommended timeframe of 24 hours.

With this change order, the NPAC would have the capability to generate a BDD file of notifications for a Service Provider within a certain date and time range.

Description of Change:

The NPAC would provide the functionality for NPAC Help Desk personnel to generate a BDD file of notifications for a requesting Service Provider.

Selection criteria would be any single SPID, date and time range (notification attempt timestamp), and include all types of notifications. The sort criteria will be chronologically by date and time.

The file name will contain an indication that this is a notification file, along with the requested date and time range. The output file would be placed in that Service Provider's ftp site directory.

Major points/processing flow/high-level requirements:

1. The request for a BDD is originated by an SP, and follows M&P steps on contacting NPAC personnel, and providing required information.
2. The GUI allows:
    a. NPAC personnel to generate a BDD for notifications for a requesting Service Provider.
    b. Only time-based delta BDD files to be generated.
3. Selection criteria include requesting Service Provider, time range based on notification attempt timestamp (available data based on retention/aging interval).
4. The BDD file:
    a. Contains results based on the selection criteria.
    b. Sorted in date/time/notification type order.
    c. Uses SP Profile flags for ranges, and notification types (at the time the notification was created).
    d. Uses NPA-NXX filters (at the time the notification was created).
    e. File name indicates notification file and requested date and time.
    f. Uses variable length records to accommodate the various notifications that are of different lengths.
5. The results file is put in the requesting Service Provider's FTP sub-directory.
6. The amount of historical data available for the results file will be based on housekeeping processes, and the notification purge tunable value.

Mar '03 APT: Other than the need to capture the variable length records, the rest of the text captures the desired functionality.

Requirements:

RR3-223 Bulk Data Download – Selection Criteria for File Creation

NPAC SMS shall allow network data only, subscription data only, notification data only, orall, as selection criteria for bulk data download file generation.

NPAC SMS shall allow network data only, subscription data only, notification data only, or all, as selection criteria for bulk data download file generation.

Req 1 –Notification BDD File Creation

NPAC SMS shall provide a mechanism that allows a Service Provider to recovery notification data in file format.

Req 2 –Notification BDD Selection Criteria Fields

NPAC SMS shall include the requesting Service Provider and a time range, as selection criteria fields for the Notification bulk data download file, via the NPAC Administrative Interface.

Req 3 –Notification BDD Required Selection Criteria

NPAC SMS shall require, as selection criteria for notification bulk data download file generation, a requesting Service Provider ID and a time range.

Req 4 –Notification BDD File Name

NPAC SMS shall provide a bulk data download file for notification data, using a file name that indicates the Notification data and requested time range.

Req 5 –Notification BDD Time Range

NPAC SMS shall use the Start Time Range entry field as an exclusive start range, and the End Time Range entry field as an inclusive end range, for Notification data that were broadcast during the specified time range, based on notification attempt timestamp.

Req 6 –Notification BDD Results

NPAC SMS shall provide a bulk data download file, based on selection criteria, that contains all Notification data in the NPAC SMS.

Req 7 –Notification BDD Sort Order

NPAC SMS shall sort the Notification bulk data download file, in ascending order based on the value for dat~~ae~~ and ~~/~~time~~/ notification type~~.

Req 8 –Notification BDD Filters

NPAC SMS shall apply SP Profile Flags for ranges and notification type (based on the settings at the time the notification was created).

Req 9 –Notification BDD FTP Sub-Directory

NPAC SMS shall automatically put the Notification bulk data download file into the FTP sub-directory of the Service Provider, based on the SPID value of the requesting Service Provider.

Appendix E of FRS Additions:

Notifications Download File

The Notifications download block contains two records in the file, individual fields are pipe delimited, with a carriage return(CR) after each Notification record. The breaks in the lines and the parenthesized comments are solely for ease of reading and understanding.

The “Value in Example” column in Table E-x directly correlates to the values for the first Notification in the download file example, as seen in Figure E-x.

The file name for the Notifications download file will be in the format:

Notifications.DD-MM-YYYYHHMMSS.DD-MM-YYYYHHMMSS.DD-MM-YYYYHHMMSS
(The Notifications portion is the literal string " Notifications".)

The first timestamp in the filename is the time the download begins. The second and third timestamps are the beginning and ending time ranges respectively.

The Notifications file given in the example would be named:

Notifications.15-10-2004081122.12-10-2004080000.13-10-2004133022

EXPLANATION OF THE FIELDS IN THE NOTIFICATIONS DOWNLOAD FILE		
Field Number	**Field Name**	**Value in Example**
1	Service Provider Id	1111
2	System Type (SOA=0, LSMS=1)	0
3	Notification ID	1
4	Object ID	18
5	Attribute 1	1234
6	Attribute 2	303123
7	Attribute 3	20040915000000
8	Attribute 4	0
9	Attribute 5	20040831173545
N	Attribute n	

Table E- x -- Explanation of the Fields in the Notifications Download File

1111|0|18|1234|303123|20040915000000|0|20040831173545(CR) (Notification 1)
1111|0|18|1235|303242|20040915000000|0|20040831173549(CR) (Notification 2)

Figure E- x – Notification Download File Example

See table TBD for a list of all attributes in each of the notifications.

IIS

No Change Required

GDMO

No Change Required

ASN.1

No Change Required

Origination Date: 5/6/04

Originator: LNPAWG APT

Change Order Number: NANC 393

Description: NPAC Performance Requirements

Cumulative SP Priority, Weighted Average: 6, (7.92)

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y				High	Low-High	Low-High

Business Need:

The Architecture Planning Team has been evaluating performance numbers and performance requirements, based on porting projections published in the NFG. These projections were used along with available actual volume (top 5 SOA participation percentages, peak/offpeak volume percentages, mix of activates/modifies/disconnects, busy hour/busy day, etc.), to obtain updated performance requirements for the NPAC SMS.

The current FRS performance requirements do not fully account for sustained and peak performance requirements. This change order will provide NPAC SMS performance requirements to account for sustained, peak, and total bandwidth numbers.

Description of Change:

The FRS performance requirements for the NPAC SMS will be updated based on numbers defined during the APT meetings. The April 2004 minutes that capture the discussion are included below:

> ***NPAC Forecasting Group (NFG) Traffic Model:*** *Total pooling and porting events projected for 2004 is 111 Million. This is substantially lower. Changes since the last version:*
>
> - *Changed NFG WNP assumptions for subscriber data based upon CTIA data and analyst estimate.*
> - *Changed wireless pooling forecast to 1.2M per month through end of 2004 from 800K based upon actuals from 2003.*
> - *Changed churn rate from 50% to 35% per NFG recommendations.*
> - *Changed % of churn requiring a port from 80% to 50%, which then ramps up by 10 percent per year (per NFG recommendation).*

LSMS Throughput Sustained and Peak Requirements Discussion: *With the new Traffic Model assumptions, the projected LSMS throughput requirement reflected during the 4Q04 Busy Hour is now less than or equal to 1 message per second for each region. However, it would be ill-advised to use 1 per second as the requirement because if all messages in the hour came in the first second, we would abort. Using the West Coast projected data, which has the highest projection of 3479 messages in the Busy Hour, we would need to support 4 messages per second sustained to clear in 15 minutes to prevent aborting. This equates to total bandwidth of 156 messages per second (30 LSMSs * 4.0 messages/second + 30 LSMSs * 1.2 messages per second (peak of 5.2). The assumption still is one peak per hour.*

SOA Throughput Sustained and Peak Requirements Discussion: *Previously, the group determine that the top 5 SOAs represented 67% of the total SOA messaging traffic. The total bandwidth was calculated and multiplied by 67% to come up with a total bandwidth requirement for the top 5 SOAs. This was then divided by 5 to derive a possible single SOA interface throughput requirement. After reviewing this methodology, the group felt that dividing by 5 inappropriately spread the messaging traffic evenly among the top 5 SOAs. A new methodology was discussed to project the sustained and peak rates for SOA interface throughput. It was agreed to use the top SOA % participation (40% from the Mid-Atlantic Region), and the top SOA message traffic in the Busy Hour (19,326 from the Northeast Region) and plug this into the 4Q04 Summary spreadsheet for the Northeast Region. This resulted in a sustained rate projection of 4.3 messages per second (updated to 4.0 mps during the May '04 meeting). Next, using 100% participation in the Northeast Region, the total NPAC bandwidth requirement was 10.7 messages per second (updated to 40.0 mps during the May '04 meeting). This was also determined to be the projected peak rate if a single SOA were to use 100% of the total NPAC bandwidth in a given period of time.*

FRS Assumptions: (remove two, add four)

~~**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.~~

AR-New-1 TN-to-Transaction Ratio

There is one TN per CMIP transaction as specified in R6-28.1, R6-28.2, R6-29.1 R6-29.2, New1, New2, and NewN.

AR-New-2 CMIP Transaction Definition

A CMIP transaction is a request/notification and it's corresponding response.

AR-New-3 Peak Period Definition

Peak, as specified in R6-28.2 and R6-29.2, is defined as a five minute period, and one peak can occur within any 60 minute window.

AR-New-4 Number of Local SMS Associated to the NPAC SMS

There are thirty (30) Local SMSs associated to the NPAC SMS as specified in NewReq3, related to the total NPAC SMS bandwidth for a single NPAC SMS region.

Requirements: (current requirements with updates in yellow hightlight)

R6-28.1 SOA to NPAC SMS interface transaction rates - sustained

A transaction rate of ~~2~~ 4.0 CMIP transactions (sustained) per second shall be supported by each SOA to NPAC SMS interface association.

R6-28.2 SOA to NPAC SMS interface transaction rates - peak

NPAC SMS shall support a peak rate of ~~5.2~~ 10.0 CMIP transactions per second (peak for a five minute period, within any 60 minute window) over a single SOA to NPAC SMS interface association.

NewReq 1 SOA to NPAC SMS interface transaction rates – total bandwidth

NPAC SMS shall support a total bandwidth of 40.0 SOA CMIP transactions per second (sustained) for a single NPAC SMS region.

NewReq 2 NPAC SMS to Local SMS interface transaction rates - sustained

NPAC SMS shall support a rate of 4.0 CMIP transactions per second (sustained) over each NPAC SMS to Local SMS interface association.

R6-29.2 NPAC SMS to Local SMS interface transaction rates - ~~sustainable~~ peak

NPAC SMS shall~~, given a transaction rate of 25 TN downloads per second and the assumptions concerning range activations expressed above,~~ support a rate of 5.2 CMIP transactions per second (~~sustainable for 5 minutes~~peak for a five minute period, within any 60 minute window) over each NPAC SMS to Local SMS interface association.

NewReq 3 NPAC SMS to Local SMS interface transaction rates – total bandwidth

NPAC SMS shall support a total bandwidth of 156 Local SMS CMIP transactions per second (sustained) for a single NPAC SMS region.

IIS

No Change Required

GDMO

No Change Required

ASN.1

No Change Required

Origination Date: 12/13/00

Originator: WorldCom

Change Order Number: NANC 321

Description: Regional NPAC Edit of Service Provider Network Data – NPA-NXX Data

Cumulative SP Priority, Weighted Average: 7, (8.31)

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y				Med	N/A	N/A

Business Need:

When a service provider submits a message to the NPAC in order to create a pending subscription version, the NPAC verifies that the old service provider identified in the message is the current service provider and that the number to be ported is from a portable NPA-NXX. If the telephone number already is a ported number, the NPAC will look at the active SV for that number to determine the identity of the current SP as shown in the active SV. If no active SV exists, then the number is not currently ported and the NPAC determines the current SP instead based on NPA-NXX ownership as shown in the NPAC's network data for each service provider. The NPAC also looks at the network data to confirm that the NPA-NXX has been identified as open to portability.

If a service provider has entered an NPA-NXX in its network data but has done it for its network data associated with the wrong region, then the correct NPAC region, when receiving create messages involving numbers in that NPA-NXX, will be unable to see that the TNs involve a portable NPA-NXX; in this case the create message will be rejected by NPAC. Furthermore, another service provider could erroneously enter the NPA-NXX in its network data for the correct NPAC region. Then the NPAC's portable NPA-NXX validation would pass, but the current service provider validation would fail. In either case the telephone number could not be ported until the service provider network data error were corrected.

It is important therefore to assure that service provider NPA-NXX network data be populated only in the proper NPAC region and to allow only the LERG-assignee to populate the data. The introduction of an NPA edit function, to validate that an NPA-NXX input is to network data associated with the NPAC region encompassing the involved NPA will effectively serve both functions. Such an edit function would not allow a service provider to put its NPA-NXX data in the wrong NPAC region's database and it consequently would not allow the improper LERG-assignee entries to remain long undetected.

Jun '04: During the June 2004 LNPWG meeting, this change order was discussed in terms of the CinBell exception for the ten KY rate areas in LATA 922. Specifically, a portion of northern KY (which is part of the Southeast NPAC Region service area) contains rate areas that are

defined in the Midwest NPAC Region, rather than the Southeast NPAC Region. These ten rate areas include, Alexandria, Boone, Butler, Covington, Flamouth, Glencoe, Independence, Walton, Warsaw, and Williams. This will need to be added to this change order.

Description of Change:

Service Providers submit Network Data over their SOA interfaces. A provider is required to enter each portable NPA-NXX for which it is the LERG assignee. The NPAC uses this service provider network data to perform certain validation functions of subscription version data -- to confirm current SPID correct and that TN is from portable NXX -- and to determine TN ownership in snap-back situations.

Jun '04: Based on the CinBell exception, an additional NPA-NXX edit will need to be added. The NPA of 859 (Lexington, KY and surrounding area) includes NXXs that are assigned to either LATA 922 or a different LATA (462 or 466). In order to accommodate this change order, the following rule should be applied:

- If the NPA-NXX (859-xxx) is associated with LATA ID 922, then it belongs to the Midwest NPAC Region.
- Else, it belongs to the Southeast NPAC Region.

Requirements:

Req 1 Valid NPAs for each NPAC Region

NPAC SMS shall establish a list of valid NPAs for each NPAC region using information obtained from an industry source.

Req 2 Maintaining List of Valid NPAs for Each NPAC Region

NPAC SMS shall maintain the list of valid NPAs for each NPAC region.

Req 3 Updating List of Valid NPAs for Each NPAC Region

NPAC SMS shall update the list of valid NPAs for each NPAC region using information obtained from an industry source.

Note: The 859 (Lexington, KY and surrounding area) exception needs to be correctly processed.

Req 4 Rejection of NPA-NXXs that Do Not Belong to a Valid NPA for the NPAC Region

NPAC SMS shall reject a Service Provider request to open an NPA-NXX for portability if the associated NPA is not valid for the region.

Note: The 859 (Lexington, KY and surrounding area) exception needs to be correctly processed.

Req 5 Regional NPAC NPA Edit Flag Indicator

NPAC SMS shall provide a Regional NPA Edit Flag Indicator, which is defined as an indicator on whether or not NPA edits will be enforced by the NPAC SMS for a particular NPAC Region.

Req 6 Regional NPAC NPA Edit Flag Indicator Modification

NPAC SMS shall provide a mechanism for NPAC Personnel to modify the Regional NPA Edit Flag Indicator.

Req 7 Regional NPAC NPA Edit Flag Indicator – Default Value

NPAC SMS shall default the Regional NPA Edit Flag Indicator to **TRUE**.

Req 8 Valid NPA-NXXs for 859 KY Exception

NPAC SMS shall establish a list of valid NPA-NXXs for the KY 859 NPA using information obtained from and industry source.

Req 9 Maintaining List of Valid NPA-NXXs for 859 KY Exception

NPAC SMS shall maintain the list of valid NPA-NXXs for the KY 859 NPA.

Req 10 Updating List of Valid NPAs for 859 KY Exception

NPAC SMS shall update the list of valid NPA-NXXs for the KY 859 NPA using information obtained from an industry source.

Req 11 Rejection of NPA-NXXs that Do Not Belong to a Valid NPA for the 859 KY Exception

NPAC SMS shall reject a Service Provider request to open an NPA-NXX for portability if the associated 859-xxx NPA-NXX is not valid for the region as defined below:
-- 859-xxx with LATA 922 may only be opened in the Midwest NPAC Region.
-- 859-xxx with LATA **OTHER THAN** 922 may only be opened in the Southeast NPAC Region.

IIS

No Change Required

GDMO

No Change Required

ASN.1

No Change Required

Origination Date: 8/7/1998

Originator: MCI

Change Order Number: NANC 227/254

Description: Exclusion of Service Provider from an SV's Failed SP List

Cumulative SP Priority, Weighted Average: 8, (8.75)

Functional Backwards Compatible: NO

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y		Y		Med	N/A	Med-Low

Business Need:

Currently, the NPAC will not permit information about an active ported number to be changed until all SPs have acknowledged receipt of the original information broadcast by NPAC about the number.

Consequently, an error such as wrong LRN cannot be fixed until the original, incorrect, information is broadcast successfully to all SPs. In this example, the customer could receive no incoming calls for hours or even days after cut-over.

Likewise, a subsequent port by a currently ported customer would be prevented by lack of successful broadcast of the original ported number information to all SPs.

With this change order, SPs can make changes quickly to minimize impact on newly ported customer's service and can do ports as scheduled when partial broadcast failure situations occur. Without this change order, only a complex and error prone manual method employed by NPAC personnel is available to circumvent this NPAC software restriction.

Description of Change:

The NPAC SMS currently rejects a request to "modify active" or "disconnect" an SV that has a partial failure status. Nothing can be done to the SV until the discrepant LSMS(s) come back on line, and either recover the broadcast, or accept a re-send from the NPAC.

A business scenario arose whereby a partial failure was affecting a customer's main number, and the New SP couldn't do anything to the SV until the partial failure was resolved.

The NPAC should provide a mechanism that allows activity (modify, disconnect, subsequent port) on the SV, regardless of the Failed SP List.

Jun 99 meeting, during the Pooling Assumptions walk-thru, four SV requirements were modified, and the functionality was moved into this change order. Basically, the "partial failure/failed" text is moved to this change order. The affected requirements are listed below:

SV-230 Modification of Number Pooling Subscription Version Information – Subscription Data

SV-240 Modification of Number Pooling Subscription Version Information – Status Update to Sending

SV-270 Modification of Number Pooling Subscription Version Information – Status Update

SV-280 Modification of Number Pooling Subscription Version Information – Failed SP List

Dec 99 LNPAWG meeting, the consensus of the group is to not include pooling in this change order. The scope of this change order is for regular SVs. Open a new change order to capture pooling (so that we don't lose our work on this up to now).

Jan 00 LNPAWG meeting, the group talked about another option (resend exclusion). So, instead of the NPAC providing a mechanism that allows activity (modify, disconnect, subsequent port) on the SV, regardless of the Failed SP List, the NPAC will provide a mechanism that allows a Service Provider to be removed from a Failed SP List via the new resend exclusion function.

Note: With this change order, an LSMS may receive subscription data during recovery, where more than one activity occurred for a given subscription version during the time the LSMS was not available. This will occur when NPAC Personnel via the OpGUI, exclude a Service Provider from the Failed SP List to allow the current Service Provider to perform some type of subsequent activity on that subscription version. Hence, when the LSMS performs recovery, the recovered data will contain data for both activities (all current attributes).

Requirements:

Req 1 – Subscription Version Failed SP List – Exclusion of a Service Provider from Resend

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to request that a Service Provider be excluded from the Subscription Version Failed SP List when resending an Inter-Service Provider port or Intra-Service Provider port Version, and not broadcast to the Service Provider that is excluded.

Req 2 – Subscription Version Failed SP List – Logging of an Excluded Service Provider

NPAC SMS shall log the following information when a Service Provider is excluded from the Failed SP List based on a request by NPAC Personnel via the NPAC Administrative Interface: date, time, excluded SPID, current SPID, TN, SV-ID.

Req 3 – Subscription Version Failed SP List – Recovery of Excluded Service Provider Subscription Versions

NPAC SMS shall, for a recovery of subscription data, in instances where the NPAC SMS excluded the Service Provider from the Failed SP List based on a request by NPAC Personnel via the NPAC Administrative Interface, allow the Local SMS to recover a Subscription Version with all current attributes, even though the Service Provider is no longer on the Failed SP List.

Req 4 – Subscription Version Failed SP List – Excluded Service Provider Log Data Availability for the Excluded Service Provider Report

NPAC SMS shall allow the Excluded Service Provider log data to be available for the Excluded Service Provider Report.

Req 5 – Subscription Version Failed SP List – Resend Excluded Service Provider Report by Current SPID via OpGUI

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to generate the Resend Excluded Service Provider Report by Current SPID on Excluded Service Provider log data.

Req 6 – Subscription Version Failed SP List – Resend Excluded Service Provider Report by Current SPID Request

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to specify time range and current SPID option (of either an individual SPID or all SPIDs) when generating the Resend Excluded Service Provider Report by Current SPID on Excluded Service Provider log data.

Req 7 – Subscription Version Failed SP List – Resend Excluded Service Provider Report by Current SPID Request Sort Criteria

NPAC SMS shall use the following sort order when generating the Resend Excluded Service Provider Report by Current SPID on Excluded Service Provider log data:

1. current SPID (ascending)
2. TN (ascending)
3. date/time (earliest date/time to latest date/time)
4. excluded SPID (ascending)
5. SVID (ascending)

Req 8 – Subscription Version Failed SP List –Resend Excluded Service Provider Report by Excluded SPID via OpGUI

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to generate the Resend Excluded Service Provider Report by Excluded SPID on Excluded Service Provider log data.

Req 9 – Subscription Version Failed SP List – Resend Excluded Service Provider Report by Excluded SPID Request

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to specify time range and excluded SPID option (of either an individual SPID or all SPIDs) when generating the Resend Excluded Service Provider Report by Excluded SPID on Excluded Service Provider log data.

