



Standards Committee T1
Telecommunications

TECHNICAL REQUIREMENT

T1.TRQ.2-2001

Technical Requirement on Number Portability Switching Systems

Prepared by

T1S1.6

**Working Group on
Number Portability**



Problem Solvers to the Telecommunications Industry

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Technical Requirements for

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Approved March 2001

Prepared by

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Number Portability**

Foreword

This document defines the Switching Systems technical requirements for the number portability (NP) using the location routing number (LRN) method.

Number portability is a circuit switched network capability that allows an end user to move their North American Numbering Plan (NANP) number from one serving switch in a network to another serving switch in the same or different network while retaining their same NANP number. Other users can connect to the portable subscriber without any changes to their dialing procedures. Requirements provided in this document address number portability using the LRN obtained from a centralized database to identify the recipient switch when numbers are ported. This document does not address number portability for subscribers with directory numbers that are also used for packet switched data.

This document provides the requirements for service provider portability and location portability within a rate center. Number portability outside a rate center is beyond the scope of this document. This document does not address thousand block number pooling (see T1.TRQ.4-2001, *Thousand Block Number Pooling Using Number Portability*), resale or unbundling.

Information contained in normative annexes is considered part of this technical requirements document. Information contained in informative annexes is not considered part of these technical requirements but is rather auxiliary to the specification. Similarly, footnotes are informative.

Future control of this technical requirements document will reside with Alliance for Telecommunications Industry Solutions (ATIS). Suggestions for improvement of this specification will be welcome. These should be sent to the Alliance for Telecommunications Industry Solutions, T1 Secretariat, 1200 G Street, NW, Suite 500, Washington DC 20005.

This technical requirements document was processed and approved for submittal to ATIS by the Accredited Standards Committee on Telecommunications, T1. Committee approval of this specification does not necessarily imply that all committee members voted for its approval.

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Technical Requirements for Number Portability Switching Systems

1 Scope and Overview

This technical requirements document defines the switch requirements for Number Portability (NP) between wireline networks, using the Location Routing Number (LRN) Method. The terms Number Portability (NP) and Local Number Portability (LNP) are used interchangeably within this document.

Number portability is a circuit switched network capability that allows a North American Numbering Plan (NANP) number associated with an end-user to be moved from one serving switch in a network to another serving switch in the same or different network without changing the association between the end-user and the number. Only Directory Numbers (DNs) associated with circuit-switched voice or data calls are portable. The porting of packet addresses are not supported by the NP capability. For example, DNs assigned to ISDN B-channels carrying either voice or circuit switched data can be ported; however, if the B or D channels are carrying packet data, the channels have packet addresses, which are not portable. Requirements provided in this document address number portability using the LRN obtained from a centralized database to identify the recipient switch when numbers are ported. This document addresses the necessary requirements for service provider and location portability within a rate center. This document does not address number portability for subscribers with directory numbers that are also used for packet switched data.

This technical requirements document does not fully address the billing issues associated with identifying multiple service providers on the same switch (no service provider line attribute), especially when the number moves from one service provider to another on the same switch. This document does not address the issues related to porting subscribers out of a non-NP capable switch.

This document does not address requirements for porting between wireless networks, nor requirements for porting between wireless and wireline networks. For requirements related to porting between wireless networks, see ANSI/TIA/EIA-41-D-97, T1.713-2000, T1.711-1999, T1.708-1998, and TIA-756-A. The wireless switches follow the same network interface (i.e., signaling the LRN) as wireline switches in accordance with the signaling standards defined in T1.660-1998.

2 Introduction

2.1 Network Prerequisites for Number Portability

This clause addresses network prerequisites that must be met for NP to function properly as defined in this document.

- Each end office switch supporting number portability shall have at least one NPA-NXX that is “homed” to the switch (assigned in the Local Exchange Routing Guide (LERG)). This NPA-NXX may be an existing NPA-NXX or newly assigned NPA-NXX. Violation of this network prerequisite will preclude the ability to use 6-digit routing to reach the serving switch.

2.2 Assumptions

- 1) Existing intra-switch features are not expanded to support subscribers on different switches if a subscriber access is moved from one switch to another. For example, intraswitch centrex groups can only be maintained when the entire group of subscribers is served by the same switch.

- 2) Only Directory Numbers (DNs) associated with circuit-switched voice or data calls are portable. The porting of packet addresses is not supported by the NP capability. For example, DNs assigned to ISDN B-channels carrying either voice or circuit-switched data can be ported; however, if the B or D channels are carrying packet data, the channels have packet addresses, which are not portable.
- 3) NP queries are the responsibility of the N-1 network. Upon receiving a call which has not had an NP query already performed (and in the absence of active ACG controls), an N-1 network will perform an NP query for the call, or will arrange for an NP query to be performed for the call. Queries may be performed in the originating LEC, by prior agreement between the LEC and the N-1 network.
- 4) Only one NPA-NXX is needed for the first 6-digits of an LRN per Local Access Transport Area (LATA) to identify the switch.
- 5) Ported numbers that become vacant will be returned to the donor switch.
- 6) Translation Type 11 has been defined for the "Internetwork NP Query/Response" application group. Therefore, this TT value can be provisioned for NP queries as distinct from other ANSI T1.667-1999 or pre-IN (IN/1) queries.
- 7) Operator-destined calls will not be queried by the originating LEC and the call will be routed to the appropriate operator service without NP modification.
- 8) LRNs may also be DNs assigned to customers and these DNs may also be ported.
- 9) NP Triggers are not placed on Service Codes (e.g., 411) or Service Access Codes (e.g., 800).
- 10) Number Portability will not be "flash cut" into a network(s).
- 11) End-user rating and billing under NP will be unaffected by calls which transit over MF facilities.
- 12) Billing changes to support NP will be transparent to end-user(s).
- 13) An end-user bill for a given call may be processed on a single AMA record.
- 14) Multiple rate centers may be served by the same switch.
- 15) A capability to bill for performing an NP query will be available to service providers. However, all of this functionality may not be provided by switch AMA recording. The Number Portability Database (NPDB) may also record peg counts for NP queries in an appropriate billing format.
- 16) Existing T1.667-1999 or pre-IN (IN/1) procedures apply for Automatic Code Gapping (ACG) controls for NP queries.
- 17) Handling of calls to blocked NXXs (e.g., 976) will continue to be an originating line restriction and should be blocked before the NP query is hit.
- 18) The rate center of a DN is determined by the NPA-NXX of the DN. Determination of rate center assignment is not part of switch-based functionality.
- 19) An NPA-NXX used as a JIP is a LERG-assigned code on the switch.

2.3 Acronyms and Definitions

2.3.1 Acronyms

AC	Automatic Callback
ACG	Automatic Code Gapping
AMA	Automatic Message Accounting
ANI	Automatic Number Identification (a.k.a. Billing Number)
ANSI	American National Standard Institute
AR	Automatic Recall
AT	Access Tandem
BAF	Bellcore AMA Format
CAC	Carrier Access Code
CAMA	Centralized Automatic Message Accounting
CdPN	Called Party Number
CDR	Call Detail Record
CgPN	Calling Party Number
CPE	Customer Premises Equipment
CSDC	Circuit Switched Data Calls
DID	Direct Inward Dialing
DN	Directory Number
EO	End Office
FCI	Forward Call Indicator
GAP	Generic Address Parameter
GTT	Global Title Translation
IAM	Initial Address Message
IC	Interexchange Carrier
IN	Intelligent Network
INC	International Interexchange Carrier
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
IXC	Interexchange Carrier
JIP	Jurisdiction Information Parameter
LATA	Local Access Transport Area
LEC	Local Exchange Carrier
LERG	Local Exchange Routing Guide
LIDB	Line Information Database
LNP	Local Number Portability
LRN	Location Routing Number

MDR	Message Detail Recording
MF	Multi Frequency signaling
MWI	Message Waiting Indicator
MWN	Message Waiting Indicator Control and Notification
NANP	North American Numbering Plan
NP	Number Portability
NPA	Numbering Plan Area (i.e., A-B-C digits of NANP (ABC-DEF-GHIJ))
NPAC	Number Portability Administration Center
NPDB	Number Portability Database
NXX	Central Office Code (i.e., D-E-F digits of NANP (ABC-DEF-GHIJ))
OAM	Operations, Administration and Maintenance
OCN	Original Called Number
OHD	Off-Hook Delay
OLHB	Outgoing Line History Block
OS	Operations Systems
PIC	Pre-subscribed Interexchange Carrier
PRE-IN (IN/1)	Pre-Intelligent Network (Telcordia Technologies TR-NWT-000533)
RSU	Remote Switching Unit
SCCP	Signaling Connection Control Part
SCP	Service Control Point
SDS	Specific_Digit_String
SLE	Screen List Editing
SMS	Service Management System
SOAC	Service Order Analysis and Control
SPID	Service Provider Identification
SS7	Signaling System 7
SSP	Service Switching Point
STP	Signal Transfer Point
TAT	Termination Attempt Trigger
TCAP	Transaction Capabilities Application Part
WATS	Wide-Area Telephone Service

2.3.2 Definitions

2.3.2.1 Automatic Code Gapping: Network management controls imposed on the switch by an SCP or NPDB application to throttle query traffic on a three, six, or ten-digit basis.

2.3.2.2 Connecting Network Access Record: A new type of terminating access record to support recording of number portability information. This record may be generated for calls incoming to

the intermediate (or Donor) switch when no other terminating access record is generated (e.g., for calls incoming over traditional, non-equal access inter-office trunks).

2.3.2.3 Donor Switch: The switch from which a DN was originally ported. More specifically, the switch that is considered the default destination for the NPA-NXX of the DN.

2.3.2.4 Default Routing: The ability of the switch to continue the call based on the dialed number when the NPDB application cannot be accessed due to abnormal circumstances or when the NPDB response contains a protocol error.

2.3.2.5 End-User: A user of telecommunication services. Examples are business, residential, coin, hotel/motel, etc.

2.3.2.6 Ignore Number Portability Information Option: Allows an incoming trunk group to be provisioned to use the Dialed Number in the Ported Number GAP as the Called Party Number and reset the Ported Number Translation Indicator (FCI M-Bit) for digit analysis.

2.3.2.7 Intermediate Switch: A tandem switch.

2.3.2.8 Interexchange Carrier (IXC) Routing: Routing to an IXC based on presubscription or dialed 101XXXX.

2.3.2.9 Local Access Transport Area (LATA): A defined geographic area where equal access switches or access tandem switches can provide carrier access to the local switch.

2.3.2.10 Location Portability: Allows the end-user to retain the same DN when changing physical locations.

2.3.2.11 Location Routing Number (LRN): A 10-digit number, in the format NPA-NXX-XXXX. The first 6 digits of the LRN identify the switch.

2.3.2.12 Local Exchange Carrier (LEC) Routing: Routing for a call that does not involve an Interexchange Carrier. For this case, an IXC is neither dialed nor presubscribed.

2.3.2.13 NP Query: A request for call routing information sent from the switch to the NPDB when a call encounters an NP trigger.

2.3.2.14 Non-NP Capable Switch: A switch that does not have the capabilities described in this technical requirements document.

2.3.2.15 Non-Ported Number: A DN that may or may not be in a Portable NPA-NXX, but resides on the switch to which it is assigned in the LERG.

2.3.2.16 Number Portability Information: Information associated with a ported DN used by AMA recording to identify the recipient switch (e.g., the switch's LRN) of the ported DN to assist in billing.

2.3.2.17 Operational Users: The service provider's craft personnel.

2.3.2.18 Originating Party LNP Module: An LNP module that contains number portability information for an originating party.

2.3.2.19 Originating Switch: The switch serving the calling party.

2.3.2.20 Portable NPA-NXX: An NPA-NXX designated as "open" for portability. No numbers may have actually ported.

2.3.2.21 Ported Number: A DN in a Portable NPA-NXX that resides on a switch other than the switch to which it is assigned in the LERG.

2.3.2.22 Rate Center: A geographic area used to distinguish rate boundaries. {Note: In this document “rate center” denotes the smallest geographic area used to distinguish rate boundaries. In other contexts, rate centers may contain even smaller geographic areas used for rating (e.g., rate districts, wire centers, rate areas)}.

2.3.2.23 Recipient Switch: The switch to which the DN is ported.

2.3.2.24 Service Portability: Allows an end-user to retain the same DN when changing services.

2.3.2.25 Service Provider Portability: Allows an end-user to retain the same DN when changing service providers.

2.3.2.26 Signal Ported Number Option: Allows a trunk group to be provisioned to send the dialed number in the CdPN in lieu of sending the LRN in the CdPN and the Dialed Number in the GAP. In this case, the FCI is set to “number not translated”.

2.3.2.27 Terminating Party LNP Module: An LNP module that contains number portability information for a terminating party.

2.4 References

2.4.1 Normative References

The following standards contain provisions which, through reference in the text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below.

For non-ANSI documents, only specific sections referenced in the body of this technical requirement are considered normative. The remaining sections of those documents are considered informative.

American National Standards:

T1.113-2000, *Signaling System No. 7 (SS7) - Integrated Service Digital Network (ISDN) User Part.*¹

T1.660-1998, *Signaling System No. 7 (SS7) - Call Completion to a Portable Number - Integrated Text.*¹

T1.667-1999, *Intelligent Network.*¹

Telcordia Technologies References:

GR-1100-CORE, *Bellcore Automatic Message Accounting Format (BAF) Generic Requirements*, Issue 6, Telcordia Technologies, Inc., December 2001.²

¹ This document is available from the Alliance for Telecommunications Industry Solutions. <<http://www.atis.org>>

² This document is available from Telcordia Technologies, Inc. <<http://www.telcordia.com>>

T1.TRQ.2-2001

GR-1298-CORE, *Advanced Intelligent Network Generic Requirements: Switching Systems (A Module of AINGR, FR-15)*, Section 8 (Feature Interactions), sections 9.6.1, and 9.6.2, Issue 4, Telcordia Technologies, Inc., September 1997 (This document has been revised; Issue 7 of November 2001 is the latest version).²

TR-NWT-001050, *Expansion of Carrier Identification Code Capacity for Feature Group D (FGD)*, Appendix B, Issue 1, Telcordia Technologies, Inc., April 1991.²

TR-NWT-000533, *Database Services - Service Switching Points, Toll-Free Service*, sections 3.1.3, 3.1.4, 3.1.7, 3.5.7, and Appendix B, Issue 3, Supplement 1, Telcordia Technologies, Inc., April 1995 (This document has been superceded by GR-533-CORE, LSSGR Database Services - Service Switching Points, Toll-Free Service (FSD 31-01-000), Issue 2, Telcordia Technologies, Inc., June 2001).²

Other References:

T1.TRQ.1-2001, *Number Portability Operator Services Switching Systems*.¹

T1.TRQ.3-1999, *Number Portability Database and Global Title Translation*.¹

T1.TRQ.4-2001 *Thousand Block Number Pooling Using Number Portability*.¹

2.4.2 Informative References

American National Standards:

TIA/EIA-41-D, *Cellular Radiotelecommunications Intersystem Operations (ANSI/TIA/EIA-41-D-97)*, December 1997.³

T1.622-1999, Message Waiting Indicator Control and Notification (MWN) Supplementary Services and Associated Switching and Signalling Specifications.¹

Telcordia Technologies References:

GR-1083-CORE, *Generic Requirements for Exchange Access Automatic Message Accounting (AMA) (FSD-20-25-0000)*, Issue 3, Telcordia Technologies, Inc., November 2000.²

GR-508-CORE, *LSSGR: Automatic Message Accounting (AMA) (A Module of LSSGR, FR-64)*, Section 8.1, Issue 2, Telcordia Technologies, Inc., December 1997 (This document has been revised; the current version is Issue 3 of December 2001).²

GR-1504-CORE, *Generic Requirements for Wireless Service Provider AMA*, Issue 3, Telcordia Technologies, Inc., September 2000.²

GR-1299-CORE, *AINGR: Switch - Service Control Point (SCP)/Adjunct Interface*, Issue 7, Telcordia Technologies, Inc., November 2001.²

Other References:

³ This document is available from the Telecommunications Industry Association. <<http://www.tiaonline.org>>

Industry Numbering Committee Doc. 96-06-07-013, July 1996, *INC Report on Number Portability.*⁴

Illinois Commerce Commission (ICC) Number Portability Workshop - *Generic Operator Services Switch Requirements for Number Portability*, Issue 1.1, June 20, 1996.⁴

ICC Number Portability Workshop - *SMS General Description and Requirements Document.*⁴

ICC Number Portability Workshop - *Generic Requirements for SCP Applications and GTT Function for Number Portability*, Issue 1.00.⁴

General Number Portability Information for the Midwest Region.⁴

ICC Number Portability Workshop – *Generic Switching and Signaling Requirements for Number Portability*, Issue 1.05, August 1, 1997.⁴

North American Numbering Council Local Number Portability Administration Working Group Report on Wireless Wireline Integration, May 8, 1998.⁴

Wireless References:

The following references specify the implementation of Number Portability in wireless networks.

TIA-756A, *TIA/EIA-41-D Enhancements for Wireless Number Portability Phase-II*, , January 1, 2002.³

T1.708-1998, *PCS 1900 Service Provider Number Portability.*¹

T1.711-1999, *Number Portability for PCS 1900 Short Messagee Service and Other Services.*¹

T1.713-2000, *Personal Communications Services PCS 1900 Specifications (Revision, redesignation and consolidation of ANSI J-STD-007-1997, J-STD-007a-1999, ANSI J-STD-023-1996, ANSI J-STD-024-1997).*¹

3 User Perspective

3.1 End User Perspective (Human Interface)

The operation of this network capability impacts the end-user even though end-user procedures are unchanged. There may be some intraswitch feature limitations when the DN ports between switches. The end-user will be responsible for requesting the use of this capability from a service provider. For service provider portability, the end user will be able to request a change in service providers while retaining the same DN. The end-user will also have the option to retain the same DN following a location move within the rate center.

⁴ This document and additional information on the subject is available from the Federal Communications Commission. <http://www.fcc.gov/Bureaus/Common_Carrier>

3.1.1 NP Network Capability Overview

Number Portability (NP) gives the end-user the ability to move from one switch to another and keep their original Directory Number (DN). There are 3 types of Number Portability - Service Portability, Service Provider Portability and Location Portability.

- Service Portability - allows an end user to retain the same DN when changing services.
- Service Provider Portability - allows an end user to retain the same DN when changing service providers.
- Location Portability - allows an end user to retain the same DN when changing physical locations. In this case, the subscriber may or may not change service providers.

Only service provider portability and location portability within a rate center are supported at this time.

The NP capability is based on T1.667-1999 and follows the T1.667-1999 protocol. This capability will introduce a new T1.667-1999 trigger, which can support all three types of Number Portability. This capability does not preclude the use of pre-IN (IN/1) triggers to access the NPDB. When pre-IN (IN/1) is used, the signaling follows the existing message set defined for tollfree service.

When an NPA-NXX is defined as portable, the NPDB service logic returns a Location Routing Number (LRN) of the recipient switch for each DN that has been ported. When the switch receives the LRN, the LRN will be used to route the call to its correct destination. In the Initial Address Message (IAM), the Called Party Number parameter will be populated with the LRN and a Generic Address Parameter (GAP) will be populated with the actual dialed digits (plus derived NPA when necessary). The Forward Call Indicator (FCI) parameter in the ISUP IAM will be used to indicate whether an NP query has been performed. This is used to prevent more than one NP query from being launched on a call.

The switch does not distinguish the type of call (intra-LATA local, intra-LATA toll, or inter-LATA) based on whether the dialed DN is portable or ported. The type of call is determined based on the analysis of the dialed DN and not the LRN.

Queries for non-ported DNs will cause the NPDB to return the actual dialed DN and not the LRN. In this case, the dialed DN will be translated in the NP Routing Tables. (See clause 5.1.)

Switches that do not have the NP capability will route the call toward the donor switch or a tandem switch that has the NP capability, and the NP capable switch will launch the query to determine routing.

Use of the T1.667-1999 Number Portability trigger to provide NP leaves the T1.667-1999 protocol unchanged; no new TCAP parameters are required in this case.

The functionality provided by this capability is applicable only to calls encountering the NP trigger. The functionality provided by this capability allows the switch to create an NP GAP for use in interswitch ISUP signaling and for NP call routing operations.

The following statements highlight some of the NP capabilities specified in this technical requirements document:

- a) This capability specifies a new T1.667-1999 trigger or pre-IN (IN/1) trigger operation that can be encountered within a switch either prior to routing or during initial call routing.
- b) This capability specifies NP Routing Tables for use in Digit Analysis for NP-specific call routing.
- c) This capability specifies assignment of the NP trigger.

- d) The NPDB is expected to respond with either an Analyze_Route or ConnectionControl: Connect message for both non-ported (provides the Dialed Number) and ported (provides the LRN) numbers for NP based triggers.
- e) This capability also allows assignment of routes for use by the NP-specific NPDB analyzeRoute response or for NP query failures.
- f) The NP trigger will be encountered based on analysis of the dialed/received digits; however, the NP query will be conditionally sent based on additional call routing determinations and checks (e.g., DN not resident on the switch).
- g) When the NP trigger is assigned, all switch features should be supported for ported calls (unless otherwise noted in the document (see Assumptions (clause 2.2) or Feature Interactions (clause 5.4)). In particular, the following feature interactions will be supported:
 - CLASS⁵ (also known as ANSI Call Management) Automatic Callback and Automatic Recall features.
 - CLASS Screen List Editing (SLE).
 - The ANSI Message Waiting Indicator Control and Notification (MWN) feature (see T1.622-1999).
 - IntraLATA toll carrier selection.
- h) LRNs will be provisioned to uniquely identify each recipient switch in the NP-capable network.
- i) Default routing towards the donor switch will be available for NP triggers to allow the call to continue in the event that the NPDB is unavailable or a fatal signaling error occurs. Default Routing will be applied if the NPDB cannot be accessed due to abnormal circumstances. The default routing will be treated as if an analyzeRoute or ConnectionControl:Connect with the Dialed Number was returned from the NPDB except the Ported Number Translation indicator in the FCI parameter will be set to "number not translated".
- j) The T1.667-1999 NP trigger will follow the existing T1.667-1999 serial triggering. The NP trigger can be encountered during a persistent transaction.
- k) The Specific_Digit_String (SDS) trigger has precedence over NP trigger regardless of whether the SDS trigger has more or fewer specific digits. The NP trigger can be placed on the exact same digits as the SDS trigger, but the SDS will have precedence.

3.2 Service Provider Perspective

The following operational functions need to be facilitated:

- Provisioning the NP routing tables.
- The service provider "A" customer ports his/her number to service provider "B."
- A customer in a NP-capable network discontinues his/her service.

⁵ CLASS is a Service Mark of Telcordia Technologies.

3.2.1 Operational User Perspective

Operations users are responsible for providing the resources (administration, provisioning, maintenance and billing) for customers who desire to change their current service provider while retaining their DNs. This process should be as transparent as possible to the end-user with minimal disruption of service. The operations users or third-party administration will be responsible for updating the databases efficiently as numbers get ported.

3.2.2 Operational Functions

The description below is provided as background information.

Provisioning of NP Routing Tables

- A) The service providers shall have the ability to specify the LRN that identifies the switch. The switch must support provisioning of a minimum of two 10-digit LRNs per LATA.⁶ Each LRN provisioned can come from any NPA-NXX assigned to that switch in the LERG.
- B) The service provider shall be able to provision translations for routing for when either the dialed DN or the LRN is returned from the NPDB. The routing for the NPA-NXX will be the same regardless of whether the NPDB returned the LRN or the DN. The call will route to the donor switch when the DN is returned, and the call will route to the recipient switch based on the LRN when the LRN is returned. In either case, this is LERG-based routing.
- C) The service provider shall be able to provision translations for routing when the NPDB is unavailable. The switch shall treat this situation as though an analyzeRoute with the Dialed Number was returned from the NPDB. These translations would normally route towards the donor switch.

Provisioning and Discontinuance of Service

Outside the scope of this document.

3.3 Call Flows

For the following call flows, assume that the calls are handled by the LEC. Since no IXC is involved in the call, intraLATA SS7 signaling is used. These call flows are provided for illustration purposes to aid in understanding the NP processes and are not meant to be all inclusive. No network boundaries should be assumed or implied unless specifically stated.

⁶ As an example, the need for two LRNs per switch arises during transition when an Area Code is split. Note that the two LRNs should not come from the same NPA-NXX.

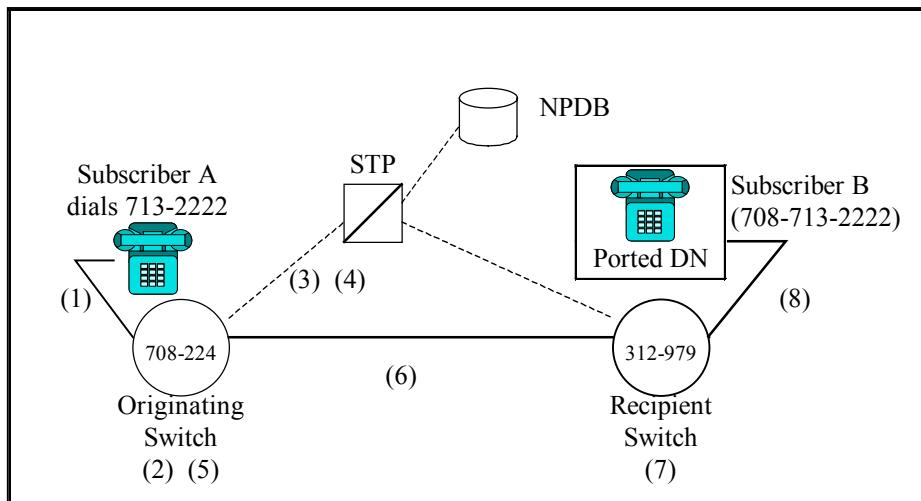


Figure 1 **Originating Switch NP Processing Direct to Recipient Switch**

Scenario A: Common case where a subscriber number is ported to a different switch and the subscriber can be connected via a direct connection. The “Signal Ported Number” trunk group option is not specified for this scenario.

1. See figure 1. Subscriber A (708-224-1111) dials subscriber B (708-713-2222).
2. The Originating Switch performs digit analysis on the dialed digits to determine how to route the call. The switch determines that B is in a portable NPA-NXX (708-713) and the DN does not reside on the switch.
3. The switch sends a T1.667-1999 (analyzeInformation) or pre-IN (IN/1) (ProvideInstructions:Start) query based on the dialed digits to the NPDB.
4. The NPDB sends a T1.667-1999 (analyzeRoute) or pre-IN (IN/1) (ConnectControl:Connect) response containing the LRN (312-979-xxxx) of the Recipient Switch.
5. The Originating Switch receives the NPDB response and analyzes the data. The LRN is translated in the NP Routing Tables and an ISUP route out of the switch is determined. The LRN is stored in the CdPN parameter and the dialed digits are stored in the GAP parameter of the ISUP IAM message. The FCI Ported Number Translation Indicator is set to indicate a query has been done (set to "translated number").
6. The call is routed to the Recipient Switch based on the LRN.
7. The Recipient Switch receives and processes the contents of the IAM message. The switch determines that an LRN is received and that it is the switch's LRN. Since the LRN identifies this switch, the switch uses the contents of the GAP rather than the Called Party Number parameter to identify the subscriber.
8. The Recipient Switch completes the call to the subscriber.

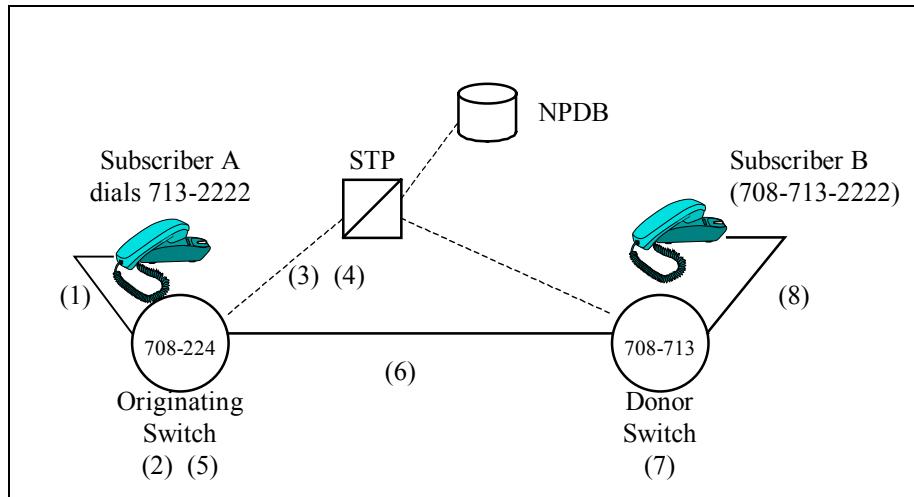


Figure 2 Originating Switch NP Processing Direct to Donor Switch - Non-Ported Case

Scenario B: This case is when the call is originated to a number that is not ported. Note, the same processing can be applied whether the call is incoming from a line or trunk.

1. See figure 2. Subscriber A (708-224-1111) dials subscriber B (708-713-2222).
2. The Originating Switch performs digit analysis on the dialed digits to determine how to route the call. The switch determines that B is in a portable NPA-NXX (708-713) and the DN does not reside on the originating switch.
3. The switch sends a T1.667-1999 (analyzeInformation) or pre-IN (IN/1) (ProvideInstructions:Start) query based on the dialed digits to the NPDB.
4. The NPDB sends a T1.667-1999 (analyzeRoute) or pre-IN (IN/1) (ConnectControl:Connect) response containing the Dialed Number to the Originating Switch. For example, the Dialed Number with analyzeRoute response could be sent when the number is in a ported NPA-NXX but the DN has not ported. This allows the NPDB to only have information about ported subscribers.
5. The Originating Switch receives the NPDB response and analyzes the data. The dialed number is translated in the NP Routing Tables and an ISUP route out of the switch is determined. The dialed number is stored in the CdPN parameter and the FCI Ported Number Translation Indicator is set to indicate a query has been done (set to "translated number"). The GAP is NOT included in the IAM for this scenario.
6. The call is routed to the Donor Switch based on the dialed number.
7. The Donor Switch receives and processes the contents of the IAM message. The switch does digit analysis on the dialed digits and finds the subscriber on the switch.
8. The Donor Switch completes the call to the subscriber.

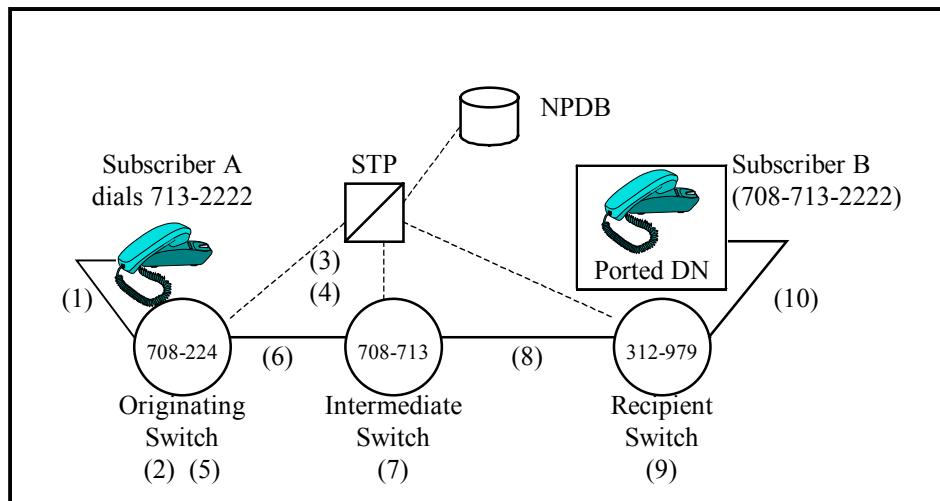


Figure 3 Originating Switch NP Processing Indirect to the Recipient Switch

Scenario C: This is the case when an intermediate switch is between the originating switch doing the NPDB query and the Recipient switch. This assumes that the call is a local call. The “Signal Ported Number” trunk group option is not specified for this scenario.

