Tekelec EAGLE® 5

Numbering Plan Processor (NPP) Overview

910-5797-001 Revision C

September 2010

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1

Introduction

Topics:

This chapter contains a brief description of the Numbering Plan Processor (NPP). The contents include sections about the manual scope, audience, and organization; how to find related publications; and how to contact Tekelec for assistance.

Introduction

NPP provides a generic software process used to simplify provisioning of complex numbering plans and execution of digit string manipulation and formatting.

Digit string manipulation common to most features can be organized into three categories:

- Digit string filtering, to select or bypass processing of the string
- Digit string conditioning, to ensure that the string is in International format before RTDB lookup
- Digit string formatting, using provisioned option values and any available results from the RTDB lookup

To address digit string manipulation needs, NPP provides:

- A consistent and flexible interface for number string conditioning and formatting
- A flexible and precise interface for the execution of specific feature logic

The ability to customize feature operation to specific numbering plan requirements enables

- Simple corrective dialing
- Number conditioning
- Operator-specific code deletion and insertion
- Flexible arrangement of numbering plan tokens

Scope and Audience

Numbering Plan Processor (NPP) Overview is an introductory and conceptual document for the Numbering Plan Processor. Component definitions, fundamentals, key terms and phrases, and a basic working knowledge of NPP are provided.

This manual describes NPP functions, NPP operation, and commands used for NPP provisioning of criteria and software parameters. Some "examples" scenarios are provided for NPP provisioning and for validating the provisioning. Details of the use of NPP for specific features are described in the Feature Manual for each feature.

Audience

This overview document is intended for EAGLE 5 ISS users who will benefit from an overall understanding of NPP and the concept of NPP relative to EAGLE 5 ISS features. Users of this document are expected to have a working knowledge of telecommunications in general and EAGLE 5 ISS specifically.

Manual Organization

This document is organized into the following chapters:

- *Introduction*, contains a brief description of the Numbering Plan Processor (NPP). The contents include section about the manual scope, audience, and organization; how to find related publications; and how to contact Tekelec for assistance.
- *NPP Overview*, describes the overall structure and operation of NPP.
- *Filters* describes how to define and use Filters to identify incoming digit strings for NPP processing.
- *Action Sets*, describes the components and functions of Action Sets, the relationship between the components of an Action Set, and execution of the components of an Action Set.
- *Rules and Service Rule Sets*, describes how Filters and Action Sets combine to form Rules, and how Rules form Service Rule Sets.
- *NPP Provisioning and NPP Test Service*, describes commands and procedures used for provisioning NPP components, and describes the use of the NPP Test service to define and validate Service Rule Sets without affecting live traffic.

Related Publications

For information about additional publications that are related to this document, refer to the *Related Publications* document. The *Related Publications* document is published as a part of the *Release Documentation* and is also published as a separate document on the Tekelec Customer Support Site.

Documentation Availability, Packaging, and Updates

Tekelec provides documentation with each system and in accordance with contractual agreements. For General Availability (GA) releases, Tekelec publishes a complete EAGLE 5 ISS documentation set. For Limited Availability (LA) releases, Tekelec may publish a documentation subset tailored to specific feature content or hardware requirements. Documentation Bulletins announce a new or updated release.

The Tekelec EAGLE 5 ISS documentation set is released on an optical disc. This format allows for easy searches through all parts of the documentation set.

The electronic file of each manual is also available from the *Tekelec Customer Support* site. This site allows for 24-hour access to the most up-to-date documentation, including the latest versions of Feature Notices.

Printed documentation is available for GA releases on request only and with a lead time of six weeks. The printed documentation set includes pocket guides for commands and alarms. Pocket guides may also be ordered separately. Exceptions to printed documentation are:

- Hardware or Installation manuals are printed without the linked attachments found in the electronic version of the manuals.
- The Release Notice is available only on the Customer Support site.

Note: Customers may print a reasonable number of each manual for their own use.

Documentation is updated when significant changes are made that affect system operation. Updates resulting from Severity 1 and 2 Problem Reports (PRs) are made to existing manuals. Other changes are included in the documentation for the next scheduled release. Updates are made by re-issuing an

electronic file to the customer support site. Customers with printed documentation should contact their Sales Representative for an addendum. Occasionally, changes are communicated first with a Documentation Bulletin to provide customers with an advanced notice of the issue until officially released in the documentation. Documentation Bulletins are posted on the Customer Support site and can be viewed per product and release.

Documentation Admonishments

Admonishments are icons and text throughout this manual that alert the reader to assure personal safety, to minimize possible service interruptions, and to warn of the potential for equipment damage.

Table 1: Admonishments

	DANGER: (This icon and text indicate the possibility of *personal injury*.)
	WARNING: (This icon and text indicate the possibility of *equipment damage*.)
	CAUTION: (This icon and text indicate the possibility of *service interruption*.)

Customer Care Center

The Tekelec Customer Care Center is your initial point of contact for all product support needs. A representative takes your call or email, creates a Customer Service Request (CSR) and directs your requests to the Tekelec Technical Assistance Center (TAC). Each CSR includes an individual tracking number. Together with TAC Engineers, the representative will help you resolve your request.

The Customer Care Center is available 24 hours a day, 7 days a week, 365 days a year, and is linked to TAC Engineers around the globe.

Tekelec TAC Engineers are available to provide solutions to your technical questions and issues 7 days a week, 24 hours a day. After a CSR is issued, the TAC Engineer determines the classification of the trouble. If a critical problem exists, emergency procedures are initiated. If the problem is not critical, normal support procedures apply. A primary Technical Engineer is assigned to work on the CSR and provide a solution to the problem. The CSR is closed when the problem is resolved.

Tekelec Technical Assistance Centers are located around the globe in the following locations:

Tekelec - Global

Email (All Regions): support@tekelec.com

- **USA and Canada**

  Phone:

  1-888-FOR-TKLC or 1-888-367-8552 (toll-free, within continental USA and Canada)

  1-919-460-2150 (outside continental USA and Canada)

  TAC Regional Support Office Hours:

  8:00 a.m. through 5:00 p.m. (GMT minus 5 hours), Monday through Friday, excluding holidays

- **Central and Latin America (CALA)**

  Phone:

  USA access code +1-800-658-5454, then 1-888-FOR-TKLC or 1-888-367-8552 (toll-free)

  TAC Regional Support Office Hours (except Brazil):

  10:00 a.m. through 7:00 p.m. (GMT minus 6 hours), Monday through Friday, excluding holidays

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  - **Brazil**

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  - **Colombia**

    Phone:

    01-800-912-0537

  - **Dominican Republic**

    Phone:

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    001-888-367-8552

  - **Peru**

    Phone:

    0800-53-087

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0800-176-6497

- **Europe, Middle East, and Africa**

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- **Software Solutions**

Phone:

+33 3 89 33 54 00

- **Asia**

- **India**

Phone:

+91 124 436 8552 or +91 124 436 8553

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- **Singapore**

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+65 6796 2288

TAC Regional Support Office Hours:

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Emergency Response

In the event of a critical service situation, emergency response is offered by the Tekelec Customer Care Center 24 hours a day, 7 days a week. The emergency response provides immediate coverage, automatic escalation, and other features to ensure that the critical situation is resolved as rapidly as possible.

A critical situation is defined as a problem with an EAGLE 5 ISS that severely affects service, traffic, or maintenance capabilities, and requires immediate corrective action. Critical problems affect service and/or system operation resulting in:

- A total system failure that results in loss of all transaction processing capability
- Significant reduction in system capacity or traffic handling capability
- Loss of the system's ability to perform automatic system reconfiguration
- Inability to restart a processor or the system
- Corruption of system databases that requires service affecting corrective actions
- Loss of access for maintenance or recovery operations
- Loss of the system ability to provide any required critical or major trouble notification

Any other problem severely affecting service, capacity/traffic, billing, and maintenance capabilities may be defined as critical by prior discussion and agreement with the Tekelec Customer Care Center.

Locate Product Documentation on the Customer Support Site

Access to Tekelec's Customer Support site is restricted to current Tekelec customers only. This section describes how to log into the Tekelec Customer Support site and locate a document. Viewing the document requires Adobe Acrobat Reader, which can be downloaded at www.adobe.com.