Req 10 – Subscription Version Failed SP List –Resend Excluded Service Provider Report by Excluded SPID Request Sort Criteria

NPAC SMS shall use the following sort order when generating the Excluded Service Provider Report on Excluded Service Provider log data:

1. excluded SPID (ascending)
2. TN/NPA-NXX-X (ascending)
3. date/time (earliest date/time to latest date/time)
4. currentSPID/Blockholder SPID (ascending)
5. SVID/Number Pool Block -ID (ascending)

RX9-6 Log File Reports

NPAC SMS shall support the following log file reports for NPAC personnel using the NPAC Administrative Interface:

22. History Report
23. Error Report
24. Service Provider Notification Report
25. Subscription Transaction Report
26. Service Provider Administration Report
27. Subscription Administration Report
28. Resend Excluded Service Provider Report

IIS:

No change required.

GDMO:

```
-- 21.0 LNP NPAC Subscription Version Managed Object Class

subscriptionVersionNPAC MANAGED OBJECT CLASS
…
subscriptionVersionNPAC-Behavior BEHAVIOUR
    DEFINED AS !
…
```

```
        When the subscription version broadcast is not successful to all
        service providers, the subscriptionFailedSP-List is populated with a
        list of the failed service providers.
        If NPAC Personnel via the NPAC Administrative Interface, exclude a
        Service Provider from the subscriptionFailedSP-List, the list of
        Service Providers will not accurately reflect those Local SMSs
        that successfully processed this subscription version.
…


-- 1.0 LNP Download Action

lnpDownload ACTION
    BEHAVIOUR
        lnpDownloadDefinition,
        lnpDownloadBehavior;
    MODE CONFIRMED;
    WITH INFORMATION SYNTAX LNP-ASN1.DownloadAction;
    WITH REPLY SYNTAX LNP-ASN1.DownloadReply;
    REGISTERED AS {LNP-OIDS.lnp-action 1};

lnpDownloadDefinition BEHAVIOUR
    DEFINED AS !
        The lnpDownload action is the action that is used by the Local SMS
        and SOA to specify the objects to be downloaded from the NPAC SMS.
    !;

lnpDownloadBehavior BEHAVIOUR
    DEFINED AS !
        Preconditions: This action is issued from an lnpSubscriptions
        or an lnpNetwork object and all objects to be downloaded
        are specified in the action request.

        Postconditions: After this action has been executed by the Local
        SMS or SOA specifying which objects to download, the NPAC SMS will
        determine which objects satisfy the download request and return
        them in the download action reply. Creation, deletion, and
        modification information will be included in the reply.  All data
        for objects that have been modified is downloaded not just the
        information that was modified. The download reason is set to
        'new1' for a new object, 'delete1' for a deleted object
        and 'modified' for a modified object.

        An LSMS may receive subscription data during recovery, where more
        than one activity occurred for a given subscription version during
        the time the LSMS was not available.  This will occur when NPAC
        Personnel via the OpGUI, exclude a Service Provider from the Failed
        SP List to allow the current Service Provider to perform some type
        of subsequent activity on that subscription version.  Hence, when
        the LSMS performs recovery, the recovered data will contain data for
        the both activities (all current attributes). So, if the recovering
        LSMS is recovering a modified subscription version for which it did
        not receive the initial M-CREATE, the download reason is set to
        'modified' for this subscription version object.

        …
    !;
```

ASN.1:

No change required.

Origination Date: 7/10/03

Originator: LNPAWG

Change Order Number: NANC 385

Description: Timer Calculation – Maintenance Window Timer Behavior

Cumulative SP Priority, Weighted Average: 9, (9.75)

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y				Med	N/A	N/A

Business Need:

NPAC Timers. As defined in the FRS, concurrence windows/timers are generated at the time an activity occurs in the NPAC that requires the use of a window/timer. Specifically, the future expiration time is calculated and stored, based on the NPAC settings, at the time of the activity. These windows/timers will then expire based on the pre-calculated date/time. Therefore, a timer is not a meter that "runs" only during the Business Day intervals, but rather is a calculation in GMT of the timer's expiration date/time.

Currently, there are no FRS requirements that address timers and NPAC Maintenance Window time periods. An operational issue can arise when an NPAC Maintenance Window time period overlaps with normal business operating hours.

This change order proposes an update to the NPAC so that NPAC Maintenance Window time periods will be factored in when calculating timer expiration date/time (i.e., excluding that period of time from the calculation). This will alleviate the problem where timers expire during the NPAC Maintenance Window time period.

Description of Change:

The following indented paragraphs are maintained for historical reference purposes only. The approach for changing the functionality was discussed at the Aug '04 meeting, and changed from what is documented directly below:

> The Timer Expiration Calculation will be modified such that a time period designated as an NPAC Maintenance Window that falls within normal business operating hours will NOT "use up" any hours, when calculating the expiration of a timer. Effectively, the NPAC Maintenance Window time period will be treated the same way as Holidays are currently treated in the NPAC (i.e., excluded from the timer expiration calculation).
>
> This will require entry of Maintenance Window information in the OpGUI by NPAC Personnel (same as Holidays are currently done).

Additionally, a discussion item needs to occur regarding the possible inclusion of Service Provider profile settings to support this new feature.

Aug '03 LNPAWG, discussion:

Sprint PCS offered the following: 1.) follow up on the Jul '03 mtg comment about SPID profile toggles. After internal discussions it was deemed to be unnecessary to have SPID toggles. 2.) this functionality was no longer high priority, since it was agreed to shorten the extended Sunday Service Provider Maintenance Window to 8 hours, assuming NPAC stays within the 8 hours for maintenance. 3.) current concern is that NANC 323 migrations may push maintenance windows beyond the 8 hours. 4.) this functionality would have to be in place before agreeing to move the extended maintenance window back to 11 hours.

Aug '04 LNPAWG, NeuStar reported that after internal discussions within the development group, a more accurate approach would be to update the timer expiration timestamp, AFTER the end of the extended maintenance window, and BEFORE allowing timer events to be processed in the NPAC. This allows the "pushed out" time to be based on the actual maintenance window time period, rather than an estimate that is provided BEFORE the maintenance window.

The discussion then centered around exactly WHICH timer events should be "pushed out"? SPs took an action item to discuss internally on whether it should be all timers, timers for that day, or only timers affected by the additional maintenance time period.

NeuStar will provide additional feedback after the above action item is resolved. The major points and requirements will be adjusted accordingly.

Sep '04 LNPAWG, the group reviewed the SP action item (see above), and agreed to the following approach:

- With this change order, the NPAC would contain a "Knowledgeable-Internal-NPAC-Generation – Timer-Update-Tool" that would update applicable timer events based on an input parameter that defined the amount of time the timers should be extended.
- The input parameters would use minutes as the unit of measure, and would have a start maintenance time and end maintenance time. The number of minutes will be calculate by the NPAC software.
- The update would be applied to all NPAC driven and generated timers that were created or imposed by NPAC business rules, and that were set to expire during the corresponding day.
- The update would NOT be applied to Service Provider specified future-dated disconnect timers.
- The update would NOT be applied to any timers that were generated AFTER the NPAC became available, even though they were generated on the same day.
- The update can be performed for both scheduled and un-scheduled NPAC downtime.

Major points/processing flow/high-level requirements: (points 1, 2, 3 below are obsolete, and are only here for historical reference. Functionality will follow the "Sep '04 LNPAWG" description above)

1. The GUI allows:
    a. NPAC personnel to enter an NPAC Maintenance Window for a specific region.
    b. To have an impact on timer expiration, the NPAC Maintenance Window must overlap with business days/hours.
2. NPAC Timer Expiration functionality will be modified to include any entered NPAC Maintenance Window when calculating the timer's expiration date/time.
3. NPAC Maintenance Window data should be entered as soon as scheduled maintenance windows are decided. This will ensure that the data is entered well in advance of any time expiration calculation.
4. No modifications required to local systems (SOA, LSMS).
5. No tunable changes.
6. No report changes.

Requirements:

Req 1 NPAC Maintenance Windows – Timer Update Tool

NPAC SMS shall support a "Knowledgeable-Internal-NPAC-Generation – Timer-Update-Tool" that would update applicable timer events based on an input parameter that defined the amount of time the timers should be extended.

Req 2 NPAC Maintenance Windows – Timer Update Tool – Affected Timers

NPAC SMS shall use the "Knowledgeable-Internal-NPAC-Generation – Timer-Update-Tool" to update the following timers:
-- Initial Concurrence Window (New SPID and Old SPID, Short and Long)
-- Final Concurrence Window (New SPID and Old SPID, Short and Long)
-- Cancellation Initial Concurrence Window (New SPID and Old SPID, Short and Long)
-- Cancellation Final Concurrence Window (New SPID and Old SPID, Short and Long)

IIS

No Change Required

GDMO

No Change Required

ASN.1

No Change Required

Origination Date: 9/15/99

Originator: LNPA WG

Change Order Number: NANC 299

Description: NPAC Monitoring of SOA and LSMS Associations via Heartbeat

Cumulative SP Priority, Weighted Average: 10, (10.62)

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y	Y	Y	Y	Med	Med-High	Med-High

Business Need:

In today's operating environment, the NPAC doesn't know if an SP's SOA/LSMS association is available to receive downloads and other messages unless there is a failure to respond to an NPAC message. There are a number of reasons that may cause the SOA/LSMS association to be unavailable ranging from the transmission facility going down to software application problems.

If an association is unavailable when a download to activate a ported number is sent, partial failures will occur. Partial failures indicate that one or more SPs did not update their routing tables, and some calls intended for the ported customer will fail.

There are often long periods of time when there are no messages being sent across a given NPAC – SOA/LSMS association. Therefore, there is no way to know if the association is working. This change order would establish a periodic "heart-beat" monitor to determine the status of the SOA/LSMS.

This change order will facilitate monitoring SOA/LSMS availability and will minimize partial failure situations, thereby saving resolution time and improving customer service.

Description of Change:

This is an extension of NANC 219 and NANC 301. Instead of utilizing a TCP Level Heartbeat and an abort message, the NPAC SMS would utilize an Application Level Heartbeat message on every association. If a response was not returned for any given Application Level Heartbeat message, an alarm would be initiated for NPAC Personnel.

The current working assumption includes the following for this Heartbeat:

- new message,
- no access control,
- at a low level in the protocol stack,
- occur on the same port as the association,
- only occur if no traffic was sent/received after a configurable period of time,

- and it would be two-way to allow either side to initiate this message.

All parties still need to examine if there might be an issue with filtering in their firewalls. The need for both a Network Level Heartbeat and Application Level Heartbeat still needs to be decided.

Oct 99 LNPAWG (KC), this change order is designed to establish the Application Level Heartbeat process (which requires an interface change to both the NPAC and the SOA/LSMS). This process will allow two-way communication and allow either side to initiate the Application Level Heartbeat message. The Application Level Heartbeat process should be set up so that the functionality can be optionally set up per association.

The alarming process is the same as 219, such that an alarm would be initiated whenever Application Level Heartbeat responses are not sent by the NPAC or SOA/LSMS. When these alarms occur, the NPAC Personnel would contact the affected Service Provider to work the problem and ensure the association is brought back up.

Jan 00 LNPAWG (Las Vegas), the group has not been able to determine the feasibility of implementing an Application Level Heartbeat. It was agreed to put this change order on hold, pending the outcome of NANC 301 (NPAC TCP Level Heartbeat [transport layer]). The functionality documented in this change order needs further review before this change order can be considered "accepted and ready for selection into a release".

Jul 00 LNPAWG, – consensus is that they do not want to cancel this change order but move it back to an accepted change order for a future release. Metrics and reports that will be provided after R4.0 will give more information to determine whether or not this change order is needed.

Requirements:

Req 1 – NPAC SMS Monitoring of SOA and Local SMS Connections via an Application Level Heartbeat

NPAC SMS shall be capable of supporting an Application Level Heartbeat via an Application Level Heartbeat message to a Service Provider SOA/Local SMS.

Req 2 – NPAC SMS-to-SOA Application Level Heartbeat Indicator

NPAC SMS shall provide a Service Provider SOA Application Level Heartbeat Indicator tunable parameter which defines whether a SOA supports an Application Level Heartbeat message.

Req 3 – NPAC SMS-to-SOA Application Level Heartbeat Indicator Default

NPAC SMS shall default the Service Provider SOA Application Level Heartbeat Indicator tunable parameter to FALSE.

Req 4 – NPAC SMS-to-SOA Application Level Heartbeat Indicator Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Service Provider SOA Application Level Heartbeat Indicator tunable parameter.

Req 5 – NPAC SMS-to-Local SMS Application Level Heartbeat Indicator

NPAC SMS shall provide a Service Provider Local SMS Application Level Heartbeat Indicator tunable parameter which defines whether a Local SMS supports an Application Level Heartbeat message.

Req 6 – NPAC SMS-to- Local SMS Application Level Heartbeat Indicator Default

NPAC SMS shall default the Service Provider Local SMS Application Level Heartbeat Indicator tunable parameter to FALSE.

Req 7 – NPAC SMS-to- Local SMS Application Level Heartbeat Indicator Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Service Provider Local SMS Application Level Heartbeat Indicator tunable parameter.

Req 8 – NPAC SMS Application Level Heartbeat Tunable Parameter

NPAC SMS shall provide an Application Level Heartbeat Interval tunable parameter that defines the period of quiet time (no interface traffic) the NPAC should wait after the receipt of any interface traffic (request or response), before sending an Application Level Heartbeat message to the SOA/Local SMS.

Req 9 – NPAC SMS Application Level Heartbeat Tunable Parameter Usage

NPAC SMS shall use the same tunable value for both SOA and the Local SMS Associations.

Req 10 – NPAC SMS Application Level Heartbeat Tunable Parameter Default

NPAC SMS shall default the Application Level Heartbeat Interval tunable parameter to 15 minutes.

Req 11 – NPAC SMS Application Level Heartbeat Tunable Parameter Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the NPAC SMS Application Level Heartbeat tunable parameter.

Req 12 – NPAC SMS Application Level Heartbeat Timeout Tunable Parameter

NPAC SMS shall provide an Application Level Heartbeat Timeout tunable parameter that defines the period of time the NPAC should wait after sending an Application Level Heartbeat message to the SOA/Local SMS, before aborting the association.

Req 13 – NPAC SMS Application Level Heartbeat Timeout Tunable Parameter Usage

NPAC SMS shall use the same tunable value for both SOA and the Local SMS Associations.

Req 14 – NPAC SMS Application Level Heartbeat Timeout Tunable Parameter Default

NPAC SMS shall default the Application Level Heartbeat Timeout tunable parameter to 1 minute.

Req 15 – NPAC SMS Application Level Heartbeat Timeout Tunable Parameter Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the NPAC SMS Application Level Heartbeat Timeout tunable parameter.

Add new tunable to Appendix C.
Name = NPAC SMS Application Level Heartbeat Tunable
Default Value = 15
Units = Minutes
Valid Range = 5-60.

Name = NPAC SMS Application Level Heartbeat Timeout Tunable
Default Value = 1
Units = Minutes
Valid Range = 1-5.

IIS:

Add new text to 5.3 Association Management and Recovery

5.3.x Application Level Heartbeat Messages

With this functionality the NPAC SMS will send a periodic Heartbeat message when a quiet period interval between the SOA/LSMS and the NPAC SMS exceeds the tunable value. If a SOA/LSMS fails to respond to the Heartbeat message within a timeout period, the association will be aborted by the NPAC SMS.

To maximize the benefit of this functionality, a Service Provider's SOA/LSMS should also implement the Application Level Heartbeat functionality.

A new flow for the NPAC will be added in section B.8, Miscellaneous. New flow is shown below:

B.8.x NPAC Application Level Heartbeat Message

This scenario shows the NPAC sending an Application Level Heartbeat Message to the SOA/LSMS.

NPAC SMS	SOA/Local SMS	
→ Application Level Heartbeat Request		1
	← Application Level Heartbeat Response	2

1. The NPAC SMS sends an Application Level Heartbeat request to the SOA/Local SMS that support this feature, after a configurable amount of time with no message traffic.
2. The SOA/Local SMS responds back to the NPAC SMS.

A new flow for the SOA/LSMS will be added in section B.8, Miscellaneous. New flow is shown below:

B.8.y SOA/LSMS Application Level Heartbeat Message

This scenario shows the SOA/LSMS sending an Application Level Heartbeat Message to the NPAC.

NPAC SMS	SOA/Local SMS	
	← Application Level Heartbeat Request	1
→ Application Level Heartbeat Response		2

1. The SOA/Local SMS sends an Application Level Heartbeat request to the NPAC SMS, after a configurable amount of time with no message traffic.
2. The NPAC SMS responds back to the SOA/Local SMS.

GDMO:

```
-- 12.0 LNP NPAC SMS Managed Object Class

lnpNPAC-SMS MANAGED OBJECT CLASS
    DERIVED FROM "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992":top;
    CHARACTERIZED BY
        lnpNPAC-SMS-Pkg,
        lnpRecoveryCompletePkg,
        lnpNotificationRecoveryPkg;
    CONDITIONAL PACKAGES
      applicationLevelHeartBeatPkg PRESENT IF
            !the object is instantiated on the NPAC SMS!;
    REGISTERED AS {LNP-OIDS.lnp-objectClass 12};

!;

-- 27.0 LNP SOA Managed Object Class

lnpSOA MANAGED OBJECT CLASS
    DERIVED FROM "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992":top;
    CHARACTERIZED BY
        lnpSOA-Pkg;
   CONDITIONAL PACKAGES
      applicationLevelHeartBeatPkg PRESENT IF
            !the object is instantiated on the SOA!;
    REGISTERED AS {LNP-OIDS.lnp-objectClass 27};
```

```
-- 2.0 LNP Local SMS Managed Object Class

lnpLocalSMS MANAGED OBJECT CLASS
    DERIVED FROM "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992":top;
    CHARACTERIZED BY
        lnpLocalSMS-Pkg;
    CONDITIONAL PACKAGES
      applicationLevelHeartBeatPkg PRESENT IF
            !the object is instantiated on the Local SMS!;
    REGISTERED AS {LNP-OIDS.lnp-objectClass 2};


--
-- Notification Definitions
--
-- 24.0 Application Level Heartbeat Notification
applicationLevelHeartBeat NOTIFICATION
    BEHAVIOUR  applicationLevelHeartBeatBehavior;
    WITH INFORMATION SYNTAX LNP-ASN1. ApplicationLevelHeartBeat
AND ATTRIBUTE IDS
      sequence-number  msgSequenceNumber,
      creation-ts heartBeatTimeStamp;
    REGISTERED AS {LNP-OIDS.lnp-notification 24};

applicationLevelHeartBeatBehavior BEHAVIOUR
    DEFINED AS !
        This notification implements a SOA or LSMS Application Level Heartbeat
function.  With this functionality the NPAC SMS will send a periodic Heartbeat
message when a quiet period interval between the SOA/LSMS and the NPAC SMS
exceeds the tunable value.  If a SOA/LSMS fails to respond to the Heartbeat
message within a timeout period, the association will be aborted by the NPAC
SMS.

        Optionally, this notification may also be implemented on the SOA or
LSMS.  With this functionality the SOA/LSMS will send a periodic Heartbeat
message when a quiet period interval between the SOA/LSMS and the NPAC SMS
exceeds the tunable value.  If the NPAC SMS fails to respond to the Heartbeat
message within a timeout period, the association will be aborted by the
SOA/LSMS.
!;


-- xx LNP Log Record for the Application Level Heart Beat Notification

lnpLogHeartBeat-InformationRecord MANAGED OBJECT CLASS
    DERIVED FROM "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 :
1992":eventLogRecord;
    CHARACTERIZED BY
        lnpLogHeartBeat-InformationPkg;
    REGISTERED AS {LNP-OIDS.lnp-objectClass xx};

lnpLogHeartBeat-InformationPkg PACKAGE
    BEHAVIOUR
        lnpLogHeartBeat-InformationDefinition,
        lnpLogHeartBeat-InformationBehavior;
    ATTRIBUTES
```

```
        msgSequenceNumber GET,
        heartBeatTimeStamp GET;
    ;

lnpLogHeartBeat-InformationDefinition BEHAVIOUR
    DEFINED AS !
        The lnpLogHeartBeat-InformationRecord class is the managed object
        that is used to create log records for the
        applicationLevelHeartBeat Notification.
    !;

lnpLogHeartBeat-InformationBehavior BEHAVIOUR
    DEFINED AS !
        This log record can be used by any CME wanting to log the
        applicationLevelHeartBeat Notification.
    !;


-- xx Message Sequence Number
msgSequenceNumber ATTRIBUTE
    WITH ATTRIBUTE SYNTAX LNP-ASN1.Integer;
    MATCHES FOR EQUALITY;
    BEHAVIOUR msgSequenceNumberBehavior;
    REGISTERED AS {LNP-OIDS.lnp-attribute xx};

msgSequenceNumber BEHAVIOUR
    DEFINED AS !
        This attribute is used to store the message sequence number associated
with an application level heartbeat notification sent from NPAC, SOA or LSMS.
!;


-- xx Application Level Heart Beat Creation Time

heartBeatTimeStamp ATTRIBUTE
    WITH ATTRIBUTE SYNTAX LNP-ASN1.GeneralTime;
    MATCHES FOR EQUALITY, ORDERING;
    BEHAVIOUR heartBeatTimeStampBehavior;
    REGISTERED AS {LNP-OIDS.lnp-attribute xx};

heartBeatTimeStampBehavior BEHAVIOUR
    DEFINED AS !
        This attribute is used to specify the application level heart beat
creation time stamp at NPAC, SOA, or LSMS.
!;


-- 999.0 Application Level Heart Beat Package

applicationLevelHeartBeatPkg PACKAGE
    BEHAVIOUR applicationLevelHeartBeatPkgBehavior;
    NOTIFICATIONS
        applicationLevelHeartBeat;
    REGISTERED AS {LNP-OIDS.lnp-package 999};

applicationLevelHeartBeatPkgBehavior BEHAVIOUR
    DEFINED AS !
```

```
        This package provides for conditionally including the
        Application level heart beat notification.
    ;
```

ASN.1

```
ApplicationLevelHeartBeat ::= SEQUENCE {
    sequence-number [0] INTEGER,
    creation-ts [1] GeneralizedTime
}
```

Origination Date: 1/6/97

Originator: AT&T

Change Order Number: ILL 130

Description: Application Level Errors

Cumulative SP Priority, Weighted Average: 11, (12.50)

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y	Y	Y	Y	High	High	High

Business Need:

The current interface has very limited error message detail. This change order will allow understanding of errors more rapidly by returning a text explanation of the error. This will reduce the amount of time it takes work centers to manually research errors and resolve troubles.