1. See figure 3. Subscriber A (708-224-1111) dials subscriber B (708-713-2222).
2. The Originating Switch performs digit analysis on the dialed digits to determine how to route the call. The switch determines that B is in a portable NPA-NXX (708-713) and the DN does not reside on the switch.
3. The switch sends a query based on the dialed digits to the NPDB.
4. The NPDB sends a response message containing the LRN (312-979-xxxx) of the Recipient Switch.
5. The Originating Switch receives the NPDB response and analyzes the data. The LRN is translated in the NP Routing Tables and an ISUP route out of the switch is determined. The LRN is stored in the CdPN parameter and the dialed digits are stored in the GAP parameter of the ISUP IAM message. The FCI Ported Number Translation Indicator is set to indicate a query has been done (set to "translated number").
6. The call is routed to the Intermediate Switch based on the LRN.
7. The Intermediate Switch receives and processes the contents of the IAM message. The FCI Ported Number Translation indicator has already been set, indicating a query was previously done, so the CdPN is checked for an LRN on this switch. The LRN does not belong to this switch so the call is routed using existing ISUP procedures.
8. The Intermediate Switch routes the call to the Recipient Switch based on the LRN.
9. The Recipient Switch receives and processes the contents of the IAM message. The switch determines that the LRN is its LRN. Since the LRN identifies this switch, the switch uses the contents of the GAP rather than the Called Party Number parameter to identify the subscriber.
10. The Recipient Switch completes the call to the subscriber.

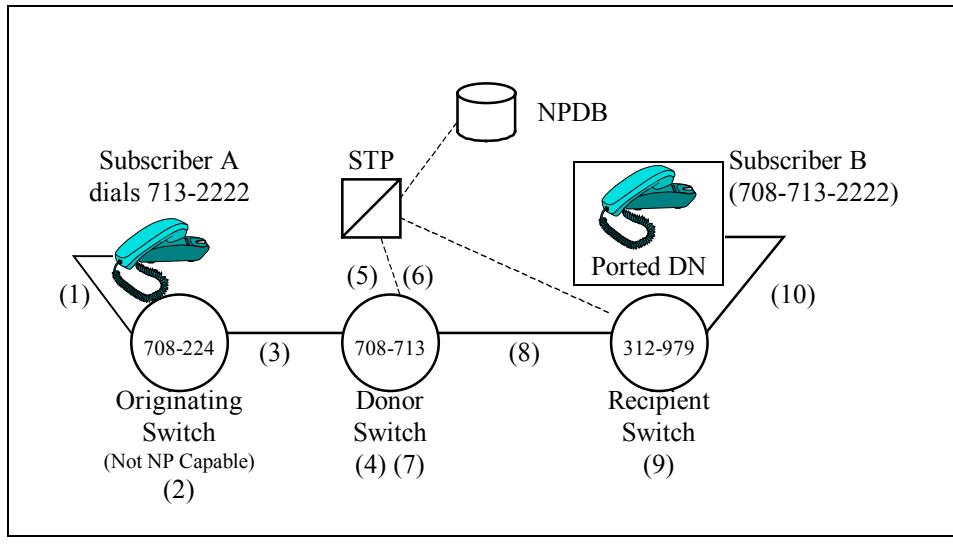


Figure 4 - Donor Switch with NP Query

Scenario D: This is the case when the originating switch does not recognize the dialed number as a ported number and routes normally to the donor switch. The donor switch recognizes the ported number. The donor switch will perform the query and direct the call to the Recipient switch. The "Signal Ported Number" trunk group option is not specified for this scenario.

1. See figure 4. Subscriber A (708-224-1111) dials subscriber B (708-713-2222).
2. The Originating Switch performs digit analysis on the dialed digits to determine how to route the call.
3. The call is routed to the Donor Switch based on the dialed number (Originating Switch is not involved in NP).
4. The Donor Switch performs digit analysis on the dialed digits to determine how to route the call. The switch determines that B is in a portable NPA-NXX (708-713) and verifies that conditions have been met such that a query should be sent.
5. The Donor Switch sends a query based on the dialed digits to the NPDB.
6. The NPDB sends a response back to the donor switch containing the LRN (312-979-xxxx) of the Recipient Switch.
7. The Donor Switch receives the NPDB response and analyzes the data. The LRN is translated in the NP Routing Tables and an ISUP route out of the switch is determined. The LRN is stored in the CdPN parameter and the dialed digits are stored in the GAP parameter of the ISUP IAM message. The FCI Ported Number Translation Indicator is set to indicate a query has been done (set to "translated number").
8. The call is routed to the Recipient Switch based on the LRN.

9. The Recipient Switch receives and processes the contents of the IAM message. The switch determines that the LRN is its LRN. Since the LRN identifies this switch, the switch uses the contents of the GAP rather than the Called Party Number parameter to identify the subscriber.
10. The Recipient Switch completes the call to the subscriber.

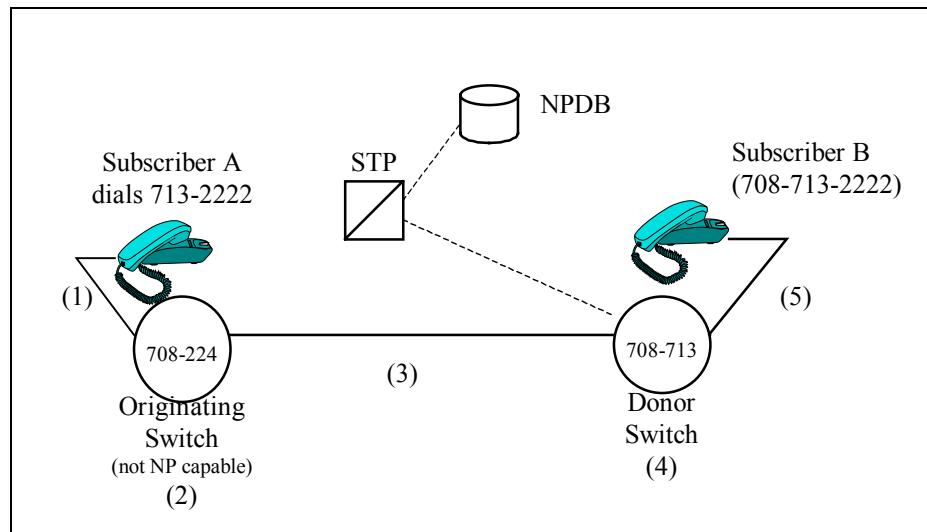


Figure 5 - Donor Switch with Non-Ported Number

Scenario E: This case is when a call is originated at the originating switch for a number that is not ported and still resides on the donor switch. The originating switch does not use the NP capability.

1. See figure 5. Subscriber A (708-224-1111) dials subscriber B (708-713-2222).
2. The Originating Switch, which is not NP capable, performs digit analysis on the dialed digits to determine how to route the call.
3. The call is routed to the donor switch based on the dialed number.
4. The Donor Switch performs digit analysis on the dialed digits to determine how to route the call. The switch determines that called DN (subscriber B) is in a portable NPA-NXX (708-713) and finds that the DN has not been ported.
5. The Donor Switch completes the call to the subscriber.

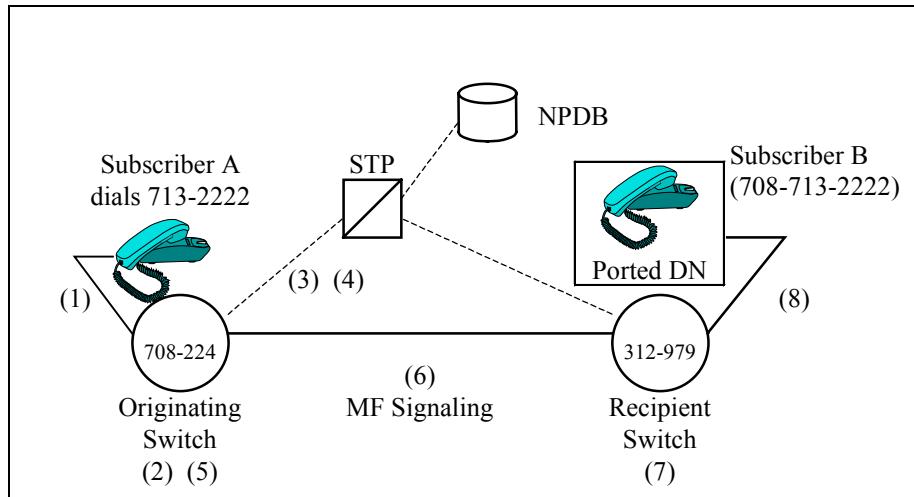


Figure 6 - Originating Switch with NP Query and Outgoing MF Signaling

Scenario F: This is the case when a subscriber moves to a switch but the call encounters MF signaling between the switch making the NPDB query and the Recipient switch. The “Signal Ported Number” trunk group option is not specified for this scenario.

1. See figure 6. Subscriber A (708-224-1111) dials subscriber B (708-713-2222).
2. The Originating Switch performs digit analysis on the dialed digits to determine how to route the call. The switch determines that called DN (subscriber B) is in a portable NPA-NXX (708-713) and finds that the DN is not on the switch.
3. The switch sends a query based on the dialed digits to the NPDB.
4. The NPDB sends a response containing the LRN (312-979-xxxx) of the Recipient Switch.
5. The Originating Switch receives the NPDB response and analyzes the data. The LRN is translated in the NP Routing Tables and determines an MF route out of the office.
6. The Originating Switch signals, using MF signaling, the dialed number (not the LRN) to the Recipient switch (i.e., on a direct trunk to the Recipient switch.) using existing procedures.
7. The Recipient Switch performs digit analysis on the incoming digits to determine how to route the call and determines that the DN is on the switch.
8. The Recipient Switch completes the call to the subscriber.

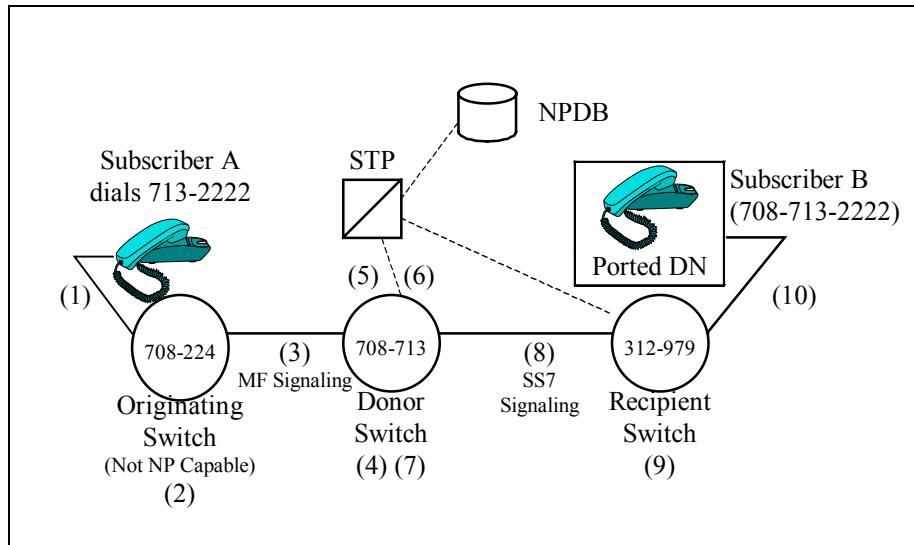


Figure 7 - Donor Switch with NP Query and Incoming MF Signaling

Scenario G: For this case, the NP trigger is encountered for digits received via a trunk. The “Signal Ported Number” trunk group option is not specified for this scenario.

1. See figure 7. Subscriber A (708-224-1111) dials subscriber B (708-713-2222).
2. The Originating Switch, which is not NP capable, performs digit analysis on the dialed digits to determine how to route the call.
3. The call is sent to the Intermediate (also the Donor Switch) switch via MF signaling.
4. The Intermediate Switch performs digit analysis on the incoming digits to determine how to route the call. The switch determines that called DN (subscriber B) is in a portable NPA-NXX (708-713) and verifies that conditions have been met such that a query should be sent.
5. The switch sends a query based on the dialed digits to the NPDB.
6. The NPDB sends a response containing the LRN (312-979-xxxx) of the Recipient Switch.
7. The Intermediate Switch receives the NPDB response message and analyzes the data. The LRN is translated in the NP Routing Tables and an ISUP route out of the switch is determined. The LRN is stored in the CdPN parameter and the dialed digits are stored in the GAP parameter of the ISUP IAM message. The FCI Ported Number Translation Indicator is set to indicate a query has been done (set to "translated number").
8. The call is routed to the Recipient Switch based on the LRN.
9. The Recipient Switch receives and processes the contents of the IAM message. The switch determines that the LRN is its LRN. Since the LRN identifies this switch, the switch uses the contents of the GAP rather than the Called Party Number parameter to identify the subscriber.
10. The Recipient Switch completes the call to the subscriber.

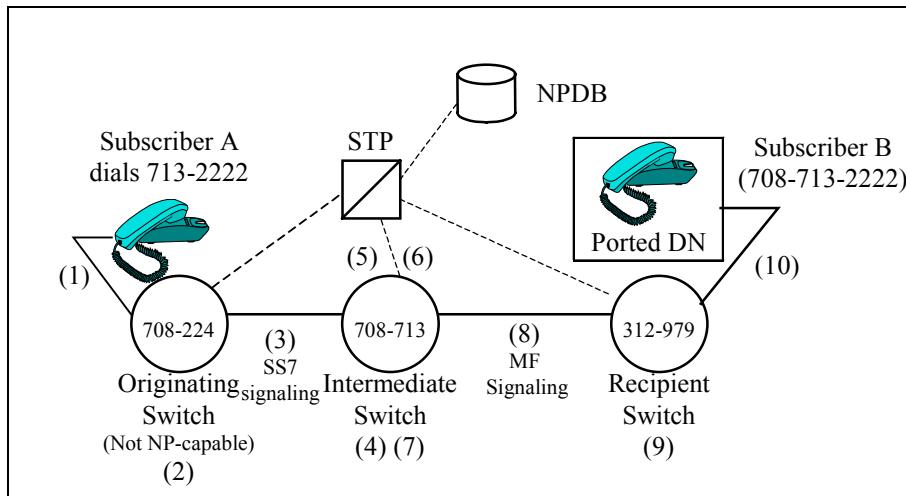


Figure 8 - Intermediate Switch with NP Query and Outgoing MF Signaling

Scenario H: For this case, the NP trigger is encountered for digits received via a trunk. The call is routed via MF signaling to the recipient switch that has the ported subscriber.

1. See figure 8. Subscriber A (708-224-1111) dials subscriber B (708-713-2222).
2. The Originating Switch performs digit analysis on the dialed digits to determine how to route the call. It routes the call to the Intermediate Switch (Originating Switch is not NP-capable).
3. The Originating Switch selects an ISUP trunk to the Intermediate switch and signals using existing ISUP procedures.
4. The Intermediate Switch performs digit analysis on the incoming digits to determine how to route the call. The switch determines that called DN (subscriber B) is in a portable NPA-NXX (708-713) and verifies that conditions have been met such that a query should be sent.
5. The switch sends a query based on the dialed digits to the NPDB.
6. The NPDB sends a response containing the LRN (312-979-xxxx) of the Recipient Switch.
7. The Intermediate Switch receives the NPDB response and analyzes the data. The LRN is translated in the NP Routing Tables and an MF route out of the switch is determined. The LRN is replaced with the dialed digits for signaling MF to the Recipient Switch.
8. The Intermediate Switch signals, using MF signaling, the dialed digits to the Recipient switch.
9. The Recipient Switch processes the incoming call to find the subscriber.
10. The Recipient Switch completes the call to the terminating subscriber.

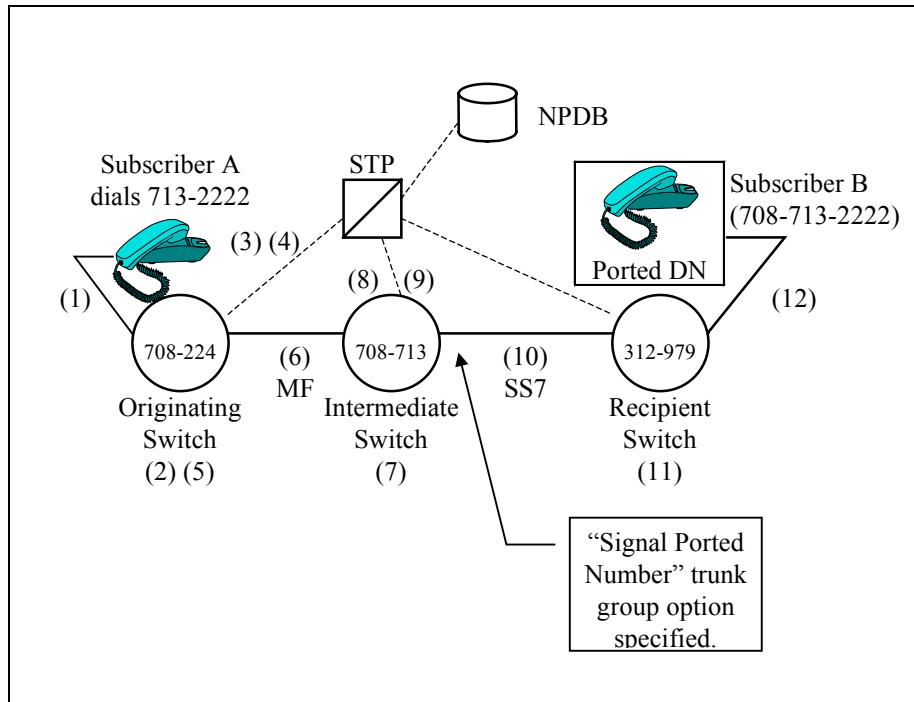


Figure 9 - Incoming MF to Intermediate Switch with NP Query and Outgoing SS7 Signaling

Scenario I: For this case, the NP trigger is encountered for the dialed digits and the call is routed through an intermediate switch (also the donor) via an MF trunk. The intermediate switch requires a second NPDB query to route the call toward a recipient switch using the “Signal Ported Number” trunk group option to complete the call to the correct subscriber. The call is routed via SS7 signaling to the switch that has the subscriber.

1. See figure 9. Subscriber A (708-224-1111) dials subscriber B (708-713-2222).
2. The Originating Switch performs digit analysis on the dialed digits to determine how to route the call. The switch determines that called DN (subscriber B) is in a portable NPA-NXX (708-713) and verifies that conditions have been met such that a query should be sent.
3. The switch sends a query based on the dialed digits to the NPDB.
4. The NPDB sends a response containing the LRN (312-979-xxxx) of the Recipient Switch.
5. The Originating Switch receives the NPDB response and analyzes the data. The LRN is translated in the NP Routing Tables and determines an MF route out of the office.
6. The Originating Switch signals, using MF signaling, the dialed number (not the LRN) to the intermediate switch using existing procedures.
7. The Intermediate Switch (also the donor switch in this case) performs digit analysis on the incoming digits to determine how to route the call. The switch determines that called DN (subscriber B) is in a portable NPA-NXX (708-713) and verifies that conditions have been met such that a query should be sent. The switch sends a query based on the dialed digits to the NPDB.

8. The NPDB sends a response containing the LRN (312-979-xxxx) of the Recipient Switch.
9. The Intermediate Switch receives the NPDB response and analyzes the data. The LRN is translated in the NP Routing Tables and an ISUP route out of the switch is determined. Since the "Signal Ported Number" trunk group option is set, the dialed digits (and not the LRN) are used for signaling to the Recipient Switch.
10. The Intermediate Switch signals, using SS7 signaling, the dialed digits in the IAM CdPN to the Recipient switch. The IAM will not contain a "Ported Number" GAP and the FCI Ported Number Translation indicator will not be set.
11. The Recipient Switch performs digit analysis on the incoming digits to determine how to route the call and determines that the DN is on the switch.
12. The Recipient Switch completes the call to the terminating subscriber.

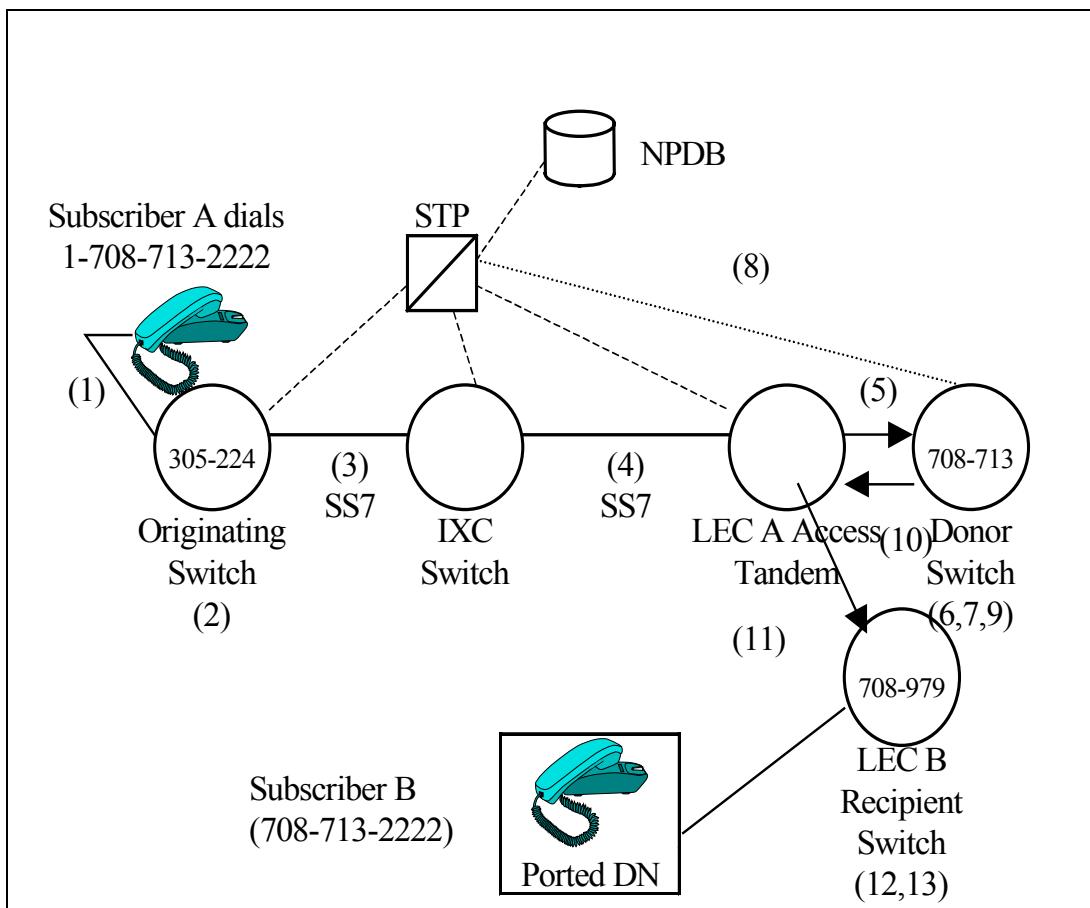


Figure 10 – Double Tandeming with NP Query at Donor Switch

Scenario J: This scenario shows how information that may need to be recorded to insure accurate settlements can be lost on an incoming IXC call when it terminates through an access tandem but the NP query is performed at the donor end office.

1. See figure 10. Subscriber A (305-224-1111) dials subscriber B (1-708-713-2222).
2. The Originating Switch performs digit analysis on the dialed digits to determine how to route the call. The switch determines that routing to the called DN (subscriber B) requires routing to an IXC and does not perform the NP query.
3. The Originating Switch signals, using SS7 signaling, the dialed number to the IXC switch using existing procedures.
4. The IXC switch default routes the call to LEC A Access Tandem..
5. LEC A tandem in turn does not query and the call is routed to the donor switch.
6. The Donor Switch performs digit analysis on the dialed digits to determine how to route the call. The switch determines that B is in a portable NPA-NXX (708-713) and verifies that conditions have been met such that a query should be sent.
7. The Donor Switch sends a query based on the dialed digits to the NPDB.
8. The NPDB sends a response back to the donor switch containing the LRN (708-979-xxxx) of the Recipient Switch.
9. The Donor Switch receives the NPDB response and analyzes the data. The LRN is translated in the NP Routing Tables and an ISUP route out of the switch is determined. The LRN is stored in the CdPN parameter and the dialed digits are stored in the GAP parameter of the ISUP IAM message. The FCI Ported Number Translation Indicator is set to indicate a query has been done (set to "translated number").
10. The call is routed through the tandem to the recipient switch based on the LRN. At this point, however, the information that the call came from an IXC and the CIC identifying that IXC have been lost.
11. The recipient switch gets the call over mutual or reciprocal compensation instead of meet point billing trunks. In the worst case, the recipient will not even know the call was an IXC call and that some components of terminating switched access should be billed. Even if the recipient can jurisdictionalize the call by comparing the calling and called party NXXs, it will be unable to determine which IXC to bill. The donor LEC, on the other hand will bill the IXC for all components of terminating switched access.
12. The Recipient Switch receives and processes the contents of the IAM message. The switch determines that the LRN is its LRN. Since the LRN identifies this switch, the switch uses the contents of the GAP rather than the Called Party Number parameter to identify the subscriber.
13. The Recipient Switch completes the call to the subscriber.

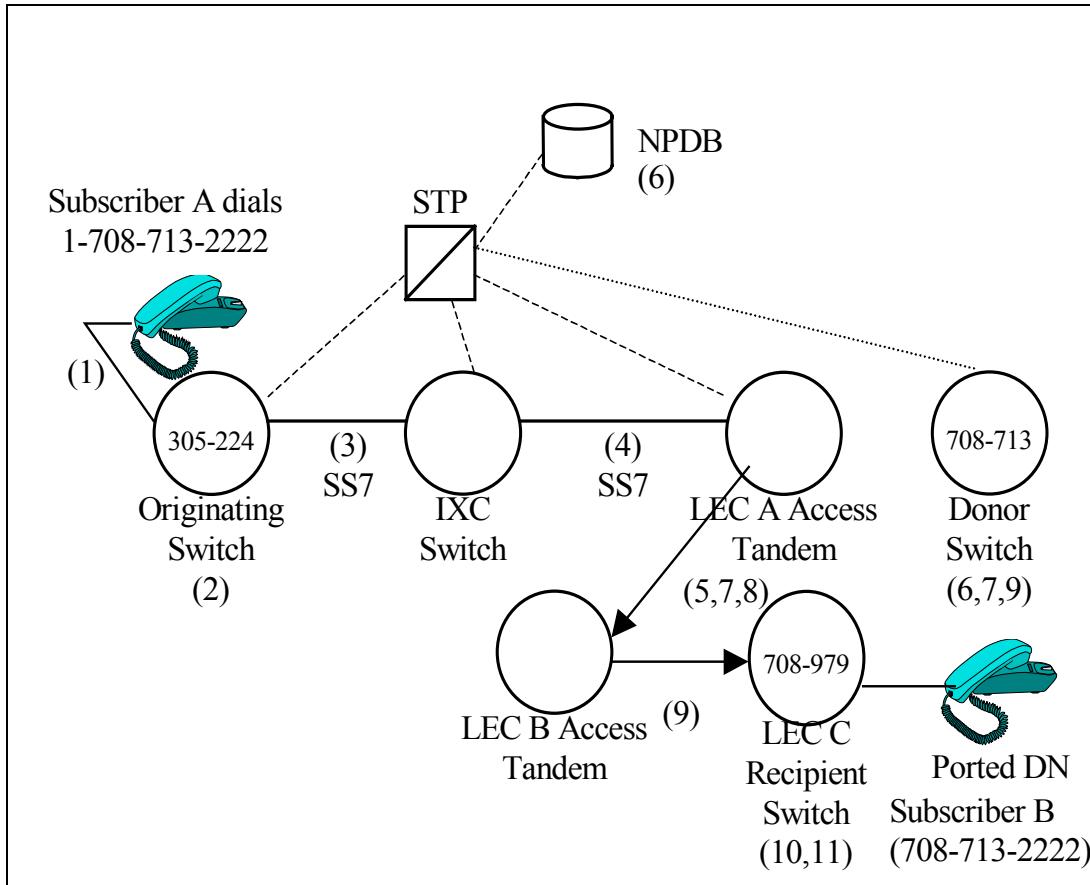


Figure 11– Double Tandeming: Dialed Number and LRN Homed on Different Tandems

Scenario K: A related problem to that illustrated in Scenario J can occur in LATAs where there are multiple tandems and different tandems or even different LECs serving the donor NXX on the one hand and the recipient LRN NXX on the other.

1. See figure 11. Subscriber A (305-224-1111) dials subscriber B (1-708-713-2222).
2. The Originating Switch performs digit analysis on the dialed digits to determine how to route the call. The switch determines that routing to the called DN (subscriber B) requires routing to an IXC and does not perform the NP query.
3. The Originating Switch signals, using SS7 signaling, the dialed number to the IXC switch using existing procedures.
4. The IXC switch default routes the call to LEC A Access Tandem.
5. The LEC A tandem performs digit analysis on the dialed digits to determine how to route the call. The switch determines that B is in a portable NPA-NXX (708-713) and verifies that conditions have been met such that a query should be sent.
6. The NPDB sends a response back to the LEC A tandem containing the LRN (708-979-xxxx) of the Recipient Switch.

7. The LEC A tandem receives the NPDB response and analyzes the data. The LRN is translated in the NP Routing Tables and an ISUP route out of the switch is determined. The LRN is stored in the CdPN parameter and the dialed digits are stored in the GAP parameter of the ISUP IAM message. The FCI Ported Number Translation Indicator is set to indicate a query has been done (set to "translated number").
8. The LEC A tandem has meet point trunks to the recipient LEC C switch but because the tandem listed in the LERG for the NXX of the LRN involved is the LEC B tandem the call is first routed there. LEC A Tandem routes the call to LEC B Tandem. At this point, however, the information that the call came from an IXC and the CIC identifying that IXC have been lost.
9. LEC B Tandem routes the call to the recipient switch.
10. The Recipient Switch receives and processes the contents of the IAM message. The switch determines that the LRN is its LRN. Since the LRN identifies this switch, the switch uses the contents of the GAP rather than the Called Party Number parameter to identify the subscriber.
11. The Recipient Switch completes the call to the subscriber.

In the process, the information about the call being an IXC call is lost and the call eventually reaches LEC C over mutual/reciprocal compensation trunks and proper billing of terminating switched access does not take place. Instead, LEC A gets all components of terminating switched access, LEC B gets mutual compensation (and perhaps transit charges) and LEC C gets mutual compensation.