1. Log into the *Tekelec Customer Support* site.

   Note: If you have not registered for this new site, click the **Register Here** link. Have your customer number available. The response time for registration requests is 24 to 48 hours.

2. Click the **Product Support** tab.
3. Use the Search field to locate a document by its part number, release number, document name, or document type. The Search field accepts both full and partial entries.
4. Click a subject folder to browse through a list of related files.
5. To download a file to your location, right-click the file name and select **Save Target As**.

Chapter
2

NPP Overview

Topics:

This chapter describes the components of NPP and provides examples and scenarios for using the components in NPP processing..

NPP Overview

EAGLE 5 ISS features and functions (referred to as "calling services") invoke NPP to process an incoming digit string, apply service-specific behaviors based on the digit string, and to produce an outgoing digit string in the desired conditioned format. The features and functions that use NPP and their calling services are listed in *Table 18: NPP Services*.

EAGLE 5 ISS commands provide the ability to provision numbering plan processing criteria to cause digit string conditioning and formatting and specific processing to take place. See *NPP Provisioning and NPP Test Service*.

For an incoming digit string that does not match specified conditioning and formatting criteria, NPP allows the original incoming digit string to pass through the system without numbering plan processing.

NPP is a rules-based engine providing the ability to specify:

- **Action Sets** (consisting of Conditioning Actions for the digit string, Service Actions for feature-specific logic, and Formatting Actions for digit string formatting)
- **Filters** (to classify a digit string based on NAI, digit string patterns, and length of digit string)
- **Rules** (to associate a Filter with an Action Set)
- **Service Rule Set** (a set of Rules for a specific service)

The high-level NPP call flow for an incoming number and an outgoing number is:

1. NPP receives the incoming message as an incoming digit string, with an NAI.
2. NPP recognizes the NAI and selects a Rule based on the incoming digit string and a corresponding filter NAI (FNAI) value.
3. NPP executes Conditioning Actions to extract digits from the digit string to be used for Service Actions and Formatting Actions.
4. NPP produces an outgoing digit string to pass back to the calling service or to a specified destination.

Figure 1: NPP Operation Overview shows the high-level events and sequence of NPP operation.

Figure 1: NPP Operation Overview
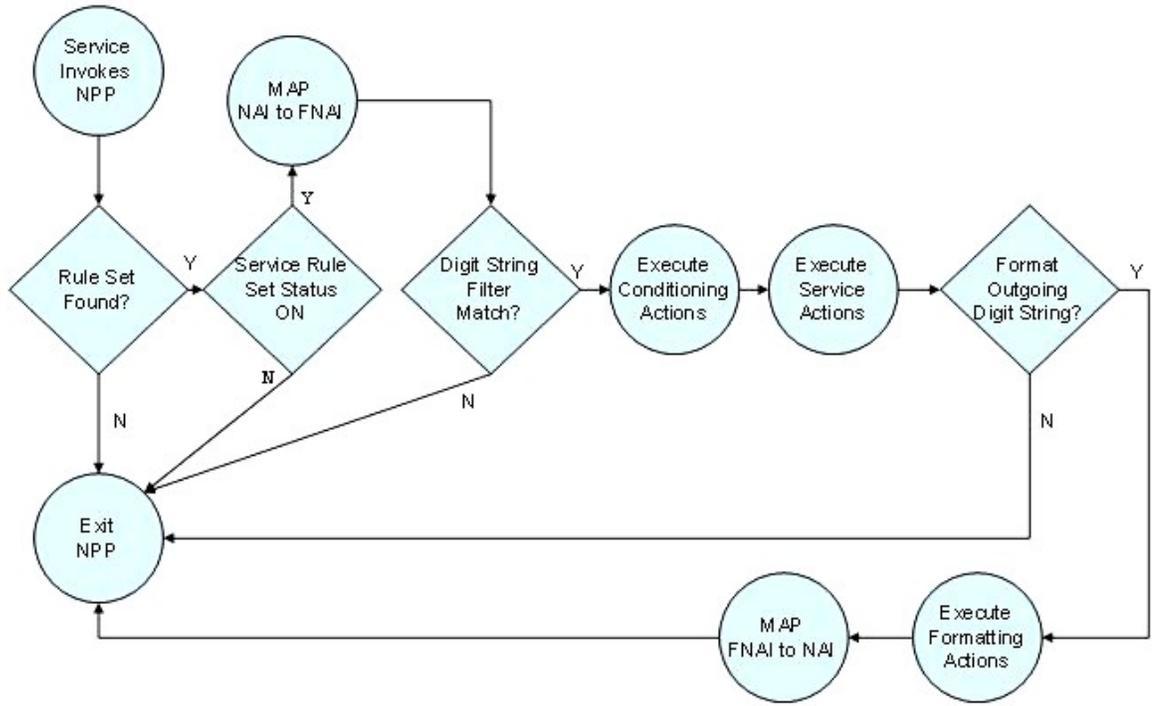
Chapter

3

Filters

Topics:

This chapter provides a high level description of NPP Filters.

When a service calls NPP to process an incoming digit string, an NPP Filter is used to determine that the digit string will be processed by NPP.

Filters

NPP uses Filters to identify incoming digit strings that need NPP processing for a service. When a digit string matches a defined filter, the digit string is processed by NPP. If the digit string does not match a Filter, the digit string exits NPP as it originally entered.

An NPP Filter is composed of the following three components:

- Filter Nature of Address Indicator (FNAI) class - maps to generic (international, national, and unknown) and service-specific NAI values for determining applicable digit string formatting.

- Filter Prefix (FPFX) - Hexadecimal digit string pattern or prefix that can occur at the beginning of an incoming digit string. Can be a wildcard (*) value to indicate that all digits match the Filter. Can contain single digit wildcard characters (?) in any positions except the last digit, to indicate that any digit in that position in the string is a match. See section *Searching NPP Filters with Wildcard Values* for more information about wildcard values.

- Filter Digit Length (FDL) - The number of digits that the incoming digit string must have to match the Filter. Can be a wildcard (*) value to indicate a Filter match for any digit length.

For NPP filter examples and scenarios, see *Filter Examples* and *Filter Search Execution*.

Filter Nature of Address Indicator (FNAI) Class

Many EAGLE 5 ISS protocols infer digit string formatting based on a protocol-specific Nature of Address Indicator (NAI) value. NPP uses this same concept to help isolate digit strings. NPP defines NPP-specific FNAI Classes to which services can map service-specific NAI values.

Services that invoke NPP processing provide an incoming NAI value along with the incoming digit string. NPP maps the incoming service-specific NAI value to an appropriate NPP FNAI Class mnemonic value.

NPP supports six different FNAI Classes:

- NATL (national)
- INTL (international)
- NAI1 (generic1)
- NAI2 (generic2)
- NAI3 (generic3)
- UNKN (Unknown)

The execution of the NAI-to-FNAI Class algorithm is described in *Figure 2: NAI to FNAI Mapping Algorithm*. Any NAI value not mapped to an FNAI Class is interpreted as UNKN (Unknown). If support is not needed for an FNAI Class, the FNAI Class value is NONE.