Description of Change:

Errors in the SOA and LSMS interfaces are being treated as CMIP errors and it may sometimes be difficult for a SOA to know the true reason for an error from the NPAC SMS and therefore indicate a meaningful error message to its users. It has been requested that application level error be defined where appropriate and returned as text to the requestor (SOA/LSMS).

January 2000: During the LNPAWG meeting additional information regarding the error processing has been requested. The following text describes the difference in current error processing and future error processing with the requested functionality of this change order (*italics* indicates the differences between today's functionality and the proposed future functionality).

Today:

When the NPAC SMS experiences an error when processing any of the actions defined in the GDMO/ASN.1, the appropriate error data is returned. (example NewSP-CreateReply).

```
ActionResult  ::= SEQUENCE {
   managedObjectClass                ObjectClass    OPTIONAL ,
   managedObjectInstance             ObjectInstance OPTIONAL ,
   currentTime           [5] IMPLICIT GeneralizedTime  OPTIONAL ,
   actionReply           [6] IMPLICIT ActionReply    OPTIONAL
}

ActionReply  ::= SEQUENCE {
```

```
   actionType       ActionTypeId,
   actionReplyInfo  [4] ANY DEFINED BY actionType
}

ActionTypeId  ::= CHOICE {
   globalForm   [2] IMPLICIT OBJECT IDENTIFIER ,
   localForm    [3] IMPLICIT INTEGER
}

NewSP-CreateReply ::= SEQUENCE {
    status [0] SubscriptionVersionActionReply,
    invalid-data [1] NewSP-CreateInvalidData OPTIONAL
}
```

Note: the object id in the globalForm of the ActionTypeId indicates the NewSP-CreateReply action reply specified in the LNP asn.

With ILL 130:

When the NPAC SMS experiences an application level error when processing any of the actions defined in the GDMO/ASN.1, a processing failure will be returned with LnpSpecificInfo containing the error text.

```
ActionResult  ::= SEQUENCE {
   managedObjectClass     ObjectClass    OPTIONAL ,
   managedObjectInstance  ObjectInstance OPTIONAL ,
   currentTime            [5] IMPLICIT GeneralizedTime  OPTIONAL ,
   actionReply            [6] IMPLICIT ActionReply    OPTIONAL
}

ActionReply  ::= SEQUENCE {
   actionType       ActionTypeId,
   actionReplyInfo  [4] ANY DEFINED BY actionType
}

ActionTypeId  ::= CHOICE {
   globalForm   [2] IMPLICIT OBJECT IDENTIFIER ,
   localForm    [3] IMPLICIT INTEGER
}

ProcessingFailure  ::= SEQUENCE {
   managedObjectClass     ObjectClass ,
   managedObjectInstance  ObjectInstance  OPTIONAL ,
   specificErrorInfo      [5] SpecificErrorInfo
}

SpecificErrorInfo ::= SEQUENCE {
   errorId   OBJECT IDENTIFIER,
   errorInfo ANY DEFINED BY errorId
}

LnpSpecificInfo ::= GraphicString255
```

February 2000: The group discussed on the 2/9/00 conference call that a flash cut has a high degree of risk, so we should be looking at another option. During the February LNPA WG meeting, it was discussed and agreed that a backwards compatible approach was needed. The current approach is to create duplicate "sister" ACTIONs that will return the error text string to the requesting SP. A sunset period will allow SPs time to upgrade their systems. At the end of the sunset period, the original ACTIONs will be removed, and the new ACTIONs (with the error text string) will be the only method of sending the requested ACTIONs to the NPAC SMS.

Optionally, at the end of the sunset period the structure of the original ACTIONs can be modified to mirror the duplicate "sister" ACTIONs, for one major release of the NPAC SMS (this allows SPs to use either the original or new ACTIONs with the error text string). At the time the subsequent release is implemented, the duplicate ACTIONs can be deleted. At this point in time, the original ACTION names with the new error text string will be the only valid ACTIONs in the NPAC SMS.

Mar '04 APT: This change order is not needed if NANC 390 (New Interface Confirmation Messages SOA/LSMS-to-NPAC) is implemented. Additionally, this change order only covers ACTIONs, so it does NOT include all messages, whereas 390 does include all messages.

Jun '04 LNPAWG, due to multiple reasons:

- the extensive amount of changes,
- the inability to use linked-replies on the new confirmation message from the NPAC,
- the utilization of a new optional attribute on the existing CMIP messages,
- the increased performance after the recently implemented technology migration of the NPAC SMS platform,

the recommendation is to not move forward with NANC 390, and instead go back to using ILL 130 for enhanced error messaging, and only revisit the confirmation message approach if delayed response messaging becomes an issue. Qwest, the originator of NANC 390, wanted it to be documented that they did not submit 390 with the error code/text functionality, as is currently contained in that change order, so the trade-out addresses two areas of functionality.

Aug '04 LNPAWG: The group discussed error codes versus error text. It was agreed that the code was the logical choice. NeuStar will provide a file that maps error codes to their corresponding error text.

Jun '05, Jul '05 LNPAWG: The group discussed M-ACTIONs only, versus, all CMIP primitives (ACTIONs, CREATEs, SETs, GETs, DELETEs, M-EVENT-REPORTs). It was concluded that this change order would address all CMIP primitives, and the NPAC would add another SP tunable to accommodate all "other" CMIP primitives less ACTIONs.

Major points/processing flow/high-level requirements:

1. The NPAC exchanges messages with the SOA/LSMS using the CMIP protocol. Using the standard CMIP error reporting mechanisms, there are a limited number of messages that may be returned (e.g., accessDenied).

2. In order to provide most robust information, a different error message will be used, along with a text field that provides detailed information about the error encountered.
3. All ACTIONs may be affected by this change order.
4. The local systems (SOA, LSMS) need to be enhanced to process this new error text.
5. No tunable changes.
6. No report changes.

Requirements:

Req 1 – NPAC SMS Application Level Errors

NPAC SMS shall provide application level errors in the CMIP messaging in the SOA to NPAC SMS Interface and NPAC SMS to Local SMS Interface for those Service Providers that support this functionality.

Req 2 – NPAC SMS Application Level Error Details

NPAC SMS shall use the application level errors defined ~~in Table TBD~~ in the IIS, Part II, Appendix A.

Req 3 – NPAC SMS Application Level Error Details in soft format

NPAC SMS shall provide application level error code-to-text details in a pipe-delimited, soft format, at the FTP sub-directory for each Service Provider.

Note: This code-to-text mapping is designed to allow a SOA/LSMS to decode an error code received from the NPAC, into its corresponding text description.

Req 4 – SOA Action Application Level Errors Indicator

NPAC SMS shall provide a SOA Action Application Level Errors Indicator tunable parameter which defines whether a Service Provider supports Application Level Errors across the SOA Interface for M-ACTIONs.

Note: For Service Providers that do NOT support Application Level Errors, the NPAC will continue to send the existing CMIP error messages.

Req 5 – SOA Action Application Level Errors Indicator Default

NPAC SMS shall default the Service Provider SOA Action Application Level Errors Indicator tunable parameter to FALSE.

Req 6 – SOA Action Application Level Errors Indicator Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Service Provider SOA Action Application Level Errors Indicator tunable parameter.

Req 7 – LSMS Action Application Level Errors Indicator

NPAC SMS shall provide an LSMS Action Application Level Errors Indicator tunable parameter which defines whether a Service Provider supports Application Level Errors across the LSMS Interface for M-ACTIONs.

Note: For Service Providers that do NOT support Application Level Errors, the NPAC will continue to send the existing CMIP error messages.

Req 8 – LSMS Action Application Level Errors Indicator Default

NPAC SMS shall default the Service Provider LSMS Action Application Level Errors Indicator tunable parameter to FALSE.

Req 9 – LSMS Action Application Level Errors Indicator Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Service Provider LSMS Action Application Level Errors Indicator tunable parameter.

Req 10 – SOA Non-Action Application Level Errors Indicator

NPAC SMS shall provide a SOA Non-Action Application Level Errors Indicator tunable parameter which defines whether a Service Provider supports Application Level Errors across the SOA Interface for all non-M-ACTIONs.

Note: For Service Providers that do NOT support Application Level Errors, the NPAC will continue to send the existing CMIP error messages.

Req 11 – SOA Non-Action Application Level Errors Indicator Default

NPAC SMS shall default the Service Provider SOA Non-Action Application Level Errors Indicator tunable parameter to FALSE.

Req 12 – SOA Non-Action Application Level Errors Indicator Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Service Provider SOA Non-Action Application Level Errors Indicator tunable parameter.

Req 13 – LSMS Non-Action Application Level Errors Indicator

NPAC SMS shall provide an LSMS Non-Action Application Level Errors Indicator tunable parameter which defines whether a Service Provider supports Application Level Errors across the LSMS Interface for all non-M-ACTIONs.

Note: For Service Providers that do NOT support Application Level Errors, the NPAC will continue to send the existing CMIP error messages.

Req 14 – LSMS Non-Action Application Level Errors Indicator Default

NPAC SMS shall default the Service Provider LSMS Non-Action Application Level Errors Indicator tunable parameter to FALSE.

Req 15 – LSMS Non-Action Application Level Errors Indicator Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Service Provider LSMS Non-Action Application Level Errors Indicator tunable parameter.

IIS

New section 5.3.3.3 (NPAC SMS Detailed Error Codes):

The NPAC SMS will issue detailed error codes to the supporting SOA and Local SMS interfaces based upon the definitions and mappings in Appendix A. The Service Provider profile flags (SOA Application Level Errors Indicator, LSMS Application Level Errors Indicator) will indicate whether application level errors are supported across the SOA/LSMS interfaces. When they are supported:

The SOA/LSMS will utilize ACTIONs that support detailed error codes (e.g., M-ACTION subscriptionVersionActivateWithErrorCode), as defined in Exhibit 10. The SOA/LSMS may still utilize ACTIONs that do not support detailed error codes.

All other CMIP messages (e.g., M-CREATE serviceProvNPA-NXX) will be supported through a processingFailure response that will contain the detailed error code, instead of the other CMIP standard errors.

This allows all messages to be covered for the detailed error codes for SOA/LSMS interfaces that support this feature.

Appendix A, Errors will be changed. An example is shown below:

Managed Object Class	CMIP Error	Message Text	Additional Information
lnpSubscription	DuplicateObject Instance	7121 A subscription version with cancel pending status exists. A new one cannot be created for this TN.	

Appendix B, ensure all message flow text implies the correct reply data.

GDMO

```
-- 14.0 LNP Subscriptions Managed Object Class

lnpSubscriptions MANAGED OBJECT CLASS
    DERIVED FROM "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992":top;
    CHARACTERIZED BY
        lnpSubscriptionsPkg,
        subscriptionVersionLocalSMS-CreatePkg;
    CONDITIONAL PACKAGES
    lnpDownloadPkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionOldSP-CreatePkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionNewSP-CreatePkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionDisconnectPkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionModifyPkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionActivatePkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionCancelPkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionOldSP-CancellationPkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionNewSP-CancellationPkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionRemoveFromConflictPkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    numberPoolBlock-CreatePkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionRangeStatusAttributeValueChangePkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionRangeAttributeValueChangePkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionRangeObjectCreationPkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionRangeDonorSP-CustomerDisconnectDatePkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionRangeCancellationAcknowledgePkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionRangeNewSP-CreateRequestPkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionRangeOldSP-ConcurrenceRequestPkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionRangeOldSPFinalConcurrenceWindowExpirationPkg PRESENT
IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionRangeNewSP-FinalCreateWindowExpirationPkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
--
```

```
-- Packages for the sister ACTIONs with error codes
--
    subscriptionVersionActivateWithErrorCodePkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionCancelWithErrorCodePkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionNewSP-CancellationWithErrorCodePkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionRemoveFromConflictWithErrorCodePkg PRESENT IF
        !the object is instantiated on the NPAC SMS!,
    subscriptionVersionOldSP-CancellationWithErrorCodePkg PRESENT IF
        !the object is instantiated on the NPAC SMS!;
    REGISTERED AS {LNP-OIDS.lnp-objectClass 14};



-- Package Definitions

-- 49.0 LNP Subscription Version Activate With Error Code Package

subscriptionVersionActivateWithErrorCodePkg PACKAGE
    BEHAVIOUR subscriptionVersionActivateWithErrorCodePkgBehavior;
    ACTIONS
        subscriptionVersionActivateWithErrorCode;
    REGISTERED AS {LNP-OIDS.lnp-package 49};

subscriptionVersionActivateWithErrorCodePkgBehavior BEHAVIOUR
    DEFINED AS !
        This package provides for conditionally including the
        subscriptionVersionActivateWithErrorCode action.
    !;


-- 50.0 LNP Subscription Version Cancel Package

subscriptionVersionCancelWithErrorCodePkg PACKAGE
    BEHAVIOUR subscriptionVersionCancelWithErrorCodePkgBehavior;
    ACTIONS
        subscriptionVersionCancelWithErrorCode;
    REGISTERED AS {LNP-OIDS.lnp-package 50};

subscriptionVersionCancelWithErrorCodePkgBehavior BEHAVIOUR
    DEFINED AS !
        This package provides for conditionally including the
        subscriptionVersionCancelWithErrorCode action.
    !;

-- 51.0 LNP New Service Provider Subscription Version Cancellation
-- Acknowledge With Error Code Package

subscriptionVersionNewSP-CancellationWithErrorCodePkg PACKAGE
    BEHAVIOUR subscriptionVersionNewSP-CancellationWithErrorCodePkgBehavior;
    ACTIONS
        subscriptionVersionNewSP-CancellationAcknowledgeWithErrorCode;
    REGISTERED AS {LNP-OIDS.lnp-package 51};

subscriptionVersionNewSP-CancellationWithErrorCodePkgBehavior BEHAVIOUR
```

```
    DEFINED AS !
        This package provides for conditionally including the
        subscriptionVersionNewSP-CancellationAcknowledgeWithErrorCode action.
    !;

-- 52.0 LNP Subscription Version Remove From Conflict With Error Code
-- Pending Package

subscriptionVersionRemoveFromConflictWithErrorCodePkg PACKAGE
    BEHAVIOUR subscriptionVersionRemoveFromConflictWithErrorCodePkgBehavior;
    ACTIONS
        subscriptionVersionRemoveFromConflictWithErrorCode;
    REGISTERED AS {LNP-OIDS.lnp-package 52};

subscriptionVersionRemoveFromConflictWithErrorCodePkgBehavior BEHAVIOUR
    DEFINED AS !
        This package provides for conditionally including the
        subscriptionVersionRemoveFromConflictWithErrorCode action.
    !;


-- 53.0 LNP Old Service Provider Subscription Version Cancellation
-- Acknowledge With Error Code Package

subscriptionVersionOldSP-CancellationWithErrorCodePkg PACKAGE
    BEHAVIOUR subscriptionVersionOldSP-CancellationWithErrorCodePkgBehavior;
    ACTIONS
        subscriptionVersionOldSP-CancellationAcknowledgeWithErrorCode;
    REGISTERED AS {LNP-OIDS.lnp-package 53};

subscriptionVersionOldSP-CancellationWithErrorCodePkgBehavior BEHAVIOUR
    DEFINED AS !
        This package provides for conditionally including the
        subscriptionVersionOldSP-CancellationAcknowledgeWithErrorCode action.
    !;



-- Action Definitions

-- 17.0 LNP Subscription Version Activate Action With Error code

subscriptionVersionActivateWithErrorCode ACTION
    BEHAVIOUR
        subscriptionVersionActivateWithErrorCodeDefinition,
        subscriptionVersionActivateWithErrorCodeBehavior;
    MODE CONFIRMED;
    WITH INFORMATION SYNTAX LNP-ASN1.ActivateAction;
    WITH REPLY SYNTAX LNP-ASN1.ActivateReplyWithErrorCode;
    REGISTERED AS {LNP-OIDS.lnp-action 17};

subscriptionVersionActivateWithErrorCodeDefinition BEHAVIOUR
    DEFINED AS !
        The subscriptionVersionActivateWithErrorCode action is the action
        that can be used by the SOA of the new service provider to activate a
        subscription version id, tn or a range of tns via the SOA to
        NPAC SMS interface.
```

```
    !;

subscriptionVersionActivateWithErrorCodeBehavior BEHAVIOUR
    DEFINED AS !
        See subscriptionVersionActivate ACTION for behaviour definition.
        In addition to the existing subscriptionVersionActivate ACTION
        behaviour, this action's reply contains an optional error code
        to be returned if the action is not successful.
    !;


-- 18.0 LNP Subscription Version Cancel Action With Error code

subscriptionVersionCancelWithErrorCode ACTION
    BEHAVIOUR
        subscriptionVersionCancelWithErrorCodeDefinition,
        subscriptionVersionCancelWithErrorCodeBehavior;
    MODE CONFIRMED;
    WITH INFORMATION SYNTAX LNP-ASN1.CancelAction;
    WITH REPLY SYNTAX LNP-ASN1.CancelReplyWithErrorCode;
    REGISTERED AS {LNP-OIDS.lnp-action 18};

subscriptionVersionCancelWithErrorCodeDefinition BEHAVIOUR
    DEFINED AS !
        The subscriptionVersionCancelWithErrorCode action is the action
        that can be used by the SOA to cancel a subscription version via the
SOA to
        NPAC SMS interface.
    !;

subscriptionVersionCancelWithErrorCodeBehavior BEHAVIOUR
    DEFINED AS !
        See subscriptionVersionCancel ACTION for behaviour definition.
        In addition to the existing subscriptionVersionCancel ACTION
        behaviour, this action's reply contains an optional error code
        to be returned if the action is not successful.
    !;


-- 19.0 LNP New Service Provider Cancellation Acknowledge Request
-- With Error code

subscriptionVersionNewSP-CancellationAcknowledgeWithErrorCode ACTION
    BEHAVIOUR
        subscriptionVersionNewSP-
CancellationAcknowledgeWithErrorCodeDefinition,
        subscriptionVersionNewSP-CancellationAcknowledgeWithErrorCodeBehavior;
    MODE CONFIRMED;
    WITH INFORMATION SYNTAX LNP-ASN1.CancellationAcknowledgeAction;
    WITH REPLY SYNTAX LNP-ASN1.CancellationAcknowledgeReplyWithErrorCode;
    REGISTERED AS {LNP-OIDS.lnp-action 19};

subscriptionVersionNewSP-CancellationAcknowledgeWithErrorCodeDefinition
BEHAVIOUR
    DEFINED AS !
```

```
        The subscriptionVersionNewSP-CancellationAcknowledgeWithErrorCode
action is the action that is used via the SOA to NPAC
        SMS interface by the new service provider to acknowledge
        cancellation of a subscriptionVersionNPAC with a status of
        cancel-pending.
    !;

subscriptionVersionNewSP-CancellationAcknowledgeWithErrorCodeBehavior
BEHAVIOUR
    DEFINED AS !
        See subscriptionVersionCancellationAcknowledge ACTION for behaviour
        definition.
        In addition to the existing subscriptionVersionCancellationAcknowledge
        ACTION behaviour, this action's reply contains an optional error code
        to be returned if the action is not successful.
    !;


-- 20.0 LNP Subscription Version Remove From Conflict With Error code

subscriptionVersionRemoveFromConflictWithErrorCode ACTION
    BEHAVIOUR
        subscriptionVersionRemoveFromConflictWithErrorCodeDefinition,
        subscriptionVersionRemoveFromConflictWithErrorCodeBehavior;
    MODE CONFIRMED;
    WITH INFORMATION SYNTAX LNP-ASN1.RemoveFromConflictAction;
    WITH REPLY SYNTAX LNP-ASN1.RemoveFromConflictReplyWithErrorCode;
    REGISTERED AS {LNP-OIDS.lnp-action 20};

subscriptionVersionRemoveFromConflictWithErrorCodeDefinition BEHAVIOUR
    DEFINED AS !
        The subscriptionVersionRemoveFromConflictWithErrorCode action
        is the action that is used via the SOA to NPAC
        SMS interface by either the old or new service provider to set the
        subscription version status from conflict to pending.
    !;

subscriptionVersionRemoveFromConflictWithErrorCodeBehavior BEHAVIOUR
    DEFINED AS !
        See subscriptionVersionRemoveFromConflict ACTION for behaviour
        definition.
        In addition to the existing subscriptionVersionRemoveFromConflict
        ACTION behaviour, this action's reply contains an optional error
        string to be returned if the action is not successful.
    !;


-- 21.0 LNP Old Service Provider Cancellation Acknowledge Request
-- With Error code

subscriptionVersionOldSP-CancellationAcknowledgeWithErrorCode ACTION
    BEHAVIOUR
        subscriptionVersionOldSP-
CancellationAcknowledgeWithErrorCodeDefinition,
        subscriptionVersionOldSP-CancellationAcknowledgeWithErrorCodeBehavior;
    MODE CONFIRMED;
    WITH INFORMATION SYNTAX LNP-ASN1.CancellationAcknowledgeAction;
```

```
    WITH REPLY SYNTAX LNP-ASN1.CancellationAcknowledgeReplyWithErrorCode;
    REGISTERED AS {LNP-OIDS.lnp-action 21};

subscriptionVersionOldSP-CancellationAcknowledgeWithErrorCodeDefinition
BEHAVIOUR
    DEFINED AS !
        The subscriptionVersionOldSP-CancellationAcknowledgeWithErrorCode
action is the action that is used via the SOA to NPAC
        SMS interface by the old service provider to acknowledge
        cancellation of a subscriptionVersionNPAC with a status of
        cancel-pending.
    !;

subscriptionVersionOldSP-CancellationAcknowledgeWithErrorCodeBehavior
BEHAVIOUR
    DEFINED AS !
        See subscriptionVersionOldSP-CancellationAcknowledge ACTION
        for behaviour definition.
        In addition to the existing
        subscriptionVersionOldSP-CancellationAcknowledge ACTION
        behaviour, this action's reply contains an optional error code
        to be returned if the action is not successful.
    !;


-- 3.0 LNP Specific Error Code Parameter

lnpSpecificErrorCodeParameter PARAMETER
    CONTEXT SPECIFIC-ERROR;
    WITH SYNTAX LNP-ASN1.LnpSpecificErrorCode;
    REGISTERED AS {LNP-OIDS.lnp-parameter 3};
```