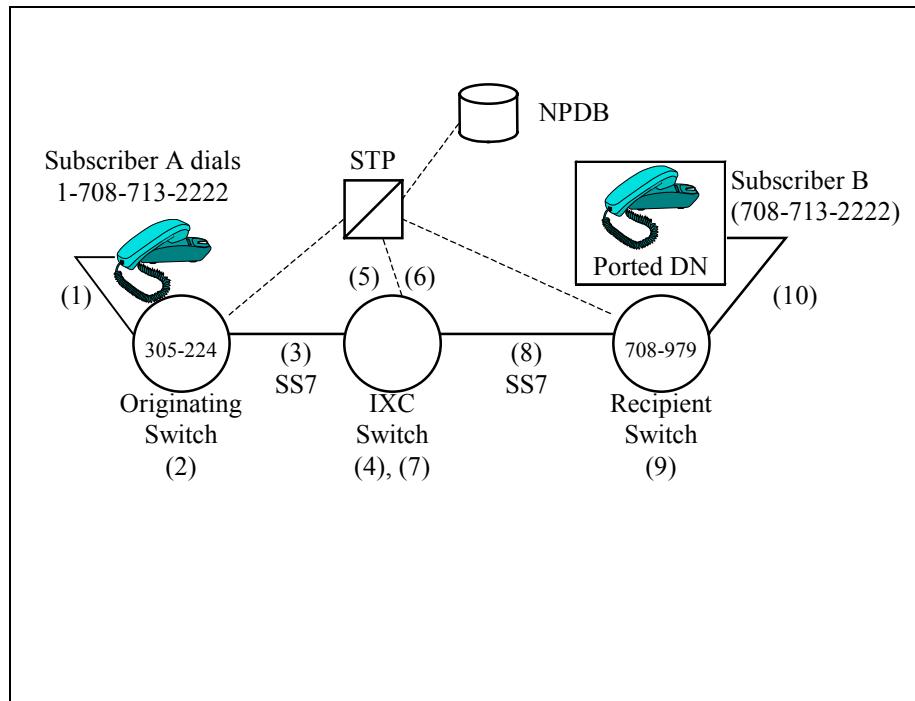


Figure 12 – IXC-Routed Call; NP Query at IXC Switch

Scenario L: For this case, the originating switch determines that the call is to be routed to an IXC, and does not perform the NP query. The NP query is performed at the IXC switch, and the call is routed onward to the recipient switch. In this example, the IXC has direct trunks to both the originating and recipient switches.

1. See figure 12. Subscriber A (305-224-1111) dials subscriber B (1-708-713-2222).
2. The Originating Switch performs digit analysis on the dialed digits to determine how to route the call. The switch determines that routing to the called DN (subscriber B) requires routing to an IXC and does not perform the NP query.
3. The Originating Switch signals, using SS7 signaling, the dialed number to the IXC switch using existing procedures.
4. The IXC Switch performs digit analysis on the incoming digits to determine how to route the call. The switch determines that called DN (subscriber B) is in a portable NPA-NXX (708-713) and verifies that conditions have been met such that a query should be sent.
5. The switch sends a query based on the dialed digits to the NPDB.
6. The NPDB sends a response containing the LRN (708-979-xxxx) of the Recipient Switch.
7. The IXC Switch receives the NPDB response and analyzes the data. The LRN is translated in the NP Routing Tables and an ISUP route out of the switch is determined.
8. The IXC Switch signals, using SS7 signaling, the LRN in the IAM CdPN to the Recipient switch. The IAM will include a “Ported Number” GAP containing the dialed digits and the FCI Ported Number Translation indicator will be set to “translated number.”
9. The Recipient Switch performs digit analysis on the incoming digits to determine how to route the call and determines that the DN is on the switch.
10. The Recipient Switch completes the call to the terminating subscriber.

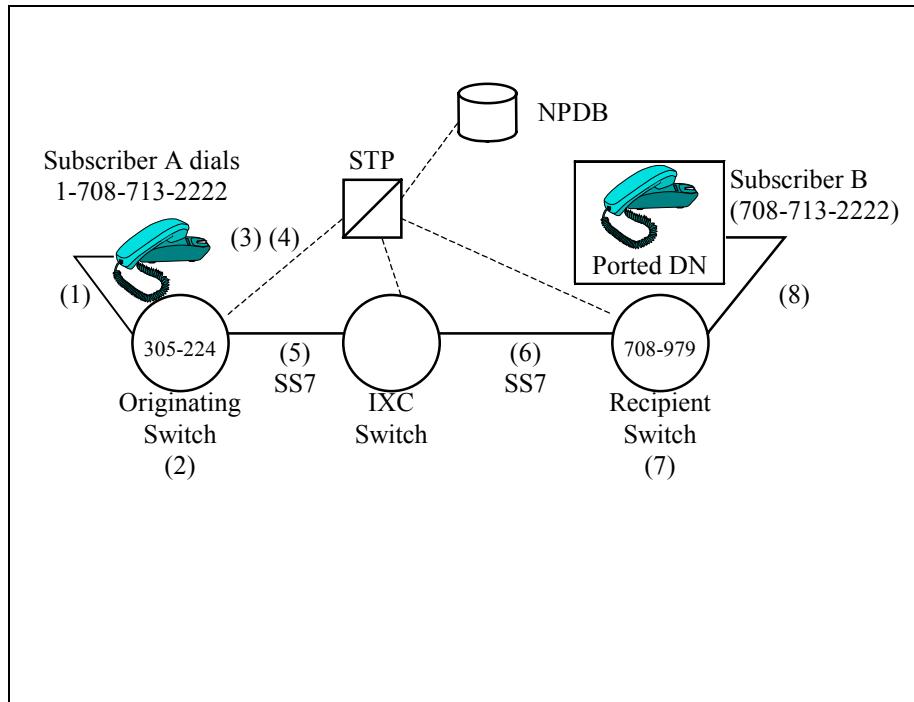


Figure 13 – IXC-Routed Call; NP Query at Originating LEC Switch; IXC Accepts NP Information

Scenario M: For this case, the originating switch determines that the call is to be routed to an IXC, and by agreement with the IXC performs the NP query on behalf of the IXC. The NP query is not performed at the IXC switch, which accepts the NP information signaled forward by the LEC. In this example, the IXC has direct trunks to both the originating and recipient switches.

1. See figure 13. Subscriber A (305-224-1111) dials subscriber B (1-708-713-2222).
2. The Originating Switch performs digit analysis on the dialed digits to determine how to route the call. The switch determines that routing to the called DN (subscriber B) requires routing to an IXC. The switch also determines that the IXC is one for which it performs NP queries, and proceeds to perform the NP query.
3. The switch sends a query based on the dialed digits to the NPDB.
4. The NPDB sends a response containing the LRN (708-979-xxxx) of the Recipient Switch.
5. Using SS7 signaling, the Originating Switch signals the LRN in the IAM CdPN to the IXC switch. The IAM will include a “Ported Number” GAP containing the dialed digits and the FCI Ported Number Translation indicator will be set to “translated number.” Routing to the IXC Switch uses the predetermined carrier and route.
6. The IXC Switch routes the call based on the contents of the CdPN field (the LRN) to the Recipient Switch.
7. The Recipient Switch performs digit analysis on the incoming digits to determine how to route the call and determines that the DN is on the switch.

8. The Recipient Switch completes the call to the terminating subscriber.

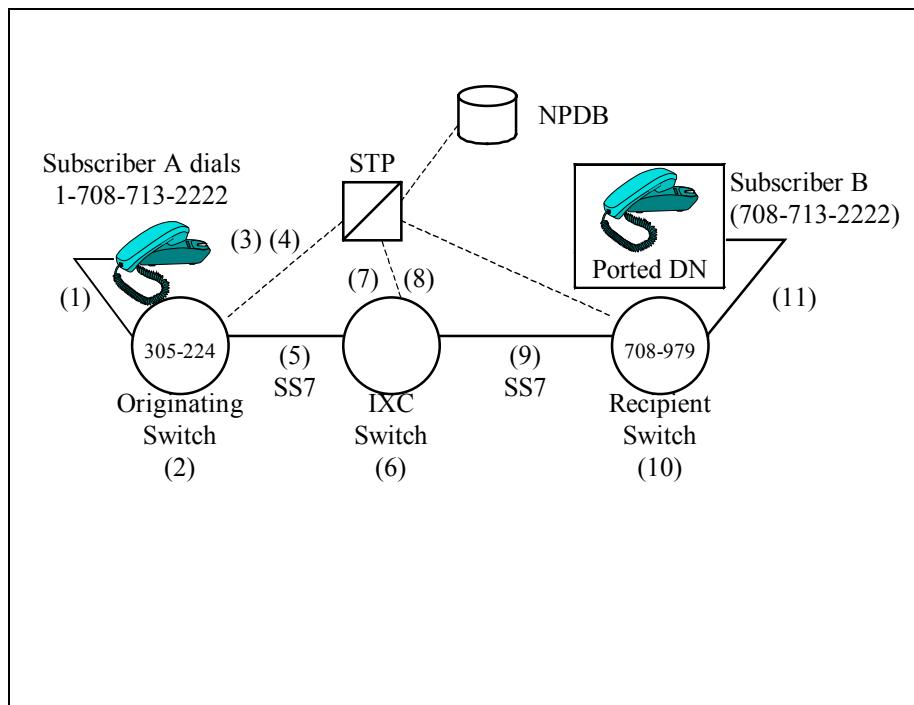


Figure 14 – IXC-Routed Call; IXC Ignores NP Information

Scenario N: For this case, the originating switch performs an NP query, perhaps in error, and routes the call to the IXC switch. Per the Ignore Number Portability Information option set on the incoming trunk, the IXC switch chooses to ignore the incoming number portability information, resets the call to an unqueried status, and launches an NP query for the call. In this example, the IXC has direct trunks to both the originating and recipient switches.

1. See figure 14. Subscriber A (305-224-1111) dials subscriber B (1-708-713-2222).
2. The Originating Switch performs digit analysis on the dialed digits to determine how to route the call. The switch determines that routing to the called DN (subscriber B) requires routing to an IXC. The switch also determines that the IXC is one for which it performs NP queries, and proceeds to perform the NP query.
3. The switch sends a query based on the dialed digits to the NPDB.
4. The NPDB sends a response containing the LRN (708-979-xxxx) of the Recipient Switch.
5. Using SS7 signaling, the Originating Switch signals the LRN in the IAM CdPN to the IXC switch. The IAM will include a "Ported Number" GAP containing the dialed digits and the FCI Ported Number Translation indicator will be set to "translated number." Routing to the IXC Switch uses the predetermined carrier and route.

6. The IXC Switch receives the SS7 message from the originating LEC, and the incoming trunk indicates the IXC Switch should ignore number portability information. The IXC Switch resets the FCI (M-bit) to “Number Not Translated” and replaces the Called Party Number digits (where the LRN is stored) with the Dialed Number digits located in the Ported Number GAP.
7. The IXC Switch sends a query based on the dialed digits to the NPDB.
8. The NPDB sends a response containing the LRN (708-979-xxxx) of the Recipient Switch.
9. Using SS7 signaling, the IXC Switch signals the LRN in the IAM CdPN to the Recipient Switch. The IAM will include a “Ported Number” GAP containing the dialed digits and the FCI Ported Number Translation indicator will be set to “translated number.”
10. The Recipient Switch performs digit analysis on the incoming digits to determine how to route the call and determines that the DN is on the switch.
11. The Recipient Switch completes the call to the terminating subscriber.

4 Network Impacts

4.1 Security Issues

No security issues have been identified.

4.2 Signal Transfer Point (STP)

Implementation of NP does not result in any modifications to the STP protocol. Existing SCCP and TCAP routing procedures apply between the switch and the STP, including Global Title Translations (GTT). The STP may need to be updated to handle 10-digit GTT, and existing procedures can be used to support 10-digit GTT on the STP.

4.3 Number Portability Database (NPDB)

The NPDB is needed to provide the database functions for number portability. Below are the possible general database data attributes that can be stored in the NPDB and are related to the DN:

- Point Code and Subsystem Number for 10-digit GTT (e.g., CLASS, Message Waiting Indicator Control and Notification, Calling Name, Line Information Database (LIDB))
- Location Routing Number

The NPDB requirements are provided via a separate technical requirements document generated by T1S1.6 (see T1.TRQ.3-1999.)

4.4 Local Service Management System (LSMS)

The Local Service Management System can be used as a central database for subscriber information to be downloaded to the NPDBs.

4.5 Operations Systems Impacts

Operations Systems impacts are outside the scope of this document.

4.6 Operator Services Network Elements

The operator services network elements will be impacted by this capability and will need to access the NP data (including 10-digit GTT) for information on the location of the correct LIDB for a given subscriber. The operator services systems requirements are defined in T1.TRQ.1-2001.

4.7 Customer Premises Equipment (CPE) Requirements or Impacts

No CPE requirements or impacts have been identified.

4.8 Wireless Service Providers

The requirements for porting wireless subscribers to wireline subscribers and vice versa are for further study. See assumptions described throughout this document for wireless-to-wireless number portability.

4.9 Toll Network Interface

4.9.1 Originating LATA

In the originating LATA, signaling to an interexchange carrier includes the JIP, but otherwise is typically unaffected by number portability. However, if the originating LEC has an agreement with the interexchange carrier to perform NP queries on its behalf, the results of the query are reflected in signaling to the interexchange carrier.

4.9.2 Terminating LATA

The NP requirements specified in this document apply when an interexchange carrier delivers a call to the terminating LATA. If applicable, the IXC should send the LRN, GAP, and FCI indicator to the terminating LATA service provider. If so, the service provider terminating the call shall process the call using the NP procedures.

4.10 Interactions with Non-NP Capable Switches

The document describes the interfaces within the context of the NP-capable switch. See the Call Flows (clause 3.3) for example interfaces. No new interface or signaling requirements are needed in non-NP capable switches.

5 Feature Requirements

This clause defines the capability requirements for Number Portability (NP). The requirements are highlighted in "tags" to facilitate requirements traceability. Each tag in the document has a label containing a unique number (e.g., <REQ-00090> where REQ is the type of requirement, and 00090 is the number) which identifies the specific requirement. Bold text within the tag identifies the specific

requirement. Non-bold text provides supplementary explanation of the requirement. Non-bold text does not contain additional requirements.

This document uses the following terminology:

- **Requirement** - Feature or function that is necessary to satisfy the needs of a typical service provider. Failure to meet a requirement may cause application restrictions, result in improper functioning of the product, or hinder operations. A requirement is flagged by the letters “**REQ**”.
- **Conditional Requirements** - are needed by some but not all service providers and as such are left for the individual service providers to choose. A conditional requirement is flagged by the letters “**CR**”.

5.1 Call Processing Requirements

There are basic considerations with respect to NP service provisioning on the switches that should be noted in reading the following requirements:

1. A switch using the NP trigger must open up a new NPA-NXX in order to serve a DN in that NPA-NXX. Lines are provisioned as their corresponding DNs port onto the switch.
2. When a DN moves off a switch serving a given NPA-NXX, the switch will need to perform an NP query in order to route calls to the subscriber correctly. The switch must allow an NP trigger to be placed against the portable NPA-NXX and must mark the DN as ported out, NP-Reserved, or unallocated, as appropriate.
3. If a donor switch receives a call with the Ported Number Translation indicator in the FCI set for a number that ported from the switch, the donor switch does not need to re-query for the call. If providers do not update their NPDBs in a timely fashion (i.e., NPDBs may be locked out from updating during upgrades, etc.), calls to ported numbers may fail. The donor switch does not have the responsibility for redirecting mis-routed calls if the FCI indicator is set. Appropriate error treatment should be applied.
4. The switch must support provisioning of a minimum of two 10-digit LRNs per LATA served. Each LRN provisioned can come from any NPA-NXX assigned to that switch in the LERG. When calls are received, the switch will compare the received LRN with its own LRN(s). When there is a match, the switch will use the “Ported Number” GAP to connect to the subscriber.

The NP trigger:

Throughout these requirements, the term NP trigger is used to refer to the NP trigger detection and NPDB response processing. The NP trigger is defined as a T1.667-1999-based trigger that is assigned identically to the Specific_Digit_String trigger assigned on an NPA-NXX. The NP trigger can be defined as a pre-IN (IN/1) based trigger that is assigned identically to the “tollfree” based pre-IN (IN/1) trigger. The rules on when call processing can encounter the NP trigger follow the T1.667-1999 or pre-IN (IN/1) rules with exceptions as noted. Unlike other triggers, the NP trigger will initiate a query to the NPDB based on additional call processing checks after the trigger is initially encountered. In other words, the NP trigger is a conditional trigger and the operation will have the following functional components that are enhancements to the current T1.667-1999 or pre-IN (IN/1) trigger. Any line or trunk call origination can encounter the new NP trigger.

The Functional Components Required in Support of NP:

1. Conditional NP Trigger:

The NP trigger is a conditional trigger, which will initiate a query based on further routing determinations and checks following the trigger detection.

2. Multiple NP Routing Tables:

The NP trigger response processing will make use of new routing functions, termed the "NP Routing Tables." The NP Routing Tables will be used in processing the NPDB message received in response to an NP query.

3. NP Location Routing Number (LRN):

The switch will be provisioned with the LRNs that can be used to uniquely identify the switch. The switch must be capable of supporting at least 2 NPA-NXXs per LATA that identify an LRN for this switch.

4. Non-Ported Subscriber Response Processing:

The analyzeRoute or ConnectControl:Connect message containing the Dialed Number within the CalledPartyID parameter (for the analyzeRoute message) or the Digits (Routing Number) parameter (for the ConnectControl:Connect message) will be received in response to the NP query for a non-ported subscriber. This response may result in the retranslation of the CalledPartyID or Digits (Routing Number) using the NP Routing Tables.

5. NP Trigger Default Routing:

Default Routing may cause the dialed number to be reanalyzed in the NP Routing Tables similar to receiving an analyzeRoute or ConnectControl:Connect message with the dialed number. For default routing, the Ported Number Translation indicator in the FCI is set to "number not translated" and the "Ported Number" GAP is not included in the IAM.

6. NP GAP Creation:

When the pre-IN (IN/1) or T1.667-1999 NP trigger results in a query which returns an NP response message with the CalledPartyID or Digits (Routing Number) different from the dialed digits, and the call proceeds, then the switch must generate a "Ported Number" GAP for use in routing calls to ISUP trunks, unless the "Signal Ported Number" option is set for the outgoing trunk.

7. ISUP NP Parameter Support:

ISUP signaling supports the transport of an "Ported Number" GAP as well as an NPDB query indication. The NPDB query indication is provided using the ISUP Forward Call Indicators (FCI) parameter. The originating, intermediate (including donor), and terminating switches will be able to detect and process these NP parameters.

8. NP Trigger & Specific_Digit_String Trigger Interactions:

The NP trigger can coexist with Specific_Digit_String triggers and have matching and/or overlapping digit patterns. The SDS trigger will always have precedence over the NP trigger and the NP trigger will be encountered if routing continues to the number that initiated the first trigger.

9. NP Trigger & Switch-Based Feature Interactions:

The NP trigger can coexist with other existing switch features (i.e., CLASS Automatic Recall (AR) and Automatic Callback (AC) features) without altering the operation from an end user's perspective.

10. LRN Detection and Processing:

The recipient switch will be able to identify its own LRN and replace the Called Party Number with the "Ported Number" GAP address information. The dialed number (not the LRN) is used to route the call.

11. Trunk Option for Signaling Ported Number:

An originating or intermediate switch will support a per trunk group option for signaling the ported number instead of the LRN as the called party for ISUP trunks. The switch will select a route out of the switch, based on an analysis of the LRN (since the LRN is not its own LRN). When the SS7 outgoing trunk is selected, the switch will use the "Ported Number" GAP information, after proper digit editing, to formulate the Called Party Number in the IAM. The FCI shall be set to "Number not translated" and the "Ported Number" GAP shall not be included.

12. Trunk Option for Ignoring Number Portability Information:

An intermediate or terminating switch will support an incoming trunk group option for performing call processing as if number portability information was not received. This option performs the following actions

- If the Ported Number Translation Indicator (FCI M-Bit) of the incoming IAM is set to "Number Translated", then it is reset to "Number Not Translated", and
- If a Ported Number GAP is included in the incoming IAM, then the Called Party Number digits (where the LRN is stored) are replaced by the Dialed Number digits located in the Ported Number GAP.

These actions will occur before any other digit analysis of information in the Called Party Number field of information in the Ported Number GAP is performed. In addition, these actions will occur before any analysis of the FCI M-Bit is performed.

NP Routing Tables: The NP trigger responses will be processed using routing tables provisioned specifically for use with NP call routing. The use of NP Routing Tables will facilitate the following NP functions:

- I. NP Routing Tables will allow calls to be routed to an LRN (in general).
- II. NP Routing Tables will allow calls to be routed interswitch to an LRN, even when the NPA-NXX code associated with the LRN is open on the switch (as would be the case of a switch that is a recipient of ported numbers with that NPA-NXX).

- III. NP Routing Tables will allow calls to be routed interswitch to a DN, even when the NPA-NXX code associated with the DN is open on the switch (as would be the case of a switch that is a recipient of ported numbers with that NPA-NXX). In particular, when, in response to an NP query, the switch receives the Dialed Number in the CalledPartyID parameter (dialed digit retranslation) as an indication that it has no record that the called DN has been ported, the switch will be able to retranslate the dialed number using new Routing Tables. While the non-NP Routing Tables in the switch did not point to an interoffice route, the NP Routing Tables can be provisioned to send the call to another switch.
- IV. NP Routing Tables facilitate default routing to the donor switch when the query cannot be successfully completed.

NP Routing Tables also allow a call to be routed interswitch to an LRN even if a DN identical to that LRN is served by the switch.

Figure 15 illustrates the need for NP routing tables identified in item III. In this scenario, 708-222 is a portable NPA-NXX. DN 708-222-1111 has been ported into the switch shown in the figure. 708-222-1112 is still assigned on the donor switch. If a subscriber on the switch shown in the figure dialed 708-222-1112, digit analysis would yield a DN that is not served by the switch and is denoted as an “unallocated number”. Since the 708-222 is a portable NPA-NXX, the NP query is sent to the NPDB. The NPDB response will be the Dialed Number, since the DN was not ported and is still on the donor switch. In this example, digit analysis in the normal line/trunk routing tables would yield an unallocated number and the call would fail. If a new NP routing table is used, the analysis of the Dialed Number would yield a route to the donor switch resulting in proper treatment for the call. No specific implementation is suggested by the figure or by the example.

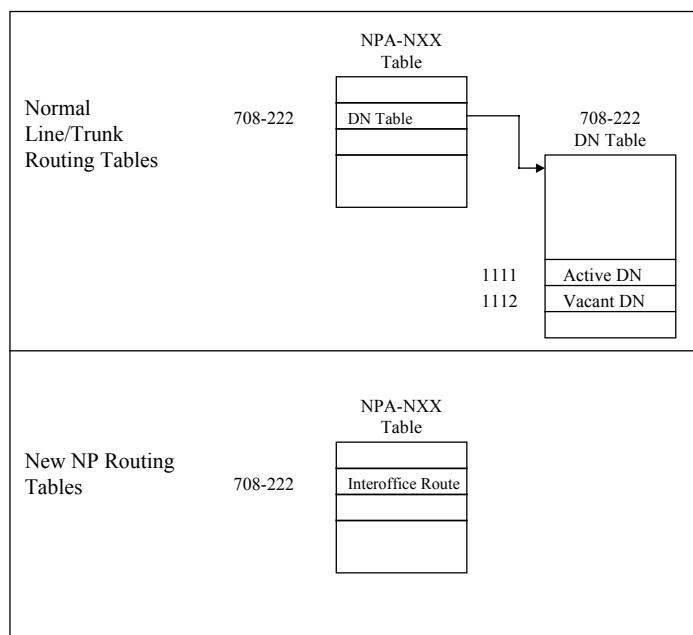


Figure 15 NP Routing Tables

<REQ-00100>

The switch shall implement new routing functions known as NP Routing Tables to provide routing for NP query processing. These routing functions will be defined and provisioned for use by the NP capability. This functionality can be implemented using either existing or new routing tables.

The switch must have the means to select a different route based on the line or trunk's dialing plan and select a different route based on the same digits after an NP query.

<End of REQ-00100>

<REQ-00200>

The switch shall be capable of routing calls to ported numbers to the same switch over different routes where required for intraLATA separations purposes (e.g. local flat rate versus toll) even where the same LRN is assigned to numbers in different rate centers.

<End of REQ-00200>

5.1.1 NP Trigger Detection and Processing

5.1.1.1 NP Query

Given that the NP trigger is assigned, when call processing encounters the NP trigger, the switch will make a determination based on the trigger assignment data and/or look ahead in routing to decide whether to generate a query or bypass the trigger. The NP trigger is a conditional trigger which can be encountered by calls from lines or trunks; however, the NP query is launched only if additional criteria are satisfied for the call.

Given the NP trigger is encountered for the Called Party DN, the following are conditions when the query should not be launched.

1. If the called party DN is served by the switch and the transition mechanism (<REQ-08600>) is not active.
2. If the call is routed to an operator system.
3. If an NP query was already made for the call.
4. If the serial triggering limit is exceeded.
5. If the call is to be routed to an interexchange carrier unless NP queries are to be launched in the originating network (by agreement between the originating service provider and the interexchange carrier).

<REQ-00300>

With respect to call processing, the NP trigger can be encountered at an originating, intermediate, or terminating switch. NP processing in the switch may be encountered from an originating line (ISDN, analog) or originating trunk (Inband, ISUP, PRI).

<End of REQ-00300>

<REQ-00400>

The switch shall support the administration of a six-digit (NPA-NXX) NP trigger.

<End of REQ-00400>

<CR-00410>

The switch shall support the administration of the NP trigger for the following specific digit patterns: NPA, NPA-NXX-X, NPA-NXX-XX, NPA-NXX-XXX, and NPA-NXX-XXXX.

<End of CR-00410>

The NP trigger is a conditional trigger with the following triggering determination strategy:

<REQ-00500>

An NP Query shall only be sent when:

- an NP trigger has been encountered, and
- the FCI⁷ indicates “number not translated”.

However, the query will not be performed if,

- the called number is served by this switch and the transition mechanism (as specified in <REQ-08600>) does not apply to the called number, or
- the call is identifiable as destined for an operator, or
- the call is to an interexchange carrier, as indicated by presubscription or dialed digits (101XXXX) (for exceptions see <CR-00950>).

The expected NP query messages are as follows:

- a) analyzedInformation message for an SDS-based NP trigger
- b) ProvideInstructions:Start message for a pre-IN-based (IN/1) NP trigger

NOTE - Non-SS7 originations will always imply an FCI of “number not translated”.

<End of REQ-00500>

<REQ-00600>

The analyzedInformation message shall be populated with the following parameters:

- UserID populated as defined by T1.667-1999 protocol
- Bearer Capability populated as defined by T1.667-1999 protocol
- CalledPartyID populated as defined by T1.667-1999 protocol, but with the full 10 digits of the dialed number
- TriggerCriteriaType populated as *numberPortability* (assigned as value 37).

<End of REQ-00600>

⁷ FCI refers to the Forward Call Indicators included in the ISUP protocol. The FCI values will be discussed in detail in later sections. The setting of “Number Translated” means that an NP query has been successfully performed.

<REQ-00700>

The analyzedInformation acgEncountered parameter is an optional parameter, and shall be sent as defined by T1.667-1999 protocol.

<End of REQ-00700>

<REQ-00800>

The ProvideInstructions:Start message shall be populated as follows (see Telcordia Technologies TR-NWT-000533):

- Digits (Dialed Digits) populated with 10 digits of dialed number
- Digits (Calling party Number) populated with 10 digits of Calling Party Number
- Digits (Originating LATA) populated with LATA ID
- Originating Station Type populated with ANI II digits
- CIC Expansion Parameter⁸ (also see Telcordia Technologies TR-NWT-001050).

<End of REQ-00800>

<REQ-00900>

If an NP trigger is encountered and IXC routing (not LEC routing) is assured prior to launching the NP query, the NP query shall be bypassed, and the call routed to the predialed carrier, or presubscribed carrier (PIC), or group carrier, or lastly to the Office provisioned interLATA carrier (for exceptions see CR-00950).

<End of REQ-00900>

<CR-00950>

If an NP trigger is encountered and IXC routing (not LEC routing) is assured prior to launching the NP query, the switch shall launch the NP query if the call is to be routed to any of the specific designated set of IXCs provisioned by <CR-08550>. This specification shall be on a per route basis for each of the designated carriers. The switch shall not perform the NP query for calls to be routed to any other IXC.

The default behavior shall be as described in REQ-00900.

This requirement shall not apply to operator-destined calls.

When the NP query is performed, the call shall be routed to the predetermined carrier and route.

The originating LEC shall perform the NP query on behalf of an IXC only when business arrangements are in place that explicitly allow the LEC to perform the NP query.

Some tandem switches can not perform this capability.

<End of CR-00950>

<REQ-01000>

If an NP trigger is encountered and the call is destined for an operator services system, the NP query shall be bypassed and the call should be routed to the operator services system.

<End of REQ-01000>

⁸ The CIC Expansion Parameter is a mandatory parameter in pre-IN (IN/1), although it is not required for NP functionality.

<REQ-01100>

The rating of the call and the determination of local or toll nature of the call shall be based on the dialed number, not the LRN returned from the NPDB. For LEC-routed calls, if an NP trigger is encountered and the call is destined for a toll trunk based on the dialed number, the NP query shall be made and the call shall be routed via a toll trunk using the LRN. For LEC-routed calls, if an NP trigger is encountered and the call is destined for a local trunk based on the dialed number, the NP query shall be made and the call shall be routed via a local trunk using the LRN.

<End of REQ-01100>

<REQ-01200>

If an incoming ISUP call includes an FCI indication of "Number Translated", and the NP trigger is encountered, the NP trigger shall be ignored and the call shall continue as if the NP trigger was not encountered.

<End of REQ-01200>

<REQ-01300>

The Specific_Digit_String shall take precedence over the NP trigger. If the Specific_Digit_String query results in a "Continue" response, the NP trigger shall be encountered if its trigger criteria are satisfied.

<End of REQ-01300>

5.1.1.2 Trigger Response Processing

The Called Party DN received in the NP response message will be retranslated using the NP Routing Tables. This allows the service providers to set up routing of NP calls using the NP Routing Tables. The NP Routing Tables provisioning will also allow the service provider to:

- handle an NPDB response message with the switch's own LRN as the Called Party ID.
- handle an NPDB response with the Dialed Number message and retranslate the dialed DN in the NP routing tables.
- allow an NP call to be delivered to a DN (or to unallocated number announcement).
- handle an NPDB response message with an LRN of another switch.

NOTE - If the DN is the same as a switch's LRN, then there is no difference in processing.

<REQ-01400>

If an NP response message is received from the NPDB without error, the NP Routing Tables shall be used for digit analysis of the NP Response message.

When the NP trigger is encountered, and the analyzedInformation message is sent to the NPDB, the allowed response message is analyzeRoute.

When the pre-IN-based (IN/1) NP trigger is encountered, and the ProvideInstructions:Start message is sent to the NPDB, the allowed response message is ConnectionControl:Connect.

For a LEC routed call, the route shall be determined based on the analysis of digits in the CalledPartyID in the NPDB response message; for an IXC-routed call, the call shall be routed using the predetermined carrier and route. The ANI information is derived from any previous

triggers, or else from the originating facility. The response does not change the ANI information unless the NPDB provides a new ANI (per existing T1.667-1999 requirements).