Figure 2: NAI to FNAI Mapping Algorithm
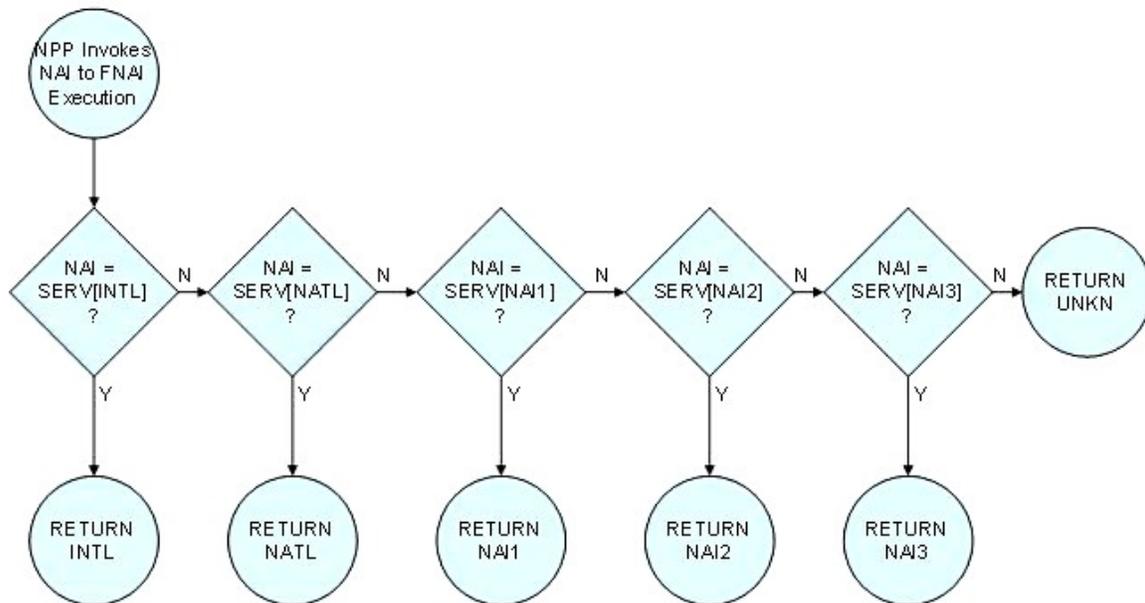
Filter Prefix

Many EAGLE 5 ISS features search for matching digit patterns at the beginning of digit strings to determine if processing is required. NPP provides this function with a Filter Prefix (FPFX).

An FPFX value can be a hexadecimal string of digits that are located at the beginning of an incoming digit string, such as d, 919, 060, or 9090). For example, the incoming digit string 00152558776925 would match a Filter Prefix (FPFX) of 001.

An FPFX value can be a wildcard (*) to match any leading digit string.

An FPFX value can be a series of hexadecimal digits that includes single digit wildcard characters (?) in any positions except the last digit of the string. For example, the incoming digit strings 00152559776925 and 00252559886925 would match a Filter Prefix of 00?525. The total number of single digit wildcard characters used in all of the filters in the Service Rule Set for a service cannot exceed 25.

When the FPFX filter parameter is defined in NPP, the leading incoming digit pattern must match the FPFX filter value for further NPP processing. See *Searching NPP Filters with Wildcard Values* for wildcard descriptions and examples.

Filter Digit Length

NPP provides digit string isolation based on the incoming length of the digit string. The NPP Filter Digit Length (FDL) specifies the number of digits that the incoming digit string must have to match the Filter.

An FDL value can be a wildcard (*) to match a digit string of any length.

Filter Search Execution

NPP uses Filters to identify incoming digit strings that need NPP processing for a service. When a digit string matches a defined Filter, the digit string is processed by NPP. If the digit string does not match a Filter, the digit string exits NPP as it originally entered.

NPP first consider the Filter NAI (FNAI), then Filter Prefix (FPFX), then the Filter Digit Length (FDL) when searching for a Filter match to the incoming digit string.

Table 2: Filter Match Search Order specifies the order in which the matching algorithm searches for a Filter match to the incoming digit string.

Table 2: Filter Match Search Order

Search Order	FNAI [NATL, INTL, UNKN, NA1...3]	FPFX	FDL
1	Specific	Specific	Specific
2	Specific	Specific	Wildcard (*)
3	Specific	Wildcard (*)	Specific
4	Specific	Wildcard (*)	Wildcard (*)

Filter Examples

Table 3: NPP Filter Examples illustrates NPP Filters, some with values for all components and some with wildcard values.

Table 3: NPP Filter Examples

Filter Nature of Address Indicator (FNAI) Class	Filter Prefix (FPFX)	Filter Digit Length (FDL)
INTL	9090	8
INTL	060	12
NATL	*	8
INTL	d	*
INTL	*	*

Filter Nature of Address Indicator (FNAI) Class	Filter Prefix (FPFX)	Filter Digit Length (FDL)
NAI1	919	*
UNKN	*	*
INTL	abc?3	16
INTL	abc?23	*

The following examples illustrate some specific NPP Filter scenarios:

- All standard national calls receive the same handling where NAI=NATL, digits XXXXXXXXXX

  - FNAI = NATL
  - FPFX = *
  - FDL = *

- International calls with International Escape Code where NAI=INTL, digits 011+XXXXXXXXXXXX

  - FNAI = INTL
  - FPFX = 011
  - FDL = *

- Collect calls with Operator Code, Area Code following the Operator Code, NAI=Unknown, digits 'b'+AC+9090+XXXXXXXX

  - FNAI = UNKNOWN
  - FPFX = b (or FPFX = b339090 or FPFX=b349090, and so on -- there are many options for this configuration)
  - FDL = 15

Searching NPP Filters with Wildcard Values

Filters can be defined that have wildcard values for the Filter Prefix (FPFX) value, the Filter Digit Length (FDL) value, or both values.

When the FPFX or FDL value is the wildcard character (*) , the value is considered to be categorically wildcarded; it contains no characters other than the * character.

Filters can be defined with specific digit FPFX values that include one or more of the single digit wildcard character "?" along with hexadecimal digits in the value.

Categorical Wildcarding

There are three search cases where categorical wildcard values are used. In each case the search algorithm considers only NPP Filters that have the wildcard value specified for the Filter criteria. If no specific match is found, NPP then searches the NPP Filters that have FDL=*, then the Filters that have FPFX=*. When searching with wildcard values for FDL or FPFX, NPP considers only the NPP Filters that are provisioned with wildcard values. NPP Filters with specific values and no wildcard values for FDL or FPFX, are not considered during wildcard searches.

Table 5: NPP Filter Search for Categorical Wildcard Example Filters indicates the example Filter that is selected for each Filterer selection scenario shown in *Table 4: NPP Provisioned Filter Examples for Categorical Wildcarding*.

Table 4: NPP Provisioned Filter Examples for Categorical Wildcarding

Provisioned Filter	FNAI	FPFX	FDL	NOTES
1	INTL	abc	16	Specific, Specific, Specific
2	INTL	abc123	16	Specific, Specific, Specific
3	INTL	abc12	*	Specific, Specific, Wildcard
4	INTL	*	16	Specific, Wildcard, Specific
5	UNKN	*	*	Specific, Wildcard, Wildcard

Table 5: NPP Filter Search for Categorical Wildcard Example Filters

Example	Incoming FNAI	Incoming Digit String	Incoming Digit Length	Example Filter Selected
1	INTL	abcdef12345678901	16	1
2	INTL	abc123def12345678	16	2
3	INTL	abc2345678901def	16	1
4	INTL	abc1234567890	13	3
5	INTL	0123456789abcdef	16	4
6	INTL	1234567890abcde	15	5

Single Digit Wildcarding

A Filter Prefix can include single digit wildcard characters (?) in any positions except the last digit of the string. The number of single digit wildcard characters used in all of the filters in the Service Rule Set for a service cannot exceed 25.

Based on the presence of the single digit wildcard value "?" in the Filter Prefix (FPFX), the Filter with the larger number of matching leading digits not involving the "?" wildcard will have priority. If the number of matching leading digits is the same for two Filters, then Filter priorities are established as follows: A non-wildcard digit has the highest priority, followed by the "?" wildcard, with the lowest priority assigned to Filters with no further digits to match.

For example, if two Filters exist with FPFX values of 12345678 and 12?45?78. An incoming digit string of 123456789 would be filtered by FPFX=123456789. An incoming digit string of 12a456789 would be filtered by FPFX=12?4.

indicates the example Rule that is selected for each Filter selection scenario from *Table 6: NPP Provisioned Filter Examples for Single Digit Wildcarding*.