ASN.1

```
ActivateReplyWithErrorCode ::= SubscriptionVersionActionReplyWithErrorCode

CancellationAcknowledgeReplyWithErrorCode ::=
   SubscriptionVersionActionReplyWithErrorCode

CancelReplyWithErrorCode ::= SubscriptionVersionActionReplyWithErrorCode

DisconnectReply ::= SEQUENCE {
    status SubscriptionVersionActionReply,
    version-id SET OF SubscriptionVersionId OPTIONAL,
    error-code [0] INTEGER LnpSpecificErrorCode OPTIONAL
                                          -- present if status not success
}

DownloadReply ::= SEQUENCE {
    status ENUMERATED {
        success (0),
        failed (1),
        time-range-invalid (2),
        criteria-to-large (3),
```

```
        no-data-selected (4)
    },
    downloaddata [0] CHOICE {
        subscriber-data [0] SubscriptionDownloadData,
        network-data [1] NetworkDownloadData,
        block-data [2] BlockDownloadData
    } OPTIONAL,
    actionId [10] INTEGER OPTIONAL,
    error-code [11] ~~INTEGER~~ LnpSpecificErrorCode OPTIONAL
                                        -- present if status not success
}


ModifyReply ::= SEQUENCE {
    status SubscriptionVersionActionReply,
    invalid-data SubscriptionModifyInvalidData OPTIONAL,
    error-code ~~[0] INTEGER~~ LnpSpecificErrorCode OPTIONAL
                                        -- present if status not success
}

NetworkNotificationRecoveryReply ::= SEQUENCE {
    status ENUMERATED {
        success (0),
        failed (1),
        time-range-invalid (2),
        criteria-to-large (3),
        no-data-selected (4)
    },
   system-choice [0] CHOICE {

        lsms [1] SET OF SEQUENCE {
            managedObjectClass ObjectClass,
            managedObjectInstance ObjectInstance,
            notification CHOICE {
               subscription-version-new-npa-nxx [1] VersionNewNPA-NXX-Recovery,
               lnp-npac-sms-operational-information [2]
                   NPAC-SMS-Operational-InformationRecovery
            }
        },
        soa [2] SET OF SEQUENCE {
            managedObjectClass ObjectClass,
            managedObjectInstance ObjectInstance,
            notification CHOICE {
               subscription-version-new-npa-nxx [1] VersionNewNPA-NXX-Recovery,
               subscription-version-donor-sp-customer-disconnect-date [2]
                   VersionCustomerDisconnectDateRecovery,
               subscription-version-audit-discrepancy-report [3]
                   AuditDiscrepancyRptRecovery,
               subscription-audit-results [4] AuditResultsRecovery,
               lnp-npac-sms-operational-information [5]
                   NPAC-SMS-Operational-InformationRecovery,
               subscription-version-new-sp-create-request [6]
                   VersionNewSP-CreateRequestRecovery,
               subscription-version-old-sp-concurrence-request [7]
                   VersionOldSP-ConcurrenceRequestRecovery,
               subscription-version-old-sp-final-window-expiration [8]
                   VersionOldSPFinalConcurrenceWindowExpirationRecovery,
```

```
                subscription-version-cancellation-acknowledge-request [9]
                    VersionCancellationAcknowledgeRequestRecovery,
                subscriptionVersionStatusAttributeValueChange [10]
                    VersionStatusAttributeValueChangeRecovery,
                attribute-value-change [11] AttributeValueChangeInfo,
                object-creation [12] ObjectInfo,
                object-deletion [13] ObjectInfo,
                numberPoolBlockStatusAttributeValueChange [14]
                    NumberPoolBlockStatusAttributeValueChangeRecovery
            }
        }
    } OPTIONAL,
    actionId [10] INTEGER OPTIONAL,
    error-code [11] INTEGER LnpSpecificErrorCode OPTIONAL
                                        -- present if status not success

}

NewSP-CreateReply ::= SEQUENCE {
    status [0] SubscriptionVersionActionReply,
    invalid-data [1] NewSP-CreateInvalidData OPTIONAL,
    error-code [2] INTEGER LnpSpecificErrorCode OPTIONAL
                                        -- present if status not success
}

NumberPoolBlock-CreateReply ::= SEQUENCE {
    block-id [0] BlockId,
    status [1] ENUMERATED {
        success (0),
        failed (1),
        soa-not-authorized (2),
        no-npa-nxx-x-found (3),
        invalid-data-values (4),
        number-pool-block-already-exists (5),
        prior-to-effective-date (6),
        invalid-subscription-versions (7)
    },
    block-invalid-values [2] NumberPoolBlock-CreateInvalidData OPTIONAL,
    error-code [3] INTEGER LnpSpecificErrorCode OPTIONAL
                                        -- present if status not success
}

OldSP-CreateReply ::= SEQUENCE {
    status SubscriptionVersionActionReply,
    invalid-data OldSP-CreateInvalidData OPTIONAL,
    error-code [0] INTEGER LnpSpecificErrorCode OPTIONAL
                                        -- present if status not success
}

RecoveryCompleteReply ::= SEQUENCE {
    status ResultsStatus,
    subscriber-data [1] SubscriptionDownloadData OPTIONAL,
    network-data [2] NetworkDownloadData OPTIONAL,
    block-data [3] BlockDownloadData OPTIONAL,
    error-code [4] INTEGER LnpSpecificErrorCode OPTIONAL
                                        -- present if status not success
}
```

```
RemoveFromConflictReplyWithErrorCode ::=
    SubscriptionVersionActionReplyWithErrorCode

SubscriptionVersionActionReply ::= ENUMERATED { -- to be removed in release x.0
    success (0),
    failed (1),
    soa-not-authorized (2),
    no-version-found (3),
    invalid-data-values (4),
    version-create-already-exists (5)
}
SubscriptionVersionActionReplyWithErrorCode ::= SEQUENCE {
    status [0] SubscriptionVersionActionReply,
    error-code [1] INTEGER LnpSpecificErrorCode OPTIONAL
                                        -- present if status not success
}

LnpSpecificErrorCode ::= INTEGER
```

Origination Date: 6/16/04

Originator: LNPAWG

Change Order Number: NANC 394

Description: Consistent Behavior of Five-Day Waiting Period Between NPA-NXX-X Creation and Number Pool Block Activation, and Subscription Version Creation and its Activation

Cumulative SP Priority, Weighted Average: 12, (13.64)

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y	Y	Y		Med	TBD	N/A

Business Need:

As specified in the PIM 38 problem statement, "*The current NPA-NXX-X object (1K Pool Block) tunable of five(5) business days between the Create and Activate is too long and acts as a constraint against service providers.*"

Many service providers use the 1K Pool Block methodology (in addition to Number Pooling Activities) to accomplish Network Re-Home and Acquisition activities. Between the NPA-NXX-X (1K Pool Block) Object Creation date and the Block Activation date there is a mandatory five business day tunable period. During this time, service providers cannot conduct SV activity until the NPA-NXX-X is both created and activated at the NPAC. Any activity will result in error transactions or "SOA NOT AUTHORIZED" 7502. The five business day waiting period allows for increased errors as service providers are unable to conduct activities for pending NPA-NXX-X objects.

Currently, the FRS does not require the NPAC to enforce a five business day delay for conventional ports (inter or intra). However, the FRS does require the NPAC to enforce the waiting period for all Number Pool Blocks (NPBs). Since the reason for the interval is to allow time to provision a switch trigger, consistent behavior is desired.

This change order will assist in resolving most of this problem. Since almost all of these NPBs, have already had some porting activity and therefore a first port notification has previously been broadcast, the five day waiting period is not necessary. This change order would require the *NPA-NXX-X Holder Effective Date Window tunable parameter* to be applied in situations only where the first port notification for the corresponding NPA-NXX had not previously been broadcast.

Additionally, this change order would add consistency by requiring the five day waiting period to be applied to SVs (inter or intra) in situations where the first port notification for the corresponding NPA-NXX had not previously been broadcast.

Description of Change:

The functionality for both SV and NPB data within the NPAC will be modified to enforce the waiting period minimum (*NPA-NXX-X Holder Effective Date Window tunable parameter*, defaulted to five business days) only when a first port notification for the corresponding NPA-NXX has NOT previously broadcast.

In the proposed update, once a first port notification for an NPA-NXX has been broadcast, the *NPA-NXX-X Holder Effective Date Window tunable parameter* will not apply for subsequent NPB creates/activates, and will therefore allow NPA-NXX-X Creation to be followed by an immediate NPB Activation.

Additionally, for SV data, the addition of the waiting period minimum will provide a restriction that is currently not in the NPAC. Once a first port notification for an NPA-NXX has been broadcast, the minimum restriction window will not apply for subsequent SV creates/activates.

Appropriate changes will also be made for modifications.

In order to accommodate subsequent data that is created within the five day window, additional functionality will be added to enforce the restriction.

Requirements:

Mar '05 – The requirements listed below in the box have been changed for clarity and consistency. Some of these requirements will be left "as is" (no yellow highlights), and others may be removed/replaced by the new requirements listed at the end of this section.

Modification of current FRS requirements that relate to five-day waiting period for Number Pool Blocks even after first port notification has been previously broadcasted. Changes are highlighted in yellow.

RR3-90 Addition of Number Pooling NPA-NXX-X Holder Information Effective Date Window– Tunable Parameter

DELETED

RR3-91 Addition of Number Pooling NPA-NXX-X Holder Information Effective Date Window – Tunable Parameter Default

DELETED

RR3-92 Addition of Number Pooling NPA-NXX-X Holder Information Effective Date – Validation

DELETED

RR3-93 Addition of Number Pooling NPA-NXX-X Holder Information Effective Date – OpGUI Default

NPAC SMS shall set the time portion of the Effective Date Timestamp to 00:00 Central Time, and not allow the NPAC Personnel to modify the Time portion of the Effective Date, on the NPAC Administrative Interface. (Previously N-170)

RR3-99 Modification of Number Pool NPA-NXX-X Holder Information Effective Date – Validation for Current Date

DELETEDRR3-100 Modification of Number Pool NPA-NXX-X Holder Information Effective Date – Validation for Tunable

DELETED

Modification of current FRS requirements to add a five-day waiting period for Subscription Versions if the first port notification has not previously been broadcasted. Changes are highlighted in yellow.

R5-18.3 Create Subscription Version - Due Date Validation

DELETED

RR5-6.3 Create "Intra-Service Provider Port" Subscription Version - Due Date Validation

DELETED

R5-29.2 Modify Subscription Version - Due Date Validation

DELETEDRR5-54 Modify Subscription Version - Due Date Validation for NPA-NXX Effective Date

DELETED

Req 1 NPA-NXX Availability – First Usage Effective Date Window– Tunable Parameter

NPAC SMS shall provide a First Usage Effective Date Window tunable parameter which is defined as the minimum length of time between the current date (exclusive) and the effective date/due date (inclusive), when Creating a NPA-NXX-X or Subscription Version for the first time within that NPA-NXX.

Note: If the current date is Tuesday the 2nd, the tunable is set to 5 business days, and the port is using short business days (i.e., Monday-Friday), then the minimum effective date for the NPA-NXX-X or Subscription Version would be Tuesday the 9th.

Req 2 NPA-NXX Availability – First Usage Effective Date Window – Tunable Parameter Default

NPAC SMS shall default the First Usage Effective Date Window tunable parameter to five (5) business days.

Note: The value of five (5) business days is selected because of the first port notification, since this would affect SPs operationally if this value is set to less than five business days.

Req 2.5 NPA-NXX Availability – First Usage Effective Date Window – Tunable Parameter Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the First Usage Effective Date Window tunable parameter.

Req 3 NPA-NXX– Live TimeStamp

NPAC SMS shall calculate an NPA-NXX Live TimeStamp for every NPA-NXX, which is the sum of the First Port Notification Broadcast TimeStamp (or the current system TimeStamp in cases where the first port notification has NOT been sent), plus the First Usage Effective Date Window tunable parameter.

Note: This is an internal TimeStamp, and therefore, not represented in the NPA-NXX Data Model.

Req 4 Addition of Number Pooling NPA-NXX-X Holder Information Effective Date – Validation

NPAC SMS shall verify that the Effective Date is equal to, or greater than, the NPA-NXX Live TimeStamp, and greater than or equal to the current date, when adding an NPA-NXX-X.

Req 5 Modification of Number Pooling NPA-NXX-X Holder Information Effective Date – Validation

NPAC SMS shall verify that the Effective Date is equal to, or greater than, the NPA-NXX Live TimeStamp, and greater than or equal to the current date, when modifying an NPA-NXX-X.

Req 6 Addition of Subscription Version Due Date – Validation

NPAC SMS shall verify that the Due Date is equal to, or greater than, the NPA-NXX Live TimeStamp, and greater than or equal to the current date, when adding a Subscription Version.

Note: For an Inter-Service Provider port, the due date may be a past date when it is the 2nd create for the subscription version (see requirement RR5-119).

Req 7 Modification of Subscription Version Due Date – Validation

NPAC SMS shall verify that the Due Date is equal to, or greater than, the NPA-NXX Live TimeStamp, and greater than or equal to the current date, when modifying a Subscription Version.

Req 8 Regional NPAC NPA-NXX Live Indicator

NPAC SMS shall provide a Regional NPAC NPA-NXX Live Indicator, which is defined as an indicator on whether or not NPA-NXX Live TimeStamp functionality will be supported by the NPAC SMS for a particular NPAC Region.

Req 9 Regional NPAC NPA-NXX Live Indicator Modification

NPAC SMS shall provide a mechanism for NPAC Personnel to modify the Regional NPAC NPA-NXX Live Indicator.

Req 10 Regional NPAC NPA-NXX Live Indicator – Default Value

NPAC SMS shall default the Regional NPAC NPA-NXX Live Indicator to **TRUE**.

RR3-64 Number Pool NPA-NXX-X Holder Information – NPA-NXX Effective Date

DELETED

RR3-98 Modification of Number Pool NPA-NXX-X Holder Information Effective Date Window – Tunable Parameter Modification

DELETED

RR5-44 Create Subscription Version – Due Date Validation for NPA-NXX effective date

DELETED

RR5-45 Create “Intra-Service Provider Port” Subscription Version – Due Date Validation for NPA-NXX effective date

DELETED

RR5-53 Create Subscription Version - Notify NPA-NXX First Usage of a New NPA-NXX involved in an NPA Split

NPAC SMS shall notify all accepting Local SMSs and SOAs of the NPA-NXX, effective date, and owning Service Provider when a new NPA-NXX involved in an NPA Split, is being ported for the first time, after the start of permissive dialing, immediately after creation validation of a Subscription Version, only in cases where no SV or NPA-NXX-X activity had previously taken place in the Old NPA-NXX.

Appendix C – System Tunables

BLOCK TUNABLES				
Tunable Name	**Tunable Variable Name**	**Default Value**	**Units**	**Valid Range**
~~**NPA-NXX-X Holder Information Effective Date Window**~~	~~NPA-NXX-X Holder Information Effective Date Window~~	~~5~~	~~business days~~	~~5-360~~
~~Minimum length of time between the Creation date and the effective date when creating or modifying an NPA-NXX-X. This minimum length of time restriction only applies in cases where the first usage notification for the corresponding NPA-NXX has **NOT** previously been broadcast.~~				
First Usage Effective Date Window	First Usage Effective Date Window	5	business days	5-360
Minimum length of time between the Creation date and the effective date when creating an NPA-NXX-X or Subscription Version for the first time within that NPA-NXX.				

Table C- -- Block Tunables

IIS

Mar ’05 – The flow descriptions listed below in the box will also be changed for clarity and consistency, similarly to the requirements section above.

Removal of current IIS flow descriptions that relate to five-day waiting period for Number Pool Blocks even after first port notification has been previously sent.

Flow B.4.3.1 – Service Provider NPA-NXX-X Create by NPAC SMS

#1. second bullet point.
The effective date is greater than or equal to the ~~effective date of the serviceProvNPA-NXX~~ NPA-NXX Live TimeStamp.

#1. third bullet point.
The effective date is greater than or equal to the current date.

Flow B.4.3.2 – Service Provider NPA-NXX-X Modification by NPAC SMS

#2.
NPAC SMS responds indicating whether the modification was successful. The update request will fail if the effective timestamp is less than the NPA-NXX Availability Live TimeStamp, or if the current date is greater than or equal to the object's current effective timestamp.

GDMO

Mar '05 – The GDMO behaviour descriptions listed below in the box will also be changed for clarity and consistency, similarly to the requirements section above.

Addition of current GDMO behavior description that relate to five-day waiting period for Subscription Versions regarding the first port notification.

```
-- 21.0 LNP NPAC Subscription Version Managed Object Class

subscriptionVersionNPAC MANAGED OBJECT CLASS
    DERIVED FROM subscriptionVersion;
    CHARACTERIZED BY
        subscriptionVersionNPAC-Pkg;
    REGISTERED AS {LNP-OIDS.lnp-objectClass 21};

subscriptionVersionNPAC-Behavior BEHAVIOUR
    DEFINED AS !
```

•••

```
Upon subscription version creation, the subscriptionOldSP-DueDate and
subscriptionNewSP-DueDate must match. If the due date for the port is a
previous date, the NPAC SMS accepts a value of a previous date from a service
provider, in order to match the due date of the port that was previously
received from the other Service Provider (new or old). The first submitted
due date (either subscriptionNewSP-DueDate or subscriptionOldSP-DueDate) must
be greater than or equal to BOTH the current date AND the NPA-NXX Live
Timestamp, otherwise an error will be returned.


Validation will be done for both old and new service provider data that is
specified on an M-SET. If validation fails, no changes will be made and a
processing failure will be returned. If the version passes validation, the
version status will be set to pending. An error message will be returned to
```

the service provider if the status is not pending when they attempt to change the version status to cancel-pending.

When modifying a subscription version (M-ACTION or M-SET), a change in due date (either subscriptionNewSP-DueDate or subscriptionOldSP-DueDate) will be edited. The updated due date must be greater than or equal to BOTH the current dateAND the NPA-NXX Live Timestamp, otherwise an error will be returned.

Once a pending version has been created, the new service provider can activate the subscription version if the new service provider due date has been reached and the NPA-NXX effective date has been reached.

Removal of current GDMO behavior description that relate to five-day waiting period for Number Pool Blocks even after first port notification has been previously sent.

```
-- 31.0 Service Provider NPA-NXX-X Data Managed Object Class
--
serviceProvNPA-NXX-X MANAGED OBJECT CLASS
    DERIVED FROM "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992":top;
    CHARACTERIZED BY
        serviceProvNPA-NXX-X-Pkg;
    REGISTERED AS {LNP-OIDS.lnp-objectClass 31};

serviceProvNPA-NXX-X-Behavior BEHAVIOUR
    DEFINED AS !
```

•••

An object creation attempt will be rejected by the NPAC SMS if any subscription versions exist with a status of pending, conflict, cancel-pending or failed ("pending-like") for a TN implied by the NPA-NXX-X value and an active subscription version object does not exist for that TN or the subscription version is a port-to-original request. Additionally, an object creation attempt will be rejected by the NPAC SMS if, the date of the serviceProvNPA-NXX-X-EffectiveTimeStamp is NOT greater than or equal to BOTH the current date AND the NPA-NXX Live Timestamp.