<End of REQ-01400>

<REQ-01500>

When the switch receives an analyzeRoute message in response to an NP analyzedInformation query, it resumes call processing taking into account the information contained in the message. The point in call that call processing resumes shall be in accordance with T1.667-1999 procedures. However, call classification for rating purposes is based on the dialed digits.

Also see <REQ-01100>.

<End of REQ-01500>

<REQ-01600>

When the NP trigger is encountered, and the analyzedInformation message is sent to the NPDB, and the analyzeRoute message is returned, the NPDB may include additional requests including:

- sendNotification (not an expected NPDB response)
- requestReportBCMEvent (not an expected NPDB response)
- sendToResource (not an expected NPDB response)
- acg component

When the response from the NPDB contains any of the above items, the switch shall follow processing as specified in T1.667-1999.

Procedures for processing requestReportBCMEvent or sendToResource in response to an NP query have not been defined in T1.667-1999.

<End of REQ-01600>

5.1.1.2.1 Routing Following the NP Query

The called party number received in the NP response message, if different from the dialed DN, will be compared against the LRNs assigned to the querying switch. If the called party number matches one of the querying switch's LRNs, the call will be routed to the dialed number and the LRN ignored.

<REQ-01900>

Prior to routing on the NP response, if the call is not to be routed to an IXC, then:

- If the received CalledPartyID matches the dialed DN, the call shall be routed using the dialed DN, the "Ported Number" GAP will not be created and the FCI will be set to "translated number".
- If the received CalledPartyID does not match the dialed DN:
 - if the received CalledPartyID is not an LRN value owned by the switch, the call shall be routed using the LRN towards the recipient switch. The "Ported Number" GAP will be created and the FCI will be set to "translated number".
 - if the received CalledPartyID is an LRN value owned by the switch, the LRN will be ignored and the call will be routed to the dialed number using the NP Routing Tables.

If the dialed number routes off the switch using SS7, the “Ported Number” GAP will not be created and the FCI will be set to “translated number”.⁹

The above cases are inclusive and mutually exclusive for a given CalledPartyID.

<End of REQ-01900>

<CR-01950>

Prior to routing on the NP response, if the call is to be routed to an IXC, then:

- if the received CalledPartyID matches the dialed DN, the call shall be routed using the predetermined carrier and route. The ported number GAP shall not be populated and the FCI shall be set to “translated number”.
- if the received CalledPartyID does not match the dialed DN, the call shall be routed using the predetermined carrier and route. The “Ported Number” GAP shall be created and the FCI shall be set to “translated number”.

<End of CR-01950>

<REQ-02000>

When the switch signals to another switch using either MF or SS7, the called party information follows normal digit prefixing or digit deletion or both regardless of whether the called party information is an LRN or dialed number. The trunk interface for the expected number of digits must be maintained for NP calls.

<End of REQ-02000>

5.1.1.2.2 NP Trigger Impact on Switch-based Call Redirection Information

The NP operation should not alter the call redirection information and DNs that are used by the switch-based features. This clause does not apply to pre-IN-based (IN/1) NP triggers.

<REQ-02100>

The NP trigger shall not manipulate the switch values for the Original Called Party DN and Redirecting Party DN unless specifically indicated by the inclusion of the RedirectingPartyID parameter in the NPDB response.

The NP trigger shall not increment the call forwarding redirection counter unless specifically indicated by the inclusion of the RedirectionInformation parameter in the NPDB response.

If the NP trigger response message contains the RedirectingPartyID or RedirectionInformation parameters, the switch shall treat them using existing T1.667-1999 requirements.

Any other T1.667-1999 analyzeRoute message parameters which are received on an NP query shall be honored as per the T1.667-1999 requirements.

<End of REQ-02100>

⁹ In some unusual cases, the LRN associated with a DN may be the same 10-digit number as the DN itself. Calls will still complete properly in this case. Note that in such a case, the DN must, by definition, reside on the donor switch even though an LRN is associated with it in the NPDB. Thus, the call will complete properly when routed, per REQ-01900, as a non-ported number.

5.1.1.2.3 NP Trigger Default Routing

NP uses default routing defined by T1.667-1999 where the trigger default routing can be assigned to the NP trigger. If the default routing feature is assigned, then when the NPDB is unavailable, or the NPDB response has a fatal error in it, the call will be routed as if an NP response with Dialed Number message were received from the NPDB and retranslate the Called Party DN using the NP Routing Tables.

<REQ-02200>

The NP trigger can have the default routing capabilities assigned.

NP trigger default routing will operate normally, and proceed as if the NPDB responded with an NP response with Dialed Number if the query fails and default routing is correctly assigned.

However, unlike the normal NP response with Dialed Number response processing, the FCI parameter will not indicate "Number Translated". The "Ported Number" GAP will not be generated as a result of a failed NP trigger and default routed call.

<End of REQ-02200>

5.1.2 Generic Address Parameter (GAP) Generation and FCI Determinations

The use of an ISUP Generic Address Parameter (GAP) for ISUP signaling is required for preserving the dialed DN for interoffice calls following a successful NP query when routing out of the switch (i.e., when the LRN is not the switch's own LRN). In addition, the Forward Call Indicator (FCI) parameter in the ISUP Initial Address Message (IAM) will be used to indicate whether or not an NP query was performed. With respect to the GAP and FCI:

1. For ISUP interoffice calls, the "Ported Number" GAP is included in the IAM whenever the NP query returns an NP response with a CalledPartyID different from the dialed number.
2. The FCI is set to indicate "Number Translated" whenever an NP query is performed and a response is successfully received without error.
3. The switch clears the GAP and FCI values whenever switch-based call forwarding or subsequent T1.667-1999 or non-T1.667-1999 triggers result in a change in the Called Party DN. In addition, the Ported Number Translation indicator in the FCI is set to "number not translated" and the "Ported Number" GAP is not included in the IAM when the "Signal Ported Number" trunk group option is specified on an outgoing SS7 trunk. However, the ported number is signaled in the Called Party Number parameter.
4. When the NPDB returns the switch's own LRN, the switch will treat the call as if the NPDB returned the Dialed Number. The call could terminate within the switch or route to a DN subtending the switch. If the call routes out of the switch, the FCI shall be set to "number translated" without a GAP.

<REQ-02300>

GAP Creation - When the NP trigger is encountered, a query is sent, and the NPDB returns an appropriate response (without fatal errors), then the switch shall:

1. Not create a "Ported Number" GAP if the received CalledPartyID parameter is the same as the CalledPartyID sent in the query to the NPDB. Any existing "Ported Number" GAP shall be deleted from the IAM.
2. Not create a "Ported Number" GAP if the received CalledPartyID parameter specifies the querying switch's LRN.

3. Not create a "Ported Number" GAP if the "Signal Ported Number" trunk group option specifies that the dialed number shall be sent in place of the LRN in the outgoing signaling. In addition, the "Ported Number" GAP shall not be sent for MF signaling.
4. Create a "Ported Number" GAP if the received CalledPartyID parameter is different from the CalledPartyID sent in the query to the NPDB and the LRN is not the switch's LRN. Any existing "Ported Number" GAP shall be overwritten. (e.g., as with a call forwarded from a ported number to a ported number.)
5. The switch shall preserve up to one "Ported Number" GAP value from the received IAM.

<End of REQ-02300>

<REQ-02400>

If, in response to a pre-IN-based (IN/1) or SDS-based NP query, the received CalledPartyID is not 10 digits, this shall be considered a fatal error for the NP trigger response. The CalledPartyID received shall be 10 digits in North American Numbering Plan format. Default routing, if assigned, shall apply for a fatal error response.

<End of REQ-02400>

<REQ-02500>

FCI Creation - When the NP trigger is encountered, a query is sent, and the NPDB returns a valid response, the switch shall set the FCI to "Number Translated."

The Ported Number Translation indicator FCI will be set to "Number Translated" whether the NPDB provided Called Party ID is the same or different (i.e., an LRN) from the Called Party ID in the NP query. The Ported Number Translation indicator FCI shall be set to "Number Translated" even if the NPDB response specifies the querying switch's LRN.

The FCI is set to "Number not translated" when the "Signal Ported Number" trunk group option is specified.

<End of REQ-02500>

<REQ-02600>

The switch shall not create or modify the "Ported Number" GAP or FCI if an NP trigger is detected and the query is not launched.

<End of REQ-02600>

5.2 Signaling and Protocol Requirements

5.2.1 Subscriber/Switch Interfaces

The signaling from the originating terminal, including non-NP capable switches, is not modified by NP processing.

From a signaling perspective, the line or trunk originated signaling is the same for a call to a ported number as for a call to a non-ported number.

5.2.2 Switch/Switch Interfaces

See the Call Flows (clause 3.3) for additional signaling descriptions.

5.2.2.1 Signaling Formats

5.2.2.1.1TCAP Formats

<REQ-02800>

Existing TCAP error reporting shall be preserved and provided for the NP trigger. Namely, the switch shall report trigger query/response error detection to the NPDB when the NP trigger query fails as specified in T1.667-1999 requirements or pre-IN (IN/1) requirements.

<End of REQ-02800>

<REQ-02900>

If an NP trigger is encountered and the analyzedInformation message is sent to the NPDB, the message parameter population rules are identical to the analyzedInformation parameter population rules for the T1.667-1999 Specific_Digit_String trigger.

If the pre-IN-based (IN/1) NP trigger is encountered and the ProvideInstructions:Start query message is sent to the NPDB, the parameter population rules for the ProvideInstructions:Start message are identical to those for pre-IN (IN/1) services (i.e., tollfree).

<End of REQ-02900>

It is recommended that optional parameters not necessary for the NP application not be included in the message unless a specific need has been identified by the service provider. To minimize the impacts on the switch, SCP, STP, and signaling links, the transmission of unnecessary optional parameters is discouraged.

5.2.2.1.2 ISUP Signaling Formats

Below are the ISUP signaling parameters affected by this capability.

The Called Party Number parameter follows the existing formats and procedures regardless of whether the address digits specify an LRN or a subscriber's telephone number.

<REQ-03000>

The Forward Call Indicator Parameter (Parameter Name Code = 00000111) shall be encoded as follows. The remaining indicators in the parameter are unaffected.

Table 1 Forward Call Indicators

	8	7	6	5	4	3	2	1
1	H	G	F	E	D	C	B	A
2	P	O	N	M	L	K	J	I

bit M: Ported number translation indicator
 0 number not translated
 1 number translated

<End of REQ-03000>

<REQ-03100>

The ISUP Generic Address Parameter (Parameter Name Code = 11000000) shall be encoded as follows:

Table 2 Ported Number Generic Address Parameter

	8	7	6	5	4	3	2	1					
1	Type of Address												
2	O/E	Nature of address Indicator											
3	Spare	Numbering Plan			Address Presentation Restriction		Rsvd.						
4	2nd address signal				1st address signal								
n	Filler (if necessary)				nth address signal								

(1)	Type of Address	
	1 1 0 0 0 0 0 0	Ported Number
(2)	Odd/Even indicator	
	0	Even Number of Address Signals
	1	Odd Number of Address Signals
(3)	Nature of Address	
	0000001	subscriber number
	0000011	national (significant) number
	0000100	international number
	1110001	subscriber number, operator requested
	1110010	national number, operator requested
	1110011	international number, operator requested
	1110100	no number present, operator requested
	1110101	no number present, cut-through call to carrier
	1110110	950+ call from local switch carrier public station hotel/motel, or non-exchange access end office
	1110111	test line code
(5)	Numbering Plan	
	000	unknown (no interpretation)
	001	ISDN (Telephony) numbering plan
	101	Private Numbering Plan
(6)	Address Presentation Restriction	
	00	Not Applicable for Type "Ported Number"
(7)	Rsvd	Reserved field -- for future use
(8)	Address Signal	Coding the same as Called Party Number
(9)	Filler (if needed)	

NOTE - The code points in bold apply to this capability.

The format for the GAP is specified by T1.113-2000 and T1.660-1998. The Nature of Address and Numbering Plan for the "Ported Number" type follow the coding of the Called Party Number parameter.

<End of REQ-03100>

<REQ-03200>

The ISUP Jurisdiction Information Parameter (Parameter Name Code = 11000100) shall be encoded as follows. The format shown below is defined in American National Standards T1.113-2000.

Table 3 JIP Format

8	7	6	5	4	3	2	1
2nd Address Signal				1st Address Signal			
4th Address Signal				3rd Address Signal			
6th Address Signal				5th Address Signal			

The address signal shall be populated in NPA-NXX format where the NPA digits are specified in the 1st, 2nd, and 3rd address signals and the NXX digits are specified in the 4th, 5th, and 6th address signals. The switch shall support at least one designated number of the format NPA-NXX to be signaled in the JIP parameter in the IAM.

<End of REQ-03200>

<REQ-03300>

The ISUP JIP parameter shall be included in the IAM for all line and private trunk call originations. Unless a separately billed call leg is initiated at the intermediate switch resulting in a change to the billed party, the JIP shall be passed from the incoming IAM to the outgoing IAM without modification at an intermediate switch. If no JIP is received in the incoming IAM, the JIP will be generated at an intermediate switch when the incoming trunk is provisioned with a per-trunk group LRN, otherwise no JIP will be generated.

At an intermediate switch, the JIP shall be passed for cases such as toll-free services or call tandeming. The JIP identifies the switch from which the call originates, and can be recorded to identify that switch.

<End of REQ-03300>

<REQ-03400>

When feature interactions result in a separately billed call segment, the ISUP JIP parameter shall be generated or replaced with the JIP of the switch. In particular, call forwarding, call redirection, and call deflection shall result in a JIP generated by this switch in accordance with the procedures for a new origination. T1.667-1999 services that result in a separately billed call segment shall generate a JIP or override an incoming JIP following the procedures for a new origination.

In either case (e.g. switch based supplementary service or T1.667-1999 feature interactions), the JIP signaled will be that of the switch at which the billing number was modified (i.e. the forwarding switch or T1.667-1999 switch).

<End of REQ-03400>

<REQ-03500>

If the LRN is replaced with a new routing number due to feature invocation (e.g., T1.667-1999) without a subsequent NP query, the IAM shall not include the GAP with type "Ported Number" and the FCI's Ported Number Translation Indicator shall be set to "Number not Translated." The call may encounter a subsequent NP trigger.

The LRN shall have an associated Ported Number Translation Indicator and "Ported Number" GAP for signaling to another switch. If the LRN is replaced by another address (i.e., due to feature invocation), the "Ported Number" GAP and Ported Number Translation Indicator shall be modified based on the new address.

NOTE - Extra care in database provisioning is needed to prevent network looping.

<End of REQ-03500>

<REQ-03600>

An originating or intermediate switch shall support a per trunk group option for ISUP trunks for signaling the ported number instead of the LRN as the called party. The switch shall select a route out of the switch based on an analysis of the LRN (since the LRN is not its own LRN) when the LRN is either received from another switch or via an NP query. When the SS7 outgoing trunk is selected, the switch shall use the GAP information, after normal digit prefixing or digit deletion or both, to formulate the Called Party Number in the IAM. The FCI shall be set to "Number not translated" and the GAP shall not be included.

This requirement allows the service provider to send the dialed number and must be coordinated with the connected switch. This flexibility increases the chances of trunk looping since the dialed number could route back to the sending switch.

<End of REQ-03600>

<REQ-03650>

When an intermediate or terminating switch receives an IAM for a trunk group that has the Ignore Number Portability Information Option turned on¹⁰ (see <REQ-08450>), the intermediate or terminating switch shall perform the following actions:

- If the Ported Number Translation Indicator (FCI M-Bit) of the incoming IAM is set to "Number Translated", then it is reset to "Number Not Translated", and
- If a Ported Number GAP is included in the incoming IAM, then the Called Party Number digits (where the LRN is stored) are replaced by the Dialed Number digits located in the Ported Number GAP.

For call processing and billing purposes, the call shall be treated as though NP signaling information was not received.

These actions will occur before any other digit analysis of information in the Called Party Number field of information in the Ported Number GAP is performed. In addition, these actions will occur before any analysis of the FCI M-Bit is performed.

The Ignore Number Portability Information Option shall not affect the contents of the JIP.

<End of REQ-03650>

<REQ-03700>

When the call is routed out of the originating or intermediate switch after NP processing with an LRN and the trunk selected uses inband signaling (e.g., MF), the called party number sent inband to the other switch shall be the dialed number (after normal digit prefix or digit deletion or both) and not the LRN. Note that the call was routed via the LRN from NP query and not via the dialed number.

¹⁰ If this option is set in error, it can result in unnecessary NP queries at a service provider switch even though the preceding service provider's switch performed the queries.

The remaining signaling procedures are not modified. This requirement allows the service provider the ability to continue the call's progress for interworking situations. It should be noted that care should be taken when performing digit prefixing or deletion in those cases where the LRN and dialed number may have different NPAs.

<End of REQ-03700>

<REQ-03800>

A Release (REL) Message cause value {ANSI standard, normal event, cause code 0011010 (26) - "Misrouted call to a ported number"} shall be used to clear a call when the switch's own LRN was received and the address digits in the GAP specify an unallocated number. The call can be cleared using this new cause code with the existing release procedures.

For exceptions related to the generation of a REL with cause code 26, see "NP-Reserved" marking, clause 5.5.1.1.4.

Also see requirement <REQ-16500> for requirements on the Administrative Messages.

<End of REQ-03800>

5.2.2.2 Switch without the Ported Subscriber

Table 4 Originating Switch Signaling

NP Trigger Response	Basis for Routing	Outgoing Signaling (“Signal Ported Number” trunk group option not specified)			
		Type	FCI	Ported Number GAP	CdPN
LRN	LRN	ISUP	1	DN	LRN
DN	DN	ISUP	1	No GAP	DN
No Trigger	DN	ISUP	0	No GAP	DN
LRN	LRN	MF	N/A	N/A	DN
DN	DN	MF	N/A	N/A	DN
No Trigger	DN	MF	N/A	N/A	DN
NPDB Failure	DN	ISUP	0	No GAP	DN
NPDB Failure	DN	MF	N/A	N/A	DN

N/A = Not applicable

NOTE - A response with the querying switch's LRN will be treated as a Dialed Number response.

This clause describes the signaling from an originating switch that is not serving the ported subscriber. Table 4 gives a summary of the signaling from the originating switch.

<REQ-03900>

For Interoffice ISUP calls, when an NP query is not made at an originating switch, the "Ported Number Translation Indicator" in the FCI parameter in the IAM shall be set to "Number not translated (0)".

Bit M of the Forward Call Indicators parameter is always set to "0" for non-NP capable switches.

<End of REQ-03900>

<REQ-04000>

When the call is routed out of the originating switch after NP trigger processing with another switch's LRN and the trunk selected uses ISUP with the "Signal Ported Number" trunk group option not specified, the Initial Address Message shall be sent with the following additional requirements:

- a) The Called Party Number Parameter shall be populated with the LRN address and coded following existing ISUP requirements.
- b) The GAP shall be coded as follows:
 - Type of Address: Ported Number (11000000).
 - Odd/Even: Set for even number of address digits (0). For NP, ten address digits are included so this field has an even number of address digits.
 - Nature of Address: National Number (0000011).
 - Numbering Plan: ISDN (telephony) Numbering Plan (001).
 - Presentation Restriction indicator: Not Applicable (00)
 - Address Signals: The 10 digit ported number (dialed, derived, or signaled) shall be stored in the Address Signals in the GAP. The switch shall convert the dialed number into a 10-digit number for inclusion in the GAP by prepending the NPA or expanding the extension. The prefix (e.g., 1+) or access code (e.g., 101XXXX) shall not be included in the GAP. The NPA is derived based on the dialing plan for the originating subscriber (i.e., currently when a subscriber dials a 7 digit number, the NPA must be assumed). The derivation of the NPA must account for the case where 7 digit dialing can cross NPA boundaries (e.g., protected NXX codes). For this case, the NXXs are not duplicated across the NPAs and therefore the NPA is assumed for the particular NXX.
- c) The "Ported Number Translation Indicator" in the Forward Call Indicators of the IAM shall be coded as "Number Translated."

The remaining signaling parameters (CgPN, CHG, etc.) in the IAM follow the existing ISUP requirements.

<End of REQ-04000>

<REQ-04100>

When the call is routed out of the originating switch after NP trigger processing with a Dialed Number response (not ported) and the trunk selected uses ISUP, the following modifications to the Initial Address Message shall be made:

- I. The Called Party Number Parameter shall be coded using existing switch procedures with the dialed number.
- II. The IAM shall not include the "Ported Number" GAP.
- III. The "Ported Number Translation Indicator" in the Forward Call Indicators of the IAM shall be coded as "Number Translated."

For this case, the "Signal Ported Number" is not specified for this trunk group. See <REQ-03600> in clause 5.2.2.1.2 for requirements on this option.

The remaining signaling parameters (CgPN, CHG, etc.) in the IAM follow the existing ISUP requirements.

<End of REQ-04100>

<REQ-04200>

When the call is routed out of the originating switch after an NP trigger processing with a Dialed Number response (not ported) and the trunk selected uses inband signaling, the called party number signaled shall be the dialed number after normal digit prefixing or digit deletion or both.

The remaining signaling procedures are not modified. This requirement allows the service provider the ability to continue the call's progress for interworking situations.

<End of REQ-04200>

5.2.2.3 Intermediate Switch

ISUP procedures specify that any intermediate SS7 switch should pass the optional GAP parameter used by number portability. In addition, all SS7 switches should pass unrecognized fields within an existing parameter (i.e., FCI) or recognized fields containing unrecognized values. ANSI T1.113-2000 enables this capability to be deployed without modification to all the switching systems in the network.

This clause describes the requirements at an intermediate switch where an NP query may or may not be done. This clause does not include the case where the switch is the recipient switch for the dialed number (e.g., DN is served by the switch). outlines the signaling at an NP-capable intermediate switch.

Table 5 Intermediate Switch Signaling

Incoming Signaling				NP Trigger Response	Basis for Routing	Outgoing Signaling ("Signal Ported Number" trunk group option not specified)			
Type	FCI	Ported Number GAP	CdP N			Type	FCI	Ported Number GAP	CdPN
MF	N/A	N/A	N/A	LRN	LRN	ISUP	1	DN	LRN
MF	N/A	N/A	N/A	CdPN	CdPN	ISUP	1	No GAP	CdPN
MF	N/A	N/A	N/A	No Trigger	CdPN	ISUP	0	No GAP	CdPN
MF	N/A	N/A	N/A	LRN	LRN	MF	N/A	N/A	CdPN
MF	N/A	N/A	N/A	CdPN	CdPN	MF	N/A	N/A	CdPN
MF	N/A	N/A	N/A	No Trigger	CdPN	MF	N/A	N/A	CdPN
ISUP	0	*	DN	LRN	LRN	ISUP	1	CdPN	LRN
ISUP	0	*	DN	CdPN	CdPN	ISUP	1	No GAP	CdPN
ISUP	0	*	DN	No Trigger	CdPN	ISUP	Pass	Pass	CdPN
ISUP	0	*	DN	LRN	LRN	MF	N/A	N/A	CdPN
ISUP	0	*	DN	CdPN	CdPN	MF	N/A	N/A	CdPN
ISUP	0	*	DN	No Trigger	CdPN	MF	N/A	N/A	CdPN
ISUP	1	DN	Not LRN	N/A	LRN	MF	N/A	N/A	DN from GAP
ISUP	1	N/A	Not LRN	N/A	CdPN	MF	N/A	N/A	CdPN
ISUP	1	*	Not LRN	N/A	CdPN	ISUP	Pass	Pass	CdPN
ISUP	0	N/A	DN	NPDB Failure	CdPN	ISUP	0	No GAP	CdPN
MF	N/A	N/A	DN	NPDB Failure	CdPN	ISUP	0	No GAP	CdPN

* = Don't Care

N/A = Not applicable

Not LRN = Not switch's LRN

NOTE - CdPN=Dialed Number unless changed via a feature.

<REQ-04220>

The intermediate switch shall provide an option, on an incoming trunk group basis, to bypass the NP query for unqueried calls received over that trunk group and route such calls toward the donor switch or network. As a default, the intermediate switch shall provide normal NP processing (i.e. option is inactive).

<End of REQ-04220>

In some cases, an interexchange call may be default routed to the tandem to which the donor office is homed. The LRN returned by the NP query may include an NPA-NXX that is homed to a different tandem. Since normal restrictions against double tandeming would prevent call completion, the following requirement addresses LRN routed calls in such circumstances.

<REQ-04240>

A switch serving as an access tandem that receives a call from an interexchange carrier shall allow the selection of a unique route to a subsequent access tandem in order to complete the call if and only if the following conditions all apply:

- the received ISUP IAM contains no “Ported Number” GAP,
- in the received IAM, the FCI M-bit indicates “Number not translated”,
- the switch performs an NP query and,
- the response to the NP query contains an LRN, and that LRN is not assigned to this switch¹¹

Otherwise, the switch shall attempt to complete the call using only routes which do not involve multiple access tandems.

It is possible that selection of a unique route (meaning a route that is not selected for any other type of traffic) will be accomplished via separate routing tables that are needed only in this specific call scenario. Unique route selection should provide routes for the NPA-NXXs corresponding to the LRNs whether these routes are direct or through another tandem.

<End of REQ-04240>

<REQ-04300>

When an IAM is received at a switch via ISUP and no NP query is made, the Ported Number GAP and/or FCI's Translated Dialed Number Indicator in the incoming IAM shall be sent in the outgoing IAM when ISUP signaling is used with the “Signal Ported Number” trunk group option not specified. If the called party number is modified due to feature invocation, the FCI's Translated Dialed Number Indicator will be set to "number not translated" and the Ported Number GAP removed, if applicable.

The Forward Call Indicator Ported Number Translation Indicator, Ported Number GAP, and Called Party Number parameters are interrelated. If the content of one parameter is changed, the remaining parameters must be modified to reflect this change.

<End of REQ-04300>

<REQ-04400>

When an intermediate switch does not send an NP query, the outgoing IAM shall have the following requirements:

1. For an incoming ISUP trunk, the “Ported Number Translation Indicator” in the FCI parameter and the “Ported Number” GAP shall be passed as received from the incoming IAM.
2. For an MF incoming trunk, the “Ported Number Translation Indicator” in the FCI parameter in the outgoing IAM shall be defaulted to “number not translated.” The “Ported Number” GAP shall not be included in the outgoing IAM.

¹¹ Only those tandems that also serve as end offices are expected to have assigned LRNs.

<End of REQ-04400>

<REQ-04500>

For an intermediate switch when:

- the incoming signaling is ISUP,
- the FCI received is set to "number translated,"
- the CdPN does not contain this switch's own LRN,
- the "Ported Number" GAP is received in the IAM, and
- the outgoing signaling is MF,

the switch shall route on the LRN using the NP Routing Tables but shall signal, using inband signaling, the "Ported Number" GAP address digits to the egress switch.

<End of REQ-04500>

<REQ-04600>

When an intermediate switch sends an NP query and receives an NP response with another switch's LRN, the LRN shall be translated in the NP Routing Tables to select an outgoing route. If the route is SS7, the outgoing IAM shall be sent with the following additional requirements:

- a) The Called Party Number Parameter shall be populated with the LRN and coded following existing ISUP requirements.
- b) The GAP coded as follows:
 - Type of Address: Ported Number (11000000).
 - Odd/Even: Set for even number of address digits (0). For NP, ten address digits are included so this field has an even number of address digits.
 - Nature of Address: National Number (0000011).
 - Numbering Plan: ISDN (telephony) Numbering Plan (001).
 - Presentation Restriction indicator: Not Applicable (00)
 - Address Signals: The 10 digit ported number (dialed, derived, or signaled) shall be stored in the Address Signals in the GAP. The switch shall convert the dialed number into a 10-digit number for inclusion in the GAP by prepending the NPA or expanding the extension. The prefix (i.e., 1+) or access code (i.e., 101XXXX) shall not be included in the GAP. The NPA is derived based on the dialing plan for the originating subscriber (i.e., currently when a subscriber dials a 7 digit number, the NPA must be assumed).
- c) The "Ported Number Translation Indicator" in the Forward Call Indicators of the IAM shall be coded as "Number Translated."

For this case, the "Signal Ported Number" is not specified for this trunk group. See <REQ-03600> in clause 5.2.2.1.2 for requirements on this option.

The requirement above applies whether the incoming trunk signaling is ISUP or MF.

The remaining signaling parameters (CgPN, CHG, etc.) in the IAM follow the existing ISUP requirements.

<End of REQ-04600>

<REQ-04700>

When an intermediate switch that encounters an NP trigger receives a response with an LRN, the LRN shall be used to select an outgoing route using the NP routing tables. If the route is to an

inband facility, the dialed number shall be outpulsed, after normal digit prefix or digit deletion or both, as the called party number on the outgoing trunk. The LRN shall not be signaled to the egress switch.

<End of REQ-04700>

<REQ-04800>

When an intermediate switch sends an NP query and receives an NP response with the dialed DN or switch's LRN, the dialed DN shall be translated in the NP Routing Tables to select the route. If the route is SS7 with the "Signal Ported Number" trunk group option not specified, the outgoing IAM shall be sent with the following additional requirements:

- I. The Called Party Number Parameter shall be populated with the Dialed Number and coded following existing ISUP requirements.
- II. The "Ported Number" GAP shall not be included in the outgoing IAM.
- III. The "Ported Number Translation Indicator" in the Forward Call Indicators of the IAM shall be coded as "Number Translated."

The requirement above applies whether the incoming trunk signaling is ISUP or MF.

The remaining signaling parameters (CgPN, CHG, etc.) in the IAM follows the existing ISUP requirements.

<End of REQ-04800>

<REQ-04900>

When an intermediate switch sends an NP query and receives an NP response containing the dialed DN or the switch's own LRN in the CalledPartyID parameter, the dialed DN shall be translated in the NP Routing Tables to select the outgoing route. If the outgoing route is inband, the dialed number shall be outpulsed, after normal digit prefixing or digit deletion or both, as the called number on the outgoing trunk.

<End of REQ-04900>

<REQ-05000>

When an intermediate switch receives an IAM with the FCI set to "Translated Number" and the CdPN does not contain an LRN for this switch, the CdPN shall be analyzed and the call routed.

<End of REQ-05000>

<REQ-05100>

If the "Ported Number" GAP is to be used for routing but is formatted incorrectly, the intermediate switch shall abort the call using standard release procedures. If a release is sent, the REL cause indicators parameter shall be coded with a location of "Local Local Network" and a cause value of "Invalid number format (address incomplete) (28)."

The GAP may not be available or coded incorrectly due to protocol/application errors on another switching system in the network. If no GAP is available, the destination subscriber for the call can not be determined.

<End of REQ-05100>

5.2.2.4 Recipient Switch

Table 6 outlines the signaling for the Recipient switch.

Table 6 Recipient Switch Signaling

Incoming Signaling				NP Trigger Response	Basis for Routing
Type	FCI	Ported Number GAP	CdPN		
MF trunk	N/A	N/A	DN	CdPN	CdPN
MF trunk	N/A	N/A	DN	No Trigger	CdPN
Line	N/A	N/A	DN	No Trigger	CdPN
ISUP	1	None	DN	Trigger not relevant	CdPN
ISUP	1	DN	LRN	Trigger not relevant	DN from GAP
ISUP	0	N/A	DN	Switch's LRN	CdPN
ISUP	0	N/A	DN	Trigger not relevant	CdPN

N/A = Not applicable

NOTE - CdPN=Dialed Number unless changed via a feature.