Table 6: NPP Provisioned Filter Examples for Single Digit Wildcarding

Provisioned Filter	FNAI	FPFX	FDL	Notes
1	INTL	abc	16	specific, specific, specific

Provisioned Filter	FNAI	FPFX	FDL	Notes
2	INTL	abc123	16	specific, specific, specific
3	INTL	abc12	*	specific, specific, wildcard
4	INTL	abc?3	16	specific, specific, specific
5	INTL	abc?23	*	specific, specific, wildcard
6	INTL	*	16	specific, wildcard, specific
7	UNKN	*	*	specific, wildcard, wildcard

Table 7: NPP Filter Search for Single Digit Wildcard Example Filters

Example	Incoming FNAI	Incoming Digit String	Incoming Digit Length	Filter Selected
1	INTL	abcdef1234567890	16	1
2	INTL	abc123def4567890	16	2
3	INTL	abc2345678901def	16	4
4	INTL	abc1234567890	13	3
5	INTL	0123456789abcdef	16	6
6	UNKN	1234567890abcde	15	7

Chapter

4

Action Sets

Topics:

This chapter describes the components and functions of an NPP Action Set.

Action Sets

NPP allows customized numbering plan processing behavior to be provisioned as an Action Set. Up to 1024 Actions Sets are supported by an EAGLE 5 ISS.

An Action Set consists of three types of Actions and an outgoing FNAI class:

- **Conditioning Actions** (CAs; up to 12 per Action Set) determine how a digit string is manipulated prior to applying service-specific behavior Digit manipulation includes number conditioning to international format and extraction of digits to use in formatting the outgoing digit string.
- **Service Actions** (SAs; up to 8 per Action Set) determine what service-specific behavior to apply to a digit string (such as corrective dialing and number portability checking).
- **Formatting Actions** (FAs; up to 12 per Action Set), determine how the outgoing digit string is formatted after Service Action execution.
- **Outgoing FNAI Class** (outgoing FNAI or OFNAI ; one per Action Set), setting communicates the NAI of the outgoing digit string to the calling service.

Figure 3: Action and Action Set Relationship shows the relationship between Actions and Action Sets.

Figure 3: Action and Action Set Relationship
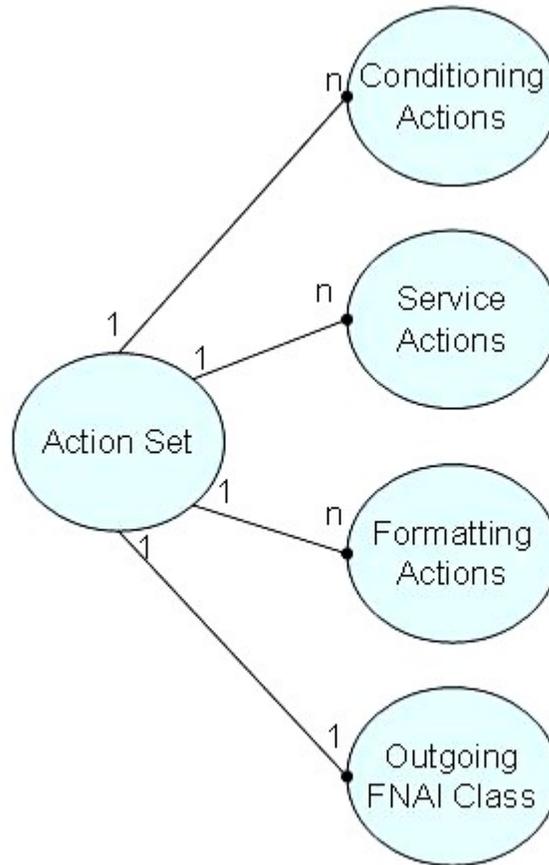
Action Set Examples

Examples of simple NPP Action Sets can be where number portability processing is needed on the following types of calls and all other calls are not subject to the specified number portability processing:

- Properly formatted NATL calls
- Messages with unknown NAI, a National Escape Code of 1, and 10 digits

The Actions for the examples are shown in *Table 8: Action Set Actions Scenarios*:

Table 8: Action Set Actions Scenarios

Filter Nature of Address	Filter Prefix	Filter Digit Length	Conditioning Actions	Service Actions	Format	Outgoing NAI
NATL	*	*	Add Default Country Code	Number portability	RN+DN	NATL

Filter Nature of Address	Filter Prefix	Filter Digit Length	Conditioning Actions	Service Actions	Format	Outgoing NAI
Unknown	1	11	Delete matched prefix, add Default Country Code	Number portability	RN+DN	Incoming

Conditioning Actions

NPP defines a set of Conditioning Actions (CAs) that are available to all NPP services. Conditioning Actions determine how a digit string is manipulated before service-specific behavior is applied to the digit string. The behavior of CAs does not differ between services; however, each service defines which CAs it supports. NPP allows up to 12 CAs per Action Set; certain CAs can occur more than once in an Action Set.

Table 22: Conditioning Actions lists CAs and their purpose.

CAs are executed in the order of the consecutive numbers of the provisioned Conditioning Action parameters, or in the sequence of the values in the CA parameter comma-separated list. Enough Conditioning Actions must be provisioned to process all of the digits in the incoming digit string from the beginning to the end of the string.

CAs determine whether or not digit strings that represent subscriber numbers are in international format. International format is defined as "CC + AC + SN" or "CC + DN" or "ZN" (see *Table 22: Conditioning Actions* for definitions). If a digit string is not in international format, the Conditioning Actions are used to convert the digit string to international format, which is required for performing RTDB lookup.

CAs extract digits from the incoming digit string and assign the digits as values that are later used to format the outgoing digit string.

For filters with FDL=* (wildcard), the associated Conditioning Action group must contain a ZNX, DNX, or SNX Conditioning Action. For filters with specific FDL (Filter Digit Length) values, the associated Conditioning Action group must process the entire number of digits (by either ignoring or processing them).

Conditioning Action Examples

The following examples illustrate simple to more complex Conditioning Action scenarios:

- EXAMPLE 1: Standard national calls all receive the same handling where NAI=NATL, digits XXXXXXXXXX

  To condition this number to international format, the Country Code must be prefixed. The conditioning action (CA) for this is Country Code Default (CCDEF)

  If CCDEF = 55 (for example), and the digit string is 87654321, then the digit string will become 5587654321

    - Filter NAI = national (FNAI = NATL)

- Filter Prefix = wildcard (FPFX = *)
- Filter Digit Length = wildcard (FDL = *)

- EXAMPLE 2: International calls with International Escape Code where NAI = international (INTL), digits 011 + XXXXXXXXXXXX

  It is common that international calls need only to "escape" any service processing. In these cases, no CAs are required.

  - FNAI = INTL
  - FPFX = 011
  - FDL = *

- EXAMPLE 3: Collect calls with Operator Code, Area Code follows the Operator Code, NAI=Unknown, digits 'b' + AC + 9090 + XXXXXXXX

  If the digit string is b33909087654321, FPFX = b339090 is matched. To achieve standard international format, "b" and "9090" must be stripped, Area Code "33" must be placed next to Directory Number "87654321", and the Country Code must be prefixed. The Conditioning Actions for this scenario are shown in *Table 9: Conditioning Actions for Collect Calls with Operator Code* .

  - FNAI = UNKNOWN
  - FPFX = b (or FPFX = b339090 or FPFX = b349090, etc. -- there are many options for this configuration)
  - FDL = 15

Table 9: Conditioning Actions for Collect Calls with Operator Code

Conditioning Action...	Consisting of Formatting Actions...	Resulting Digit String
		[incoming digit string = b33909087654321]
IGN1	[no Formatting Action, just ignore first digit]	33909087654321
AC2	AC =33	909087654321
PFXA4	AC=33, PFXA=9090	87654321
SNZ	AC=33, PFXA=9090, SN=87654321	
CCDEF	AC=33, PFXA=9090, SN=87654321, CC=55	

Conditioning Action Execution

Conditioning Actions process the incoming digit string from the beginning to the end of the string, and extract digits from the string to be used in Service Action execution and Formatting Action execution. All digits must be ignored, assigned as Formatting Action values, or replaced by a Formatting Action value with a provisioned default value.

Conditioning Action execution identifies the digit strings that correspond to the subscriber number in international format, and populates the appropriate Formatting Action values to encode the outgoing digit string. A digit string in international format is passed to each Service Action that is executed for the service.

Service Actions

Service Actions (SAs) determine the EAGLE 5 ISS behavior to apply to a digit string. NPP allows up to 8 SAs to be associated with a single Action Set. Service Actions are provisioned and executed in order of an assigned precedence (see *Service Action Precedence*).