NPAC SMS personnel can modify the date of the serviceProvNPA-NXX-X-EffectiveTimeStamp only prior to the number pool block activation. The updated date must be greater than or equal to BOTH the current date, AND the NPA-NXX Live Timestamp.

```
-- 7.0 LNP Subscription Version Modify Action

subscriptionVersionModify ACTION
```

```
    BEHAVIOUR
        subscriptionVersionModifyDefinition,
        subscriptionVersionModifyBehavior;
    MODE CONFIRMED;
    WITH INFORMATION SYNTAX LNP-ASN1.ModifyAction;
    WITH REPLY SYNTAX LNP-ASN1.ModifyReply;
    REGISTERED AS {LNP-OIDS.lnp-action 7};

subscriptionVersionModifyDefinition BEHAVIOUR
    DEFINED AS !
        The subscriptionVersionModify action is the action that can be
        used by the SOA to modify a subscription version via the SOA to
        NPAC SMS interface.
    !;

subscriptionVersionModifyBehavior BEHAVIOUR
    DEFINED AS !

When modifying a subscription version (M-ACTION), a change in due date (either
subscriptionNewSP-DueDate or subscriptionOldSP-DueDate) will be edited.  The
updated date must be greater than or equal to BOTH the current date AND the
NPA-NXX Live Timestamp, otherwise an error will be returned.


    !;
```

ASN.1 (same change as NANC 388)

```
SubscriptionModifyData ::= SEQUENCE {
    subscription-lrn [0] LRN OPTIONAL,
    subscription-new-sp-due-date [1] GeneralizedTime OPTIONAL,
    subscription-old-sp-due-date [2] GeneralizedTime OPTIONAL,
    subscription-old-sp-authorization [3] ServiceProvAuthorization OPTIONAL,
    subscription-class-dpc [4] EXPLICIT DPC OPTIONAL,
    subscription-class-ssn [5] EXPLICIT SSN OPTIONAL,
    subscription-lidb-dpc [6] EXPLICIT DPC OPTIONAL,
    subscription-lidb-ssn [7] EXPLICIT SSN OPTIONAL,
    subscription-isvm-dpc [8] EXPLICIT DPC OPTIONAL,
    subscription-isvm-ssn [9] EXPLICIT SSN OPTIONAL,
    subscription-cnam-dpc [10] EXPLICIT DPC OPTIONAL,
    subscription-cnam-ssn [11] EXPLICIT SSN OPTIONAL,
    subscription-end-user-location-value [12] EndUserLocationValue OPTIONAL,
    subscription-end-user-location-type [13] EndUserLocationType OPTIONAL,
    subscription-billing-id [14] BillingId OPTIONAL,
    subscription-status-change-cause-code [15]
        SubscriptionStatusChangeCauseCode OPTIONAL,
    subscription-wsmsc-dpc [16] EXPLICIT DPC OPTIONAL,
    subscription-wsmsc-ssn [17] EXPLICIT SSN OPTIONAL,
    subscription-customer-disconnect-date [18] GeneralizedTime OPTIONAL,
    subscription-effective-release-date [19] GeneralizedTime OPTIONAL,
```

```
      new-version-status [20] VersionStatus OPTIONAL
}

SubscriptionModifyInvalidData ::= CHOICE {
    subscription-lrn [0] EXPLICIT LRN,
    subscription-new-sp-due-date [1] EXPLICIT GeneralizedTime,
    subscription-old-sp-due-date [2] EXPLICIT GeneralizedTime,
    subscription-old-sp-authorization [3] EXPLICIT ServiceProvAuthorization,
    subscription-class-dpc [4] EXPLICIT DPC,
    subscription-class-ssn [5] EXPLICIT SSN,
    subscription-lidb-dpc [6] EXPLICIT DPC,
    subscription-lidb-ssn [7] EXPLICIT SSN,
    subscription-isvm-dpc [8] EXPLICIT DPC,
    subscription-isvm-ssn [9] EXPLICIT SSN,
    subscription-cnam-dpc [10] EXPLICIT DPC,
    subscription-cnam-ssn [11] EXPLICIT SSN,
    subscription-end-user-location-value [12] EXPLICIT EndUserLocationValue,
    subscription-end-user-location-type [13] EXPLICIT EndUserLocationType,
    subscription-billing-id [14] EXPLICIT BillingId,
    subscription-status-change-cause-code [15]
          EXPLICIT SubscriptionStatusChangeCauseCode,
    subscription-wsmsc-dpc [16] EXPLICIT DPC,
    subscription-wsmsc-ssn [17] EXPLICIT SSN,
    subscription-customer-disconnect-date [18] EXPLICIT GeneralizedTime,
    subscription-effective-release-date [19] EXPLICIT GeneralizedTime,
    new-version-status [20] EXPLICIT VersionStatus
}
```

Origination Date: 12/6/99

Originator: LNPA WG

Change Order Number: NANC 300

Description: Resend Exclusion for Number Pooling

Cumulative SP Priority, Weighted Average: 13, (14.00)

Functional Backwards Compatible: NO

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y		Y		Med	Med-Low	Med-Low

Business Need:

When information about ported (or pooled) numbers is broadcast, no changes in this information can be subsequently broadcast until all service providers' LSMSs have acknowledged successful receipt of the original broadcast. That is, no changes can be made to SVs in a "partial failure" condition. This limitation is being corrected for ported telephone numbers in NPAC Release 4.0. However, a ported pooled thousands block remains subject to this restriction. Change Order NANC 300, proposed for NPAC release 5.0, effectively removes the restriction and allows changes to be made to ported pooled thousands blocks in a partial failure condition.

The business need for this change is the need to promptly correct erroneous NPAC broadcast information about ported pooled blocks. For example, there may be an error in the LRN associated with the pooled thousands block; this would render the block's thousand numbers unusable until the correct LRN information could be modified and broadcast by NPAC. This is less serious a problem than the inability to change an existing ported customer's SV, at least if the error is discovered before numbers from the pooled block are assigned to end-users. However, even if no numbers are yet assigned to end-users, it is important to be able to correct errors promptly rather than being held hostage to a particular service provider's inability to receive or acknowledge broadcasts when the original pooled block broadcast was made. An LSMS can be off line for days during which time no numbers from the block could be used. INC guidelines state that the pooled numbers can be used the following day, which would make it imperative that the block be able to be modified.

An additional need for this change order is contaminated working numbers missed by the code holder at the time of block donation, that need to be intra-service provider ported for a Number Pool Block, that contains a Partial Failure status (which currently cannot be performed until the Number Pool Block is Active).

A process is available that could be implemented by NPAC personnel for such situations – using NPA-NXX filters – but the process is risky and very likely to cause greater problems. A higher definition filter therefore is necessary to avoid the problems introduced by use of existing NPA-NXX filter. The 10-digit filter provided in release 4.0 is not feasible for addressing the problem

of pooled thousands blocks. Hence this change order which proposes a 7-digit (NPA-NXX-X) filter.

Description of Change:

This is an extension of NANC 227. During the Dec 99 LNPA-WG meeting, it was proposed to remove Number Pooling functionality from NANC 227, and create a new change order for this functionality. This functionality was removed from NANC 227 because it was too much for Release 4.0.

The NPAC SMS currently rejects a request to "modify active" or "disconnect" a Number Pool Block or SVs of LNP type POOL that has a partial failure status. Nothing can be done to the Block/SV until the discrepant LSMS(s) come back on line, and either recover the broadcast, or accept a re-send from the NPAC SMS.

Similar to NANC 227 for non-pooled SVs, the NPAC should provide a mechanism that allows activity (modify, disconnect, subsequent port) on the Block/SV, regardless of the Failed SP List. This will be done via the resend exclusion functionality (defined in NANC 227), which is a mechanism that allows a Service Provider to be removed from a Failed SP List.

Jun 99: during the Pooling Assumptions walk-thru, four SV requirements were modified, and the functionality was moved into this change order. Basically, the “partial failure/failed” text is moved to this change order. The affected requirements are listed below:

SV-230 Modification of Number Pooling Subscription Version Information – Subscription Data

SV-240 Modification of Number Pooling Subscription Version Information – Status Update to Sending

SV-270 Modification of Number Pooling Subscription Version Information – Status Update

SV-280 Modification of Number Pooling Subscription Version Information – Failed SP List

May 00: using the resend exclusion functionality eliminates the need to update the above four requirements. Other requirements will need to be written to define the functionality.

Requirements:

Req 1 Number Pool Block Failed SP List – Exclusion of a Service Provider from Resend

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to request that a Service Provider be excluded from the Number Pool Block Failed SP List when resending a number pool block and the associated subscription version(s) of LNP type POOL, and not broadcast to the Service Provider that is excluded.

Req 2 Number Pool Block Failed SP List – Logging of an Excluded Service Provider

NPAC SMS shall log the following information when a Service Provider is excluded from the Failed SP List based on a request by NPAC Personnel via the NPAC Administrative Interface: date, time, excluded SPID, Blockholder SPID, NPA-NXX-X, Number Pool Block ID.

Req 3 Number Pool Block Failed SP List – Recovery of Excluded Service Provider Subscription Versions

NPAC SMS shall, for a recovery of number pool block data, in instances where the NPAC SMS excluded the Service Provider from the Failed SP List based on a request by NPAC Personnel via the NPAC Administrative Interface, allow the Local SMS to recover a Number Pool Block or its associated pool-type subscription versions with all current attributes, even though the Service Provider is no longer on the Failed SP List.

Req 4 Number Pool Block Failed SP List – Excluded Service Provider Log Data Availability for the Excluded Service Provider Report

NPAC SMS shall allow the Excluded Service Provider log data to be available for the Excluded Service Provider Report.

Req 5 Number Pool Block Failed SP List –Resend Excluded Service Provider Report by Current SPID/Blockholder SPID via OpGUI

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to generate the Resend Excluded Service Provider Report by Current SPID/Blockholder SPID on Excluded Service Provider log data.

Req 6 Number Pool Block Failed SP List – Resend Excluded Service Provider Report Request by Current SPID/Blockholder SPID

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to specify time range and Current SPID/Blockholder SPID option (of either an individual SPID or all SPIDs in the failed SP list) when generating the Resend Excluded Service Provider Report by Current SPID/Blockholder SPID on Excluded Service Provider log data.

Req 7 Number Pool Block Failed SP List – Resend Excluded Service Provider Report by Current SPID/Blockholder SPID Request Sort Criteria

NPAC SMS shall use the following sort order when generating the Resend Excluded Service Provider Report by Current SPID/Blockholder SPID on Excluded Service Provider log data:

1. Current SPID/Blockholder SPID (ascending)
2. TN/NPA-NXX-X (ascending)
3. date/time (earliest date/time to latest date/time)
4. excluded SPID (ascending)
5. SVID/Number Pool Block -ID (ascending)

Req 8 Number Pool Block Failed SP List –Resend Excluded Service Provider Report by Excluded SPID via OpGUI

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to generate the Resend Excluded Service Provider Report by Excluded SPID on Excluded Service Provider log data.

Req 9 Number Pool Block Failed SP List – Resend Excluded Service Provider Report by Excluded SPID Request

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to specify time range and excluded SPID option (of either an individual SPID or all SPIDs) when generating the Resend Excluded Service Provider Report by Excluded SPID on Excluded Service Provider log data.

Req 10 Number Pool Block Failed SP List –Resend Excluded Service Provider Report by Excluded SPID Request Sort Criteria

NPAC SMS shall use the following sort order when generating the Excluded Service Provider Report on Excluded Service Provider log data:

1. excluded SPID (ascending)
2. TN/NPA-NXX-X (ascending)
3. date/time (earliest date/time to latest date/time)
4. Current SPID/Blockholder SPID (ascending)
5. SVID/Number Pool Block -ID (ascending)

Note: The TN and SVID attributes were added to requirements 7 & 10 in this change order because of the corresponding change order (NANC 227/254) for SVs in Release 4.0.

RX9-6 Log File Reports

NPAC SMS shall support the following log file reports for NPAC personnel using the NPAC Administrative Interface:

22. History Report
23. Error Report
24. Service Provider Notification Report
25. Subscription Transaction Report
26. Service Provider Administration Report
27. Subscription Administration Report
28. Resend Excluded Service Provider Report

IIS

No change required.

GDMO

```
-- 30.0 Number Pool Block NPAC Data Managed Object Class

numberPoolBlockNPAC MANAGED OBJECT CLASS
…
numberPoolBlockNPAC-Behavior BEHAVIOUR
    DEFINED AS !
…
```

Insert at the end of the section:

If NPAC Personnel via the NPAC Administrative Interface, exclude a Service Provider from the numberPoolBlockFailed-SP-List, the list of Service Providers will not accurately reflect those Local SMSs that successfully processed this number pool block.

…

```
-- 1.0 LNP Download Action

lnpDownload ACTION
    BEHAVIOUR
        lnpDownloadDefinition,
        lnpDownloadBehavior;
    MODE CONFIRMED;
    WITH INFORMATION SYNTAX LNP-ASN1.DownloadAction;
    WITH REPLY SYNTAX LNP-ASN1.DownloadReply;
    REGISTERED AS {LNP-OIDS.lnp-action 1};

lnpDownloadDefinition BEHAVIOUR
    DEFINED AS !
        The lnpDownload action is the action that is used by the Local SMS
        and SOA to specify the objects to be downloaded from the NPAC SMS.
    !;

lnpDownloadBehavior BEHAVIOUR
    DEFINED AS !
        Preconditions: This action is issued from an lnpSubscriptions
        or an lnpNetwork object and all objects to be downloaded
        are specified in the action request.

        Postconditions: After this action has been executed by the Local
        SMS or SOA specifying which objects to download, the NPAC SMS will
        determine which objects satisfy the download request and return
        them in the download action reply. Creation, deletion, and
        modification information will be included in the reply.  All data
        for objects that have been modified is downloaded not just the
        information that was modified. The download reason is set to
        'new1' for a new object, 'delete1' for a deleted object
        and 'modified' for a modified object.

        An LSMS may receive subscription or number pool block data during
        recovery, where more than one activity occurred for a given subscription
        version or number pool block during the time the LSMS was not available.
        This will occur when NPAC Personnel via the OpGUI, exclude a Service
        Provider from the Failed SP List to allow the current Service Provider to
        perform some type of subsequent activity on that subscription version or
        number pool block.  Hence, when the LSMS performs recovery, the recovered
        data will contain data for the both activities (all current attributes).
        So, if the recovering LSMS is recovering a modified subscription version
        or number pool block for which it did not receive the initial M-CREATE,
        the download reason is set to 'modified' for this subscription version
        or number pool block object.

        …
```

```
!;
```

ASN.1

No change required

Origination Date: 4/12/02

Originator: NeuStar

Change Order Number: NANC 352

Description: Recovery Enhancements – Recovery of SPID

Cumulative SP Priority, Weighted Average: 14, (14.27)

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y	Y	Y	Y	Med	Med-Low	Med-Low

Business Need:

The NPAC SMS allows for the recovery of missed messages for network data, block data, and SV data. However, the NPAC functionality based on current requirements does not allow recovery of customer information (SPIDs). So, if customer information is downloaded, and the Service Provider misses it, it is not recoverable.

This new functionality would improve the recovery process by adding customer (i.e., header data) to the list of recoverable messages, so that subordinate network/block/SV data does not cause rejects or errors.

Description of Change:

Implement a new optional recovery request that allows the Service Provider to recover customer information (SPIDs). This new optional feature would send missed customer adds, modifies, or deletes to the Service Provider during the recovery process.

A Service Provider could implement this optional feature at any time, and would send this request during the recovery process similar to the requests sent for network, block, and SV data today.

The data representation would be something like, SPID, text, and download reason.

Major points/processing flow/high-level requirements:

1. This recovery of SPID enhancement will implement a new recovery request type. This will be used with the lnpDownload message. This is optional functionality.
2. This recovery of SPID enhancement only applies to recovery mode, not normal mode.
3. No reports are required for this recovery enhancement.
4. The data representation would include, SPID, SP name, and download reason.

5. NPAC regional tunables will be added for 187-Linked Replies capable Service Providers (maximum recoverable data, Blocking Factor).
6. No Service Provider specific tunables are required for this recovery enhancement.
7. This new request type can be used by both 187-Service Providers (linked replies will be sent), and non-187-Service Providers (regular non-linked reply will be sent).
8. SOA/LSMS associates to the NPAC and uses the new request type with the lnpDownload message. The NPAC:
    a. Validates the message by the requesting SOA/LSMS
    b. Validates maximum recovery size (if over the max size, an error message is returned)
    c. Uses SP Profile flags for linked replies
    d. Skips checks for SP Profile flags for ranges, notification types, EDR, and skips check for NPA-NXX filters
    e. Packages up and sends the maximum data given the different variables and tunable settings. This process continues until all requested recoverable data has been sent to the requesting SOA/LSMS.
9. Upon completion of recovery, SOA/LSMS sends existing recovery complete message (lnpRecoveryComplete), and processing between SOA/LSMS and NPAC continues in normal mode.

Note: If NANC 351 is implemented at the same as this change order, changes will need to be made to this documented functionality to support SWIM recovery of SPID data.

Requirements:

Req 1 Service Provider Data Recovery

NPAC SMS shall provide a mechanism that allows a SOA or LSMS to recover service provider downloads that were missed during a broadcast to the SOA or LSMS.

Req 2 Service Provider Data Recovery Only in Recovery Mode

NPAC SMS shall allow a SOA or LSMS to recover service provider data ONLY in recovery mode.

Req 3 Service Provider Data Recovery – Order of Recovery

NPAC SMS shall recover all service provider data download broadcasts in time sequence order when service provider recovery is requested by the SOA or LSMS.

Req 4 Service Provider Data Recovery – Time Range Limit

NPAC SMS shall use the Maximum Download Duration Tunable to limit the time range requested in a service provider data recovery request.

Req 5 Service Provider Data Recovery – SOA and LSMS Independence

NPAC SMS shall support the recovery of service provider data for the SOA and LSMS as independent requests.

Req 6 Service Provider Data Recovery – SOA Network Data

NPAC SMS shall allow the SOA to only recover service provider data downloads intended for the SOA.

Req 7 Service Provider Data Recovery – LSMS Network Data

NPAC SMS shall allow the LSMS to only recover service provider data downloads intended for the LSMS.

Req 8 Service Provider Data Recovery – ~~Network~~ Service Provider Data Criteria

NPAC SMS shall support the following service provider data download criteria:

- ~~Time-range (optional)~~
- Single Service Provider with optional time range, or all Service Providers with optional time range~~(required)~~
- **SWIM** (**S**end **W**hat **I** **M**issed)

~~Req 9 Service Provider Data Recovery – Network Data Choices~~

~~NPAC SMS shall require one of the following service provider data download choices:~~

- ~~service-provider-data (with one of the two selections below)~~
  - ~~service-provider-ID~~
  - ~~all~~

RR3-336 NPAC Customer SOA Linked Replies Indicator

NPAC SMS shall provide a mechanism to indicate whether a Service Provider supports receiving Service Provider, Network and Notification Recovery Responses as Linked Replies to their SOA, via the SOA to NPAC SMS Interface. (Previously NANC 187 Req 1)

RR3-339 NPAC Customer Local SMS Linked Replies Indicator

NPAC SMS shall provide a mechanism to indicate whether a Service Provider supports receiving Service Provider, Network, Subscription, and Notification Recovery Responses as Linked Replies to their Local SMS, via the NPAC SMS to Local SMS Interface. (Previously NANC 187 Req 6)

RR3-342 Service Provider and Network Data Linked Replies Blocking Factor – Tunable Parameter

NPAC SMS shall provide a Network Data Linked Replies Blocking Factor tunable parameter which is defined as the number of objects in a single linked reply sent in response to a Service Provider or network data recovery request sent by a SOA/LSMS, when the SOA/LSMS supports Linked Replies. (Previously NANC 187 Req 12)

RR3-351 Service Provider and Network Data Maximum Linked Recovered Objects – Tunable Parameter

NPAC SMS shall provide a Network Data Maximum Linked Recovered Objects tunable parameter which is defined as the maximum number of objects sent in response to a Service Provider or network data recovery request sent by a SOA/LSMS, when the SOA/LSMS supports Linked Replies. (Previously NANC 187 Req 26)

Req 10 Linked Replies Information – Sending Linked Replies During Service Provider Data Recovery to SOA

NPAC SMS shall send Service Provider data in response to a recovery request, via the SOA to NPAC SMS Interface, to a SOA that support Linked Replies, in groups of objects based on the Network Data Linked Replies Blocking Factor tunable parameter value.

Req 11 Linked Replies Information – Sending Linked Replies During Service Provider Data Recovery to Local SMS

NPAC SMS shall send Service Provider data in response to a recovery request, via the NPAC SMS to Local SMS Interface, to a Local SMS that support Linked Replies, in groups of objects based on the Network Data Linked Replies Blocking Factor tunable parameter value.

Req 12 Linked Replies Information – Service Provider Data Recovery Maximum Size to SOA

NPAC SMS shall allow Service Provider data in response to a recovery request, via the SOA to NPAC SMS Interface, to a SOA that support Linked Replies, to be as large as the Network Data Maximum Linked Recovered Objects tunable parameter value.

Req 13 Linked Replies Information – Service Provider Data Recovery Maximum Size to Local SMS

NPAC SMS shall allow Service Provider data in response to a recovery request, via the NPAC SMS to Local SMS Interface, to a Local SMS that support Linked Replies, to be as large as the Network Data Maximum Linked Recovered Objects tunable parameter value.

IIS

Modification of existing IIS Flows – The flow pictures for recovery remain the same, i.e., M-ACTION Response (network data). The words of the flow descriptions will be changed to include SPID.

B.7 Local SMS and SOA Recovery

...

It is optional as to whether the Local SMS recovers Service Provider Data, Network Data, Subscription Data, Notification Data, or any combination of the four; and if the SOA recovers the Service Provider Data, Network Data, Notification Data, or any combination of the three. For an Local SMS or SOA that initiates recovery, the only step that is required is the lnpRecoveryComplete message, at the end of all previous data recovery requests. This instructs the NPAC SMS to send previously queued messages, at the next scheduled retry interval, and resume normal processing.