A switch is the recipient switch when the Called Party Number parameter received at the switch contains the LRN for this switch. The switch has a list of unique North American Numbering Plan numbers that are defined as LRNs for this switch. When a call is incoming to the switch over an ISUP trunk and the FCI is set to "Number Translated," the switch will check if the Called Party Number parameter contains an LRN associated with this switch. If so, the "Ported Number" GAP will replace the LRN as the called number. This new called number will then be used to route to the subscriber. Within switch call processing, an LRN for the switch is identified when all the following apply:

- The FCI Ported Number Translation indicator indicates a translated number.
- The "Ported Number" GAP is present in the IAM.
- The Called Party Number contains a Directory Number that is provisioned as an LRN for this switch. The LRN, although a ten-digit number, can be identified from the NPA-NXX, if present, or from the implied NPA-NXX from the Called Party Number parameter.

<REQ-05150>

The switch shall follow existing ISUP procedures for call completion when the IAM contains an FCI indicating "number translated" but no "Ported Number" GAP is received.

<End of REQ-05150>

<REQ-05200>

When a recipient switch receives the IAM with the FCI coded as "Number Translated" and a "Ported Number" GAP, the Called Party Number parameter shall be analyzed to determine if the number is the switch's LRN. If so, the switch shall interpret the GAP. The address signaled in the

GAP shall be analyzed via normal digit translations to yield the line or trunk termination for the call.

If normal digit analysis routes the call out of the office, the IAM shall be formatted using existing ISUP procedures except the FCI shall indicate a translated number. No GAP shall be included in the IAM and the DN included in the CdPN parameter.

<End of REQ-05200>

The Ported Number GAP always contains a 10-digit number. This parameter is created at the switch where the NP query occurs using the dialed digits. If a call was dialed using only 7 digits, then the querying switch derives the NPA.

<REQ-05250>

During an NPA Split permissive dialing period, the terminating switch shall be able to correctly complete calls to ported DNs served by the switch regardless of whether the 10 digit DN contained in the Ported Number GAP contains the old NPA or the new NPA. This requirement does not apply to the switches serving the ported DNs for which the NPA is not changing.¹²

This capability supports the correct completion of calls to ported DNs during an NPA Split permissive dialing period where the NPA digits dialed by the calling party or derived by the originating switching system may not match the NPA digits provisioned for the DN at the terminating switching system.

<End of REQ-05250>

<REQ-05300>

When

- a switch receives an IAM with the FCI indicating a translated number and containing a "Ported Number" GAP, and
- the called party number is not recognized as an LRN for the switch, and
- the LRN in the called party number does not route off the switch

then

- reorder tone shall be applied toward the calling party [either by this switch, or by RELeasing the call with cause value "temporary failure" (41)], and
- the switch shall generate an appropriate maintenance alert.

<End of REQ-05300>

<REQ-05400>

If the GAP is to be used for routing but is formatted incorrectly, the recipient switch shall abort the call using standard release procedures. If a release is sent, the REL cause indicators parameter shall be coded with a location of "Local Local Network" and a cause value of "Invalid number format (address incomplete) (28)."

¹² Once an office-serving customers where the NPA is changing is converted to the new NPA, seven-digit dialed calls to ported numbers served by offices keeping the old NPA must store the correct NPA in the GAP. That is, if a call is made to a ported number whose NPA is not changing, the old NPA must be stored in the GAP. If the new NPA is mistakenly used there is a high probability of call failure.

The GAP might not be available or might be coded incorrectly due to protocol/application errors on another switching system in the network. If no GAP is available, the destination subscriber for the call can not be determined.

<End of REQ-05400>

<REQ-05500>

While translating the "Ported Number" GAP as the new called party number, the switch could encounter an NP trigger for the called party number. For this case, the NP query shall not be made and the call routed using existing routing procedures.

When the LRN is replaced with the address information from the GAP, the new called number is retranslated and the routing should proceed to the terminating line or trunk using existing routing in the switch. The FCI will be set to "number translated" and no "Ported Number" GAP will sent in the IAM.

<End of REQ-05500>

<REQ-05600>

If digit analysis of the called number from the "Ported Number" GAP yields a terminating party with a call redirection active (e.g., call forwarding), the call redirection shall be allowed using existing switch procedures. Call processing shall proceed as though the called number was not a portable number (i.e., no "Ported Number" GAP, FCI set to "number not translated"), unless it encounters a subsequent NP trigger.

For example, the "Ported Number" GAP could translate to a terminating party with call forwarding. The Call Forwarding parameters in the IAM (i.e., Original Called Number or Redirecting Number) shall be populated with the "Ported Number" information which is the called number. At this point in the call, the LRN is no longer needed.

<End of REQ-05600>

Existing ISUP procedures are used to define the population rules for the call forwarding parameters (i.e., Redirection Information, Original Called Party Number, and Redirecting Number). The requirements below are provided to clarify the signaling relating to these parameters. See the Feature Interactions (clause 5.4) for more information.

<REQ-05700>

If digit analysis of the ported number from the "Ported Number" GAP yields a terminating party with call forwarding active, the Call Forwarding parameters in the IAM (i.e., Original Called Number or Redirecting Number) shall be populated with the "ported number" information and not the LRN.

<End of REQ-05700>

<REQ-05800>

If digit analysis of the ported number from the "Ported Number" GAP yields a terminating party with a call forwarding feature active and the "forward to" number is a ported number, the call shall be allowed to forward to the ported number. The processing of the "forward to" number shall result in an NP query and response. The response from the NP query shall be processed like the initial NP query. The IAM shall include the GAP with type "Ported Number" for the "forward to" number and the FCI's Ported Number Translation field shall be set to "Number Translated." The Call Forwarding parameters in the IAM (i.e., Original Called Number or Redirecting Number) shall be populated with the "ported number" information from the base number (forwarding station) and not the LRN.

Once the "Ported Number" GAP replaces the LRN, digit analysis and subsequent call processing for the "forward to" number shall receive the normal NP processing.

<End of REQ-05800>

5.2.3 Other Intra-Network Interfaces

As specified in the T1.667-1999 requirements, for NP triggers, the switch should send the NPDB the same error messages as for existing trigger query failures.

5.3 Hardware Interfaces Requirements

No unique hardware elements are needed.

5.4 Feature Interactions

The critical assumption with respect to feature interactions is that the switch-based feature interaction with the NP triggers will be identical to the feature interactions with the current triggers except for features defined in this clause.

<REQ-05900>

Unless noted, the interactions between the NP trigger operation and switch-based features including other T1.667-1999 capabilities will be identical to the feature interactions specified for such triggers in Telcordia Technologies GR-1298-CORE (Feature Interactions, section 8).

<End of REQ-05900>

<REQ-06000>

For calls to non-ported subscribers, the services and features shall continue to function as though the NP trigger does not exist.

<End of REQ-06000>

<REQ-6050>

The switch shall allow the assignment of DNs, both non-ported DNs and those ported onto the switch, in the same intra-switch multi-DN group.

<End of REQ-6050>

<REQ-06100>

Whenever the Called Party ID is changed due to feature invocation (e.g., call forwarding operations), any existing "Ported Number" GAP and Ported Number Translation indicator in the FCI parameter shall be cleared.

Also see <REQ-04300>.

<End of REQ-06100>

5.4.1 T1.667-1999 Services Interactions

With respect to terminationNotification, it is assumed that the NPDB-based service operation will not use the terminationNotification capability.

With respect to the T1.667-1999 sendToResource operation (including sendToResource external), it is assumed that the NPDB-based service operation will not initiate a sendToResource session to collect additional information from the user or play announcements to the user.

5.4.1.1 T1.667-1999 Next Event List Interactions

<REQ-06200>

The switch shall be allowed to encounter an NP trigger while a persistent transaction is open. For the resulting NP transaction only one response is allowed, and the NP transaction shall neither open as a persistent transaction nor use the T1.667-1999 sendToResource operation. If an NP trigger results in a persistent transaction or a sendToResource operation, the switch shall treat the response as a fatal error in accordance with existing T1.667-1999 procedures.

NOTE - If during sendToResource processing, an NP trigger is encountered, any resulting analyzeRoute response will be treated as "Continue".

<End of REQ-06200>

5.4.1.2 T1.667-1999 Serial Triggering Interactions

The T1.667-1999 NP trigger will interwork with the T1.667-1999 serial triggering operation the same as existing T1.667-1999 Specific_Digit_String triggers.

With respect to the serial triggering counter, the NP query will result in the counter being incremented. The switch will check the serial triggering count prior to the NP query and, if the serial triggering limit is exceeded, the switch will not launch the query.

The NP capability will conditionally preserve "Ported Number" GAP across subsequent triggers based on the called number replacement. If the called number is not replaced by a subsequent trigger, the GAP and FCI information will be maintained.

<REQ-06300>

The "Ported Number" GAP parameter and FCI status shall be preserved across subsequent serial triggers only if the Called Party ID is not changed as a result of the query.

If a non-NP query is encountered, and the received Called Party ID is changed, any existing "Ported Number" GAP shall be cleared and the NP FCI value shall be cleared.

An NP query should not be launched if the FCI is set and a second NP trigger is encountered.

<End of REQ-06300>

5.4.1.3 Trigger Precedence

Existing Public Office Dialing Plan triggers definitions allow for triggers to share the same (but not identical) digits, or have overlapping digit patterns. The existing Specific_Digit_String or pre-IN (IN/1) triggers will have precedence over NP triggers.

<REQ-06400>

When the triggering pattern of the NP trigger called/dialed number matches a T1.667-1999 trigger, existing Specific_Digit_String or pre-IN (IN/1) triggers shall take precedence. And,

1. If the T1.667-1999 trigger returns a Continue response, the call shall encounter the NP trigger following the first trigger. An NP query may or may not be sent as per the conditional detection algorithm.
2. If the T1.667-1999 trigger returns an analyzeRoute response (whether the CalledPartyID is changed or not), the switch shall perform trigger analysis again and may or may not encounter an NP trigger.
3. If the pre-IN response message returns the same dialed DN as the CalledPartyID, then the NP trigger shall be encountered.
4. These interactions shall also hold if the trigger is an AIN Release 0 Trigger or 800 service trigger, in addition to the T1.667-1999 triggers.

<End of REQ-06400>

5.4.2 Attendant Features

There is no change to the Attendant features with respect to the NP trigger interactions. The current trigger interactions will be followed.

5.4.3 Automatic Recall (AR)

Automatic Recall (AR, or *69) is a call management feature that allows a customer to perform an activation procedure to automatically set up a call to the last incoming number. With T1.667-1999, calls originated by the Automatic Recall feature cannot successfully encounter a Specific_Digit_String trigger on the same switch. Therefore, if the target number for a call originated by AR corresponds to a Specific_Digit_String trigger, the AR request receives denial treatment.

With the NP trigger assignment, AR needs to continue to work even when the number to which the call is being returned is a ported number. When the number to which the call is being returned is determined through digit analysis to be located on another switch, this results in a standard AR Initial Query TCAP message being launched (whether or not there is an NP trigger on the number to which the call is being returned). The TCAP message is encapsulated in the data field of a Signaling Connection Control Part (SCCP) message. This SCCP message is formatted to request Global Title Translation (GTT) routing. This SCCP message will be routed based on the Translation Type (appropriate for CLASS) and the full 10-digits of the called DN (i.e., the target DN). Modifications to the STP/NPDB as described in clause 4.2 will permit the message to be routed to the correct destination switch (i.e., where the actual target DN is located) whether or not the number is a ported number. Since the Response TCAP message from the destination switch contains its Destination Point Code, all subsequent AR messages can be routed directly to the appropriate target switch (according to existing procedures).

AR needs to continue to work as expected when the AR number is a ported number that results in an NP trigger at the switch where the AR user is located.

<REQ-06500>

If the AR number is located on the same switch as the AR user, an AR activation attempt shall be treated as an intraswitch AR activation attempt and shall not result in any AR TCAP messages

being sent. This shall be the case whether or not the number has an associated NP trigger. The result of this AR activation attempt shall be unaffected by the presence of an NP trigger.

See <REQ-08600> for the exception to this requirement.

<End of REQ-06500>

<REQ-06600>

If the AR number is not located on the same switch as the AR user and the AR number has an associated NP trigger, an AR activation attempt shall be treated as an interswitch AR activation attempt.

This is expected to result in the standard TCAP Initial Query message for AR.

<End of REQ-06600>

<REQ-06700>

The SCCP routing data used by the switch attempting an AR activation shall not be affected by the porting status of the target DN, i.e., the SCCP message will be routed based on the Translation Type (appropriate for CLASS) and the full 10-digit target DN.

Therefore, for an interswitch AR activation, if there is a change in the porting status of the target DN of an interswitch AR activation request (i.e., the target DN changes from ported to non-portable or from non-portable to ported) and a subsequent AR activation request is made, the activating switch will be able to launch a AR query for successful routing to the target switch without regard to the porting status.

This assumes that the DN is not ported to the same switch as where the AR user is located in which case there would be no TCAP messaging.

<End of REQ-06700>

5.4.4 Automatic Callback (AC)

Automatic Callback (AC, or *66) is a call management feature that allows a customer to perform an activation procedure to automatically set up a call to the last station that the customer called without the customer having to redial the telephone number. If the called party is busy when AC is activated, call setup is performed automatically when the called station becomes idle.

As with Automatic Recall, the Automatic Callback feature needs to work when the number being reattempted is a ported number. The discussion in the previous clause (5.4.3) on AR also applies to AC. For the requirements in this clause, assume that the AC activation attempts are made under conditions where AC activation would result in checking the status (i.e., TCAP Query for interswitch case) of the party whose DN is in the Outgoing Line History Block (OLHB). This means that the user is authorized to make an AC request and the necessary switch and network resources are available.

<REQ-06800>

If the AC number is located on the same switch as the AC user, an AC activation attempt shall be treated as an intraswitch AC activation attempt and shall not result in any AC TCAP messages being sent. This shall be the case whether or not the number has an associated NP Trigger.

See <REQ-08600> for the exception to this requirement.

<End of REQ-06800>

<REQ-07000>

If the AC number is associated with an NP trigger and not located on the same switch as the AC user, an AC activation attempt shall be treated as an interswitch AC activation attempt.

This results in the standard TCAP Initial Query message for AC.

<End of REQ-07000>

<REQ-07100>

The SCCP routing data used by the switch attempting an AC activation shall not be affected by the porting status of the target DN, i.e., the SCCP message will be routed based on the Translation Type (appropriate for CLASS) and the full 10-digit target DN.

Therefore, for an interswitch AC activation, if there is a change in the porting status of the target DN of an interswitch AC activation request (i.e., the target DN changes from ported to non-portable or from non-portable to ported) and a subsequent AC activation request is made, the activating switch will be able to launch a AC query for successful routing to the target switch without regard to the porting status.

This assumes that the DN is not ported to the same switch as where the AC user is located in which case there would be no TCAP messaging.

<End of REQ-07100>

5.4.5 Call Forwarding

A Call Forwarded call can encounter an NP trigger and route the call to the portable subscriber.

<REQ-07200>

If a call is setup during call forwarding activation (i.e., courtesy call), then normal number portability operation applies.

<End of REQ-07200>

5.4.6 Emergency (911) Services

Emergency Services (911) ringback to a ported number will operate successfully whenever the ringback is over a dedicated trunk between the Public Safety Answering Point (PSAP) switch and the originating switch.

It is recommended that routing numbers to which emergency services (911) calls are translated not be ported.

5.4.7 Message Waiting Indicator Control and Notification (MWN)

The Message Waiting Indicator Control and Notification (MWN) feature needs to be able to continue to change the status of an MWN user's Message Waiting Indicator (MWI) for the case where the user's DN is a ported number. When the number with the Message Waiting Indicator is determined, through digit analysis, to be located on a different switch from the switch to which the Messaging System is connected, this will result in a Message Waiting Indicator TCAP message being launched. The TCAP message is encapsulated in the data field of a Signaling Connection Control Part (SCCP) message.

This SCCP message is formatted to request Global Title Translation (GTT) routing. This SCCP message will be routed based on the Translation Type (appropriate for MWN) and the full 10 digits of the Message Waiting Indicator DN. Modifications to the STP and NPDB as described in clauses 4.2 and 4.3 will permit the message to be routed to the correct destination switch (i.e., where the actual target DN is located) whether or not the number is a ported number. No MWN switch development is required to support this routing.

MWN needs to continue to work as expected when the MWN Message Waiting indicator is a number that results in an NP Trigger.

<REQ-07300>

A Message Waiting indicator status change for a message service user who is located on the same switch as the Message Service must be treated as an intraswitch Message Waiting indicator status change, and not result in a TCAP Message Waiting indicator message for MWN, whether or not the message service user's DN is associated with an NP trigger.

See <REQ-08600> for the exception to this requirement.

<End of REQ-07300>

<REQ-07400>

A Message Waiting indicator status change for a message service user who is not located on the same switch as the Message Service, and whose DN is associated with an NP trigger must be treated as an interswitch TCAP Message Waiting indicator status change.

This is expected to result in the standard TCAP Message Waiting indicator message for MWN.

<End of REQ-07400>

<REQ-07500>

For a Message Waiting indicator status change request towards a non-portered message service user's DN (interswitch), if the message service user's DN is ported to another switch (not the same switch as the one on which the Message Service is located) and the message service again requests a Message Waiting indicator status change for the same message service user, there will be no change (from the non-portered case) needed in the SCCP routing data of the Message Waiting indicator TCAP message. This is the case whether or not the user's DN is associated with an NP trigger.

This assumes that the DN is not ported to the same switch as where the Message Service is located in which case there would be no Message Waiting indicator TCAP message sent.

<End of REQ-07500>

5.4.8 Multiway Calling/Flexible Calling Modular Feature

For Three-Way Calling, Six-Way Conference Calling, Add-on/Consultation Hold Incoming Only, and Attendant Conference, a ported subscriber can initiate, add to or drop from the conference call using existing conferencing procedures. Call transfer attempts using normal routing may encounter T1.667-1999 triggers and NP triggers.

5.4.9 ISDN

There are no changes to ISDN PRI or BRI access or services.

Only DNs associated with circuit-switched voice or data calls are portable. The porting of packet addresses are not supported by the NP capability. For example, DNs assigned to ISDN B-channels carrying either voice or circuit-switched data can be ported; however, if the B or D channels are carrying packet data, the channels have packet addresses, which are not portable.

5.4.10 OA&M Features

<REQ-07600>

The switch shall be able to trace a route to a ported number. In addition, the switch shall be able to verify the switch data associated with the ported number.

<End of REQ-07600>

5.4.11 Screen List Editing (SLE)

The Screen List Editing feature needs to work when the number being added to the list is a ported number. The discussion in the previous clause on Automatic Recall (5.4.3) also applies to SLE. For the requirements in this clause, assume that the SLE attempts are made under conditions that result in checking the status (i.e., TCAP Query for interswitch case) of the party whose DN is being added to the screening list. This means that the user is authorized to make an SLE request and the necessary switch and network resources are available.

A Screen List Editing (SLE) verification of an entry by a user of an SLE feature (e.g., Selective Call Rejection, Selective Call Forwarding) is expected to continue to function as expected whether or not the entry is a ported number or associated with an NP trigger. An SLE verification of a number which is on the same switch as the SLE user does not result in an SLE TCAP Query, and an SLE verification of a number which is not on the same switch as the SLE user does result in an SLE TCAP Query.

<REQ-07700>

An SLE verification of a DN which is located on the same switch as the SLE feature user shall be treated as an intraswitch SLE entry verification and shall not result in a TCAP SLE Query message being sent. This shall be the case whether or not the number is associated with an NP trigger.

See <REQ-08600> for the exception to this requirement.

<End of REQ-07700>

<REQ-07800>

An SLE verification of a DN which is associated with an NP trigger and which is not located on the same switch as the SLE feature user shall be treated as an interswitch SLE entry verification.

This is expected to result in the standard TCAP SLE Query message.

<End of REQ-07800>

<REQ-07900>

For an SLE entry request towards a non-ported target DN (interswitch) which results in a TCAP SLE Query message, if the target DN is subsequently ported to another switch (not the same switch as the one on which the SLE feature user is located) and the SLE feature user again

requests an SLE entry of the now ported DN, there will be no change (from the non-ported case) needed in the SCCP routing data used for the SLE TCAP Query message.

This assumes that the DN is not ported to the same switch as where the SLE feature user is located in which case there would be no TCAP message sent. It also assumes that the SLE feature user has removed the initial entry so that he/she is not trying to add an already existing entry.

<End of REQ-07900>

5.5 Operations, Administration and Provisioning Requirements

5.5.1 Service Changes

NP trigger assignment can be viewed as an incremental assignment to the existing T1.667-1999 triggers.

The NP trigger definition and assignment can occur wherever the current Specific_Digit_String trigger can be provisioned.

5.5.1.1 Switch Provisioning Modifications - NP

5.5.1.1.1 General Provisioning

<REQ-08000>

The Switch Provisioning shall support NP triggers at an NPA-NXX basis (at a minimum) as supported for the T1.667-1999 triggers or pre-IN (IN/1) triggers. The NP trigger designation is in addition to the current T1.667-1999 or pre-IN (IN/1) trigger assignment for a given dialing pattern. The NP trigger can coexist with T1.667-1999 or pre-IN (IN/1) triggers as a separate trigger and the NP trigger will be encountered "last" in the case where both triggers are assigned on the same digit pattern.

NOTE - <CR-00410> extends the assignment of the NP trigger to additional digit patterns.

<End of REQ-08000>

<REQ-08100>

The switch shall allow, as a configurable option, default routing for an NP trigger when the NPDB does not respond or the switch cannot interpret the response.

<End of REQ-08100>

<REQ-08200>

The switch shall support the capability to assign an LRN for each NPA-NXX homed in the switch. The switch shall support assignment of a distinct LRN for each switch and for each Remote Switching Unit (RSU), to be included in the IAM in the JIP for call originations and to be included in the AMA for ported DNs.

It should be noted that only the first six digits (NPA-NXX) of an LRN is transported in the ISUP JIP even though the LRN assigned to the switch or remote switching unit is a full 10-digits. An LRN is needed on a per LATA basis to identify the point of presence for incoming calls to a service provider's network. In addition, a second LRN is required for maintenance purposes (e.g., switch replacement).¹³

¹³ A service provider may want to be able to designate additional LRNs to be used for specific call scenarios unique to the needs of that provider. Therefore, it may be desirable for the switch to support the designation of more than one LRN to be included in the IAM in the JIP for call originations and to be included in AMA recording for ported DNs.

<End of REQ-08200>

<REQ-08300>

The switch shall allow provisioning of a unique translation type (SS7 SCCP) used for NP queries.

Committee T1 has assigned a unique translation type value of "11" as the inter-network NP query type.

<End of REQ-08300>

<REQ-08400>

The switch shall allow a "Signal Ported Number" option for signaling the Dialed Number instead of the LRN in the Called Party Number. The switch shall not send a "Ported Number" GAP and shall set the FCI to "number not translated". The option can be specified on a per-SS7 trunk group basis and the default value is "Signal Ported Number" not specified (in other words, to send the "Ported Number" GAP and the LRN).

<End of REQ-08400>

<REQ-08450>

The switch shall allow, as a configurable option, office level data that specifies the default behavior for the "Ignore Number Portability Information Option" for all incoming trunk groups. The default value of this office level data is "Off" so that incoming NP information is not ignored. Additionally, the switch shall allow, as a configurable option, trunk group level data that can override the behavior specified by the office level data.

This is used in support of <REQ-03650> at an intermediate switch.

<End of REQ-08450>

<REQ-08500>

A per-trunk group "LRN" in the format NPA-NXX-XXXX shall be assignable to any incoming trunk group which is connected to another service provider (e.g., dedicated facilities). This per-trunk group "LRN" shall indicate the LRN of the connected switch. This information may be used in AMA recording and is used to generate the JIP parameter at an intermediate, CAMA, or IXC switch when no JIP is received in the incoming IAM.

The presence of a per-trunk group LRN does not automatically cause an AMA record to be generated, nor is an LNP Module automatically appended to an existing record. Requirements describing AMA generation based on provisioned per-trunk group LRNs are provided in clause 5.5.4.

<End of REQ-08500>

<CR-08550>

When routing calls to an IXC, a switch shall allow a service provider to designate the set of IXCs for which NP queries are performed. This specification will be on a per route basis for each of the designated carriers. As a default, a carrier is not designated for NP queries to be performed.

This is used in conjunction with <CR-00950>. If <CR-00950> is not supported, the switch shall not perform the NP query when the call is to be routed to an IXC.

<End of CR-08550>

The mechanisms used to identify how the switch selects which of the designated LRNs should be included in the IAM in the JIP for call originations and included in AMA recording for ported DNs for specific call scenarios will need to be negotiated between service provider and their associated switching system suppliers.

<REQ-08560>

The switch shall allow a service provider to activate an option on an incoming trunk group that will bypass NP queries for incoming calls even if an NP trigger is encountered during processing. By default, this option is not active.

This is used in support of <REQ-04220> at an intermediate switch.

<End of REQ-08560>

5.5.1.1.2 Transition Mechanism

During the porting process, but while the DN is still provisioned on the donor switch, the donor switch needs to be able to query on the DN being ported. Similarly, the DN may be pre-provisioned on the recipient switch, and the recipient switch needs to be able to query on the DN being ported into the switch. For both these scenarios, the NP trigger must support a transition mechanism that allows the NP query to be launched even though the DN is allocated on the switch(es). This mechanism should be supported by provisioning on a 10-digit DN basis.

The transition mechanism, also known as the non-conditional trigger or the 10-digit trigger, allows disconnect service order activity at the donor switch and pre-provisioning service order activity at the recipient switch overlapping the NPDB changes. After the NPDB record has been created/updated with the recipient switch's LRN, a service order would result in the deactivation of the mechanism at the recipient switch; when the DN is disconnected at the donor switch, the mechanism would be deactivated there. At that time, normal NP processing would result in successful call completion.

<REQ-08600>

For each DN served by the switch, the switch shall support a transition mechanism that provides the option to allow an NP query for that DN. When provisioned, the DN or group of DNs shall receive special NP processing to override the check for NP triggers when the called number is being served by the switch. With this option, the switch shall conform to all other NP trigger conditions (see <REQ-00500>) except the check for whether the DN is on the switch or not. The option shall also be provided for all DNs including but not limited to Direct Inward Dialing (DID) service and shall be functional for DNs where the Remote Call Forwarding feature is assigned.

When the DN is removed from service, the option shall be removed and, based on the normal NP processing, the NP trigger shall result in a query when the NP criteria is satisfied (see <REQ-00500>).

The default DN setting shall not over-ride the basic LRN criteria. In other words, when a DN is assigned, the default treatment shall be that the NP trigger shall not result in a query.

The table below summarizes the switch operation for both the switch receiving a DN and for the switch losing the DN. In this table, both of the switches are using this optional DN attribute to cause a query even if the DN exists on the switch.

Table 7 Transition Mechanism

	Old Service Provider		New Service Provider	
Cases	Prior to NPDB update	After NPDB update	Prior to NPDB update	After NPDB update
Porting the first time	Dialed # returned - terminate on the switch.	LRN returned - route to the new service provider.	Dialed # returned - route to the donor.	Home LRN returned - terminate on this switch.
Previously ported and porting again.	Home LRN returned - terminate on the switch.	New LRN returned - route to new service provider.	Old LRN returned - routed to the old service provider.	Home LRN returned - terminate on this switch.
Previously ported and porting back to donor	Home LRN returned - terminate on the switch.	Dialed # returned - routed to the donor.	Old LRN returned - route to the old service provider.	Dialed # returned - terminate on the switch.

For services

- which send a TCAP message to a switch where a target DN resides (i.e., Automatic Callback, Automatic Recall, Screen List Editing, Message Waiting Indicator Control and Notification, etc.), and
- which originate on the same switch as the target DN, and
- where the target DN has a transition option,

the switch shall launch the TCAP message as though the DN does not reside on the switch. Incoming TCAP messages shall be processed following existing switch functions. If the DN does actually reside on the same switch as the originating user (as determined by the NPDB), this switch is expected to be both the sender and receiver of these messages.

This option allows service providers to complete the hardware actions on the switch while redirecting the call to the recipient switch.

NOTE - The SS7 signaling network does not currently require MTP routing where the Destination Point Code (DPC) and the Originating Point Code (OPC) are the same (e.g., STPs will treat this case as an error condition). Therefore, the switch is expected to process the TCAP response message internally when the DPC and OPC are the same.

<End of REQ-08600>

<REQ-08700>

For intra-switch groups of DNs (e.g., Multi-Line Hunt Group, Centrex Groups, DID), the Service Provider shall have the option to set the transition mechanism on an individual DN basis.

Existing intra-switch features are not expanded to support subscribers on different switches if a subscriber moves interswitch. For example, intraswitch centrex groups can only be maintained when the entire group of subscribers ports.

<End of REQ-08700>

<CR-08800>

For intra-switch groups of DNs (e.g., Multi-Line Hunt Group, Centrex Groups, DID), the Service Provider shall have the option to set the transition mechanism on the entire group.

<End of CR-08800>

5.5.1.1.3 Ported Out Marking

Prior to Number Portability, each NPA-NXX was "owned" by the service provider and typically assigned on a specific switch. With Number Portability, an NPA-NXX can be spread over many switches and not every DN in the NPA-NXX is allocated to a customer of the service provider that historically owned the NPA-NXX. Thus, Number Portability presents an administrative change to the procedures for DN allocation.

The donor switch should support a means of marking a DN that has ported off the switch as "ported out". This administration attribute provides a distinct ported out indicator associated with the DN. This indicator will be set by the service provider for DNs that are ported out of the switch and the DN is removed from service on this switch. Although the DN is removed from the switch, the DN still exists in the network on another switch. This "ported out" status indicator allows the DN to be marked to block assignment of the DN until the status is changed. The switch provides specific operational user messages for errors relating to the provisioning of ported out DNs.

One purpose of the "ported out" status indicator is to block inadvertent assignment of DNs that are allocated on another switch. Service providers are concerned that operational users will follow the "pre Number Portability" procedures. For example, the operational user may assign a temporary DN for testing switching changes, make the tests, and then unassign the DN. With NP, the DN may be already assigned in another switch but the DN appears unallocated in this switch. If this situation occurs, calls originating from this switch to the DN will not complete to the subscriber's DN. This capability is used to maintain a list of DNs allocated on other switches.

<CR-08900>

The switch shall provide the capability to mark a DN or range of DNs as "ported out". DNs or ranges of DNs are not ported out unless specifically marked as such.

<End of CR-08900>

<CR-09000>

The switch shall allow the "ported out" status to be provisioned when the directory number is unallocated. In addition, the switch shall allow the "ported out" status to be removed when the directory number is allocated.

<End of CR-09000>

<CR-09100>

The switch shall support an office option for the "ported out" marking to allow a service provider, on a switch basis, to either;

- a) prevent assignment of a directory number with a "ported out" marking until the marking is removed, or
- b) allow the automatic overwrite of the "ported out" marking, thus allowing the directory number to be assigned without manual removal of the "ported out" marking against the number.