Service Action behavior is determined by the EAGLE 5 ISS feature or function (service) that invokes NPP. The service must provide a Service Action Handler for each Service Action that it supports. Such behavior includes Number Portability Release and Relay, RTDB lookup, simple number substitution, and use of Additional Subscriber Data (ASD) and Generic Routing Number (GRN).

Table 23: Service Actions describes valid Service Actions, the precedence for each Service Action, and EAGLE 5 ISS features and functions that use each Service Action.

Service Action Examples

The following examples illustrate Service Action scenarios:

- Example 1: Standard national calls all receive the same handling; NAI=NATL XXXXXXXXXX

  If number portability service is needed here, then the IDP Relay Service Action can be just CDPNNP.

- Example 2: International calls with International Escape Code; NAI=INTL 011+XXXXXXXXXXX

  This call just wants to "escape" any service processing. There is no Service Action in this rule.

- Example 3: Collect Calls with Operator Code, Area Code in-between; NAI=Unknown 'b'+AC+9090+XXXXXXXX

  For this filter, the desired actions are number portability and forward the message to the Service Creation System (SCS). The Service Actions for TIF are NPRELAY and FWDSCS.

- Example 4: Fraudulent Calls

  The FRAUDCHK Service Action uses the conditioned digit string for the RTDB lookup to determine whether the message Calling Party belongs to the network and to determine whether the call is fraudulent.

- Example 5: Prepaid calls

  The PPRELAY Service Action uses the conditioned digit string for RTDB lookup to determine whether the Calling Party or Called Party is a prepaid subscriber, and for prepaid calls sets the message to be routed to a Prepaid Server.

Service Action Execution

Each service can support one or more Service Actions that can be assigned to the Action Sets in the Service Rule Set for the service.

Each Service Actions performs service-specific behavior for a conditioned digit string that it receives from a Conditioning Action that is executed for the service. The behavior is determined by feature-specific provisioned data and feature-specific logic. NPP verifies that the service status is ON for the calling service before executing Service Actions for the service.

When multiple Service Actions can be associated with an NPP Action Set for a service, the service must define the precedence value for each Service Action that it supports. The precedence determines

the order in which multiple Service Actions will be executed for the service. Service Action precedence is represented by a number between 0 and 100. Higher precedence Service Actions are always executed before lower precedence Service Actions; execution of a lower precedence Service Action ahead of higher precedence Service Action is prevented. Service Actions can be defined with equal precedence. NPP executes Service Actions of equal precedence in the order of the consecutive numbers of the provisioned SAx parameters, or in the sequence of the values in the SA parameter comma-separated list.

NPP processes messages for MO SMS features when the **smsmr** service selector is provisioned. NPP verifies that the required MO SMS feature is enabled and on before executing a Service Action that is provisioned for an MO SMS service. The Service Actions are executed in precedence sequence first for Calling Party numbers (IS41 Original Originating Address digits or GSM MSISDN digits), then for Called Party numbers (IS41 Destination Address or Original Destination Address, or GSM TP-DA digits).

NPP Formatting Action values can be populated during Service Action execution (see *Provisioning Formatting Actions*).

Upon execution completion, the Service Action indicates whether to continue executing another Service Action and whether to execute Formating Actions. The CDIAL Service Action can be provisioned to execute Formatting Actions even when a Service Action indicates that Formatting Action execution should not occur.

Service Action Precedence

Multiple service actions (SAs) can be associated with an NPP Action Set. In order to provide a systematic method for Service Action provisioning and execution, SA precedence value is assigned. Each service defines the order in which SAs are executed. SA execution order follows the defined SA precedence value.

SA precedence is represented by a number between 0 and 100. Higher precedence SAs are always executed before lower precedence SAs; provisioning of a lower precedence SA ahead of higher precedence SA is prevented. SAs can be defined with equal precedence. NPP executes SAs of equal precedence in the order of the consecutive numbers of the provisioned SAx parameters, or in the sequence of the values in the SA parameter comma-separated list.

Table 10: Service Action Precedence Example shows an example group of SAs and their precedence values.

Table 10: Service Action Precedence Example

Example Service Action Name	Precedence	Notes
EXSA1	100	Always executed first regardless of provisioning order
EXSA2	50	Always executed after EXSA1 and prior to EXSA4. EXSA2 and EXSA3 execution order is dependent on the order provisioned.
EXSA3	50	Always executed after EXSA1 and prior to EXSA4. EXSA2 and EXSA3 execution order is dependent on the order

Example Service Action Name	Precedence	Notes
		provisioned in consecutively numbered :sa[x] parameters.
EXSA4	10	Always executed last.

Given the SA precedence values defined in *Table 10: Service Action Precedence Example*, the SA groups defined in *Table 11: Valid Service Action Group Examples* are allowed and the SA groups defined in *Table 12: Invalid Service Action Group Examples* are prevented.

Table 11: Valid Service Action Group Examples

Service Action Group	Validity	Notes
:sa1=EXSA1 :sa=EXSA1	Valid	Single Service Actions always execute in the correct order [100]
:sa1=EXSA2 :sa=EXSA2	Valid	Single Service Actions always execute in the correct order [50]
:sa1=EXSA3 :sa=EXSA3	Valid	Single Service Actions always execute in the correct order [50]
:sa1=EXSA4 :sa=EXSA4	Valid	Single Service Actions always execute in the correct order [10]
:sa1=EXSA1:sa2=EXSA2 :sa=EXSA1,EXSA2	Valid	Service Actions executed in order of precedence [100, 50]
:sa1=EXSA1:sa2=EXSA3 :sa=EXSA1,EXSA3	Valid	Service Actions executed in order of precedence [100, 50]
:sa1=EXSA1:sa2=EXSA4 :sa1=EXSA1,EXSA4	Valid	Service Actions executed in order of precedence [100, 10]
:sa1=EXSA1:sa2=EXSA2:sa3=EXSA3 :sa=EXSA1,EXSA2,EXSA3	Valid	Service Actions executed in order of precedence [100,50,50] – Service Actions of equal precedence execute in the order provisioned (EXSA2 then EXSA3).
:sa1=EXSA1:sa2=EXSA2:sa3=EXSA4 :sa=EXSA1,EXSA2,EXSA4	Valid	Service Actions executed in order of precedence [100,50, 10]

Service Action Group	Validity	Notes
:sa1=EXSA1:sa2=EXSA3:sa3=EXSA2 :sa=EXSA1,EXSA3,EXSA2	Valid	Service Actions executed in order of precedence [100,50,50] – Service Actions of equal precedence execute in the order provisioned (EXSA3 then EXSA2).
:sa1=EXSA1:sa2=EXSA3:sa3=EXSA4 :sa=EXSA1,EXSA3,EXSA4	Valid	Service Actions executed in order of precedence [100,50,10]
:sa1=EXSA1:sa2=EXSA2:sa3=EXSA3:sa4=EXSA4 :sa=EXSA1,EXSA2,EXSA3,EXSA4	Valid	Service a\Actions executed in order of precedence [100,50,50,10] – Service Actions of equal precedence execute in the order provisioned (EXSA2 then EXSA3).
:sa1=EXSA1:sa2=EXSA3:sa3=EXSA2:sa4=EXSA4 :sa=EXSA1,EXSA3,EXSA2,EXSA4	Valid	Service Actions executed in order of precedence [100,50,50,10] – Service Actions of equal precedence execute in the order provisioned (EXSA3 then EXSA2)
:sa1=EXSA2:sa2=EXSA3 :sa=EXSA2,EXSA3	Valid	Service Actions executed in order of precedence [50,50] – Service Actions of equal precedence execute in the order provisioned (EXSA2 then EXSA3)
:sa1=EXSA2:sa2=EXSA3:sa3=EXSA4 :sa=EXSA2,EXSA3,EXSA4	Valid	Service Actions executed in order of precedence [50,50, 10] – Service Actions of equal precedence execute in the order provisioned (EXSA2 then EXSA3)
:sa1=EXSA2:sa2=EXSA4 :sa=EXSA2,EXSA4	Valid	Service Actions executed in order of precedence [50,10]
:sa1=EXSA3:sa2=EXSA2 :sa=EXSA3,EXSA2	Valid	Service Actions executed in order of precedence [50,50] – Service Actions of equal precedence execute in the order provisioned (EXSA3 then EXSA2).
:sa1=EXSA3:sa2=EXSA2:sa3=EXSA4 :sa=EXSA3,EXSA2,EXSA4	Valid	Service Actions executed in order of precedence [50,50,10] – Service Actions of equal precedence execute in the order provisioned (EXSA3 then EXSA2)