It is also expected that the order of recovery would be Service Provider Data, followed by Network Data, Subscription Data, then Notification Data.

GDMO

```
-- 17.0 LNP Service Provider Network Managed Object Class

serviceProvNetwork MANAGED OBJECT CLASS
    DERIVED FROM "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992":top;
    CHARACTERIZED BY
        serviceProvNetworkPkg;
    CONDITIONAL PACKAGES
        serviceProvDownloadReasonPkg PRESENT IF
            !the service provider has the download reason populated!;
    REGISTERED AS {LNP-OIDS.lnp-objectClass 17};


serviceProvNetworkPkg PACKAGE
    BEHAVIOUR
        serviceProvNetworkDefinition,
        serviceProvNetworkBehavior;
    ATTRIBUTES
        serviceProvID GET,
        serviceProvName GET-REPLACE,


-- 46.0 Service Provider Download Reason Package

serviceProvDownloadReasonPkg PACKAGE
    BEHAVIOUR serviceProvDownloadReasonPkgBehavior;
    ATTRIBUTES
```

```
        serviceProvDownloadReason GET-REPLACE;
    REGISTERED AS {LNP-OIDS.lnp-package 46};

serviceProvDownloadReasonPkgBehavior BEHAVIOUR
    DEFINED AS !
        This package provides for conditionally including the
        serviceProvDownloadReason attribute.
    !;

    ;
```

ASN.1

```
DownloadAction ::= CHOICE {
    subscriber-download [0] EXPLICIT SubscriptionDownloadCriteria,
    network-download [1] NetworkDownloadCriteria,
    block-download [2] BlockDownloadCriteria,
    service-prov-download [3] ServiceProvDownloadCriteria
}

ServiceProvDownloadCriteria::= SEQUENCE {
    time-range [0] TimeRange OPTIONAL,
    service-prov-choice [1] EXPLICIT CHOICE {
        service-prov [0] ServiceProvId,
        all-service-provs [1] NULL
    }
}

DownloadReply ::= SEQUENCE {
    status ENUMERATED {
        success (0),
        failed (1),
        time-range-invalid (2),
        criteria-to-large (3),
        no-data-selected (4)
    },
    downloaddata CHOICE {
        subscriber-data [0] SubscriptionDownloadData,
        network-data [1] NetworkDownloadData,
        block-data [2] BlockDownloadData,
         service-prov-data [3] ServiceProvDownloadData


    } OPTIONAL
}

ServiceProvDownloadData  ::= SET OF SEQUENCE {
        service-prov-id [0] ServiceProvId,
         service-prov-type [1] ServiceProviderType OPTIONAL,
        service-prov-name [2] ServiceProvName OPTIONAL,
        service-prov-download-reason [3] DownloadReason

    },

SwimDownloadDataType ::= CHOICE {
    subscriber-download   [0] NULL,
```

```
    network-download       [1] NULL,
    block-download         [2] NULL,
    service-prov-download  [3] NULL
}
```

Origination Date: 5/6/03

Originator: LNPAWG APT

Change Order Number: NANC 383

Description: Separate SOA Channel for Notifications

Cumulative SP Priority, Weighted Average: 15, (15.45)

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y	Y	Y		Med	Med	N/A

Business Need:

Currently, most SOAs have one association to the NPAC SMS over which all interface traffic is sent and received. As volume increases over the interface, a SOA may desire a separate channel for notification traffic. This change order would separate out notifications with other messages, such that a separate channel will be established for SOA notifications versus all other SOA messages. This performance related change order allows additional throughput on both channels.

Description of Change:

The NPAC SMS would support a separate channel for SOA notifications and manage the distribution of transactions to the SOA such that notification are send on one channel and all other SOA traffic is sent on a different channel.

Major points/processing flow/high-level requirements:

1. The NPAC exchanges messages with the SOA. For every request from either the SOA or NPAC, a response is required from the recipient system. In overload situations, many messages (including requests, responses, and notifications) can be backed up.
    a. Requests and responses have a higher priority than all notifications, so in an overload situation all requests/responses are processed before starting on the notifications, regardless of origination time. The algorithm is "*whatever-comes-in, highest-priority-is-first-out*".
    b. In order to alleviate the backlog in an overload situation, a SOA will be allowed to establish a dedicated SOA association for notifications. This will allow the current SOA association to have a "*first-in, first-out*" algorithm for requests/responses, and the notification association will also have a "*first-in, first-out*" algorithm for notification.

2. A new SP specific tunable, SOA Notification Channel (SNC), will indicate whether or not a SOA supports receiving request/response messages (network data, SV data) on one SOA association and SOA notifications on a separate SOA association.
3. SNC (when value set to TRUE) will be used to allow a Service Provider to establish a SOA association specifically for notifications.
4. SOA function masks will be changed to handle the SOA requests/responses and notifications transmitting across their applicable SOA associations.
5. NPAC processing in a SNC environment. Applicable for Service Providers with SNC set to TRUE.

a. When a Service Provider **does not support** SNC with the NPAC:
    i. All SOA traffic (network data, SV data, notifications) flow across the one SOA association.
    ii. Priority of messages is based on current functionality.
    iii. SOA Recovery is based on current functionality.

b. When a Service Provider **does support** SNC with the NPAC:
    i. In instances where only one SOA association is available, the NPAC sends all applicable SOA traffic (network data, SV data, notifications) across the one SOA association based on the functionality mask defined for that SOA association.
    ii. In instances where a separate SOA notification has been established, the NPAC sends all data based on functionality mask. The standard configuration includes, all non-notification SOA traffic (network data, SV data) across the one SOA association, and all notification SOA traffic across the other SOA association dedicated to SOA notifications.
    iii. SOA Recovery is based on the functionality supported by that binding association.
        1. The current SOA association will be used for network data recovery.
        2. The new notification association will be used for notification data recovery.

Requirements:

Req 1 SOA Notification Channel Service Provider Tunable

NPAC SMS shall provide a Service Provider SOA Notification Channel tunable parameter which defines whether a SOA supports a separate SOA association dedicated to notifications.

Req 2 SOA Notification Channel Service Provider Tunable – Default

NPAC SMS shall default the Service Provider SOA Notification Channel tunable parameter to FALSE.

Req 3 SOA Notification Channel Service Provider Tunable – Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Service Provider SOA Notification Channel tunable parameter.

Req 4 Separation of Association Functions

Requirement deleted. Restriction too limited. SOA, even with tunable TRUE, should be allowed to have just a single association for all SOA function masks.

Req 5 Separate Association for the Notification Function From different NSAPs

NPAC SMS shall accept a separate association from the SOA for the Notification function from different Service Provider NSAPs, when the SOA Notification Channel tunable is set to TRUE.

Req 6 Security Management of Multiple SOA Associations of Different Association Functions

NPAC SMS shall manage security for multiple SOA associations of different association functions from different Service Provider NSAPs.

Req 7 Sending of SOA Notifications when Notification Channel is Active

NPAC SMS shall send notifications for a particular Service Provider across a Notification Channel when it is active.

Req 8 Separate Notification Channel during Recovery

NPAC SMS shall only allow a separate Notification Channel association to request notification recovery, when the Service Provider SOA Notification Channel tunable is TRUE.

Req 9 Treatment of Multiple Associations when there is an Intersection of Association Function

NPAC SMS shall accept an association bind request, in the case of an intersection of the association functions of an existing SOA association, and abort any previous associations that use that same function.

IIS

Update the table in Chapter 5 (5.2.1.8, Association Function):

Add the new bit mask as an entry in the table.

Add to the end of Chapter 5:

5.x Separate SOA Channel for Notifications

A SOA system may connect to the NPAC SMS with multiple SOA channels (i.e., associations) for different functions (different bit masks), specifically request/response data versus notification data. The NPAC SMS will distribute transactions across these SOA associations based on functionality (different bit masks). This allows additional throughput on both associations.

GDMO

```
lnpDownload ACTION
    BEHAVIOUR
        lnpDownloadDefinition,
        lnpDownloadBehavior;
    MODE CONFIRMED;
    WITH INFORMATION SYNTAX LNP-ASN1.DownloadAction;
    WITH REPLY SYNTAX LNP-ASN1.DownloadReply;
    REGISTERED AS {LNP-OIDS.lnp-action 1};

lnpDownloadBehavior BEHAVIOUR
    DEFINED AS !

        The SOA or LSMS is capable of recovering data based on the association
functions. The SOA recovers network data using the data download association
function (dataDownload). The SOA recovers notification data using the network
data management association function (networkDataMgmt).  If a SOA supports a
separate SOA channel, the SOA recovers notification data using the
notification download association function (notificationDownload).



-- 15.0 Notification Recovery Action

lnpNotificationRecovery ACTION
    BEHAVIOUR
        lnpNotificationRecoveryDefinition,
        lnpNotificationRecoveryBehavior;
    MODE CONFIRMED;
    WITH INFORMATION SYNTAX LNP-ASN1.NetworkNotificationRecoveryAction;
    WITH REPLY SYNTAX LNP-ASN1.NetworkNotificationRecoveryReply;
    REGISTERED AS {LNP-OIDS.lnp-action 15};

lnpNotificationRecoveryBehavior BEHAVIOUR
    DEFINED AS !

        The SOA or LSMS is capable of recovering data based on the association
functions. The SOA recovers network data using the data download association
function (dataDownload). The SOA recovers notification data using the network
data management association function (networkDataMgmt). If a SOA supports a
separate SOA channel, the SOA recovers notification data using the
notification download association function (notificationDownload).
```

ASN.1

```
SoaUnits ::= SEQUENCE {
    soaMgmt [0] NULL OPTIONAL,
    networkDataMgmt [1] NULL OPTIONAL,
    dataDownload [2] NULL OPTIONAL,
    notificationDownload [3] NULL OPTIONAL
}
```

Origination Date: 9/4/97

Originator: Bellcore

Change Order Number: NANC 151

Description: TN and Number Pool Block Addition to Notifications

Cumulative SP Priority, Weighted Average: 16, (15.83)

Pure Backwards Compatible: NO

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y	N	Y	Y	Low	High	N/A

Business Need:

This change order saves research time for SOA operational staff when they receive a notification for a subscription version that has inadvertently been removed from their local database or was never received. Currently, only the NPAC subscription version id (SVID) is included in the notification message. If the SOA missed the subscription version create message ("object creation", which includes both TN and SVID), any subsequent notification that the NPAC sends cannot be associated with the TN, since those subsequent notifications currently do not include the TN.

Description of Change:

It has been requested that the TN for the subscription version be added to all notifications that currently contain SVID but not TN from the NPAC SMS. It is possible for a SOA in a disconnect or modify-active situation, to not have the SV record in their database. Therefore, when the attribute/status change notification comes from the NPAC SMS, there is no way to correlate its version id with the TN on the disconnect or modify request in SOA.

This would be a deviation from the standard since the TN would not have been an attribute that was changed.

Jun 00 LNPAWG (Chicago), Additionally, the same type of change should be done for Number Pool Block (i.e., add the NPA-NXX-X to all notifications that currently contain Block-ID but not NPA-NXX-X).

Requirements:

Req 1 Subscription Version Status Attribute Value Change – Send TN

NPAC SMS shall, based on the Subscription Version TN Attribute Flag Indicator, send the Subscription Version TN when sending a Subscription Version Status Attribute Value Change notification.

Req 2 Subscription Version Attribute Value Change – Send TN

NPAC SMS shall, based on the Subscription Version TN Attribute Flag Indicator, send the Subscription Version TN when sending a Subscription Version Attribute Value Change notification.

Req 3 Number Pool Block Status Attribute Value Change – Send NPA-NXX-X

NPAC SMS shall, based on the Number Pool Block NPA-NXX-X Attribute Flag Indicator, send the Number Pool Block NPA-NXX-X when sending a Number Pool Block Status Attribute Value Change notification.

Req 4 Number Pool Block Attribute Value Change – Send NPA-NXX-X

NPAC SMS shall, based on the Number Pool Block NPA-NXX-X Attribute Flag Indicator, send the Number Pool Block NPA-NXX-X when sending a Number Pool Block Attribute Value Change notification.

Req 5 Subscription Version TN Attribute Flag Indicator

NPAC SMS shall provide a Subscription Version TN Attribute Flag Indicator, which is defined as an indicator on whether or not the Service Provider supports receipt of the Subscription Version TN attribute in a Subscription Version Status Attribute Value Change or Attribute Value Change notification.

Req 6 Modification of Subscription Version TN Attribute Flag Indicator

NPAC SMS shall allow the NPAC Personnel, via the NPAC Administrative Interface, to modify the Subscription Version TN Attribute Flag Indicator.

Req 7 Subscription Version TN Attribute Flag Indicator Default Value

NPAC SMS shall default the Subscription Version TN Attribute Flag Indicator to **FALSE**.

Req 8 Number Pool Block NPA-NXX-X Attribute Flag Indicator

NPAC SMS shall provide a Number Pool Block NPA-NXX-X Attribute Flag Indicator, which is defined as an indicator on whether or not the Service Provider supports receipt of the Number Pool Block NPA-NXX-X attribute in a Number Pool Block Status Attribute Value Change or Attribute Value Change notification.

Req 9 Modification of Number Pool Block NPA-NXX-X Attribute Flag Indicator

NPAC SMS shall allow the NPAC Personnel, via the NPAC Administrative Interface, to modify the Number Pool Block NPA-NXX-X Attribute Flag Indicator.

Req 10 Number Pool Block NPA-NXX-X Attribute Flag Indicator Default Value

NPAC SMS shall default the Number Pool Block NPA-NXX-X Attribute flag Indicator to **FALSE**.

IIS

No Changes Required

GDMO

```
-- 11.0 LNP Subscription Version Status Attribute Value Change Notification
subscriptionVersionStatusAttributeValueChange NOTIFICATION
    BEHAVIOUR  subscriptionVersionStatusAttributeValueChangeBehavior;
    WITH INFORMATION SYNTAX  LNP-ASN1.VersionStatusAttributeValueChange
    AND ATTRIBUTE IDS
        value-change-info subscriptionVersionAttributeValueChangeInfo,
        failed-service-provs subscriptionFailed-SP-List,
        status-change-cause-code subscriptionStatusChangeCauseCode,
        subscription-tn subscriptionTN,
        access-control accessControl;
    REGISTERED AS {LNP-OIDS.lnp-notification 11};
subscriptionVersionStatusAttributeValueChangeBehavior BEHAVIOUR
    DEFINED  AS !
        This notification type is used to report changes to the
        subscriptionVersionStatus field.  It is identical to an
        attribute value change notification as defined in M.3100
        except for the addition of the list of failed service
        providers in cases where the version status is active, failed or
        partial failure and the subscriptionStatusChangeCauseCode if
        it is set.
        Failed lists will also be potentially sent for subscription versions
        with statuses of active, failed, partial failure, and old.

        If the service provider's <> indicator is set in their service
provider profile,
        the subcriptionTN is provided.
    !;

-- 13.0 LNP Number Pool Block Status Attribute Value Change Notification
numberPoolBlockStatusAttributeValueChange NOTIFICATION
    BEHAVIOUR  numberPoolBlockStatusAttributeValueChangeBehavior;
    WITH INFORMATION SYNTAX
LNP-ASN1.NumberPoolBlockStatusAttributeValueChange
    AND ATTRIBUTE IDS
        value-change-info subscriptionVersionAttributeValueChangeInfo,
```

```
        failed-service-provs numberPoolBlockFailed-SP-List,
        access-control accessControl,
        npa-nxx-x numberPoolBlockNPA-NXX-X;
    REGISTERED AS {LNP-OIDS.lnp-notification 13};
numberPoolBlockStatusAttributeValueChangeBehavior BEHAVIOUR
    DEFINED  AS !
        This notification is used to report changes to the
        numberPoolBlockStatus field. It is identical
        to an attribute value change notification as defined in M.3100
        except for the addition of the list of failed service
        providers.
        The failed service provider list reflects the EDR service
        providers who failed to receive the number pool block and any non-EDR
        service provider who failed to receive the corresponding subscription
        versions of LNP type equal to 'pool'.
        Failed lists will be potentially sent for number pool blocks
        with statuses of active, failed, partial failure and old. This
        notification will be sent to the SOAs when the
        numberPoolBlockSOA-Origination is true for the number pool block
        object.

        If the service provider's <> indicator is set in their service
provider profile,
        the numberPoolBlockNPA-NXX-X is provided.
    !;



-- 21.0 LNP NPAC Subscription Version Managed Object Class

subscriptionVersionNPAC MANAGED OBJECT CLASS
    DERIVED FROM subscriptionVersion;
    CHARACTERIZED BY
        subscriptionVersionNPAC-Pkg;
    REGISTERED AS {LNP-OIDS.lnp-objectClass 21};

subscriptionVersionNPAC-Pkg PACKAGE
    BEHAVIOUR
        subscriptionVersionNPAC-Definition,
        subscriptionVersionNPAC-Behavior;
    ATTRIBUTES
        subscriptionVersionStatus GET-REPLACE,
        subscriptionOldSP GET-REPLACE,
        subscriptionNewSP-DueDate GET-REPLACE,
        subscriptionNewSP-CreationTimeStamp GET-REPLACE,
        subscriptionOldSP-DueDate GET-REPLACE,
        subscriptionOldSP-Authorization GET-REPLACE,
        subscriptionStatusChangeCauseCode GET-REPLACE,
        subscriptionOldSP-AuthorizationTimeStamp GET-REPLACE,
        subscriptionBroadcastTimeStamp GET-REPLACE,
        subscriptionConflictTimeStamp GET-REPLACE,
        subscriptionCustomerDisconnectDate GET-REPLACE,
        subscriptionEffectiveReleaseDate GET-REPLACE,
        subscriptionDisconnectCompleteTimeStamp GET-REPLACE,
        subscriptionCancellationTimeStamp GET-REPLACE,
        subscriptionCreationTimeStamp GET-REPLACE,
```

```
        subscriptionFailed-SP-List GET-REPLACE,
        subscriptionModifiedTimeStamp GET-REPLACE,
        subscriptionOldTimeStamp GET-REPLACE,
        subscriptionOldSP-CancellationTimeStamp GET-REPLACE,
        subscriptionNewSP-CancellationTimeStamp GET-REPLACE,
        subscriptionOldSP-ConflictResolutionTimeStamp GET-REPLACE,
        subscriptionNewSP-ConflictResolutionTimeStamp GET-REPLACE,
        subscriptionPortingToOriginal-SPSwitch GET-REPLACE,
        subscriptionPreCancellationStatus GET-REPLACE,
        subscriptionTimerType GET,
        subscriptionBusinessType GET;
    NOTIFICATIONS
        subscriptionVersionOldSP-ConcurrenceRequest,
        subscriptionVersionNewSP-CreateRequest,
        subscriptionVersionOldSPFinalConcurrenceWindowExpiration,
        subscriptionVersionNewNPA-NXX,
        subscriptionVersionCancellationAcknowledgeRequest,
        subscriptionVersionDonorSP-CustomerDisconnectDate,
        subscriptionVersionStatusAttributeValueChange,
        subscriptionVersionNewSP-FinalCreateWindowExpiration,
        "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 :
1992":attributeValueChange
            accessControlParameter phoneNumberParameter,
        "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992":objectCreation
            accessControlParameter;
    ;


-- 30.0 Number Pool Block NPAC Data Managed Object Class
--
numberPoolBlockNPAC MANAGED OBJECT CLASS
    DERIVED FROM numberPoolBlock;
    CHARACTERIZED BY
        numberPoolBlockNPAC-Pkg;
    REGISTERED AS {LNP-OIDS.lnp-objectClass 30};

numberPoolBlockNPAC-Pkg PACKAGE
    BEHAVIOUR
        numberPoolBlockNPAC-Definition,
        numberPoolBlockNPAC-Behavior;
    ATTRIBUTES
        numberPoolBlockBroadcastTimeStamp GET,
        numberPoolBlockCreationTimeStamp GET,
        numberPoolBlockDisconnectCompleteTimeStamp GET,
        numberPoolBlockModifiedTimeStamp GET,
        numberPoolBlockSOA-Origination GET-REPLACE,
        numberPoolBlockStatus GET,
        numberPoolBlockFailed-SP-List GET;
    NOTIFICATIONS
        numberPoolBlockStatusAttributeValueChange,
        "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 :
1992":attributeValueChange
            accessControlParameter numberPoolBlockNPA-NXX-XParameter,
        "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992":objectCreation
            accessControlParameter;
    ;
```

```
-- 4.0 Phone Number Parameter

phoneNumberParameter PARAMETER
    CONTEXT EVENT-INFO;
    WITH SYNTAX LNP-ASN1.PhoneNumber;
    REGISTERED AS {LNP-OIDS.lnp-parameter 4};


-- 5.0 numberPoolBlockNPA-NXX-X Parameter

numberPoolBlockNPA-NXX-XParameter PARAMETER
    CONTEXT EVENT-INFO;
    WITH SYNTAX LNP-ASN1.NPA-NXX-X;
    REGISTERED AS {LNP-OIDS.lnp-parameter 5};


subscriptionAuditBehavior BEHAVIOUR
    DEFINED AS !
        When the subscriptionAuditStatus changes an attribute value
        change will be emitted to the audit requester. The TN of the SV
        will be put in the additionalInformation parameter of
AttributeValueChangeInfo
        that is defined in the standard Attribute-ASN1Module.
        ...

subscriptionVersionNPAC-Behavior BEHAVIOUR
    DEFINED AS !
      ...
      The TN of the SV will be put in the additionalInformation parameter
      of AttributeValueChangeInfo that is defined in the standard
      Attribute-ASN1Module.
      ...

lnpLogStatusAttributeValueChangeRecord MANAGED OBJECT CLASS
    DERIVED FROM "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 :
1992":eventLogRecord;
    CHARACTERIZED BY
        lnpLogStatusAttributeValueChangePkg;
    CONDITIONAL PACKAGES
        subscriptionVersionAttributeValueChangeFailed-SP-ListPkg PRESENT IF
            !the version broadcast failed!,
        subscriptionStatusChangeCauseCodePkg PRESENT IF
            !the version status is set to conflict by the old service
             provider!,
            subscriptionVersionTNPkg PRESENT IF
            !the subscription version TN is supported by the service provider
                  in SAVC notifications!;
    REGISTERED AS {LNP-OIDS.lnp-objectClass 10};

lnpLogNumberPoolBlockStatusAttributeValueChangeRecord MANAGED OBJECT CLASS
    DERIVED FROM "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 :
1992":eventLogRecord;
    CHARACTERIZED BY
        lnpLogNumberPoolBlockStatusAttributeValueChangePkg;
    CONDITIONAL PACKAGES
```

```
        numberPoolBlockAttributeValueChangeFailed-SP-ListPkg PRESENT IF
            !the number pool block broadcast failed!,
            numberPoolBlockNPA-NXX-XPkg PRESENT IF
            !the number pool block npa-nxx-x is supported by the service
                provider in the number pool block status attribute value
                change notification.!;
    REGISTERED AS {LNP-OIDS.lnp-objectClass 28};

numberPoolBlockNPAC-Behavior BEHAVIOUR
    DEFINED AS !
      ...
      The NPA-NXX-X value of the number pool block will be put in the
       additionalInformation parameter of AttributeValueChangeInfo that is
       defined in the standard Attribute-ASN1Module.
      ...



subscriptionVersionTNPkg PACKAGE
    BEHAVIOUR subscriptionVersionTNPkgBehavior;
    ATTRIBUTES
        subscriptionTN GET;
    REGISTERED AS {LNP-OIDS.lnp-package 53};

subscriptionVersionTNPkgBehavior BEHAVIOUR
    DEFINED AS !
        This package provides for conditionally including the
        subscription TN number attribute.
    !;


-- 54.0 LNP Number Pool Block NPA-NXX-X Package

numberPoolBlockNPA-NXX-XPkg PACKAGE
    BEHAVIOUR
            numberPoolBlockNPA-NXX-XPkgBehavior;
    ATTRIBUTES
        numberPoolBlockNPA-NXX-X GET;
    REGISTERED AS {LNP-OIDS.lnp-package 54};

numberPoolBlockNPA-NXX-XPkgBehavior BEHAVIOUR
    DEFINED AS !
        This package provides for conditionally including the
        numberPoolBlock NPA-NXX-X value in
        lnpLogNumberPoolBlockStatusAttributeValueChangeRecord object.
    !;

subscriptionVersionStatusAttributeValueChange NOTIFICATION
    BEHAVIOUR  subscriptionVersionStatusAttributeValueChangeBehavior;
    WITH INFORMATION SYNTAX  LNP-ASN1.VersionStatusAttributeValueChange
    AND ATTRIBUTE IDS
        value-change-info subscriptionVersionAttributeValueChangeInfo,
        failed-service-provs subscriptionFailed-SP-List,
        status-change-cause-code subscriptionStatusChangeCauseCode,
        access-control accessControl,
        subscription-tn subscriptionTN;
    REGISTERED AS {LNP-OIDS.lnp-notification 11};
```

```
numberPoolBlockStatusAttributeValueChange NOTIFICATION
    BEHAVIOUR  numberPoolBlockStatusAttributeValueChangeBehavior;
    WITH INFORMATION SYNTAX  LNP-
ASN1.NumberPoolBlockStatusAttributeValueChange
    AND ATTRIBUTE IDS
        value-change-info subscriptionVersionAttributeValueChangeInfo,
        failed-service-provs numberPoolBlockFailed-SP-List,
        access-control accessControl,
        npa-nxx-x numberPoolBlockNPA-NXX-X;
    REGISTERED AS {LNP-OIDS.lnp-notification 13};
```