Office option "b" would result in the automatic removal of the "ported out" marking upon assignment. The default is office option "a".

<End of CR-09100>

<CR-09200>

If a DN can be allocated (i.e., NPA-NXX code open on the switch), then the DN can be marked as "ported out".

Every DN that the switch has or could have provisioned on the switch supports a marking of "ported out". If a directory number could not normally be allocated, then there is no need for a "ported out" status for that DN. Up to 100% of all DNs on the switch could be marked as ported out.

<End of CR-09200>

<CR-09300>

The switch shall support administrative commands to remove the "ported out" marking for a DN or range of DNs. After the marking is removed, the DN becomes either unallocated or NP-Reserved, as appropriate.

<End of CR-09300>

<CR-09400>

If the office option is set to prohibit "ported out" override (see <CR-09100>, office option b), then administrative commands to activate DNs marked with a "ported out" status shall not be honored. The requester shall be notified that the request to activate a "ported out" DN was denied because the status of the DN was "ported out".

<End of CR-09400>

<CR-09500>

The switch shall be able to display a listing of all the DNs that are marked as "ported out". This output can be requested by the operational user and output via existing mechanisms (i.e., office records).

<End of CR-09500>

<CR-09550>

If a call to a number is received by the switch with its Home LRN and the address digits in the GAP specify an unallocated number and, if the DN is set to "ported out", the switch shall clear the call using existing ISUP call procedures with a REL message with ANSI cause code 26 – "Misrouted call to a ported number".

<End of CR-09550>

5.5.1.4 NP-Reserved Number Marking

In a Number Portability environment, there are cases where customers port their working directory numbers and some other "NP-Reserved" numbers which are not yet activated in the new service provider's switch. Additionally, there could be ported numbers that have been disconnected from a service provider's switch and are under aging process. Under the current Number Portability implementation, when a call is routed to the service provider's switch with the switch's LRN and a GAP parameter containing one of the "NP-Reserved" numbers or the disconnected numbers under aging process, the switch will treat the call as a misrouted LRN call and provide Cause Code 26 treatment. However, the call is not a misrouted LRN call.

To address this, a new indicator is proposed to indicate that a given directory number or range of directory numbers is "NP-Reserved" and Cause Code 26 should not be sent for the number or range of

numbers, regardless of how a call is routed (i.e., correctly routed or misrouted). Normal unallocated number treatment should be provided for calls to such number or range of numbers.

In addition, if a customer ports away numbers that happen to be within the “NP-Reserved” range of numbers, the switch should provide Cause Code 26 treatment for LRN routed calls to the ported away numbers since in this case, the calls are truly misrouted LRN calls and Cause Code 26 is the proper treatment. This will be made possible by allowing the “ported out” marking to override the “NP-Reserved” marking.

In addition to supporting a Number Portability environment, the “NP-Reserved” marking can also be used to support a Number Pooling environment. When pooled numbers are activated in the NPDB prior to being assigned to a customer, the “NP-Reserved” marking capability can be used to suppress release with Cause Code 26 and instead provide unallocated number treatment.

The following summarizes the call processing associated with the “NP-Reserved” marking.

1. If the “NP-Reserved” marking is set and the “ported out” marking is not set, then vacant number treatment, instead of Cause Code 26 treatment, will be provided.
2. If the “NP-Reserved” marking is set on a range and the “ported out” marking is set on a DN within that range, then Cause Code 26 treatment will be provided. Although the “NP-Reserved” marking is set, since the number has ported away, an LRN routed call to the switch would be a misrouted LRN call. Therefore, Cause Code 26 treatment is the proper treatment.
3. If the “NP-Reserved” marking is not set and the “ported out” marking is not set, then regular call processing will apply per the current Number Portability implementation. This includes completing the call if the number is found on the switch or providing Cause Code 26 treatment if the number is not found on the switch.
4. If the “NP-Reserved” marking is not set and the “ported out” marking is set, then Cause Code 26 treatment will be provided per the current Number Portability implementation.

<CR-09600>

The switch shall provide the capability to mark a DN or range of DNs as “NP-Reserved”. The switch shall not permit, administratively, the assignment of the “NP-Reserved” and “ported out” marking on an individual DN basis simultaneously. DNs or ranges of DNs are not “NP-Reserved” unless specifically marked as such.

Some applications of this marking are number pooling and aging ported numbers.

<End of CR-09600>

<CR-09700>

If a call to a number is received by the switch with its Home LRN and the address digits in the GAP specify an unallocated number:

- if the “NP-Reserved” marking is not set for this number, the switch shall clear the call using existing ISUP call procedures with a REL message with ANSI cause code 26 – “Misrouted call to a ported number”.
- if the “NP-Reserved” marking is set and the “ported out” marking is not set for this number, the switch shall provide unallocated number treatment.

<End of CR-09700>

<CR-09800>

The switch shall be able to display a listing of all the DNs marked as “NP-Reserved”. This report can be requested by the operational user and output via existing mechanisms (i.e., office records).

<End of CR-09800>

5.5.1.1.5 Multiple NPAs per NXX on the Switch.

With NP a number could be ported in to a switch where the same 7-digit NXX-XXXX number already resides within a different NPA. Historically, switches have prohibited the ability to assign the same NXX for different NPAs on the same switch. In addition certain switch types only support DN provisioning at the 7-digit level, relying on an implied NPA scheme.

This problem is also introduced with NPA-relief (e.g., NPA-splits, NPA-overlays, and rate center consolidations). Presently NPA guidelines do not permit the assignment of the same NXX in different NPAs to the same switch. As NPA overlays become more common, it will become increasingly difficult to follow the current NPA guidelines related to duplicate NXXs for multiple NPAs on the switch. Therefore, the switch should allow the same NXX to exist for different NPAs.

<REQ-09900>

A switch shall support the same NXX for multiple NPAs.

This means that different DNs with the same NXX-XXXX but with different NPAs can reside on the same switch.

<End of REQ-09900>

5.5.1.1.6 Billing Related Provisioning

<CR-10000>

The switch shall provide the service provider with the option, on a per-office basis, to choose to record BAF Module 719 for all calls served by the switching office requiring the recording of an LNP module, in lieu of the BAF Module 720.

This conditional requirement allows a service provider to convert a switching office from recording BAF Module 720 to recording BAF Module 719, or vice versa. The formats of BAF Modules 719 and 720 are defined in Telcordia Technologies GR-1100-CORE (Division 5, BAF Modules). Generation and population requirements for BAF Modules 719 and 720 are described in this document.

<End of CR-10000>

<REQ-10100>

On a per-trunk group basis, the switch shall provide data to allow specification to do just one of the following:

- **Generate a Connecting Network Access (CNA) AMA recording for all calls received over an incoming or two-way trunk group (referred to as “unconditional CNA recording”)**
- **Generate a CNA AMA recording for all calls received over an incoming or two-way trunk group for which an NP query is also performed by the switch (referred to as “limited CNA recording”).**
- **Do not generate a CNA AMA recording.**

As a default, the switch shall not generate CNA AMA recording.

This option shall not be applied to Feature Group B or D trunks between a LEC and an IXC; nor shall it apply to Type 1, Type 2A, or Type 2B trunks between a LEC and a wireless service provider.

<End of REQ-10100>

<REQ-10200>

A per-trunk group "billing number" (BN) of the format NPA-NXX-XXXX shall be assigned to any trunk group for which either the "unconditional CNA recording" or "limited CNA recording" option described in <REQ-10100> is active.

This billing number is provisioned separately from the incoming trunk group LRN used to populate the JIP at an intermediate switch.

<End of REQ-10200>

<CR-10300>

On a per-trunk group basis, the switch shall provide the ability for a service provider to provision a four-digit numeric interconnecting network identification code on CNA trunk groups. This code shall be used to populate BAF Table 57 of BAF Call Type Code 720 records, as described in <REQ-15600>.

For example, a service provider might choose to assign codes from the service provider administerable range of CIC codes (i.e., 9000-9199), or might choose an "alternative billing entity code" of their own design.

<End of CR-10300>

<REQ-10400>

The switch shall provide a "record billing number" option on a per-trunk group basis to always record the per trunk group billing number in the originating NPA and originating number fields (BAF Tables 13 and 14) of the CNA BAF CTC 720 record. The default for this option is OFF.

The formats of BAF Tables 13 and 14 are defined in Telcordia Technologies GR-1100-CORE (Division 2, BAF Tables).

<End of REQ-10400>

<REQ-10500>

The switch shall provide a "CNA Module 164 –Chargeable Account Number" option on a per-trunk group basis to append a BAF Module 164, containing one of the data elements specified in Table 12 to a CNA record. This option shall only be settable to ON when the "record billing number" option is on. The default for the "CNA Module 164 –Chargeable Account Number" option is OFF.

<End of REQ-10500>

<CR-10600>

The switch shall provide a "CNA Module 164 - CPN" option on a per-trunk group basis to append a BAF Module 164, containing the CPN received (if any), to a CNA record. The default for the "CNA Module 164 - CPN" option is OFF.

<End of CR-10600>

<REQ-10700>

On an office wide basis, the switch shall provide office data to allow specification to do just one of the following:

- 1) Generate an LNP Default Flat Rate (LNP DFR) AMA record of BAF CTC 721 for line and private facility trunk originated calls when an NP query is performed by the originating switch (regardless of whether or not an LRN is received) and when no other AMA record is created for the call.
- 2) Generate an LNP DFR AMA record of BAF CTC 721 for line and private facility trunk originated calls when an NP query is performed by the originating switch, an LRN is received from the NPDB, and when no other AMA record is created for the call.
- 3) Do not generate an LNP DFR AMA record of BAF CTC 721 for flat rate calls.

As a default, the switch shall not generate an LNP DFR BAF CTC 721 AMA record.

<End of REQ-10700>

<REQ-10800>

The switch shall provide a per-trunk group option on terminating IC, INC, CMC and CNA trunk groups which enables or disables recording of an originating party LNP module appended to terminating access records made for calls received over these trunk groups. The default for this option is off; i.e., recordings are disabled.

This option does not need to be available for FG-A lines. Note that requirements <REQ-13600>, <REQ-13700>, and <REQ-13800> specifically exclude FG-A lines from recording an LNP module based on a signaled JIP or provisioned per-trunk group LRN.

<End of REQ-10800>

<REQ-10900>

On an office wide basis, the switch shall provide office data to allow specification to do just one of the following:

1. Generate an AMA record with appropriate LNP modules for all calls for which answer supervision is not received, an NP query is performed at the AMA recording switch (regardless of whether or not an LRN is received), and an AMA record would have been generated had the call completed.
2. Generate an AMA record with appropriate LNP modules for all calls for which answer supervision is not received, an NP query is performed at the AMA recording switch, an LRN is received from the NPDB, and an AMA record would have been generated had the call completed.
3. Not generate an NP busy or unanswered call recording.

As a default, the switch shall not generate an NP busy or unanswered call recording.

This requirement includes, but is not limited to, calls which are abandoned before routing, calls which receive busy, and calls which are not answered.

<End of REQ-10900>

<CR-10950>

On a per-trunk group basis, the switch shall provide data to allow specification to do just one of the following:

- Record an originating party LNP Module for all calls originating from a PBX

- Not record an originating party LNP Module for all calls originating from a PBX

As a default, the switch shall not record an originating party LNP Module for all calls originating from the PBX.

<End of CR-10950>

5.5.2 Measurements

<REQ-11000>

The NP triggering switch will provide measurements for the following:

- 1) NP Query Initiated: the number of calls encountering an NP trigger that result in an NPDB query.
- 2) NP Query Failures: the number of calls encountering an NP trigger that result in an NPDB query failure.
- 3) NP Ported Number Calls: the number of NP query responses containing an LRN (not the dialed number).
- 4) NP Data Inconsistencies with REL: the number of calls encountering an ISUP REL message with an ANSI cause of 26.

These measurements are in addition to the existing relevant measurements relating to T1.667-1999 query activities.

<End of REQ-11000>

<REQ-11100>

The terminating switch will provide measurements for the following:

- 1) NP Unallocated Number Calls: the number of calls which encounter an unallocated/vacant number indication in the donor switch following an NP query in this switch or another switch as indicated by the Ported Number Translation indicator in the FCI parameter with no “Ported Number” GAP.
- 2) NP Data Inconsistencies: the number of NP calls encountering an unallocated/vacant indication when the switch’s own LRN has been detected after an NP query in this switch or in another switch as indicated by the Ported Number Translation indicator in the FCI parameter and the “Ported Number” GAP. This case does not apply to DNs marked as “NP-Reserved”.

<End of REQ-11100>

Protocol errors detected and reported for NP triggers and responses will be pegged normally without distinction for the NP trigger.

5.5.3 Network Management

<REQ-11200>

For NP calls, Network Management controls shall be extended to the LRN. This includes controls for the LRN and called number at the intermediate switch contained in the CdPN and “Ported Number” GAP, respectively.

For calls to a non-ported subscriber, the existing procedures for provisioning and application of the code gapping shall apply at both the end office and intermediate office.

For calls to ported subscribers, the following modifications to the code gapping shall apply:

1. The existing procedures for provisioning the code gapping shall be used at both the originating switch and intermediate switch.
2. Calls to a carrier for which the originating LEC does not perform the query shall follow the existing procedures at both the originating switch and the intermediate switch.
3. At an originating switch;
 - a 10 digit call gapping shall be applied based on the dialed number and not the LRN.
 - a 3 or 6 digit code gapping shall be applied based on the LRN. The LRN is returned in the NP response for ported numbers.
4. At an intermediate switch;
 - a 10 digit call gapping shall be applied based on the dialed number and not the LRN. The dialed number will be signaled via the ISUP “Ported Number” GAP or in the Called Party Number parameter (when the call has not been queried at the previous switch).
 - a 3 or 6 digit code gapping shall be applied based on the LRN. The LRN is signaled via the ISUP Called Party Number parameter or returned in the NP response for ported numbers.

<End of REQ-11200>

<CR-11210>

For IXC-routed NP calls in which the originating LEC performs the NP query (per CR-00950), Network Management controls shall be extended to the LRN. This includes controls for the LRN and called number at the intermediate switch contained in the CdPN and “Ported Number” GAP, respectively.

For calls to a non-ported subscriber, the existing procedures for provisioning and application of the code gapping shall apply at both the end office and intermediate office.

For calls to ported subscribers, the following modifications to the code gapping shall apply:

1. The existing procedures for provisioning the code gapping shall be used at both the originating switch and intermediate switch.
2. At an originating switch;
 - a 10 digit call gapping shall be applied based on the dialed number and not the LRN.
 - a 3 or 6 digit code gapping shall be applied based on the LRN. The LRN is returned in the NP response for ported numbers.
3. At an intermediate switch;
 - a 10 digit call gapping shall be applied based on the dialed number and not the LRN. The dialed number will be signaled via the ISUP “Ported Number” GAP or in the Called Party Number parameter (when the call has not been queried at the previous switch).
 - a 3 or 6 digit code gapping shall be applied based on the LRN. The LRN is signaled via the ISUP Called Party Number parameter or returned in the NP response for ported numbers.

<End of CR-11210>

There is a need for differentiating controls for 10-digit ACGs from controls for digits of less specificity. This may be illustrated by considering the case where a single number (e.g., mass call-in) causes SCP overload. In this case, a single DN has been identified as the source of the overload and queries to the database can be gapped and calls to this DN should be failed when a query is not made. In the case where gapping is done on a less specific set of digits, it cannot be established which calls are contributing to the overload. For this case, it may be desirable to block the query (in response to the ACG) and default route the calls toward the donor switch (with the FCI indicating the query has not been made), rather than fail the calls.

<REQ-11220>

When the switch detects an NP trigger, the switch shall check for active ACG controls.

In this requirement and <REQ-11230>, an armed ACG control is “active” in the time intervals (as specified by the GapInterval parameter) during which queries are suppressed. An armed ACG control is not active when an interval has expired and a query may be sent.

<End of REQ-11220>

<REQ-11230>

When an NP trigger has been detected and ACG controls are active, the switch shall not launch an NP query. In addition:

- **When the ACG control is a 10-digit SCP ACG control, a 10-digit SMS-Originated Code Control (SOCC), or a manual gap, the switch shall provide final treatment to the call.**
- **For all other ACG controls, the switch shall attempt to route the call to the dialed digits.**

In the case of Media-Stimulated Mass Dialing, there may be sufficient traffic (for a particular dialed number) to the NP Database resulting in an ACG control. In such a situation, calls directed to the number should be blocked to avoid propagating responsibility for the queries to other switches in the call path, otherwise congestion may be exacerbated.

<End of REQ-11230>

5.5.4 Billing

5.5.4.1 Overview of Local Number Portability AMA Recording

Bellcore AMA Format (BAF) modules will be appended to switch-generated AMA records when number portability information must be captured for a given call. These modules will be referred to in this document as LNP Modules. Multiple LNP Modules may be appended to an AMA record when it is necessary to provide number portability information for more than one party of a call (e.g. calling party, called party, aggregate/feature user, or alternatively billed party). Formats for BAF Structure Codes (SC), Modules and Tables, as well as the definition of Call Type Code (CTC) for particular call types, are defined in Telcordia Technologies GR-1100-CORE (Divisions 2-5).

A terminating party LNP Module will be appended to existing AMA records generated at an NP-capable switch which performs an NP query. The terminating party LNP Module will contain the LRN associated with a ported terminating (called) party as supplied by the NPDB. In addition, a terminating party LNP Module may be appended to AMA records made at an intermediate or terminating switch (including switches serving both the originating and terminating parties – i.e., for intra-switch calls) when no NP query is performed. In this case, the information for a terminating DN may be obtained from incoming SS7 ISUP signaling (CdPN parameter), or from switch data.

An originating party LNP Module will be appended to existing AMA records made at an originating switch when the originating DN is ported. In addition, an originating party LNP Module may be appended to AMA

records made at an intermediate or terminating switch. The information for an originating DN may be obtained from incoming SS7 ISUP signaling (Jurisdiction Information Parameter - JIP), from switch data, from data provisioned on the incoming trunk group, or from the NPDB. However, the capability for IXC or CAMA switches to obtain local number portability information from an NPDB for an originating ported DN is a conditional requirement of this document.

Local service providers bill inter-exchange carriers (IC or INC) access charges for calls which transit the local provider's network. A portion of this access charge is based on a distance component commonly known as the "airline mileage element". This element is based on the distance between the V&H of the wire-center serving the calling (originating access) or called (terminating access) party and the V&H of the IC or INC's "point of presence" in the originating or terminating LATA. While a ported user will not be moving out of their rate-center with Service Provider Portability, they may change wire-centers when porting. A wire-center is usually defined as a switch or switch building. Since current billing systems derive the wire-center V&H from the NPA-NXX of the calling (originating access) or called (terminating access) number recorded in the switch-generated AMA record, additional information needs to be recorded in switch generated AMA records used for access charges to insure that the correct wire-center location is used for users which port their numbers. These technical requirements specify the use of the serving switch's LRN in an appended LNP Module on any IC or INC access AMA records for this purpose.

The content of the LNP Module, and the rules for generation and population of it, are described in clause 5.5.4.2. The LNP Module may be generated on any call type (e.g. sent-paid, local measured usage timed, local measured usage untimed, intraLATA Toll, interLATA, OUTWATS, etc.).

In addition to the LNP Module, two new BAF Call Type Codes have been defined for number portability:

- BAF Call Type Code 720 is used for "Connecting Network Access" (CNA) recordings. These recordings may be used for calls which cross local network boundaries, but for which existing access charge recording (e.g., BAF Call Type Code 119 records for terminating IXC access charges) does not apply. BAF Call Type Code 720 is used in conjunction with BAF Structure Code 0625. CNA records will be generated only for calls incoming over interoffice trunk groups specifically marked for such recording.
- BAF Call Type Code 721 is used for "Default Flat Rate" NP AMA recordings at the originating switch. These recordings may be enabled for calls for which an NPDB query is performed and which would not otherwise generate AMA records, but for which a recording is desirable to capture number portability information. BAF Call Type Code 721 is used in conjunction with BAF Structure Codes 0001 and/or 0500 (as appropriate). Default flat rate NP records will be generated only when the option to do so is enabled.

Rules for population of AMA records with these BAF Call Type Codes are provided in subsequent clauses.

5.5.4.2 Generation of the Local Number Portability (NP) Module

<REQ-11300>

Number portability information shall be provided by a switch for AMA recording in an appended BAF Module 720, or, when the option defined in <CR-10000> is on, in an appended BAF Module 719. When an LNP Module is appended to an AMA record, it shall be populated as specified in this document using the formatting specified in Telcordia Technologies GR-1100-CORE.

Number portability information within the LNP Module consists of: the LRN of the switch serving the ported DN; the party identifier (e.g., originating or terminating) for which the information

applies; and the source of the number portability information (NPDB, SS7 ISUP signaling, or switch data). The source of the number portability information will vary depending upon the type of switch recording the information, the originating and/or terminating interfaces (e.g., line, SS7 trunk, MF trunk), and the party for which the information is recorded (e.g. originating or terminating DN). In some situations, there may even be more than one potential source for the number portability information. The source of the number portability information shall be derived as given by the precedence requirements given in table 8 unless a given LNP Module generation requirement specifically states otherwise.

Table 8 Precedence Requirements for Source of Number Portability Information

NP Module Party Identifier	Incoming Interfaces	Source of NP Information	Notes
Originating DN	Line	1 Switch data (LRN designated for use in AMA, as per <REQ-08200>)	
	SS7 trunk	1 Signaling information (ISUP JIP) 2 Switch data (incoming trunk group "LRN") 3 NPDB	D D A
	MF trunk	1 Switch data (incoming trunk group "LRN") 2 NPDB	A
Terminating DN	Line (intraswitch)	1 NPDB 2 Switch data (LRN designated for use in AMA, as per <REQ-08200>)	C
	Line (interswitch)	1 NPDB	
	SS7 trunk	1 Signaling information (ISUP CdPN) 2 NPDB 3 Switch data	B
	MF trunk	1 NPDB 2 Switch data	B

NOTES:

- A. The optional capability to obtain number portability information for the originating party via a query to the NPDB is discussed in conditional requirements <CR-12900> and <CR-14500> for CAMA and IXC switches, respectively.
- B. Switch data (LRN designated for use in AMA, as per <REQ-08200>) can be used to identify the number portability information only at the terminating switch.
- C. The NPDB can be used to obtain terminating party number portability information for an intraswitch call if the transition mechanism described in <REQ-08600> is active.
- D. See <CR-11310> for a change in the precedence.

Table 9 provides illustrative examples of how the source of the number portability information may be obtained for given scenarios.

Table 9 Recording Examples

NP Module Party Identifier	Switch Type	Incoming Trunk Type	Source of NP Information - in order of preference	Note
Originating DN	IXC or CAMA	SS7	<ul style="list-style-type: none"> • SS7 ISUP Signaling - IAM JIP (when IAM JIP is received in signaling) • Switch data - incoming trunk group "LRN" (when no ISUP JIP is received) • NPDB (when neither switch data nor ISUP JIP is available) 	1
		Non-SS7 with dedicated traffic from a single service provider	<ul style="list-style-type: none"> • Switch data - incoming trunk group "LRN" • NPDB (when switch data is not available) 	
		Non-SS7 with traffic from multiple service providers	<ul style="list-style-type: none"> • NPDB 	1
	Originating		<ul style="list-style-type: none"> • Switch data - datafilled LRN designated for use in AMA 	
	Intermediate switch that performs IC or INC Access Recording	SS7	<ul style="list-style-type: none"> • SS7 ISUP signaling - IAM JIP (when IAM JIP is received in signaling) • Switch data - incoming trunk group "LRN" (when no ISUP JIP is received) 	
		Non-SS7 with dedicated traffic from a single service provider	<ul style="list-style-type: none"> • Switch data - incoming trunk group "LRN" 	
	Terminating		<ul style="list-style-type: none"> • Not required 	

Terminating DN	Originating, IXC, CAMA, or Intermediate switch that performs an NP query		<ul style="list-style-type: none"> • NPDB 	
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NP Module Party Identifier	Switch Type	Incoming Trunk Type	Source of NP Information - in order of preference	Note
	IXC		<ul style="list-style-type: none"> • SS7 ISUP signaling - IAM CdPN (when IAM is received with a FCI indicating "Translated Number" and a "Ported Number" GAP) • NPDB (when IAM is received without an FCI indicating a "Translated Number" and if an NP query is performed by the switch) 	2
	Intermediate switch that performs IC or INC Access Recording	SS7	<ul style="list-style-type: none"> • SS7 ISUP signaling - IAM CdPN (when IAM is received with a FCI indicating "Translated Number" and a "Ported Number" GAP) • NPDB (when IAM is received without an FCI indicating a "Translated Number" and if an NP query is performed by the switch) 	
		Non-SS7 with dedicated traffic from an IXC	<ul style="list-style-type: none"> • NPDB 	
	Recipient	SS7 from a dedicated IXC	<ul style="list-style-type: none"> • SS7 ISUP signaling - IAM CdPN (when IAM is received with a FCI indicating "Translated Number" and containing a "Ported Number" GAP) • NPDB (when IAM is received without an FCI indicating a "Translated Number" and if an NP query is performed by the switch) • Switch data - datafilled LRN designated for use in AMA (when IAM is received without a FCI indicating a "Translated number" and if an NP query is not performed by the switch) 	
		Non-SS7 with dedicated traffic from a single IXC	<ul style="list-style-type: none"> • NPDB (when an NP query is performed by the switch) • Switch data - datafilled LRN designated for use in AMA (when an NP query is not performed by the switch) 	
		SS7 and Non-SS7 without dedicated IXC traffic	<ul style="list-style-type: none"> • NPDB (when an NP query is performed by the switch) • Switch data - datafilled LRN designated for use in AMA (when an NP query is not performed by the switch) 	

NOTE 1 - The capability for a switch to perform an NP query to retrieve number portability information for an originating DN is a conditional requirement of this document.

NOTE 2 - Per <REQ-03650> SS7 ISUP signaling information is considered to be "not received" when the Ignore NP Option is set to on.

<End of REQ-11300>

<CR-11310>

The switch shall provide a provisioning capability, on a per-trunk group basis, to alter the precedence (as described in <REQ-11300>) for the source of originating number portability information for calls over incoming SS7 trunks such that the following precedence shall apply:

1. Switch data (incoming trunk group "LRN")
2. Signaling information (ISUP JIP)
3. NPDB

The altered precedence shall apply to AMA recording only and does not change the JIP that is signaled forward.

As a default, the precedence as specified in Table 8 shall apply.

As an example: if this option is provisioned and active on a trunk group, and the trunk group is set to record originating party LNP modules, the LRN provisioned on that trunk group will be recorded instead of a JIP received in ISUP signaling. If no LRN is provisioned on the trunk group, and a JIP is received, the signaled JIP will be recorded.

<End of CR-11310>

<REQ-11400>

When the option defined by <CR-10000> to use BAF Module 719 to record number portability information is active, procedures in this document pertaining to population rules for Party Identifier (BAF Table 730), Location Routing Number (BAF Table 731) and Supporting Information (BAF Table 734) shall be followed. However, when BAF Module 719 is used, the procedures in this document pertaining to population of Service Provider Identity (BAF Table 732) and Location (BAF Table 733) shall not apply. BAF Module 719 shall be formatted as specified in Telcordia Technologies GR-1100-CORE (Division 5, BAF Modules).

<End of REQ-11400>

5.5.4.2.1 General Rules for Appending the LNP Module

This clause defines common rules for appending the LNP Module to switch generated AMA records. These common rules are not dependent on switch type.

<REQ-11500>

The switch shall not generate a new AMA record of BAF Structure Code 0220 or 0221, nor a pre-IN (IN/1) record of BAF Structure Code 0360 or 0364, solely as a result of the NP query. However, if the NPDB response message contains a T1.667-1999 AMAslPID parameter, then the switch shall follow procedures defined in Telcordia Technologies GR-1298-CORE, Sections 9.6.1 and 9.6.2, to generate an AMA record of BAF Structure Code 0220 or 0221. In this case, the switch shall append the terminating party LNP Module to the BAF Structure Code 0220 or 0221 AMA record.

An AMAslPID is not expected to be returned from a database in response to an NP query. The formats of BAF Structure Codes 0220, 0221, 0360, and 0364 are defined in Telcordia Technologies GR-1100-CORE (Division 3, BAF Structures). Generation and population requirements for BAF Structure Codes 0220 and 0221 are described in Telcordia Technologies GR-1298-CORE.

<End of REQ-11500>

<REQ-11600>

A terminating party LNP Module shall be appended to the AMA record whenever an NP trigger is encountered on the called DN that results in an query to the NPDB. The LNP Module shall be populated as follows depending on the contents of the response message from the NPDB:

When an LRN is received in the response message from the NPDB, it shall be included in the LRN field (BAF Table 731) of the LNP Module. The Party Identifier (BAF Table 730) shall be set to indicate the terminating party (value 002), and the Supporting Information (BAF Table 734) shall be set to indicate a LRN Source of "NP Database" (value 1) with a Query Status indicator of "Successful Query" (value 01). Both the Service Provider Identity field (BAF Table 732) and Location field (BAF Table 733) shall be populated with "Hexadecimal F" in accordance with BAF fill procedures, as described in Telcordia Technologies GR-1100-CORE Section 1.4.2.2.

When the switch receives a response message from the NPDB containing the original Dialed Number, the LRN field (BAF Table 731) of the LNP Module shall be filled with "Hexadecimal F". The Party Identifier (BAF Table 730) shall be set to indicate the terminating party (value 002), and the Supporting Information (BAF Table 734) shall be set to indicate a LRN Source of "NP Database" (value 1) with a Query Status indicator of "Successful Query" (value 01). Both the Service Provider Identity field (BAF Table 732) and Location field (BAF Table 733) shall be populated with "Hexadecimal F" in accordance with BAF fill procedures, as described in Telcordia Technologies GR-1100-CORE Section 1.4.2.2.

When the NP trigger encounters an unusual condition, the LRN field (BAF Table 731) of the LNP BAF Module shall be filled with "Hexadecimal F" in accordance with BAF fill procedures (as described in Telcordia Technologies GR-1100-CORE Section 1.4.2.2), the Party Identifier (BAF Table 730) shall be set to indicate the terminating party (value 002), and the Supporting Information (BAF Table 734) shall be set to indicate an LRN Source of "NP Database" (value 1) and a Query Status indicator field as described in <REQ-11800>. Both the Service Provider Identity field (BAF Table 732) and Location field (BAF Table 733) shall be populated with "Hexadecimal-F" in accordance with BAF fill procedures, as described in Telcordia Technologies GR-1100-CORE Section 1.4.2.2.

Originating access AMA records will have terminating party LNP modules appended when an NP query is performed per <CR-00950>.

If the LNP Module does not contain a valid LRN, then downstream billing system processing may have to do additional work to identify the switch and/or service provider serving the DN.

<End of REQ-11600>

<REQ-11700>

When an originating party LNP Module is generated, the number portability information for the originating DN may be obtained from SS7 ISUP signaling (i.e. JIP), from data provisioned on the incoming trunk group (i.e. per-trunk group "LRN"), from the LRN designated for use in AMA recordings for the serving switch or applicable remote switching unit, or from a response message from an NPDB. Accordingly, this LNP Module shall be populated as follows:

- When the number portability information for the originating DN is obtained from SS7 ISUP signaling, the 4 right-most (least significant) digits (the "line number" digits) of the LRN field in BAF Table 731 shall be zero-filled. The party identifier (BAF Table 730) shall indicate originating party (value "001"), the query status indicator within the Supporting Information field (BAF Table 734) shall be set to "no query done" (value "09"), and the LRN Source Indicator within the Supporting Information field (BAF Table 734) shall be set to "Incoming signaling" (value "3").