Service Action Group	Validity	Notes
:sa1=EXSA3:sa2=EXSA4 :sa=EXSA3,EXSA4	Valid	Execution follows Service Action precedence in decreasing order [50, 10]

Table 12: Invalid Service Action Group Examples

Service Action Group	Validity	Notes
:sa1=EXSA4:sa2=EXSA1 :sa1=EXSA4,EXSA1	Invalid	Violated Service Action precedence (10 < 100)
:sa1=EXSA4:sa2=EXSA2 :sa=EXSA4,EXSA2	Invalid	Violated service action precedence (10 < 50)
:sa1=EXSA4:sa2=EXSA3 :sa=EXSA4,EXSA3	Invalid	Violated Service Action precedence (10 < 50)
:sa1=EXSA2:sa2=EXSA1 :sa=EXSA2,EXSA1	Invalid	Violated Service Action precedence (50 < 100)
:sa1=EXSA3:sa2=EXSA1 :sa=EXSA3,EXSA1	Invalid	Violated Service Action precedence (50 < 100)
:sa1=EXSA1:sa2=EXSA4:sa3=EXSA2 :sa=EXSA1,EXSA4,EXSA2	Invalid	Violated Service Action precedence (10 < 50)
:sa1=EXSA1:sa2=EXSA4:sa3=EXSA3 :sa=EXSA1,EXSA4,EXSA3	Invalid	Violated Service Action precedence (10 < 50)

Formatting Actions

Formatting Actions (FAs) are applied after Service Action execution and determine how the outgoing digit string is formatted. The digits associated with each provisioned Formatting Action are made available during Conditioning Action execution and Service Action execution. The outgoing digit string is constructed by inserting digits associated with each FA into the string. If values are empty (have no digit value assigned), they are skipped.

The behavior of a Formatting Action does not differ between services; however, each service defines the Formatting Actions that it supports. NPP allows up to 12 Formatting Actions to be associated with one Action Set. Formatting Actions are executed in the order of the consecutive numbers of the

provisioned Formatting Action parameters, or in the sequence of the values in the FA parameter comma-separated list.

Valid Formatting Actions are listed in *Table 24: Formatting Actions*.

To provision Formatting Action parameters, Conditioning Actions for at least one of the following international formats must be provisioned:

- CC + AC + SN
- CC + DN
- ZN

Service Actions might also have to be provisioned, depending on the particular Formatting Action.

Formatting Action Execution

Conditioning Actions and Service Actions populate Formating Action digit string values that are used to construct the outgoing digit string during Formatting Action execution.

Formatting Action execution occurs after Service Action execution is complete for a digit string. The Service Action can indicate whether Formatting Action execution will or will not occur for the string.

NPP begins with an empty outgoing digit string, and inserts digits into the string in the order in which the Formatting Action values are provisioned in consecutively number parameter values. If a provisioned Formatting Action is not populated, the outgoing digit string is not modified for that Formatting Action.

After successful digit string processing and Formatting Action execution, NPP sends an outgoing NAI value (see *Outgoing FNAI Class* with the outgoing digit string to the calling service.

Formatting Actions Examples

The effects of Formatting Actions on digit strings are shown in *Table 13: FA Example 1*, *Table 14: FA Example 2*, *Table 15: FA Example 3*, and *Table 16: FA Example 4*. The examples include assumptions for required Conditioning Actions and Service Actions.

Table 13: FA Example 1

Example 1: Standard national calls all receive the same handling		
Assumptions:		
• **NAI=NATL XXXXXXXXX** • **To condition this number to international format, the Country Code must be prefixed, CA1=CCDEF** • **Example digit string is 87654321 before Conditioning Action** • **Example digit string after Conditioning Action (CA1) is 559192252645** • **Assume the example requires number portability service and the Service Action (SA) is just CdPNNP.** • **Assume the example requires just prefixing the Routing Number (RN) returned from the Realtime Database (RTDB) and the outgoing digit string should be sent in NATL format.** • **Assume the Routing Number (RN) that was returned from the RTDB is "7777".** • **The resulting outgoing format is RN DN.**		
Formatting Action set = {FA1=RN, FA2=DN}		
Formatting Action	**==>**	**Resulting Outgoing Digit String**
Begin	==>	
RN	==>	7777
DN	==>	7777559192252645

Table 14: FA Example 2

Example 2: International calls with International Escape Code		
Assumptions:		
• **NAI=INTL 011+XXXXXXXXXXX** • **Assume the original number is 449192252645.** • **Assume this call just needs to "escape" any service processing; only minimum Conditioning Actions (CAs) are required (ZNX).** • **Because this call needs to "escape" any service processing, there are no Service Actions (SA) required.** • **Because this call just needs to "escape" any service processing, the outgoing format is the original number (ORIG).**		
Formatting Action set = {FA1=ORIG}		
Formatting Action	**==>**	**Resulting Outgoing Digit String**
Begin	==>	
ORIG	==>	011449192252645

Table 15: FA Example 3

Example 3: Collect calls with Operator Code, Area Code in-between
Assumptions:

• **NAI=Unknown 'b' + AC + 9090 + XXXXXXXX**
• **Assume the digit string is b33909087654321**
• **If the desired outgoing format is to replace the 'b' with a 'd', and to insert the number portability RN after the '9090'.**
 	
    • **'9090' put in PFX4**
    • **The NPRelay Service Action updated the RN token.**
    • **Assume DLM1 is provisioned as 'd'.**
    • **Assume the RN is "5555".**
 	
• **In this case, the desired outgoing format is**
 	
    • **DLMA**
    • **AC**
    • **PFX4**
    • **RN**
    • **SN**

Formatting Action set = {FA1=DLMA, FA2=AC, FA3=PFX3, FA4=RN, FA5=SN}		
Formatting Action	**==>**	**Resulting Outgoing Digit String**
Begin	==>	
DLMA	==>	d
AC	==>	d33
PFX4	==>	d339090
RN	==>	d3390905555
SN	==>	d339090555587654321

Figure 4: Formatting Action Execution Example shows the Formatting Action Execution for FA Example 4.

Table 16: FA Example 4

Generic Example		
Assumptions:		
• Variables (Formatting Actions): PFXA = c, PFXB = b, DN = 669192252645, RN = 1234567890		
Formatting Action set = {FA1=PFXA, FA2=RN, FA3=PFXB, FA4=DN}		
Action	**==>**	**Resulting Outgoing Digit String**
Begin	==>	
PFXA	==>	c
RN	==>	c1234567890
PFXB	==>	c1234567890b
DN	==>	c1234567890b669192252645