ASN.1

```
NumberPoolBlockStatusAttributeValueChange ::= SEQUENCE {
    value-change-info [0] AttributeValueChangeInfo,
    failed-service-provs [1] Failed-SP-List OPTIONAL,
    access-control [2] LnpAccessControl,
    block-npa-nxx-x [3] NPA-NXX-X OPTIONAL
}

VersionStatusAttributeValueChange ::= SEQUENCE {
    value-change-info [0] AttributeValueChangeInfo,
    failed-service-provs [1] Failed-SP-List OPTIONAL,
    subscription-status-change-cause-code [2]
SubscriptionStatusChangeCauseCode
        OPTIONAL,
    access-control [3] LnpAccessControl ,
    subscription-tn [4] PhoneNumber OPTIONAL

}


RangeStatusAttributeValueChangeInfo ::= SEQUENCE {
   version-id [0] RangeNotifyID-Info,
   value-change-info [1] AttributeValueChangeInfo,
   failed-service-provs [2] Failed-SP-List OPTIONAL,
   subscription-status-change-cause-code [3] SubscriptionStatusChangeCauseCode
OPTIONAL,
   tn-range [4] TN-Range OPTIONAL
}

RangeAttributeValueChangeInfo ::= SEQUENCE {
   version-id RangeNotifyID-Info,
   value-change-info AttributeValueChangeInfo,
   tn-range [0] TN-Range OPTIONAL
}

NumberPoolBlockStatusAttributeValueChangeRecovery ::= SEQUENCE {
    value-change-info [0] AttributeValueChangeInfo,
    failed-service-provs [1] Failed-SP-List OPTIONAL,
  block-npa-nxx-x [2] NPA-NXX-X OPTIONAL
}
```

```
VersionStatusAttributeValueChangeRecovery ::= SEQUENCE {
    value-change-info [0] AttributeValueChangeInfo,
    failed-service-provs [1] Failed-SP-List OPTIONAL,
    subscription-status-change-cause-code [2] SubscriptionStatusChangeCauseCode
        OPTIONAL,
    subscription-tn [3] PhoneNumber OPTIONAL
}
```

Origination Date: 8/11/1997
Originator: CMA

Change Order Number: NANC 138

Description: Definition of Cause Code

Cumulative SP Priority, Weighted Average: 17, (16.36)

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y				Low	Low	Low

Business Need:

Currently the "NPAC SMS Automatic Conflict from Cancellation", notification does not have a distinct Cause Code.

This Change Order will provide a notification with a Cause Code enabling the SP to take the proper action to minimize service interruption for the customer being ported.

Description of Change:

NANC 54 defined the cause code values and the FRS was to be updated. Due to an oversight this update was not made in the FRS. The change was going to be applied in FRS 1.4 and 2.2. However, a discrepancy was found. The defined values specified in NANC 54 are as follows:

The values less than 50 were reserved for NPAC SMS internal use.

Other defined values are:

0 – NULL (DO NOT MODIFY)
1 - NPAC automatic cancellation
50 - LSR Not Received
51 - FOC Not Issued
52 - Due Date Mismatch
53 - Vacant Number Port
54 - General Conflict

In the table in the FRS the following cause code is defined: NPAC SMS Automatic Conflict from Cancellation

There is no corresponding code defined in Change Order NANC 54. Is there a numeric value or is this cause code valid?

Requirements:

Requirements for the cause code addition would be as follows:

RR5-36 should be renumbered to RR5-36.2.

Req 1 (new number will be RR5-36.1) – Cancel Subscription Version – Cause Code for New SP Timer Expiration

NPAC SMS shall set the cause code to "NPAC SMS Automatic Conflict from Cancellation" after setting the Subscription Version status to conflict from cancel-pending when the new Service Provider has not acknowledged the cancellation and after the Cancellation-Final Concurrence Window has expired.

~~RR5-36~~ RR5-36.2 Cancel Subscription Version - Inform Service Providers of Conflict Status

NPAC SMS shall notify the old and new Service Providers upon setting a Subscription Version to conflict.

Note: If the cause code value is set to "NPAC SMS Automatic Conflict from Cancellation", and the Service Provider does NOT support this cause code, then~~n a value set to "NPAC SMS Automatic Cancellation" will be sent~~existing message will be unchanged.

SV data model update:

Status Change Cause Code	N (2)		Used to specify reason for conflict when old Service Provider Authorization is set to False, or to indicate NPAC SMS initiated cancellation. Valid values are: 0 - No value 1 - NPAC SMS Automatic Cancellation *2 - NPAC SMS Automatic Conflict from Cancellation* 50 - LSR Not Received 51 - FOC Not Issued 52 - Due Date Mismatch 53 - Vacant Number Port 54 – General Conflict

Req 1.5 – Cancel-Pending-to-Conflict Cause Code Indicator

NPAC SMS shall provide a Cancel-Pending-to-Conflict Cause Code Indicator tunable parameter which defines whether a SOA supports a Conflict message that uses the Cancel-Pending-to-Conflict Cause Code.

Note: For Service Providers that do NOT support the Cancel-Pending-to-Conflict Cause Code, the NPAC will continue to send the value associated with the Automatic Cancellation Cause Code.

Req 2 – Cancel-Pending-to-Conflict Cause Code Indicator Default

NPAC SMS shall default the Service Provider SOA Cancel-Pending-to-Conflict Cause Code Indicator tunable parameter to FALSE.

Req 3 – Cancel-Pending-to-Conflict Cause Code Indicator Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Service Provider Cancel-Pending-to-Conflict Cause Code Indicator tunable parameter.

Req 4 – Regional Automatic Conflict Cause Code Tunable

NPAC SMS shall provide a Regional Automatic Conflict tunable parameter which is defined as an indicator on whether or not the automatic conflict cause code functionality is supported by the NPAC SMS for a particular NPAC Region

Req 5 – Regional Automatic Conflict Cause Code Tunable Default

NPAC SMS shall default the Regional Automatic Conflict Cause Code tunable parameter to TRUE.

Req 6 – Regional Automatic Conflict Cause Code Tunable Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Regional Automatic Conflict Cause Code tunable parameter.

IIS:

No change required.

GDMO:

```
-- 103.0 LNP Subscription Status Change Cause Code

subscriptionStatusChangeCauseCode ATTRIBUTE
    WITH ATTRIBUTE SYNTAX LNP-ASN1.SubscriptionStatusChangeCauseCode;
    MATCHES FOR EQUALITY;
    BEHAVIOUR subscriptionStatusChangeCauseCodeBehavior;
    REGISTERED AS {LNP-OIDS.lnp-attribute 103};

subscriptionStatusChangeCauseCodeBehavior BEHAVIOUR
    DEFINED AS !
        This attribute is used to indicate the reason for putting a
```

```
        subscription version into conflict, or to indicate NPAC SMS
        initiated cancellation.
!;
```

ASN.1:

No change required.

Origination Date: 7/24/03

Originator: NeuStar

Change Order Number: NANC 386

Description: Single Association for SOA/LSMS

Cumulative SP Priority, Weighted Average:

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y	Y			Low	Low	Low

Business Need:

Currently, the FRS does NOT address the number of concurrent connections to the NPAC using the same CMIP association function and specific bit mask value. Therefore, there are no requirements to either support or deny this functionality.

Because change order ILL-5 was proposed during the initial implementation of the NPAC, the NPAC partially supports multiple associations. This partial implementation can allow a situation where there are one or more non-functional CMIP associations between a SOA/LSMS and the NPAC. This situation causes an unnecessary consumption of NPAC resources (and possibly SOA/LSMS resources as well).

This change order will remedy this situation (close the hole) by only allowing a single CMIP association between a SOA/LSMS and the NPAC, for any given association function and specific bit mask value.

Description of Change:

The association management function within the NPAC will be modified to allow a single CMIP association, per bit mask, between a SOA/LSMS and the NPAC. In the proposed update, if a valid association is active, and a new association request with the same bit mask is sent from a SOA/LSMS to the NPAC, the NPAC will abort the first association, and process the request for the second association.

Aug '03 LNPAWG, discussion:

This Change Order would only allow a single association for each SOA/LSMS. NPAC would abort the existing association if a new request came in to establish a second association. If implemented, and if we want ILL-5 down the road, we would have to back this functionality out. Tekelec supports this Change Order but would want it fully tested because it is a behavioral change. BellSouth stated they are concerned that this would preclude multiple associations as a means of addressing interface performance. There was agreement to work the requirements for

this Change Order. If the next release package contains a need for multiple associations, then NANC 386 would not be implemented. If no need for multiple associations, we could possibly implement NANC 386 in the next package.

Requirements:

No Change Required

IIS

Add to the end of Chapter 5:

5.x Single Association for SOA/LSMS

A SOA/LSMS system may connect to the NPAC SMS with one association for the same function (same bit mask). The NPAC SMS will abort any previous associations that use that same function.

GDMO

No Change Required

ASN.1

```
ErrorCode ::= ENUMERATED {
    success (0),
    access-denied (1),
    retry-same-host (2),
    try-other-host (3),
    new-bind-received (4)
}
```

Origination Date: 4/12/02

Originator: Bellsouth

Change Order Number: NANC 357

Description: Unique Identifiers for wireline versus wireless carriers (long term solution)

Cumulative SP Priority, Weighted Average:

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y	Y	Y		Low	Med-Low	Med

Business Need:

In the LSR process, there is a need to identify a Service Provider's port request as that from or to a Wireline or Wireless Service Provider in order to process the port request correctly within internal systems. This information must match up with NPAC information on each Service Provider's Type. Without this information, port requests may be handled incorrectly thus effecting customer phone service including related E911 records. This is especially crucial in fully mechanized LSR processing systems.

This long-term solution replaces the interim solution provided by the associated NANC Change Order, 356.

Description of Change:

The NPAC SMS shall provide a *Service Provider Type* indicator for each Service Provider. This new indicator shall initially distinguish each Service Provider as either a Wireline Service Provider or a Wireless Service Provider. The *Service Provider Type* indicator shall be able to distinguish additional "types" as deemed necessary in the future (e.g., it may be advantageous in the future to identify other Service Provider Types such as Reseller or Service Bureau).

This information shall be sent to the SOA/LSMS upon initial creation of the Service Provider, and upon modification of a Service Provider's Type.

The *Service Provider Type* indicator shall be added to the Bulk Data Download file, available to a Service Provider's SOA/LSMS.

The *Service Provider Type* indicator shall be Recoverable across the SOA/LSMS with the implementation of NANC 352.

Requirements:

Add to table 3-2, NPAC Customer Data Model. New attribute is “Service Provider Type”. Valid values include:

- Wireline
- Wireless
- Non-Carrier
-
- SP-Type-3 (supported by the interface, but not accepted until industry use defined)
- SP-Type-4 (supported by the interface, but not accepted until industry use defined)
- SP-Type-5 (supported by the interface, but not accepted until industry use defined)

R4-8 Service Provider Data Elements

NPAC SMS shall require the following data if there is no existing Service Provider data:

1. Service Provider name, address, phone number, and contact organization.
2. NPAC customer type.
3. Service Provider allowable functions.
4. Service Provider Network Address of NPAC SMS to Local SMS interface.
5. Service Provider Network Address of SOA to NPAC SMS interface.
6. Service Provider Security Contact. Contact data is security data when Contact Type is “SE.”
7. Service Provider Repair contact name and phone number. The default Service Provider Repair Contact and phone number shall be the same as the Service Provider contact and phone number, if the Service Provider Repair Contact information is left blank.
8. Service Provider billing name, address, phone number, and billing contact for NPAC SMS billing. The default for the Service Provider Billing data shall be the same as the Service Provider data, if the Service Provider Billing information is left blank.
9. Service Provider Download Indicator
10. Service Provider Maximum Query
11. NPAC New Functionality Support
12. Port In Timer Type
13. Port Out Timer Type
14. Business Hour/Days
15. NPAC Customer SOA NPA-NXX-X Indicator
16. NPAC Customer LSMS NPA-NXX-X Indicator
17. LSMS EDR Indicator
18. SOA Notification Priority for each SOA notification. Separate values may be set for Status Attribute Value Change notifications based on whether the Service Provider is acting as the

Old Service Provider or as the New Service Provider for the port as indicated in Appendix C, Table C-7 – SOA Notification Priority Tunables.

19. TN Range Notification Indicator

20. No New SP Concurrence Notification Indicator

The following data is optional:

- Service Provider Contact Type: SOA Contact, Local SMS, Web, Network Communications, Conflict Resolution, Operations, and User Administration Contact Address Information.
- NPAC Customer Associated Service Provider Information

21. Service Provider Type

Req 1 – Service Provider Type SOA Indicator

NPAC SMS shall provide a Service Provider Type SOA Indicator tunable parameter which defines whether a SOA supports the Service Provider Type attribute.

Req 2 – Service Provider Type SOA Indicator Default

NPAC SMS shall default the Service Provider Type SOA Indicator tunable parameter to FALSE.

Req 3 – Service Provider Type SOA Indicator Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Service Provider Type SOA Indicator tunable parameter.

Req 4 – Service Provider Type LSMS Indicator

NPAC SMS shall provide a Service Provider Type LSMS Indicator tunable parameter which defines whether an LSMS supports the Service Provider Type attribute.

Req 5 – Service Provider Type LSMS Indicator Default

NPAC SMS shall default the Service Provider Type LSMS Indicator tunable parameter to FALSE.

Req 6 – Service Provider Type LSMS Indicator Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Service Provider Type LSMS Indicator tunable parameter.

Req 7 – Service Provider Type Attribute Modification Restriction

NPAC SMS shall only allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Service Provider Type attribute.

Req 8 – Service Provider Data Information Bulk Data Download – Support for Service Provider Type Data

NPAC SMS shall apply the Service Provider Type tunable support of the requesting Service Provider, in the creation of Service Provider bulk data download files.

Req 9 – Service Provider Data Information Service Provider Query – Support for Service Provider Type Data

NPAC SMS shall apply the Service Provider Type tunable support of the requesting Service Provider, in a query of Service Provider data.

IIS

No change required.

GDMO

```
-- 17.0 LNP Service Provider Network Managed Object Class

serviceProvNetwork MANAGED OBJECT CLASS
    DERIVED FROM "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992":top;
    CHARACTERIZED BY
        serviceProvNetworkPkg;
    CONDITIONAL PACKAGES
        serviceProvTypePkg PRESENT IF
            !the service provider has the service provider type information!;
    REGISTERED AS {LNP-OIDS.lnp-objectClass 17};


-- 45.0 Service Provider Type Package

serviceProvTypePkg PACKAGE
    BEHAVIOUR serviceProvTypePkgBehavior;
    ATTRIBUTES
        serviceProviderType GET-REPLACE;
    REGISTERED AS {LNP-OIDS.lnp-package 45};

serviceProvTypePkgBehavior BEHAVIOUR
    DEFINED AS !
        This package provides for conditionally including the
        serviceProviderType attribute.

        The Service Provider Type indicator initially distinguishes each
        Service Provider as either a Wireline, Wireless, or Non-Carrier
        Service Provider. It will be able to distinguish additional types
        as deemed necessary in the future.

        This information is sent to the SOA/LSMS upon initial creation of the
```

```
        Service Provider, or upon modification of a Service Provider's Type in
the NPAC.
    !;

-- 155.0 LNP Service Provider Type

serviceProviderType ATTRIBUTE
    WITH ATTRIBUTE SYNTAX LNP-ASN1. ServiceProviderType;
    MATCHES FOR EQUALITY;
    BEHAVIOUR serviceProviderType;
    REGISTERED AS {LNP-OIDS.lnp-attribute 155};

serviceProviderType BEHAVIOUR
    DEFINED AS !
        This attribute is used to specify the service provider types. The
valid values are: wireline, wireless, and non-carrier.
!;
```

ASN.1

```
ServiceProviderType ::= ENUMERATED {
    wireline (0),
    wireless(1),
    non-carrier (2),
    sp-type-3 (3)
    sp-type-4 (4)
    sp-type-5 (5)
```

Origination Date: 4/12/02

Originator: NeuStar

Change Order Number: NANC 358

Description: Change for ASN.1: Change SPID Definition

Cumulative SP Priority, Weighted Average:

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y	Y	Y	Y	Low	Low	Low

Business Need:

The current ASN.1 definition allows the SPID to be variable 1-4 alphanumeric characters. The current behavior in the NPAC requires SPID to be four alphanumeric characters, as defined in the current data model in the FRS – a "New Service Provider ID, Character (4), Old Service Provider ID, Character (4)", and the GDMO "Valid values are the Facilities Id (or OCN) of the service provider."

The OCN in the GDMO is the same OCN as defined by OBF (http://www.atis.org/pub/clc/niif/nrri/issue177/MACompany%20Code.doc):

> **"Company Code/Operating Company Number (OCN)** - A unique four-character alphanumeric code assigned by NECA that identifies a telecommunications service provider, as outlined in the ANSI T1.251 standard, Identification of Telecommunications Service Provider Codes for the North American Telecommunications System. The code set is used in mechanized systems and documents throughout the industry to facilitate the exchange of information. Company Codes assigned by NECA are referred to as OCNs in Telcordia's BIRRDs system. NANPA requires a carrier's Company Code in order to obtain numbering resources. The FCC requires a carrier's Company Code on FCC Form 502, the North American Numbering Plan Numbering Resource Utilization/Forecast Report."

This change order will correct the ASN.1 definition to match the current implementation.

Description of Change:

Change the current ASN.1 definition.