- When the number portability information for the originating DN is obtained from data provisioned on the incoming trunk group (i.e. per-trunk group “LRN”), the provisioned LRN shall be recorded in the LRN field (BAF Table 731). The party identifier (BAF Table 730) shall indicate originating party (value “001”), the Query Status Indicator within the Supporting Information field (BAF Table 734) shall be set to “no query done” (value “09”), and the LRN Source Indicator within the Supporting Information field (BAF Table 734) shall be set to “Switching system data” (value “2”).
- When the number portability information for the originating DN is obtained from the LRN (NPA-NXX-XXXX) designated for use in AMA recordings for the serving switch or applicable remote switching unit (as described in <REQ-08200>), the designated LRN shall be recorded in the LRN field (BAF Table 731). The party identifier (BAF Table 730) shall indicate originating party (value “001”), the Query Status Indicator within the Supporting Information field (BAF Table 734) shall be set to “no query done” (value “09”), and the LRN Source Indicator within the Supporting Information field (BAF Table 734) shall be set to “Switching system data” (value “2”).
- When the number portability information for the originating DN is obtained from a response message from an NPDB, the LNP Module shall be populated as follows, depending on the contents of the response message from the NPDB:
 - When an LRN is received in the response message from the NPDB, it shall be included in the LRN field (BAF Table 731) of the LNP Module. The Party Identifier (BAF Table 730) shall be set to indicate the originating party (value “001”), and the Supporting Information field (BAF Table 734) shall set the LRN Source Indicator to “NP Database” (value “1”) with a Query Status Indicator of “Successful query” (value “01”).
 - When the switch receives a response message from the NPDB containing the Originating Number, the LRN field (BAF Table 731) of the LNP Module shall be filled with “Hexadecimal F” in accordance with BAF fill procedures, as described in GR-1100-CORE Section 1.4.2.2. The Party Identifier (BAF Table 730) shall be set to indicate the originating party (value “001”), and the Supporting Information field (BAF Table 734) shall set the LRN Source Indicator to “NP Database” (value “1”) with a Query Status Indicator of “Successful query” (value “01”).
 - When the NP query encounters an unusual condition (i.e., not one of the conditions identified in the previous two dashed items), the LRN field (BAF Table 731) of the LNP Module shall be filled with “Hexadecimal F” in accordance with BAF fill procedures, as described in GR-1100-CORE Section 1.4.2.2. The Party Identifier (BAF Table 730) shall be set to indicate the originating party (value “001”), and the Supporting Information field (BAF Table 734) shall set the LRN Source Indicator to “NP Database” (value “1”) with a Query Status Indicator as described in <REQ-11800>.

For the originating party LNP Module, both the Service Provider Identity (BAF Table 732) and Location (BAF Table 733) fields shall be filled with “Hexadecimal F” in accordance with BAF fill procedures, as described in GR-1100-CORE Section 1.4.2.2.

<End of REQ-11700>

<REQ-11800>

When the NP query encounters an unusual condition, the Query Status subfield of the Supporting Information field (BAF Table 734) within the LNP Module shall be set as follows:

- If the switch receives a T1.667-1999 Continue or authorizeTermination message from the NPDB in response to the NP query, the Query Status shall be set to “T1.667-1999 Continue or authorizeTermination message received” (value ‘03’);

- If no response message is received from the NPDB for the NP query, the Query Status shall be set to “No query response message received” (value ‘02’);
- If a protocol error is detected by the switch in the response message, the Query Status shall be set to “Protocol Error in received response message” (value ‘04’);
- If an application error is detected by the switch in the response message, the Query Status shall be set to “Error detected in response data” (value ‘05’);
- If a Return Error component is received in the response message from the NPDB the Query Status shall be set to “Error detected in response data” (value ‘05’);
- If a Reject component is received in the response message from the NPDB, the Query Status shall be set to “Query rejected” (value ‘06’);
- If an ABORT message is received from the NPDB in response to the NP query, the Query Status shall be set to “Query rejected” (value ‘06’);
- If an UDTs message is received from the NPDB in response to the NP query, the Query Status shall be set to “Query rejected” (value ‘06’);
- If a sendToResource message is received from the NPDB in response to the NP query, the Query Status shall be set to “Query unsuccessful, reason unknown” (value ‘99’);
- If any other error condition occurs, or if the type of error condition can not be determined in response to the NP query, the Query Status shall be set to “Query unsuccessful, reason unknown” (value ‘99’).

<End of REQ-11800>

<REQ-11900>

The NPDB-supplied LRN shall be accepted by the switch and recorded in the LNP Module without any validation or screening.

<End of REQ-11900>

<REQ-12000>

On a long duration call, an LNP Module(s) that is appended to the first call record shall also be appended to subsequent long duration “continuation” records made for that particular call.

<End of REQ-12000>

<REQ-12100>

When an LRN is received via 7-digit signaling (NNX-XXXX) in the network, the switch shall record, in the appended LNP module, the appropriate NPA for that LRN. The switch shall derive the NPA, for AMA purposes, in the same way it derives the NPA for routing purposes (as described in <REQ-04000> and <REQ-04600>). If the switch is unable to determine the appropriate NPA for the LRN, then the switch shall not generate the LNP module for the call.

<End of REQ-12100>

5.5.4.2.1.1 Appending the LNP Module at an Originating Switch

The originating switch may append an LNP Module in several scenarios. In general, calls to a number in a portable NPA-NXX where the originating switch launches a query will result in an LNP Module to record the NP information for the terminating DN. Likewise, the originating switch will append an LNP Module with its LRN to AMA records when the originating party is ported.

It is not appropriate for the switch to derive and append an LRN that does not correspond to the directory number in the AMA record. When a post-query originating AMA record is created as the result of interaction with a T1.667-1999 SDS trigger that initiates a separately billed call leg, the switch is not to derive an originating LRN to append to that post-query AMA record. This is because the switch does not have reliable information about the porting status of, and the LRN which corresponds to, the billing number in the AMA record which is under the control of the T1.667 service logic. It is anticipated that, in the future, the T1.667-1999 SCP and signaling may have the capability to return an originating LRN for the AMA initiated by a T1.667-1999 trigger. Also, the triggering switch could have trigger attributes that identify an LRN to be associated with the triggering DN, unless overridden by the T1.667-1999 SCP. Although it is not appropriate to append an originating party LNP Module to the post-query record, note that it is appropriate to append an originating party LNP Module to the pre-query record. In the case of a T1.667-1999 SDS trigger followed by a Continue response without an AMAslpID, the originating LRN should be derived and recorded as specified in <REQ-12200>.

<REQ-12200>

An originating switch shall append an originating party LNP Module to all originating AMA records generated by the switch for calls originating from ported DNs. The LNP Module shall be populated with the LRN of the originating switch. If more than one LRN is assigned to the originating switch, the LRN (NPA-NXX-XXXX) designated for use in AMA recordings for the serving switch or applicable remote switching unit (as described in <REQ-08200>) shall be used. The originating party LNP Module shall be populated as described in <REQ-11700>.

A switch which performs call redirection shall append an originating party LNP Module to all originating AMA records generated by the switch for calls redirected via either a switch based supplemental service or as a result of a receipt of a T1.667-1999 ForwardCall message resulting from a Terminating Attempt Trigger (TAT) applied against a ported DN. The LNP Module shall be populated with the LRN of the redirecting switch. If more than one LRN is assigned to the redirecting switch, the LRN (NPA-NXX-XXXX) designated for use in AMA recordings for the serving switch or applicable remote switching unit (as described in <REQ-08200>) shall be used. The originating party LNP Module shall be populated as described in <REQ-11700>.

In the case of originating records generated for calls which encounter a T1.667-1999 Specific Digit String (SDS) trigger (in the originating switch), the switch shall append an originating party LNP Module to the originating AMA record for the pre-query call leg (i.e., the call record for the originating party 'A' to the specificDigitString trigger DN 'B'). The LNP Module shall be populated with the LRN of the originating switch. If more than one LRN is assigned to the originating switch, the LRN (NPA-NXX-XXXX) designated for use in AMA recordings for the serving switch or applicable remote switching unit (as described in <REQ-08200>) shall be used. The originating party LNP Module shall be populated as described in <REQ-11700>.

However, when an AMA record is generated after a T1.667-1999 Specific_Digit_String query resulting in a separately billed call leg, the switch shall not append an originating party LNP Module based on any of the following: (1) receipt of a JIP in ISUP signaling; (2) the presence of a provisioned per-trunk group LRN on the incoming trunk group; (3) switch data for the originating party.

Recording a distinct LRN in an LNP Module attached to an originating AMA record will continue to allow a different "wire-center" to be identified on an NPA-NXX basis for Remote Switching Units.

The following is a partial list of originating BAF Call Type Codes: CTC001 Detailed Message Rate, Timed, with MBI; CTC002, Message Rate, Timed, with MBI; CTC003 Detailed Message Rate, Untimed, with MBI; CTC004 Message Rate, Untimed, with MBI; CTC005 Detailed Message Rate, Timed, No MBI; CTC006 Station Paid, CTC038 Orig. Integrated Multiple Access Switch Service, CTC063 Cellular Mobile Carrier - Type 1 or 2B (Originating), CTC064 Cellular Mobile Carrier - Type 2A (Originating), CTC110 Originating InterLATA Station Paid, CTC111-CTC114 InterLATA WATS, CTC117 InterLATA CSDC, CTC134 Originating FG-B, CTC139 Carrier Identified CAMA InterLATA, CTC141 IC Number Service Call, CTC142 LEC Number Services, CTC173 Private Virtual Network Non-SSP End Office, CTC263 Originating

access to IEC Virtual Network, and CTC506 800 Calls from Public Stations at NON-SSP End Offices, and CTC721 Default Local Number Portability.

Telcordia Technologies GR-1100-CORE (Division 4, Call Types) should be consulted for a more comprehensive list of originating BAF Call Type Codes.

<End of REQ-12200>

<REQ-12300>

When a switch serving a FG-A carrier access line creates a FG-A terminating AMA record (CTC132) for calls from a FG-A line, the switch shall append up to two LNP modules to the AMA record.

The first LNP module (originating party LNP Module) shall be appended if the DN assigned to the FG-A line is a ported DN. If more than one LRN is assigned to the switch serving the FG-A line, the LRN (NPA-NXX-XXXX) designated for use in AMA recordings for the serving switch or applicable remote switching unit (as described in <REQ-08200>) shall be used. The originating LNP Module shall be populated as described in <REQ-11700>.

The second LNP Module (terminating party LNP Module) shall be appended when the called DN is ported, and shall be populated as follows:

- For intra-switch calls, the terminating party LNP Module shall be populated as described in <REQ-12500>
- For inter-switch calls when an NP query is performed in order to complete the call, the terminating party LNP Module shall be populated based on the information provided in the NPDB response as described in <REQ-11600>.

NOTE - CTC132 (terminating FG-A) is used by the LEC for usage measurements of calls from the FG-A line.

<End of REQ-12300>

<CR-12350>

When the option described in <CR-10950> is set to record originating party LNP Modules on calls originating from a PBX, the LRN field (BAF Table 731) shall be populated with the LRN (NPA-NXX-XXXX) designated for use in AMA recordings for the serving switch or applicable remote switching unit (as described in <REQ-08200>). The party identifier (BAF Table 730) shall indicate originating party (value "001"), the Query Status Indicator within the Supporting Information field (BAF Table 734) shall be set to "no query done" (value "09"), and the LRN Source Indicator within the Supporting Information field (BAF Table 734) shall be set to "Switching system data" (value "2").

<End of CR-12350>

<REQ-12400>

When the option defined by <REQ-10700> to generate an LNP Default Flat Rate (LNP DFR) AMA record using BAF CTC 721 is active and when no other AMA record is already being generated for the call, the originating switch shall use either BAF Structure Code 0001 or BAF Structure Code 0500 to generate the BAF CTC 721 AMA record. BAF Structure Code 0500 shall be generated as per the requirements in Telcordia Technologies GR-1100-CORE, section 1.5.1.3.

Recording of the BAF CTC 721 AMA record applies to call attempts (i.e., unanswered, busy, or abandoned) when NP call attempt recording is active (as described in <REQ-10900>), but when no other AMA record is already being generated for the call and an NP query is performed at the originating switch. When NP call attempt recording is not active, recording of the BAF CTC 721 AMA record applies only to completed (i.e., answered) calls.

In networks where "flat rate" or "free" local calls are offered; a mechanism is necessary to record calls to other networks in order to identify calls on which mutual compensation is owed, even though the originating end user is not billed for the call. Prior to number portability, the called or dialed NPA-NXX could be identified in the dialing plan as belonging to "another network" and a message billing index used to force an AMA record for the call. Unfortunately in a number portability environment the identity of the terminating network based upon the dialed number is no longer accurate. In order to avoid recording of all local calls in a flat rate service area, a mechanism is required to generate AMA records only for flat rate calls which terminate to a portable NPA-NXX or ported number.

<End of REQ-12400>

<REQ-12500>

When a call is made at an originating switch and is completed on the same switch to a ported DN without an NP query being performed, the originating switch shall append a terminating party LNP module to the AMA record (if any) generated for the call. However, completing an intra-switch call to a ported DN shall not automatically cause an AMA record to be generated.

When generated, the terminating party LNP module shall be populated with the LRN of the switch or remote switching unit. If more than one LRN is assigned to the switch or remote switching unit, the LRN (NPA-NXX-XXXX) designated for use in AMA recordings (as described in <REQ-08200>) serving the ported terminating DN shall be used. The terminating party LNP module shall contain a Party Identifier (BAF Table 730) indicating terminating party (value 002), an LRN Source Indicator of the Supporting Information field (BAF Table 734) set to "Switching System Data" (value 002), and a Query Status Indicator of the Supporting Information field (BAF Table 734) set to "no query done" (value 09).

In most cases an NP query will not be performed on an intra-switch call. However, when an NP query is done for an intra-switch call, <REQ-11600> applies.

NOTE - This requirement applies also to post specificDigitString trigger AMA records.

<End of REQ-12500>

5.5.4.2.1.2 Appending the LNP Module at a Donor Switch

The following requirements cover the general rules for appending the LNP Module at a Donor switch.

<REQ-12600>

When a NP query is made at the donor switch, if the switch records a terminating access record for calls from another network, the LNP Module containing the NPDB-supplied number portability information for the terminating party shall be appended to the terminating access record and populated as described in <REQ-11600>. If more than one AMA record is made at the donor switch for the call, the terminating party LNP Module shall only be appended to the terminating access record.

Terminating access records are commonly generated for Feature Group B, Feature Group D, Cellular Type 2B, or Connecting Network Access (i.e. CTC135, CTC119, CTC066, or CTC720 respectively).

<End of REQ-12600>

5.5.4.2.1.3 Appending the LNP Module at an Intermediate Switch

The following requirements cover the rules for appending the LNP Module at an intermediate switch, including at an intermediate switch in an N-1 network. Additionally, requirements are provided specifically

for intermediate switches that perform Centralized Automatic Message Accounting (CAMA) for incoming calls (referred to as a CAMA switch).

When originating AMA is created at an intermediate switch as the result of interaction with a T1.667-1999 SDS trigger that initiates a separately billed call leg, the intermediate switch is not to derive an originating LRN to append to that AMA record. This is because the switch does not have reliable information about the porting status of, and the LRN which corresponds to, the billing number in the AMA record which is under the control of the T1.667-1999 service logic. It is not appropriate to append a default LRN, such as the LRN of the switch, to this originating AMA record. It is anticipated that, in the future, the T1.667-1999 SCP and signaling may have the capability to return an originating LRN for the AMA initiated by a T1.667-1999 trigger. Also, the triggering switch could have trigger attributes which identify an LRN to be associated with the triggering DN, unless overridden by the T1.667-1999 SCP. In the case of a T1.667-1999 SDS trigger followed by a Continue response without an AMAslpID, the originating LRN should be derived and recorded as specified in <REQ-12200>.

<REQ-12700>

When a NP query is made at an intermediate switch, if the switch records a terminating access record for calls from another network, the LNP Module containing the NPDB-supplied number portability information for the terminating party shall be appended to the terminating access record and populated as described in <REQ-11600>. If more than one AMA record is made at the intermediate switch for the call, the LNP Module shall only be appended to the terminating access record.

Terminating access records are commonly generated for Feature Group B, Feature Group D, Cellular Type 2A, or Connecting Network Access (i.e. CTC135, CTC119, CTC064, or CTC720 respectively).

<End of REQ-12700>

<REQ-12800>

A CAMA switch shall be capable of appending up to two LNP Modules to an originating AMA Structure Code; one LNP Module for an originating DN, and the other for a terminating ported DN.

The LRN for the originating party may be obtained from SS7 ISUP signaling (i.e. JIP), from data provisioned on the incoming CAMA trunk group (i.e. per-trunk group "LRN"), or, when the capability described in <CR-12900> is available, from a response message from the NPDB. The source of the number portability information shall be determined according to the precedence rules described in <REQ-11300>. The originating party LNP Module shall be populated as described in <REQ-11700> for the applicable source of the number portability information.

The LRN for a ported terminating DN will only be available when a NP query is performed at the CAMA switch. The terminating party LNP Module shall be populated based on the information provided in the NPDB response as described in <REQ-11600>.

<End of REQ-12800>

<CR-12900>

When number portability information for an originating party can not be obtained from either incoming SS7 ISUP signaling or from switch data, then the CAMA switch shall be capable of querying the NPDB to obtain this information to be recorded in the originating party LNP Module.

If this optional capability to query for the number portability information of a ported originating DN is not available on the CAMA switch, then the CAMA switch owner will need to employ "off-line" means to determine the correct switch and/or service provider of a ported DN.

<End of CR-12900>

<REQ-13000>

When a switch serving as an access tandem or intermediate switch receives a call from an interconnected network with a FCI parameter indicating "Translated number" and a "Ported Number" GAP in the SS7 ISUP IAM; the switch shall append a terminating party LNP Module to the IC, INC, CMC, or CNA terminating access AMA record, if any, generated by the switch for the call.

The terminating party LNP Module shall be populated with the LRN of the terminating switch received in the Called Party Number (CdPN) parameter of the SS7 ISUP IAM. Additionally, the terminating party LNP Module shall include a Party Identifier (BAF Table 730) indicating the terminating party (value 002), an LRN Source Indicator in the Supporting Information field (BAF Table 734) set to "Incoming signaling" (value 3), and a Query Status Indicator in the Supporting Information field (BAF Table 734) set to "No query done" (value 09).

If the access tandem or intermediate switch receives a FCI parameter in the SS7 ISUP IAM indicating a "Translated number" for the call, but the IAM does not contain a "Ported Number" GAP, the switch shall not generate a terminating party LNP Module.

If the access tandem switch or intermediate switch does not receive a FCI parameter indicating a "Translated number" in the SS7 ISUP IAM for the call, then the switch shall follow the procedures defined in this document to determine whether or not to perform an NP query and generate an LNP module for that NP query.

NOTE - If a call to a ported DN is received at an access tandem or intermediate switch "not queried", and if the switch does not perform an NP query for the call, the IC, INC, CMC, or CNA terminating access AMA record generated by the switch can not provide adequate information to identify the actual terminating "wire-center".

<End of REQ-13000>

<REQ-13100>

When a switch serving as an access tandem or intermediate switch generates an IC or INC exchange originating access AMA record for a call on which neither switch based supplementary services nor T1.667-1999 feature interactions have modified the billing number at that switch, the switch shall append an LNP Module to the access AMA record containing the LRN of the originating switch. The LRN of the originating switch may be obtained from either;

- the JIP in the received SS7 IAM, or
- the per-trunk group "LRN" provisioned on the incoming trunk group over which the call was received at the intermediate switch.

If the originating switch's LRN is not available from either source, the originating party LNP Module will not be recorded.

If recorded, the originating party LNP Module shall be populated as described in <REQ-11700> for the applicable source of the number portability information.

<End of REQ-13100>

<REQ-13200>

When a switch serving as an access tandem or intermediate switch generates an IC or INC originating exchange access AMA record following a switch based supplementary service or a T1.667-1999 feature interaction (excluding T1.667-1999 SDS triggers) which initiates a separately billed call leg, the switch shall follow the procedures for originating exchanges for determining whether or not to append an originating party LNP Module to the IC or INC originating exchange access AMA record. (See <REQ-12200>).

In the case of switch-based supplementary services (e.g. call forwarding), the originating party LNP Module shall only be appended if the new billed party is a ported DN served by the forwarding switch. In

the case of T1.667-1999 services initiating a separately billed call leg, the switch shall not append an originating party LNP Module to a post-T1.667-1999 query AMA record (i.e., for the call from the SDS trigger DN 'B' to the routing DN 'C').

<End of REQ-13200>

<REQ-13300>

When an intermediate switch generates an IC, INC, CMC, or CNA terminating exchange access AMA record (excluding FG-A access AMA records), the option described in <REQ-10800> is enabled, and the incoming SS7 IAM includes the JIP, the switch shall append an originating party LNP Module to the AMA record. The originating party LNP Module shall be populated as described in <REQ-11700>.

An originating party LNP Module is necessary to explicitly identify the switch originating or redirecting the call. The Calling Party Number cannot be used for this purpose because it could be ported.

<End of REQ-13300>

<REQ-13400>

When an intermediate switch generates an IC, INC, CMC, or CNA terminating exchange access AMA record (excluding FG-A access AMA records), the option described in <REQ-10800> is enabled, the incoming signaling does not include the JIP, and a per-trunk group LRN is provisioned for the incoming trunk group, the switch shall append an originating party LNP Module to the AMA record. The originating party LNP Module shall be populated as described in <REQ-11700>.

The per-trunk group LRN, if provisioned, is only recorded when the JIP is not received in incoming signaling (i.e., the signaled JIP takes precedence).

<End of REQ-13400>

<REQ-13500>

When an intermediate switch generates an IC, INC, CMC, or CNA terminating exchange access AMA record (excluding FG-A access AMA records), the incoming signaling does not include the JIP, and a per-trunk group LRN is not provisioned for the incoming trunk group, the switch shall ensure that an originating party LNP Module is not appended to the AMA record.

<End of REQ-13500>

5.5.4.2.1.4 Appending the LNP Module at a Terminating Switch

<REQ-13600>

When a terminating switch generates an IC, INC, CMC, or CNA terminating exchange access AMA record (excluding FG-A access AMA records), the option described in <REQ-10800> is enabled, and the incoming SS7 IAM includes the JIP, the switch shall append an originating party LNP Module to the AMA record. The originating party LNP Module shall be populated as described in <REQ-11700>.

An originating party LNP Module is necessary to explicitly identify the switch originating or redirecting the call. The Calling Party Number cannot be used for this purpose because it could be ported.

<End of REQ-13600>

<REQ-13700>

When terminating switch generates an IC, INC, CMC, or CNA terminating exchange access AMA record (excluding FG-A access AMA records), the option described in <REQ-10800> is enabled, the incoming signaling does not include the JIP, and a per-trunk group LRN is provisioned for the incoming trunk group, the switch shall append an originating party LNP Module to the AMA record. The originating party LNP Module shall be populated as described in <REQ-11700>.

The per-trunk group LRN, if provisioned, is only recorded when the JIP is not received in incoming signaling (i.e., the signaled JIP takes precedence).

<End of REQ-13700>

<REQ-13800>

When a terminating switch generates an IC, INC, CMC, or CNA terminating exchange access AMA record (excluding FG-A access AMA records), the incoming signaling does not include the JIP, and a per-trunk group LRN is not provisioned for the incoming trunk group, the switch shall ensure that an originating party LNP Module is not appended to the AMA record.

<End of REQ-13800>

<REQ-13900>

When a switch serving a FG-A carrier access DN creates a FG-A originating AMA record (CTC131) for calls to a FG-A DN the switch shall append a terminating party LNP module to the FG-A CTC131 record, when the FG-A DN is ported. The terminating party LNP module shall contain the LRN of the switch or remote switching unit serving the FG-A DN. If more than one LRN is assigned to the switch serving the FG-A DN, the LRN (NPA-NXX-XXXX) designated for use in AMA recordings for the serving switch or applicable remote switching unit (as described in <REQ-08200>) shall be used. In addition, the party identifier (BAF Table 730) shall indicate the terminating party (value 002), a Query status indicator within the Supporting Information field (BAF Table 734) shall be set to “no query done” (value 09), and the LRN source indicator within the Supporting Information field (BAF Table 734) shall be set to “Switching system data” (value 2).

Note: CTC131 is used to bill originating carrier access based on an average minutes of use and distance for all end offices subtending the FG-A dial-tone switch. Since calling party number is not captured in the CTC131 record, it is not required to append an originating party LNP module for these records.

<End of REQ-13900>

<REQ-14000>

When a switch serving as a terminating office receives a call from an interconnecting network (e.g. IC, INC, CNA or CMC Type 2A or 2B Interface) with a FCI parameter indicating “Number Translated” and a ported number GAP in the SS7 ISUP IAM; the switch shall append a terminating party LNP Module to the IC, INC, CNA or CMC terminating exchange access AMA record, if any, generated by the terminating switch for the call.

The LRN field (BAF Table 731) in the terminating party LNP Module shall be populated with the LRN of the terminating switch received in the Called Party Number (CdPN) parameter of the SS7 ISUP IAM. Additionally, the terminating party LNP Module shall include a Party Identifier (BAF Table 730) indicating the terminating party (value 002), a LRN Source Indicator in the Supporting Information field (BAF Table 734) set to “Incoming signaling” (value 3), and a Query Status Indicator in the Supporting Information field (BAF Table 734) set to “No query done” (value 09).

If the terminating switch receives a FCI parameter in the SS7 ISUP IAM indicating a “Translated number” for the call, but the IAM does not contain a “Ported Number” GAP, the switch shall not generate a terminating party LNP Module for the call.

The following is a partial list of terminating BAF Call Type Codes: CTC039 Term. Integrated Multiple Access Switch Service, CTC065 Cellular Mobile Carrier – Type 1 or 2B (Terminating), CTC066 Cellular Mobile Carrier – Type 2A (Terminating), CTC119 Terminating InterLATA, CTC121 PSDS Terminating Access, CTC135 Terminating FG-B, and CTC172 Terminating Private Virtual Network Call, and CTC720 Connecting Network Access Incoming Record.

Telcordia Technologies GR-1100-CORE (Division 4, Call Types) should be consulted for a more comprehensive list of CMC, CNA, IC or INC terminating BAF Call Type Codes.

<End of REQ-14000>

<REQ-14100>

When a switch serving as a terminating office receives a call from an interconnecting network (e.g. IC, INC, CNA or CMC Type 1, 2A or 2B interface), over either an MF trunk, or via SS7 without an FCI parameter indicating "Translated number", the terminating switch shall append a terminating party LNP Module to the terminating exchange access record (i.e., IC, INC, CMC, or CNA) record generated by the switch, if any, when the call terminates to a ported DN.

The LRN (NPA-NXX-XXXX) of the terminating switch shall be recorded in the LRN field (BAF Table 731) of the LNP Module. If more than one LRN is assigned to the terminating switch, the LRN (NPA-NXX-XXXX) designated for use in AMA recordings for the serving switch or applicable remote switching unit (as described in <REQ-08200>) shall be used. Additionally, the terminating party LNP Module shall include a Party Identifier (BAF table 730) indicating the terminating party (value 002), a LRN Source Indicator in the Supporting Information field (BAF Table 734) set to "Switching system data" (value 2), and a Query Status Indicator in the Supporting Information field (BAF Table 734) set to "No query done" (value 09). If the call terminates to a non-ported DN, then the switch shall not generate a terminating party LNP Module for the call.

NOTE - if the call is received at a donor switch over a directly connected trunk from another service provider, and the called DN is not located on the donor switch, the requirements of this document for determining whether to launch an NP query and generate an LNP Module for that query should be followed.

NOTE - recording a distinct LRN in a module attached to an AMA record will continue to allow a different "wire-center" to be identified on an NPA-NXX basis for Remote Switching Units.

<End of REQ-14100>

<REQ-14200>

For AMA records recorded on incoming calls for feature usage by the terminating party, if Originating Party information is not captured in the BAF Structure, the terminating switch shall not append an originating-party LNP Module based on any of the following: (1) receipt of a JIP in ISUP signaling; (2) the presence of a provisioned per-trunk group LRN on the incoming trunk group; (3) switch data for the originating party.

Examples of terminating feature usage include: INWATS Terminating Entry (BAF Call Type Code 008 / BAF Structure Code 0027 or 0079), Terminating Study records (BAF Call Type Code 036 / BAF Structure Code 0079), ISDN Terminating User Service Records (BAF Call Type Code 184 / BAF Structure Code 0690), and T1.667-1999 Terminating Attempt Triggers (BAF Structure Code 0221). For Terminating Attempt Triggers, the originating-party LNP Module could be allowable based on future T1.667-1999 criteria.

<End of REQ-14200>

5.5.4.2.1.5 Appending the LNP Module at an IXC Switch

The following requirements cover the rules for appending the LNP Module at an IXC switch.

<REQ-14300>

When a NP query is made at an IXC switch, and if the switch records an AMA BAF Structure Code for the call, the terminating party LNP Module containing the NPDB-supplied number portability information for the terminating DN shall be appended to the AMA BAF Structure Code and shall be populated as described in <REQ-11600>.

IXC switches supporting Call Detail Record (CDR) format shall provide equivalent recording of the NPDB-supplied number portability information (e.g., LRN) in the appropriate format.

<End of REQ-14300>

<REQ-14400>

For a given call, an IXC switch shall be capable of appending up to two LNP Modules to an existing AMA record; one LNP Module for an originating DN, and the other for a terminating ported DN.

When the option described in <REQ-10800> is enabled, the number portability information for the originating DN may be obtained from SS7 ISUP signaling (i.e. JIP), from data provisioned on the incoming trunk group (i.e. per-trunk group “LRN”), or from a response message from an NPDB when the capability defined in <CR-14500> is available. The source of the number portability information shall be determined according to the precedence rules described in <REQ-11300>. The originating party LNP Module shall be populated as described in <REQ-11700> for the applicable source of the number portability information.

An IXC switch may append a terminating party LNP Module either when an NP query is performed at the IXC switch, or when an NP query has previously been performed for the call. The LNP Module shall be populated per <REQ-11600>. IXC switches supporting Call Detail Record (CDR) format shall provide equivalent recording of the number portability information (e.g. LRN) in the appropriate format.

An NP query will be performed for a call prior to its reaching the IXC only by mutual agreement of the LEC and the IXC.

<End of REQ-14400>

<CR-14500>

When number portability information for an originating party can not be obtained from either incoming SS7 ISUP signaling or from switch data, then the IXC switch shall be capable of querying the NPDB to obtain this information to be recorded in the originating party LNP module. IXC switches supporting Call Detail Record (CDR) format shall provide equivalent recording of the NPDB supplied number portability information (e.g., LRN) in the appropriate format.

If this optional capability to query for the number portability information of a ported originating DN is not available on the IXC switch, then the IXC switch owner may need to employ “off-line” means to determine the correct service provider for the ported DN.