Figure 4: Formatting Action Execution Example
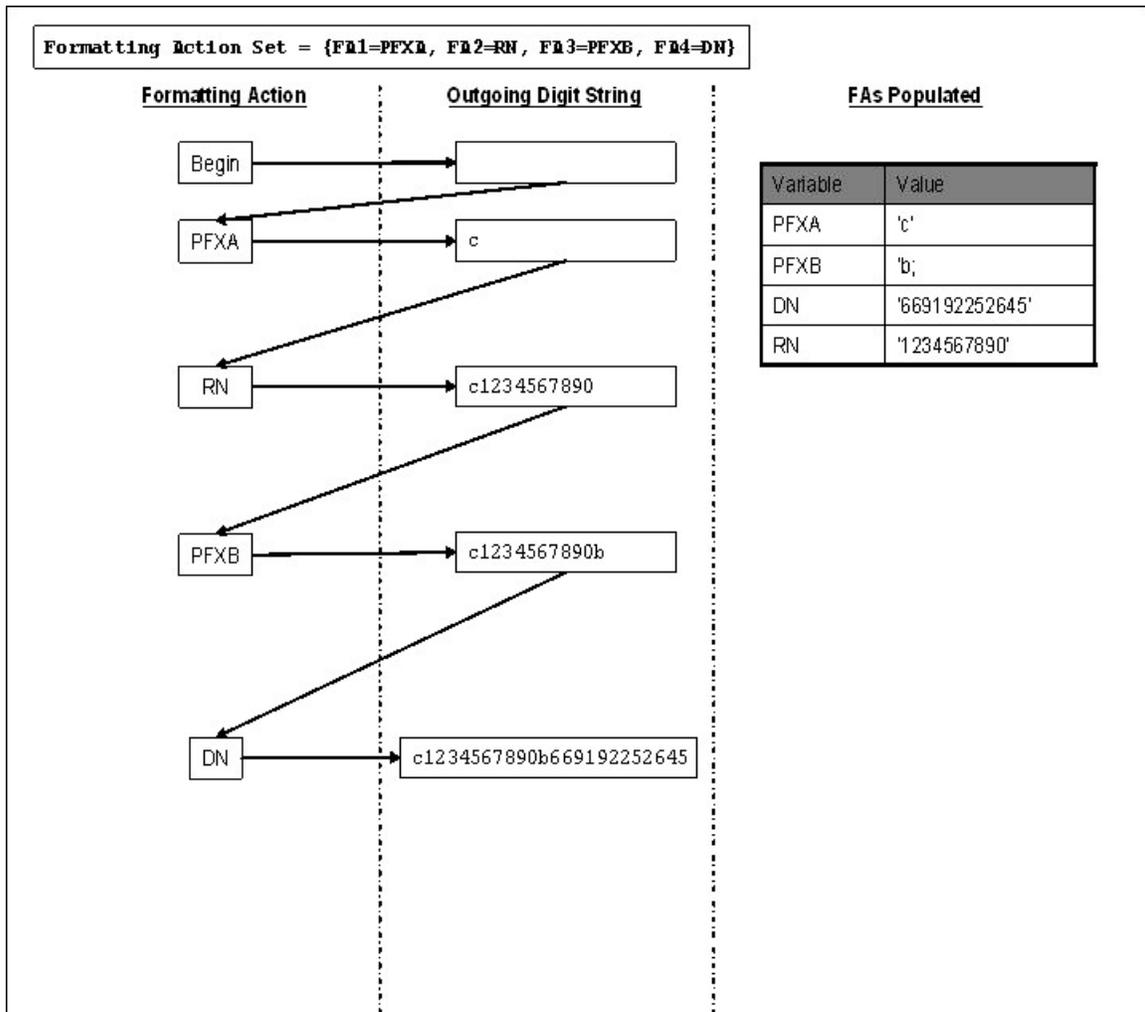
Outgoing FNAI Class

The calling service sends an incoming NAI value to NPP with the incoming digit string to be processed. NPP maps NAI numerical values to provisioned Filter NAI (FNAI) mnemonic values (NATL, INTL, NAI1, NAI2, NAI3, UNKN). The FNAI values are used in filtering incoming digit strings and NAI values for a service, to determine if NPP will process the string for the calling service.

After successful digit string processing and Formatting Action execution, NPP returns an outgoing NAI value with the outgoing digit string to the calling service.

Each Action Set for a service must indicate by the provisioned outgoing FNAI (OFNAI) mnemonic value that either:

• The OFNAI mnemonic value will be mapped to a corresponding numerical value to be sent as the outgoing NAI value.
• The incoming numerical NAI value will be returned to the calling service.

Chapter

5

Rules and Service Rule Sets

Topics:

This chapter provides a high level description of NPP Rules and Service Rule Sets.

When an incoming digit string is selected for processing by an NPP Filter in a Rule, the Action Set in the Rule determines what NPP processing will be applied to the digit string.

A set of Rules with different Filters and Action Sets can be created in a Service Rule Set for each service that calls NPP.

Rules

Defining and combining a Filter and an Action Set results in the creation of a Rule. An NPP Rule specifies the message type through the Filter and the Actions to apply to each digit string through the Action Set.

The relationship between Rules, Filters, Action Sets, and Actions is shown in *Figure 5: Rule, Filter, and Action Set Relationship*.

Figure 5: Rule, Filter, and Action Set Relationship
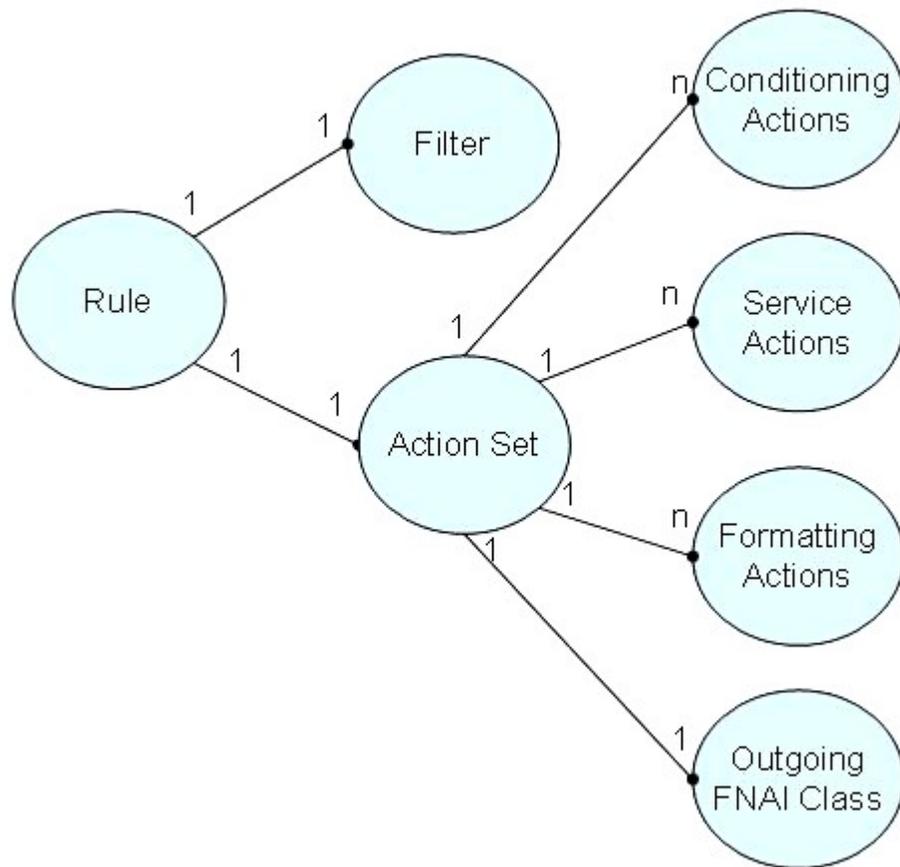
A simple representation of Rule definition is shown in *Table 17: Rule Definition Criteria*

Table 17: Rule Definition Criteria

Rule Definition						
Filters			Action Set			
Filter NAI	Filter Prefix	Filter Digit Length	Conditioning Action	Service Action	Formatting Action	Outgoing FNAI Class
(FNAI)	(FPFX)	(FDL)	(CA)	(SA)	(FA)	(OFNAI)

Services and Service Rule Sets

An NPP Service Rule Set is a collection of Rules that are associated with an NPP service. NPP supports up to 4096 rules per Service Rule Set. The maximum number of NPP Rules per EAGLE 5 ISS is 8192.

An NPP service is an EPAP-related feature such as Prepaid IDP Query Relay (IDP Relay) or TIF Number Portability, or a function used by one of those features (such as TIF). *Table 18: NPP Services* lists features and functions and their services that call NPP for processing. The Service Actions that are used by each service are described in *Table 23: Service Actions*.