Requirements:

No Change Required

IIS

No Change Required

GDMO

No Change Required

ASN.1

Current ASN.1 definition:

```
ServiceProvId ::= GraphicString4
GraphicString4 ::= GraphicStringBase(SIZE(1..4))
```

New ASN.1 definition (new is **bold**):

```
ServiceProvId ::= Graphic Fixed String4
Graphic Fixed String4 ::= GraphicStringBase(SIZE( 4 ))
```

Origination Date: 1/21/02

Originator: NeuStar

Change Order Number: NANC 346

Description: GDMO Change to Number Pool Block Data Managed Object Class (Section 29.0) and Documentation Change to Subscription Version Managed Object Class (Section 20.0)

Cumulative SP Priority, Weighted Average:

Functional Backwards Compatible: NO

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
		Y		N/A	Low	Low

Business Need:

The GDMO needs to be updated to resolve an error situation when the NPAC attempts to correct an attribute during an audit.

Description of Change:

Change the numberPoolBlock-Pkg to support updates to the numberPoolBlockActivationTimeStamp attribute. Currently this attribute is not modifiable so when it is audited by the NPAC SMS and found to be discrepant there is no way to update it. The NPAC SMS attempts to correct the attribute on the LSMS and the M-SET is failed by the service provider's system because the attribute is GET only.

Currently the numberPoolBlock-Pkg reads:

```
numberPoolBlock-Pkg PACKAGE
  BEHAVIOUR
    numberPoolBlock-Definition,
    numberPoolBlock-Behavior;
  ATTRIBUTES
    numberPoolBlockId GET,
    numberPoolBlockNPA-NXX-X GET,
    numberPoolBlockHolderSPID GET,
    numberPoolBlockActivationTimeStamp GET,
    numberPoolBlockLRN GET-REPLACE,
    numberPoolBlockCLASS-DPC GET-REPLACE,
    numberPoolBlockCLASS-SSN GET-REPLACE,
    numberPoolBlockLIDB-DPC GET-REPLACE,
    numberPoolBlockLIDB-SSN GET-REPLACE,
    numberPoolBlockCNAM-DPC GET-REPLACE,
    numberPoolBlockCNAM-SSN GET-REPLACE,
    numberPoolBlockISVM-DPC GET-REPLACE,
```

```
    numberPoolBlockISVM-SSN GET-REPLACE,
    numberPoolBlockDownloadReason GET-REPLACE;
  ;
```

Modify the numberPoolBlock-Pkg to read:

```
numberPoolBlock-Pkg PACKAGE
  BEHAVIOUR
    numberPoolBlock-Definition,
    numberPoolBlock-Behavior;
  ATTRIBUTES
    numberPoolBlockId GET,
    numberPoolBlockNPA-NXX-X GET,
    numberPoolBlockHolderSPID GET,
    numberPoolBlockActivationTimeStamp GET-REPLACE,
    numberPoolBlockLRN GET-REPLACE,
    numberPoolBlockCLASS-DPC GET-REPLACE,
    numberPoolBlockCLASS-SSN GET-REPLACE,
    numberPoolBlockLIDB-DPC GET-REPLACE,
    numberPoolBlockLIDB-SSN GET-REPLACE,
    numberPoolBlockCNAM-DPC GET-REPLACE,
    numberPoolBlockCNAM-SSN GET-REPLACE,
    numberPoolBlockISVM-DPC GET-REPLACE,
    numberPoolBlockISVM-SSN GET-REPLACE,
    numberPoolBlockDownloadReason GET-REPLACE;
  ;
```

Number Pool Block, object 29.0 -- Update the GDMO behavior text (add to the end).

```
The Local SMS can only modify the numberPoolBlockActivationTimeStamp locally
upon receiving a modify request from the NPAC SMS.
```

Subscription Version, object 20.0 -- Update the GDMO behavior text (add to the end).

```
The Local SMS can only modify the subscriptionVersionActivationTimeStamp
locally upon receiving a modify request from the NPAC SMS.
```

Requirements:

No Change Required

IIS

No Change Required

GDMO

Change Described Above

ASN.1

No Change Required

Origination Date: 3/11/04

Originator: LNPAWG APT

Change Order Number: NANC 392

Description: Removal of Cloned Copies of SVs and NPBs

Cumulative SP Priority, Weighted Average:

Functional Backwards Compatible: YES

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y				Med	N/A	N/A

Business Need:

Currently, the FRS requires the NPAC to create cloned copies of SVs and NPBs (a pre-change snapshot, with a new ID and status = old) when various updates are performed (modifies, NPA Splits, SPID Migrations, etc.). This is in addition to updating the data on the "real" SV/NPB. These cloned copies are never broadcast to the SOA or LSMS, so neither system knows about these SVs/NPBs.

As an example, a TN is ported, and is assigned SV-ID 100. That number is part of an NPA Split, a cloned copy is created (SV-ID 110 status = old), and SV-ID 100 is updated with the current NPA Split info. The number has a GTT data change, a cloned copy is created (SV-ID 120 status = old), and SV-ID 100 is updated with the new GTT info. The number has another GTT data change, a cloned copy is created (SV-ID 130 status = old), and SV-ID 100 is updated with the new GTT info. The number is then ported to another SP, and a new known/broadcasted SV is created (SV-ID 200).

When discussed during the Mar '04 APT meeting, some Service Providers stated that the current functionality is confusing because of the cloned copies, which are returned in a query, since the SOA or LSMS does not know about these ported numbers and their associated "intermediate" SV-IDs.

This change order will remedy this situation by eliminating the "intermediate" records (110, 120, 130). The known/broadcasted records (100, 200, 300) will remain in the NPAC, based on current functionality.

Based on current tunable values, these cloned copies are maintained for 180 days, and maintaining them utilizes a significant amount of NPAC processing.

Description of Change:

The functionality for SV/NPB data within the NPAC will be modified to only update the known/broadcasted SV/NPB to reflect the current SV/NPB data.

In the proposed update, “intermediate” SVs/NPBs (i.e., pre-change snapshots which are the cloned copies) will no longer be maintained in the NPAC.

Requirements:

Removal of current FRS requirements that relate to cloned SVs/NPBs (NPB = 5, SV = 5)

3.2, NPAC Personnel Functionality

R3-7.5 Mass Update - Creation of Old Subscription Version

NPAC SMS shall create an old Subscription Version with a new version id for an active Subscription Version involved in a mass update before applying changes.

3.2.1, Block Holder, Mass Update

RR3-216 Block Holder Information Mass Update - Creation of Old Block

NPAC SMS shall create an old Block with a new version id for an active Block involved in a mass update before applying changes. (Previously B-810)

3.2.2, Service Provider, Mass Update

RR3-270 SPID Mass Update – Creation of Number Pool Block for Old Service Provider

NPAC SMS shall create an old Number Pool Block with a new version id for the *migrating away from SPID*, for a Number Pool Block that contains a status of active, partial failure, or old with a FailedSP-List, prior to the partial SPID Mass Update Request Process. (Previously NANC 323 Req 16)

RR3-272 SPID Mass Update – Creation of Subscription Version for Old Service Provider

NPAC SMS shall create an old subscription version with a new version id for the *migrating away from SPID*, for a subscription version that contains a status of active, partial failure, disconnect pending, or old with a FailedSP-List, prior to the partial SPID Mass Update Request Process. (Previously NANC 323 Req 18)

3.5, NPA Split Requirements

RN3-4.36 NPA Split -Creation of Old Subscription Version

NPAC SMS shall create an old Subscription Version with a new version id for an active Subscription Version involved in an NPA split at the start of permissive dialing for the old NPA.

3.5.2, Block Holder, NPA Split

RR3-51.1 NPA Splits and the Number Pool Block Holder Information – Creation of Old Block

NPAC SMS shall create an old Block with a new version id for an active Block involved in an NPA split at the start of permissive dialing for the old NPA. (Previously B-554.1)

3.14.4, Block Holder, Modification

RR3-167 Modification of Number Pooling Block Holder Information – Creation of Old Block

NPAC SMS shall create an old Block with a new version id for an active Block prior to modification. (Previously B-380)

3.14.5, Block Holder, Deletion

RR3-178 Deletion of Number Pooling NPA-NXX-X Holder Information – Creation of Old Block

NPAC SMS shall create an old Block with a new version id for a disconnected Block when the NPA-NXX-X Holder Information de-pool request is received. (Previously B-482)

5.1.2.2.2.2, Modification of an Active/Disconnect Pending Subscription Version

RR5-46 Modify Active Subscription Version- Creation of Old Subscription Version

NPAC SMS shall create an old Subscription Version with a new version id for an active Subscription Version prior to modification.

5.1.2.2.5, Subscription Version Disconnect

RR5-48 Disconnect Pending Subscription Version- Creation of Old Subscription Version

NPAC SMS shall create an old Subscription Version with a new version id for a disconnect-pending Subscription Version when the immediate or deferred disconnect request is received.

IIS

No Change Required.

GDMO

No Change Required.

ASN.1

No Change Required.

Origination Date: 5/12/1998

Originator: LNPAWG

Change Order Number: NANC 285

Description: SOA/LSMS Requested Subscription Version Query Max Size

Cumulative SP Priority, Weighted Average:

Pure Backwards Compatible: YES (but may require local operational changes)

IMPACT/CHANGE ASSESSMENT

FRS	IIS	GDMO	ASN.1	NPAC	SOA	LSMS
Y	Y	Y		Low	Med-High	Med-High

Business Need:

Currently the NPAC responds with an error message of *complexityLimitation* for queries with a response greater than 150 SVs.

This change order will prevent the NPAC from sending the *complexityLimitation* error message if it reaches the maximum tunable value (150 SVs) for SVs queries. The NPAC will return 150 SVs at a time with the ability to query subsequent data until all SVs are returned.

Description of Change:

A SOA/LSMS request for a Subscription Version query that exceeds the maximum size tunable ("Maximum Subscriber Query"), returns an error message to the SOA.

It has been requested the NPAC return SVs up to the max tunable amount instead. The SOA/LSMS would accept this message, then use it's contents to send another query to the NPAC, starting with the next TN, and so on until all SVs are returned to the SOA/LSMS.

It will be up to the SOA/LSMS to manage the data returned from the NPAC and determine the next request to send to the NPAC in order to get the next set of SVs.

The NPAC will continue to return SVs that meet the selection criteria. However, the NPAC will not return a "count" to the SOA/LSMS for number of records that match the selection criteria.

This solution will resolve problems where the SV time stamp that the NPAC users for recovery is the same for large ranges, and therefore is exceeds the maximum TN query amount.

Jun 98 LNPAWG (San Ramon), Jim Rooks will provide additional information on a proposed solution given the inclusion of NANC 279 into this change order.

Jim's response is shown below:

This change order requests the 'more' capability that will be supported by queries in the LTI. This implementation requires 2 changes.

#1 the NPAC must be modified to always return the first n (tunable) records on the SV query. Currently, the NPAC determines that the query will return more than n records and returns an error.

#2, the service providers should modify their systems to support the following SV query operations to the NPAC:

a. When data is returned from an SV Query and there are exactly n (tunable) records returned, the SP must assume that they didn't get all the data from their query.

b. After processing the first n records, they should send a new query that picks up where the data from the prior query ended.

c. The SV data returned from the NPAC for SV queries will be sorted by TN and then by SVID so a filter can be created to pick up where the prior query ended.

d. For example, if a SOA query to the NPAC returns exactly 150 records and the last SV returned was TN '303-555-0150' with SVID of 1234. The filter used on the next query would be:All SVs where ((TN > 303-555-0150) OR (TN = 303-555-0150 AND SVID > 1234).The NPAC does support OR filters.

e. Once the results from the NPAC returns less than 150 records, the SP can assume they received all records in the requested query.

Requirements:

Req 1 – Subscription Version Query – Maximum Subscription Version Query by the SOA

NPAC SMS shall return the Maximum Subscription Query tunable value of Subscription Versions to a SOA, via the SOA to NPAC SMS Interface, when the user requests a Subscription Version query and the number of Subscription Version records that meet the query criteria exceed the Maximum Subscription Query tunable value.

Req 2 – Subscription Version Query – Maximum Subscription Version Query by the LSMS

NPAC SMS shall return the Maximum Subscription Query tunable value of Subscription Versions to a Local SMS, via the NPAC SMS to Local SMS Interface, when the user requests a Subscription Version query and the number of Subscription Version records that meet the query criteria exceed the Maximum Subscription Query tunable value.

Req 3 – Subscription Version Query – Sort Order

NPAC SMS shall return Subscription Versions as a result of a Subscription Version query, sorted in TN (primary, ascending) and SV-ID (secondary, ascending) order.

Req 4 Regional NPAC SV Query Indicator

Removed from the requirements. Regional tunable no longer needed.

Req 5 Regional NPAC SV Query Indicator Modification

Removed from the requirements. Regional tunable no longer needed.

Req 6 Regional NPAC SV Query Indicator – Default Value

Removed from the requirements. Regional tunable no longer needed.

Req 7 – Service Provider SOA SV Query Indicator

NPAC SMS shall provide a Service Provider SOA SV Query Indicator tunable parameter which defines whether a SOA supports enhanced SV Query functionality over the SOA-to-NPAC SMS Interface.

Note: For Service Providers that do NOT support enhanced SV Query functionality, the NPAC will continue to send a complexityLimitation error message, when the number of SVs in a response exceed the Maximum Subscription Query tunable value.

Req 8 – Service Provider SOA SV Query Indicator Default

NPAC SMS shall default the Service Provider SOA SV Query Indicator tunable parameter to FALSE.

Req 9 – Service Provider SOA SV Query Indicator Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Service Provider SOA SV Query Indicator tunable parameter.

Req 10 – Service Provider LSMS SV Query Indicator

NPAC SMS shall provide a Service Provider LSMS SV Query Indicator tunable parameter which defines whether an LSMS supports enhanced SV Query functionality over the NPAC SMS-to-Local SMS Interface.

Note: For Service Providers that do NOT support enhanced SV Query functionality, the NPAC will continue to send a complexityLimitation error message, when the number of SVs in a response exceed the Maximum Subscription Query tunable value.

Req 11 – Service Provider LSMS SV Query Indicator Default

NPAC SMS shall default the Service Provider LSMS SV Query Indicator tunable parameter to FALSE.

Req 12 – Service Provider LSMS SV Query Indicator Modification

NPAC SMS shall allow NPAC Personnel, via the NPAC Administrative Interface, to modify the Service Provider LSMS SV Query Indicator tunable parameter.

IIS:

4.8 Subscription Version Queries (this is a new section)

For Service Providers that support the enhanced SV Query functionality (Service Provider SV Query Indicator tunable parameter set to TRUE), the behavior is defined in this section.

If a subscription version query is requested by the SOA/LSMS, and the results are larger than the Maximum Subscription Query tunable value, the NPAC SMS will return subscription versions up to that max value. The SOA/LSMS would accept this message, then use it's contents to send another query to the NPAC SMS, starting with the next TN, and so on until all SVs are returned to the SOA/LSMS. It will be up to the SOA/LSMS to manage the data returned from the NPAC SMS and determine the next request to send to the NPAC SMS in order to get the next set of subscription versions.

The NPAC SMS will continue to return subscription versions that meet the selection criteria. However, the NPAC SMS will not return a "count" to the SOA/LSMS for number of records that match the selection criteria. Service providers should modify their systems to support the following subscription version query operations to the NPAC SMS:

1. When data is returned from a subscription version query and there are exactly n (tunable) records returned, the SP must assume that they didn't get all the data from their query.
2. After processing the first n records, they should send a new query that picks up where the data from the prior query ended.
3. The subscription version data returned from the NPAC SMS for subscription version queries will be sorted by TN and then by subscription version ID so a filter can be created to pick up where the prior query ended.
4. For example, if a SOA query to the NPAC SMS returns exactly 150 records and the last subscription version returned was TN '303-555-0150' with subscription version ID of 1234. The filter used on the next query would be:All subscription versions where ((TN > 303-555-0150) OR (TN = 303-555-0150 AND subscription version ID > 1234).The NPAC SMS does support OR filters.
5. Once the results from the NPAC SMS returns less than 150 records, the SP can assume they received all records in the requested query.

As an example, a Service Provider's SOA sends an Subscription Version query to the NPAC SMS, There are 225 Subscription Versions that meet the selection criteria. Assuming the Maximum Subscription Query tunable value is set to 150 Subscription Versions, the SOA would receive data from the NPAC SMS in the form of 150 Subscription Versions in 150 linked replies (1 SV per linked reply) followed by an reply (for a total of 151 linked replies). The SOA would then send another query based on the algorithm described above. The SOA would then receive data from the NPAC SMS in the form of 75 Subscription Versions in 75 linked replies (1 SV per linked reply) followed by a reply (for a total of 76 linked replies).

For Service Providers that DO NOT support the enhanced SV Query functionality (Service Provider SV Query Indicator tunable parameter set to FALSE), a complexityLimitation error is returned when the number of SVs in a query response exceed the Maximum Subscription Query tunable value.

B.5.6 SubscriptionVersion Query

This scenario shows subscriptionVersion query from service provider systems to the NPAC SMS.

Step-by-step message flow text is shown below:

1. Action is taken by either a service provider SOA or Local SMS for retrieving one or more versions of a subscription.

2. The service provider SOA or Local SMS issues a scoped filtered M-GET from the lnpSubscriptions object to retrieve a specific version for a subscription version TN or can request all subscription versions. However, the service provider SOA is limited by a scope and filter in their search capabilities. The filter will currently support all the attributes on the subscriptionVersionNPAC.

3. For Service Providers that DO NOT support the enhanced SV Query functionality (Service Provider SV Query Indicator tunable parameter set to FALSE), The NPAC SMS replies with the requested subscriptionVersion data if the requested number of records is less than or equal to "Max SubscriberQuery" specified in the NPAC SMS. Otherwise a complexityLimitation error will be returned.
For Service Providers that support the enhanced SV Query functionality (Service Provider SV Query Indicator tunable parameter set to TRUE), *the NPAC SMS replies with the requested subscriptionVersion data if the requested number of records is less than or equal to "Maximum Subscription Query" tunable value specified in the NPAC SMS. If the requested subscriptionVersion data exceeds the tunable value, then the number of subscriptionVersion records that equal the tunable value will be returned. The service provider SOA or Local SMS will use the data returned to submit a subsequent query, starting with the next record from where the previous query finished. Only when subscriptionVersion data is returned that contains less than the tunable value, is it safe for the service provider SOA or Local SMS to assume all data has been retrieved from the NPAC SMS.*

The query return data includes:

subscriptionTN
subscriptionLRN
subscriptionNewCurrentSP
subscriptionOldSP
subscriptionNewSP-DueDate
subscriptionNewSP-CreationTimeStamp
subscriptionOldSP-DueDate
subscriptionOldSP-Authorization
subscriptionOldSP-AuthorizationTimeStamp
subscriptionActivationTimeStamp
subscriptionBroadcastTimeStamp
subscriptionConflictTimeStamp
subscriptionCustomerDisconnectDate
subscriptionDisconnectCompleteTimeStamp
subscriptionEffectiveReleaseDate
subscriptionVersionStatus
subscriptionCLASS-DPC
subscriptionCLASS-SSN
subscriptionLIDB-DPC
subscriptionLIDB-SSN
subscriptionCNAM-DPC
subscriptionCNAM-SSN
subscriptionISVM-DPC
subscriptionISVM-SSN
subscriptionWSMSC-DPC - if supported by the Service Provider SOA
subscriptionWSMSC-SSN - if supported by the Service Provider SOA
subscriptionEndUserLocationValue
subscriptionEndUserLocationType
subscriptionBillingId

subscriptionLNPType
subscriptionPreCancellationStatus
subscriptionCancellationTimeStamp
subscriptionOldTimeStamp
subscriptionModifiedTimeStamp
subscriptionCreationTimeStamp
subscriptionOldSP-CancellationTimeStamp
subscriptionNewSP-CancellationTimeStamp
subscriptionOldSP-ConflictResolutionTimeStamp
subscriptionNewSP-ConflictResolutionTimeStamp
subscriptionPortingToOriginal-SPSwitch
subscriptionFailedSP-List
subscriptionDownloadReason
subscriptionTimerType
subscriptionBusinessType

GDMO:

```
-- 21.0 LNP NPAC Subscription Version Managed Object Class

subscriptionVersionNPAC MANAGED OBJECT CLASS
…
        For Service Providers that DO NOT support the enhanced SV Query
        functionality (Service Provider SV Query Indicator tunable parameter
        set to FALSE), the behavior is defined below.
        If a Service Provider SOA or Local SMS does a scoped filtered
        M-GET for subscription versions, this request will only be
        successful if the number of records to be returned is less
        than or equal to the NPAC SMS tunable parameter,
        "Max Subscriber Query", in the Service Data table.
…
        For Service Providers that support the enhanced SV Query
        functionality (Service Provider SV Query Indicator tunable parameter
        set to TRUE), the behavior is defined below.
        The SOA or Local SMS may issue a scoped and filtered M-GET request to
        the NPAC SMS. If the number of objects exceeds the Maximum
        Subscription Query tunable value, then the number of records that
        equal the tunable value will be returned, followed by an empty reply
        to indicate the end of the returned data. The SOA or Local SMS will use
        the data returned to submit a subsequent query, starting with the
        next record from where the previous query finished. Only when
        the subscription version data is returned that contains less than
        the tunable value, has all the data been returned. The subscription
        version linked replies will be sorted by TN and then by subscription
        version ID so a filter can be created to return the next set of data
        where the TN value is greater than the last TN returned, OR the
        TN is equal to the last TN returned AND the subscription version id
        is greater than the last subscription version id returned. (e.g.
        (TN > 123-456-7890 OR (TN = 123-456-7890 AND ID > 1234))
```

ASN.1:

No change required.