<End of CR-14500>

5.5.4.2.1.6 Rules for Appending the LNP Module for Feature Interactions

The following requirements cover the rules for appending the LNP Module at a switch which generates an AMA record associated with a feature activation, assignment, or supplementary service. Such feature related AMA records may not be associated with an actual call.

<REQ-14600>

For Message Detail Recording to the Customer Premise, the LNP Module data shall not be present in MDR records sent to the customer premise.

<End of REQ-14600>

<REQ-14700>

The terminating party LNP Module shall be appended to existing switch Toll Free (e.g. 800 or 888) AMA records (e.g. BAF Call Type Code 142 records), when an NP query follows a switch Toll Free query in the same switch. The terminating party LNP Module shall be populated based on the information provided from the NPDB response as described in <REQ-11600>.

<End of REQ-14700>

<REQ-14800>

If a ported DN is assigned a T1.667-1999 Terminating Attempt Trigger (TAT), and a BAF Structure Code 0221 AMA record is created by the switch for the call terminating attempt to the ported DN, then the terminating-party LNP Module shall be appended to the BAF Structure Code 0221 AMA record. The LRN field (BAF Table 731) of the LNP Module shall be populated with the LRN (NPA-NXX-XXXX) designated for use in AMA recordings for the switch or applicable remote switching unit serving the terminating party (as described in <REQ-08200>). The party identifier (BAF Table 730) shall indicate terminating party (value 002), the Query Status Indicator within the Supporting Information field (BAF Table 734) shall be set to “no query done” (value “09”), and the LRN Source Indicator within the Supporting Information field (BAF Table 734) shall be set to “switching system data” (value “2”).

The generation of an originating party LNP module for BAF Structure Code 221 is described in <REQ-14200>

<End of REQ-14800>

<REQ-14900>

When an NP query follows, in the same switch, an unrelated T1.667-1999 Specific_Digit_String (SDS) trigger for which the T1.667-1999 SCP returned an AMAslpID, then the terminating party LNP Module shall be appended to the BAF Structure Code 0220 record for the post-T1.667-1999-query call leg of the call.

When an NP query follows, in the same switch, an SDS trigger which resulted in a T1.667-1999 analyzeRoute response but no AMAslpID is returned, and a switch-based AMA record is written for the post-T1.667-1999-query call leg, then the terminating party LNP Module shall be appended to the switch-based AMA record. If no AMA record is written for the post-T1.667-1999 query call leg, then the LNP Module shall not be generated.

When an NP query follows, in the same switch, an SDS trigger and Continue response without an AMAslpID, then the terminating party LNP Module shall be appended to the pre-T1.667-1999 query AMA record for that call. If no AMA record is written for call, then the LNP Module shall not be generated.

See <REQ-12500> for appending the terminating party LNP Module when the response to the T1.667-1999 trigger is a ported DN which resides in the same switch (no NP query performed), and originating AMA is created for the call. Also see <REQ-12200> and <REQ-13100>, rules and exceptions for appending the originating party LNP Module before and after a T1.667-1999 SDS trigger.

T1.667-1999 SDS trigger and NP trigger precedence rules are outlined in <REQ-06400>.

<End of REQ-14900>

<REQ-15000>

When an NP query is done following an unrelated T1.667-1999 Terminating Attempt Trigger (TAT) in the same switch and a Forward Call message is received from the T1.667-1999 SCP, then the terminating-party LNP Module shall be appended to the AMA record, if any, made for the post-T1.667-1999-query leg of the call (e.g. BAF Structure Code 0220 or switch-based originating AMA record). If no AMA record is written for the post-T1.667-1999-query leg of the call, then the terminating party LNP Module shall not be generated.

See <REQ-12200> for procedures for appending an originating-party LNP Module to the AMA record when the TAT is assigned to a ported DN.

<End of REQ-15000>

<REQ-15100>

When an NP query is done following an unrelated T1.667-1999 trigger other than a Specific_Digit_String or TAT (e.g. an OHD trigger) in the same switch, then the terminating-party LNP Module shall be appended to the AMA record, if any, made for the post-T1.667-1999-query leg of the call.

T1.667-1999 triggers (other than SDS and TAT) whose T1.667-1999 SCP response may return a ported terminating DN include the Off-Hook Delay trigger, Custom Dialing Plan trigger, Feature Code trigger, and others.

Example: A call encounters an Off-Hook Delay (OHD) trigger. The OHD trigger is followed by an NP trigger in the same switch because the called party number returned in the T1.667-1999 response message for the OHD trigger is a ported DN. The terminating-party LNP Module with the information from the NP database would be appended to the originating AMA record, if any, for this call portion.

See <REQ-12500> for generating the terminating-party LNP Module when the response to the T1.667-1999 trigger is a ported DN which resides in the same switch (no NP query performed), and originating AMA is created for the call.

See <REQ-12200> for general rules on appending the originating-party LNP Module to originating AMA records.

See T1.667-1999 Services Interactions, clause 5.4.1.

<End of REQ-15100>

<REQ-15200>

The LNP Module shall be appended to all feature usage AMA records made by the switch for a ported DN. The LRN (NPA-NXX-XXXX) of the serving switch shall be recorded in the LNP Module. If more than one LRN is assigned to the serving switch, the LRN designated for use in AMA recordings for the serving switch or applicable remote switching unit (as described in <REQ-08200>) shall be used. In addition, the LNP module shall include a Party Identifier (BAF Table 730) set to "Aggregate/feature record directory number(s) data" (value 004), a LRN Source Indicator in the Supporting Information field (BAF Table 734) set to "Switching system data" (value 2), and a Query Status Indicator in the Supporting Information field (BAF Table 734) set to "No query done" (value 09).

Examples of feature usage records for which the LNP Module should be appended are: CLASS feature activation, CLASS Screen List Editing aggregate usage, Call Forwarding activation, Usage-Sensitive Three-Way Calling activation, Conference Trunk usage, Terminating Subscriber Line Usage Study (TSLUS), and Terminating ISDN supplementary services.

<End of REQ-15200>

5.5.4.3 Rules for Generating Connecting Network Access Record

<REQ-15400>

When a call is received over a trunk group with the “unconditional connecting network access recording” option on (described in <REQ-10100>), a Connecting Network Access record shall be generated with BAF Call Type Code 720 and using BAF Structure Code 0625. The Connecting Network Access record shall be populated as described in <REQ-15600>.

When the incoming CNA call results in a Number Services or T1.667-1999 Toll Free query (e.g. called 800/888 number) the CNA record shall be generated in addition to any AMA records generated for the Toll Free query. The CNA record shall be generated with BAF Call Type Code 720 and using BAF Structure Code 0625. The terminating number fields (BAF Table 15, 16, and 17) of the CNA record shall be populated with the dialed Toll Free number (e.g. 800/888 number) received over the incoming trunk group. The remainder of the CNA record shall be populated as described in <REQ-15600>.

If an NP query is performed following a Number Services or T1.667-1999 Toll Free query, the resulting terminating party LNP Module shall be appended to the Toll Free AMA record, as the Toll Free AMA record is the record applicable to the “pre-NP query” call leg.

<End of REQ-15400>

<REQ-15500>

When the call incoming to the switch is received over a trunk group with the “limited connecting network access recording” option on (as described in <REQ-10100>, the Connecting Network Access record shall be generated only when the recording switch performs a NP query for the incoming call, with the following two exceptions:

This “limited connecting network access recording” option shall NOT apply when a switch performs an NP query following call forwarding or other forms of call re-direction including redirection via a T1.667-1999 trigger (i.e. no CNA record should be generated when the called party number is changed via call forwarding, call re-direction, or T1.667-1999 trigger prior to the switch performing an NP query.)

The “limited connecting network access recording” option shall NOT apply when a switch performs a T1.667-1999 Toll Free or Number Services (e.g. 800/888) query prior to performing the NP query (note: in this case the terminating party LNP Module will be appended to any AMA record made for the T1.667-1999 or Number Services query).

When generated according to the conditions or exceptions described above for the “limited connecting network access recording” option, the CNA record shall be generated with BAF Call Type Code 720 and using BAF Structure Code 0625. The CNA record shall be populated as described in <REQ-15600>.

<End of REQ-15500>

<REQ-15600>

For the Connecting Network Access record (CTC 720) BAF Structure Code 0625 shall be populated as follows:

- a) Call Type (BAF Table 1) - BAF Call Type Code 720.
- b) Study Indicator (BAF Table 8) - character 6 shall be set to indicate “no originating number” (value 1) when neither ANI information nor trunk group “billing number” is available for the call. Otherwise, this indicator shall be populated per existing rules.
- c) Originating NPA & Originating Number (BAF Tables 13 & 14) -

- When the “record billing number” option described in <REQ-10400> is active, then BAF Tables 13 and 14 of the BAF CTC 720 record shall be populated with the provisioned billing number. If this option is ON and no billing number is available, this field shall be filled with zeroes.
 - When the “record billing number” option described in <REQ-10400> is inactive, then BAF Tables 13 and 14 of the BAF CTC 720 record shall be populated as specified in table 11 below. If table 11 below indicates that the provisioned billing number is to be recorded and no billing number is available, this field shall be filled with zeros.
- d) Overseas Indicator, Terminating NPA & Terminating Number (BAF Tables 15, 16 & 17) - record the Dialed Number (not an LRN).
- e) IC/INC Prefix (BAF Table 57) - record the interconnecting network identification code assigned to the incoming trunk or trunk group as described in <CR-10300>. If none is assigned, then record the default value of ‘0000’ (i.e. unknown interconnecting network). For both situations, character 5 shall be set to a value of ‘9’.
- f) Trunk Group Number (BAF Table 83) - records the number of the incoming trunk and the Trunk Group Signaling Type indicator as shown in table 10 below. When the CNA recording switch is the donor switch for the called DN, and when an NP query is performed by the donor switch the Trunk Group Signaling Type indicator shall be coded according to <REQ-16000>.
- g) Routing Indicator (BAF Table 59) - records a value of ‘1’ (“tandem”) when the call tandems the recording switch, and a value of ‘0’ (“Direct”) when the call terminates to a line or private trunk group on the switch. However, when the CNA recording switch is the donor switch for the called DN and when the donor switch performs an NP query the Routing Indicator shall be coded according to <REQ-16000>.
- h) Dialing and Presubscription Indicator (BAF Table 85) - records a value of ‘8’ (“no CAC dialed, station not presubscribed, no presubscription indication”), since this field is not applicable for CNA records.

Those fields that are not listed above shall be populated as they would be for non-CNA records recorded using BAF Structure Code 0625.

Table 10 CNA Record Trunk Group Signaling Type

Value	CNA Record Interpretation
1	Non-SS7 Direct Trunk Group (recording switch is terminating EO)
2	Non-SS7 Incoming Trunk Group, Non-SS7 Outgoing Trunk Group (recording switch is Tandem)
3	SS7 Direct Trunk Group (recording switch is Terminating EO)
4	SS7 Incoming Trunk Group, SS7 Outgoing Trunk Group (recording switch is Tandem)
5	Non-SS7 Incoming Trunk Group, SS7 Outgoing Trunk Group (recording switch is Tandem)
6	SS7 Incoming Trunk Group, Non-SS7 Outgoing Trunk Group (recording switch is Tandem)
7	not used
8	not used
9	Signaling Type not specified

Table 11 Originating NPA & Number for CNA Records (CTC 720) [Note 1]

Case	Populated in Incoming SS7 IAM	Orig. No. in CTC 720 Record
1	No CPN, No ChN, No RI	Provisioned per-trunk group Billing Number
2	No CPN, No ChN, RI	RN if present, otherwise OCN if present, otherwise Provisioned per-trunk group Billing Number
3	CPN, No ChN, No RI	CPN
4	CPN, No ChN, RI	RN if present, otherwise OCN if present, otherwise Provisioned per-trunk group Billing Number
5	No CPN, ChN, <i>RI</i>	ChN (Note 2)
6	CPN, ChN, <i>RI</i>	ChN (Note 2)
7	All MF signaling conditions	Provisioned per-trunk group Billing Number

NOTE 1 - IAM = Initial Address Message, CPN = Calling Party Number, ChN = Charge Number, OCN = Original Called Number, RN = Redirecting Number, RI = ISUP Redirection Information Parameter.

NOTE 2 - Italics indicate that the presence or absence of RI is irrelevant in determining the population rules for Tables 13 and 14.

Receipt of any other combination of parameters (e.g., OCN without RI) is unexpected according to ANSI T1.113-2000 procedures and shall be handled by populating the Originating NPA and Originating Number fields with the provisioned per-trunk group billing number.

<End of REQ-15600>

<REQ-15700>

When the “CNA Module 164 –Chargeable Account Number” option (described in <REQ-10500>) is active and at least one of ChN, CPN, RN or OCN is received, the switch shall append BAF Module 164 to the CNA record. The Number field (BAF Table 126) and Number Identity field (BAF Table 76) within BAF Module 164 shall be populated as specified in table 12.

Table 12 Population of Number field (BAF Table 126) and Number Identity field (BAF Table 76) in BAF Module 164 for the "CNA Module 164 – Chargeable Account Number" Option (Note 1)

Case	Populated in Incoming SS7 IAM	Number field (BAF Table 126) in BAF Module 164	Number Identity field (BAF Table 76) in BAF Module 164
1	No CPN, No ChN, No RI	No BAF Module 164	Not applicable
2	No CPN, No ChN, RI	RN if present, otherwise OCN	RN = 6 (Redirecting Number); OCN = 7 (Original Called Number)
3	CPN, No ChN, No RI	CPN	3 (Originating CPN)
4	CPN, No ChN, RI	RN if present, otherwise OCN	RN = 6 (Redirecting Number); OCN = 7 (Original Called Number)
5	No CPN, ChN, RI	ChN (Note 2)	1 (Originating ANI)
6	CPN, ChN, RI	ChN (Note 2)	1 (Originating ANI)

NOTE 1 - IAM = Initial Address Message, CPN = Calling Party Number, ChN = Charge Number, OCN = Original Called Number, RN = Redirecting Number, RI = ISUP Redirection Information Parameter.

NOTE 2 - Italics indicate that the presence or absence of RI is irrelevant in determining the population rules for BAF Table 126.

Receipt of any other combination of parameters (e.g., OCN without RI) is unexpected according to ANSI T1.113-2000 procedures and shall be handled by not generating the BAF Module 164.

<End of REQ-15700>

<CR-15800>

When the “CNA Module 164 - CPN” option (described in <CR-10600>) is active and CPN is received, the switch shall append BAF Module 164 to the CNA record. The Number field (BAF Table 126) within BAF Module 164 shall be populated with the received CPN.

When CPN is received, and thus BAF Module 164 is generated, the Number Identity field (BAF Table 76) of BAF Module 164 shall be populated with “Originating CPN” (value 3).

If no CPN is received, “CNA Module 164 - CPN” option shall not generate BAF Module 164.

NOTE - If a service provider enables both the CNA Module 164 – Chargeable Account Number option and the CNA Module 164 – CPN option, then two 164 modules could be appended to a single CNA record. It is possible that in some instances, both the E.164 Modules will contain the same CPN data.

<End of CR-15800>

5.5.4.4 Rules for Populating Terminating Access Records

<REQ-15900>

When a switch receives an SS7 ISUP IAM with the Ported Number Translation indicator in the FCI parameter indicating that an NP query was performed at a previous switch and containing the

original Dialed DN in a GAP, and if a terminating access record (e.g. CTC119, CTC066, or CTC720) is recorded by the switch, the GAP information shall be used to populate the Terminating NPA and Terminating Number fields of the terminating access record. The LRN in the Called Party Number parameter shall not be used in these fields.

<End of REQ-15900>

<REQ-16000>

When a donor switch receives a call from an from an interconnecting network (e.g., IC, INC, or CNA) either over a non-SS7 trunk, or without an indication in the IAM Forward Call Indicators parameter of “number translated”, and the donor switch performs an NP query for the call and generates an IC, INC, or CNA terminating exchange access AMA record (e.g. CTC119, CTC 135, or CTC 720); then the Routing Indicators field (BAF Table 59) shall be coded as direct (value 0), and the Trunk Group Signaling Type Indicator subfield (BAF Table 83) shall be coded as either “Non-SS7 Direct Trunk Group” (value 1) or “SS7 Direct Trunk Group” (value 3) as appropriate for the incoming trunk type. This encoding shall be used regardless of whether or not the call is subsequently re-routed to a recipient switch.

For calls received from the interconnecting network marked with an indication of “number translated”, or for calls for which the AMA recording switch is not the donor switch, the encoding rules in Telcordia Technologies GR-1083-CORE Sections 5.4.5 and 5.4.4 for both the Routing Indicators field (BAF Table 59) and the Type of Carrier Call subfield (BAF Table 83) shall be followed in generating the terminating exchange access AMA record.

<End of REQ-16000>

5.5.4.5 Rules for Busy and Unanswered Call Recording

<REQ-16100>

When the office data controls for NP busy or unanswered call recording described in <REQ-10900> are active, the switch shall generate an AMA record for any call for which answer supervision was not received. The call record generated shall use the same BAF Call Type Code, BAF Structure Code, and appended LNP module(s) that would have been generated had the call completed. This includes BAF Call Type Code 721 AMA records when the option described in <REQ-10700> is on.

The following is a partial list of originating BAF Call Type Codes: CTC001 Detailed Message Rate, Timed, with MBI; CTC002, Message Rate, Timed, with MBI; CTC003 Detailed Message Rate, Untimed, with MBI; CTC004 Message Rate, Untimed, with MBI; CTC005 Detailed Message Rate, Timed, No MBI; CTC006 Station Paid, CTC038 Orig. Integrated Multiple Access Switch Service, CTC063 Cellular Mobile Carrier - Type 1 or 2B (Originating), CTC064 Cellular Mobile Carrier - Type 2A (Originating), CTC110 Originating InterLATA Station Paid, CTC111-CTC114 InterLATA WATS, CTC117 InterLATA CSDC, CTC134 Originating FG-B, CTC139 Carrier Identified CAMA InterLATA, CTC141 IC Number Service Call, CTC142 LEC Number Services, CTC173 Private Virtual Network Non-SSP End Office, CTC263 Originating access to IEC Virtual Network, and CTC506 800 Calls from Public Stations at NON-SSP End Offices, and CTC721 Default Local Number Portability.

Telcordia Technologies GR-1100-CORE (Division 4, Call Types) should be consulted for a more comprehensive list of BAF Call Type Codes.

<End of REQ-16100>

<REQ-16300>

When the switch can determine and record a unique indication of unanswered, busy or other call conditions, the switch shall continue to do so when an AMA record is generated as described in <REQ-016100>. Otherwise, the switch shall record an indication of “unanswered”.

Some record structures do not record a unique value for busy condition; in such cases the switch shall record an unanswered value in AMA records made for busy condition (e.g. BAF Table 9 “Called Party Off-hook Indicator” = Called Party Off-hook Not Detected (i.e., unanswered) in BAF Structure Code 0001). However, since BAF Structure Codes 0220 and 0221 do record unique values for unanswered and busy conditions, the switch shall record the unique values if the existing switch criteria make that distinction.

<End of REQ-16300>

5.5.5 Administrative Messages

<REQ-16400>

With respect to the T1.667-1999 Test Query capability, operational user can initiate an NP query; however, the generated "Ported Number" GAP and FCI values need not be displayed following the test query. The test query for NP triggers must route the query to the appropriate NPDB.

<End of REQ-16400>

The following tag identifies an additional maintenance output message required to identify NPDB errors.

<REQ-16500>

The switch shall provide notification to the operational user for NP calls when the switch detects its own LRN but the DN is not allocated. The notification shall include, if available, the calling party, called party, JIP, and the LRN. The call shall be cleared using existing ISUP call procedures and will use ANSI cause 26 - “Misrouted call to a ported number”. This notification does not apply to DNs marked as “NP-Reserved”.

<End of REQ-16500>

A trouble report (e.g., a machine-detected interoffice irregularity report) details an ineffective switching attempt that was detected by a reporting office. The reporting office can be either the originating, the intermediate, or the terminating office involved in the call.

<REQ 16600>

For calls involving an IAM containing a ported-number GAP, any trouble report shall provide the contents of the GAP (the dialed digits) and the contents of the CdPN (the LRN).

<End of REQ-16600>

5.5.6 Maintenance Requirements

No new requirements have been identified.

5.5.7 Initialization and Recovery Requirements

No new requirements have been identified.

5.5.8 Capacity, Performance and Reliability Requirements

No new requirements have been identified.

5.5.9 Subscriber Limitations and Restrictions

Except where noted in this technical requirements document, switch features function transparently on calls to/from ported and non-ported numbers from a subscriber's perspective.

Annex A
(informative)

A Local Number Portability Modules and Associated BAF Tables

BAF Module 720 is the LNP Module required by this document. BAF Module 719 is conditionally required, as per <CR-10000>, if Module 720 is not used. A switch may record either Module 720 or Module 719, but not both. Module 719 omits BAF Tables 732 and 733, which are not currently in use. Recording of Module 720 or Module 719 is described in requirement <REQ-11300>.

Table 13 Local Number Portability (LNP) Module (BAF Module Code 720)

Information	Table #	Number of Characters
Module Code (AAA)	88	4 (BCD)
Party Identifier	730	4 (BCD)
Location Routing Number (LRN)	731	12 (BCD)
Service Provider Identity	732	10 (BCD)
Location	733	16 (BCD)
Supporting Information	734	8 (BCD)

This module is used to convey information pertinent to rating and billing of calls to and/or from ported numbers in environments with Number Portability (NP). BAF Module 720 is formatted as specified in Telcordia Technologies GR-1100-CORE (Division 5. BAF Modules).

Table 14 Local Number Portability (LNP) Module (BAF Module Code 719)

Information	Table #	Number of Characters
Module Code (AAA)	88	4 (BCD)
Party Identifier	730	4 (BCD)
Location Routing Number (LRN)	731	12 (BCD)
Supporting Information	734	8 (BCD)

This module is used to convey information pertinent to rating and billing of calls to and/or from ported numbers in service provider portability environments. BAF Module 719 is formatted as specified in Telcordia Technologies GR- 1100-CORE (Division 5 BAF Modules).

Table 15 BAF Table 730 Party Identifier

BCD Character	Meaning
1-3	001 = Originating party directory number data
	002 = Terminating party directory number data
	003 = Billing party directory number data
	004 = Aggregate/Feature record directory number data
	999 = Unknown
4	SIGN (Hex. "C")

This field identifies the directory number reference of the party with which this module is associated in the body of the accompanying BAF Structure.

- “001” indicates that the data included in the LNP Module refers to the originating party.
- “002” indicates that the data included in the LNP Module refers to the terminating party.
- “003” indicates that the data included in the LNP Module refers to the billing party. This value would be used by an Operator Service System (OSS) that provides Alternate Billing Services. Value “003” is used if the OSS generates an LNP Module for a “bill-to-third” or line-based calling card call.
- “004” indicates that the data included in the LNP Module refers to the party associated with the directory number in an aggregate or feature billing record.
- “999” indicates that the AMA system does not know which of the preceding parties should be associated with the LNP Module.

Table 16 BAF Table 731 Location Routing Number (LRN)

BCD Character	Meaning
1	0 (Constant)
2-11	Location Routing Number (NPA-NXX-XXXX)
12	SIGN (Hex. "C")

If used, this field identifies the switching entity that provides service to the party identified in the Party Identifier field (BAF Table 730). The identity is a Location Routing Number (LRN). It is identified in terms of BCD representation of a 10-digit decimal LRN whose source is indicated in the LRN Source Indicator of the Supporting Information field (BAF Table 734).

Some LRN sources may provide the LRN in terms of an NPA-NXX sextet followed by a 4-digit pseudo-line number. Other sources may provide the LRN in terms of an NPA-NXX sextet only. In this case, the four (4) right-most (e.g. least significant) digits (a.k.a. the line number digits) of the LRN in this table are zero (0) filled. The LRN Source Indicator of the Supporting Information field (BAF Table 734) may be used to distinguish between these cases.

If an LRN is not available due to an error encountered in querying an NPDB, this field should be filled with Hexadecimal-F in accordance with the BAF fill procedures as described in GR-1100-CORE, Section 1.4.2.2, and the appropriate Query Status Indicator shall be set in the Supporting Information field (Table 734).

If this field is not used, or is not applicable, it should be filled with Hexadecimal-F in accordance with the BAF fill procedures as described in GR-1100-CORE, Section 1.4.2.2.

Table 17 BAF Table 732 Service Provider Identity

BCD Character	Meaning
1	0 (Constant)
2-9	Service Provider Identity
10	SIGN (Hex. "C")

If used, this field identifies the entity that provides service to the party identified in the Party Identifier field (BAF Table 730). A service provider is identified in terms of the BCD representation of an 8-digit number.

If this field is not used or is not applicable, each of the 10 character positions shall be populated with Hex.-F.

In the future, information supporting the use of this field may be provided in one or more of the character positions in the Supporting Information field (BAF Table 734) that are currently reserved for future use.

Table 18 BAF Table 733 Location

BCD Character	Meaning	
1-3	Location Type	001 = V&H Coordinates 002 = 5 digit U.S. Zip Code 003 = 9 digit U.S. Zip Code 004 = Canadian Post Code 005 = Longitude & Latitude 999 = Unknown
4-15	Location	
16	SIGN (Hex. "C")	

If used, this field identifies a location in terms of the BCD representation of a 12-digit number. The location's type (e.g. V&H coordinates or Zip Code) is indicated in characters 1-3. The actual location is populated in characters 4-15. Population rules for each location type are specified below.

If the location type is "001", the location is given by V&H coordinates. In this case, the 12-digit Location (character positions 4-15) is populated as two 6-digit fields, one for the V coordinate and one for the H coordinate. The V coordinate is right-justified in positions 4-9, and any unused or insignificant digits are padded with zero (0). The H coordinate is right-justified in positions 10-15, and any unused or insignificant digits are padded with zero (0).

If the location type is "002", the location is given by a 5-digit U.S. Zip Code. It is populated in positions 11-15. Positions 4-10 are padded with zero (0).

If the location type is "003", the location is given by a 9-digit U.S. Zip Code. It is populated in positions 7-15. Positions 4-6 are padded with zero (0).

If the location type is "004", the location represents a 6-character Canadian Postal Code. Canadian Postal Codes have the format ANA NAN, where A is an alphabetic character, and N is a decimal digit. Since this field only captures digits, the alphas in a Canadian Postal Code must be represented by decimal codes. The blank is ignored. The coding scheme adopted is the same used in the "Planet Code" scheme informally agreed to by the U.S. and Canadian postal services. In this scheme, the 9 sequential letters A through I are represented by sequential numerical values from 11 to 19, the letters J through R are represented by the numbers 21 through 29, and the letters S through Z are represented by the numbers 31 through 38. In this manner, the 6-character Canadian Postal Code is represented by a 9-digit number in which digits 1-2, 4-5, and 7-8 are coded letters, and digits 3, 6, and 9 are uncoded digits.

The coded 6-character Canadian Postal Code is populated in positions 7-15. Positions 4-6 are padded with zero (0).

As an example of how a 6-character Canadian Postal Code is represented for this field, consider the code K1J 8J1. It would be represented as the 9-digit number 221218211. In this number, digits 1-2 (22), 4-5 (21), and 7-8 (21) code the letters K, J, and J of the example. Observe that the blank has been ignored. The 15 data characters of the Location field would be populated with the BCD representation of 004000221218211. The sign character of the field would be populated with Hex.-C.

If the location type is "005", the location is given by north geographic latitude and west geographic longitude. In this case, the 12-digit Location is populated as two 6-digit fields, one for the north latitude coordinate and one for the west longitude coordinate. The latitude and longitude coordinates are each expressed as 6-digit numbers consisting of three places for degrees, two places for minutes, and one place for tenths-of-minutes. The 12-digit Location is populated as follows for location type "005":

- Characters 4-6 indicate the degrees portion of the north latitude coordinate (right-justified with any insignificant positions padded with zero (0))
- Characters 7-8 indicate the minutes portion of the north latitude coordinate (right-justified with any insignificant positions padded with zero (0))
- Character 9 indicates the tenths-of-minutes portion of the north latitude coordinate
- Characters 10-12 indicate the degrees portion of the west longitude coordinate (right-justified with any insignificant positions padded with zero (0))
- Characters 13-14 indicate the minutes portion of the west longitude coordinate (right-justified with any insignificant positions padded with zero (0))
- Character 15 indicates the tenths-of-minutes portion of the west longitude coordinate

If the location type is "999", the location type is unknown.

If this field is not used or is not applicable, it should be filled with Hexadecimal-F in accordance with the BAF fill procedures as described in GR-1100-CORE, Section 1.4.2.2.

In the future, information supporting the use of this field may be provided in one or more of the currently reserved characters in the Supporting Information field (BAF Table 734).

Table 19 BAF Table 734 Supporting Information

BCD Character	Meaning
1	LRN Source Indicator 1 = NP Database 2 = Switching system data 3 = Incoming Signaling 9 = Unknown
2-3	Query Status Indicator 01 = Successful Query 02 = No query response message received 03 = T1.667-1999 Continue or Authorize_Termination message received as response 04 = Protocol Error in received response message 05 = Error detected in response data 06 = Query rejected 09 = No query done 99 = Query unsuccessful, reason unknown
4	Reserved for Future use (Constant = 0)
5	Reserved for Future use (Constant = 0)
6	Reserved for Future use (Constant = 0)
7	Reserved for NP Service Provider use (Constant = 0)
8	SIGN (Hex. "C")

This field is used in the LNP Module to provide information in support of interpreting and parsing the Location Routing Number (LRN) field (BAF Table 731).

The supporting information is provided in characters 1-5 as follows:

- Character 1 identifies the source of the LRN populated in the LRN field (BAF Table 731). Value “1” indicates that the LRN was obtained from an NPDB. Value “2” indicates that the LRN was

obtained from switching system data. Value "3" indicates that the LRN was obtained from an incoming signaling message. In this case, the four (4) right-most (e.g. least significant) digits (a.k.a. line number digits) of the LRN in the Location Routing Number field (BAF Table 731) are zero (0) filled by the AMA system. Value "9" indicates that the LRN's source is not known.

- Characters 2-3 identify the result of the status of the query that produced the LRN that is populated in the Location Routing Number field (BAF Table 731). Value "01" indicates a successful query. Values "02" through "06" indicate an unsuccessful query and give the specific reason why the query was not successful. Value "09" indicates that no NP query was performed to get the data in the LRN field (BAF Table 731). Value "99" indicates that the query was unsuccessful, but that the reason is not known.
- Characters 4-6 are reserved for future use. Value "0" is the default value recorded for reserved characters 4-6.
- Character 7 is reserved for use by NP service providers. It is not administered by Telcordia Technologies, except for the stipulation that value "0" is the default value recorded if the character is not used.

Annex B
(informative)

B Areas for Further Study

This annex provides a list of areas for further study:

1. Differential use of rate centers in billing between wireless and wireline has raised policy issues with respect to wireless/wireline porting. Depending on the resolution of these policy issues, there may be technical impacts on this document.
2. Double Tandem: Permitting the double tandeming of calls received at an inappropriate tandem switch could result in the need for modifications to AMA recordings and/or data exchange records (EMR/EMI format) to capture the fact that multiple tandems are involved in the routing of a particular call. <REQ-04240> – Issue 2 now allows call completion to occur. The impacts on billing were studied by the OBF (Issue 1764).