Table 18: NPP Services

Feature or Function	Calling Services
Info Analyzed Relay Base (IAR Base)	IARCDPN, IARCGPN
Prepaid IDP Query Relay (IDP Relay)	IDPRCDPN, IDPRCGPN
IDP A-Party Blacklist	IDPRCDPN, IDPRCGPN
IDP A-Party Routing	IDPRCDPN, IDPRCGPN
Triggerless ISUP Framework (TIF), TIF Number Portability, TIF Simple Number Substitution, TIF Forward to SCS, TIF ASD, TIF GRN	TIF, TIF2, TIF3
Prepaid SMS Intercept Phase I (PPSMS)	MOSMSGCDPN, MOSMSGCGPN
Portability Check for MO SMS (MNP SMS)	MOSMSGCGPN
MO-based GSM SMS NP, MO SMS ASD, MO SMS GRN	MOSMSGCDPN, MOSMSGCGPN
MO-based IS41 SMS NP, MO SMS ASD, MO SMS GRN	MOSMSICDPN, MOSMSICGPN
MO SMS IS41-to-GSM Migration	MOSMSICDPN
NPP Test Service	NPPT

The relationship between services, Service Rule Sets, and Action Sets is shown in *Figure 6: Service Rule Set and Rule Relationship*.

Figure 6: Service Rule Set and Rule Relationship
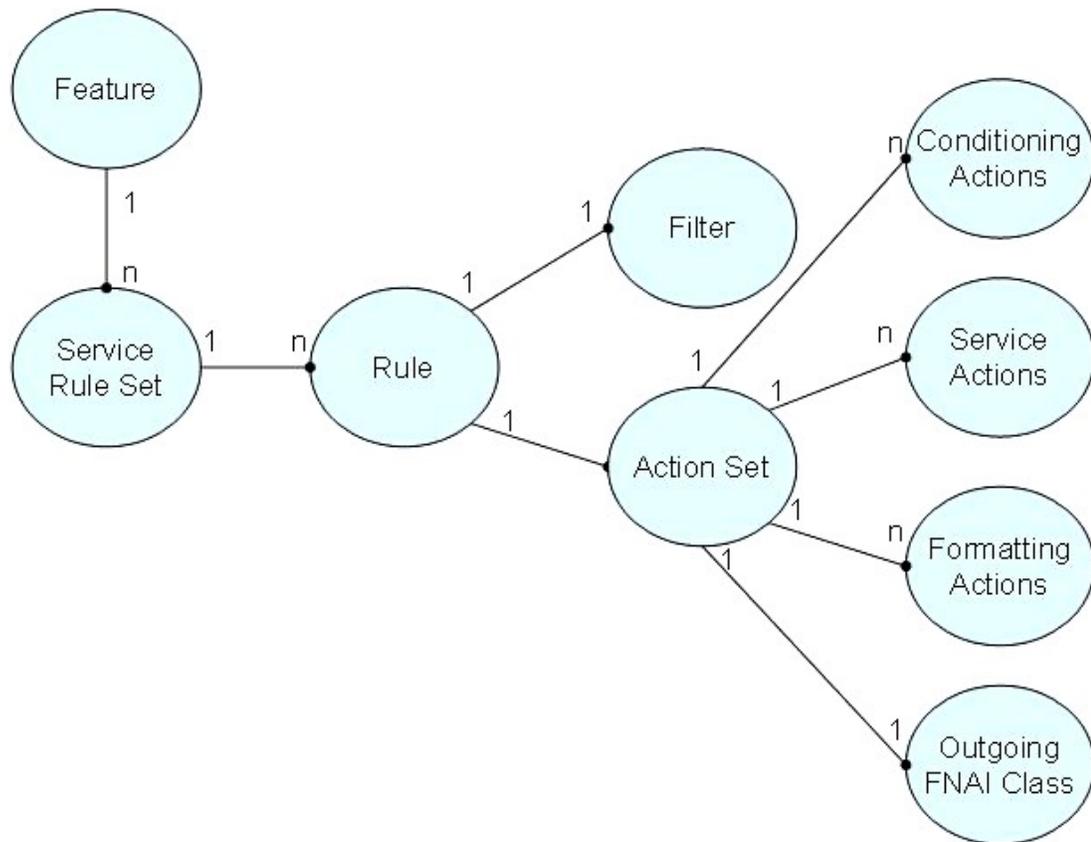
Service Rule Set Example

A simple example of a Service Rule Set is shown in *Table 19: Service Rule Set Example*.

Table 19: Service Rule Set Example

:srvn = NPPT		
:fnai = NATL	:fnai = INTL	:fnai = UNKN
:fpfx = 060	:fpfx = *	:fpfx = *
:fdl = 10	:fdl = 15	:fdl = *
:asn = ACTSET1	:asn = ACTSET2	:asn = ACTSET3

Multiple Services

An NPP service is used by EAGLE 5 ISS EPAP-based features such as IDP Relay, to process digit strings according to the Service Rule Set for that feature. NPP supports multiple services at the same time, each with a separate Service Rule Set.

Table 20: Sample NPP Configuration illustrates a sample NPP configuration containing Service Rule Sets.

Table 20: Sample NPP Configuration

	Rule						
	Filter			Action Set			
Service Rule Set	**NAI**	**FPFX**	**FDL**	**CA**	**SA**	**FA**	**OFNAI CLASS**
NPPT	NATL	060	8	IGN2, CCDEF DN12	RTDBTRN	CC, RN, DN	INTL
NPPT	NATL	*	*	NONE	NONE	ORIG	NATL
NPPT	INTL	*	*	NONE	RTDBTRNSP	ORIG	INTL
IDPRCGPN	UNKN	9090	12	FPFX, CCDEF DN8	CgPNNP	RN, DN	NATL
IDPRCDPN	UNKN	*	*	NONE	NONE	ORIG	UNKN

Chapter

6

NPP Provisioning and NPP Test Service

Topics:

This chapter describes the NPP provisioning process, including command descriptions and sequence of provisioning for correct execution.

This chapter also describes the NPP Test Service and gives examples of its application. The NPPT Service is an EAGLE 5 ISS EPAP-based function that allows NPP action sets and rules associated with the NPPT Service rule set to be tested and validated without affecting live traffic.

NPP Provisioning

This section contains procedures and information for general provisioning of NPP components for the services that call NPP. Information and procedures from the following sources must be used together to correctly and completely provision NPP for a calling service:

- Provisioning procedures and information in this manual
- Service-specific NPP provisioning procedures and information in the Feature Manual for the calling service (some service-specific information is included in this manual where appropriate)
- NPP command descriptions in the *Commands Manual*; the command information includes parameter descriptions and valid values, provisioning dependencies, output examples, and notes for the correct use of each command.

EAGLE 5 ISS controlled features must be enabled or turned on before NPP provisioning commands can be entered. Refer to the Feature Manuals for the calling services for controlled feature provisioning procedures.

Some calling services use provisioned default values for fields or digits in an outgoing message or digit string (such as Default Country Code and Default Network Destination Code). These default values must be provisioned before the NPP components are executed to process an incoming digit string from the calling service. Requirements for provisioning default digit values are included in the Feature Manual for the calling service.

NPP provisioning consists of the following tasks. The provisioning sequence depends somewhat on the data required by a service.

- Provision the NPP Action Sets.
- Provision the NPP Service Rule Sets (associate a Filter with an Action Set to create a Rule for a service).
- Provision NAI mapping values and Delimiter Digit values.
- Change the NPP on/off status for a service.

The procedures in this section describe how to provision the components of NPP. Each section describes the commands used and and the provisioning considerations for a component, including required provisioning sequences, mutually exclusive components, and components that must be provisioned together.

Provisioning Action Sets

The Action Set components customize how the incoming and outgoing digit strings are processed by NPP for a calling service. A maximum of 1024 Action Sets can be provisioned per system.

The procedures in this section describe how to provision the information for each of the following Action Set components:

- Conditioning Actions
- Service Actions
- Formatting Actions
- Outgoing FNAI Class

The following commands are used to provision NPP Action Sets:

Table 21: NPP Action Set Commands

Command	Description	Parameters	Parameter Values
ent/chg-npp-as	Create or Change an NPP Action Set		
	Action Set Name	asn	Ten-character string that uniquely identifies the Action Set.
	Conditioning Actions	:ca1...:ca12 ca=<ca1>,...,<ca12>	See *Table 22: Conditioning Actions*. Default: Any unspecified ca(x) value defaults to NONE.
	Service Actions	:sa1...:sa8 sa=<sa1>,...,<sa8>	See *Table 23: Service Actions*. Default: Any unspecified sa(x) value defaults to NONE.
	Formatting Action	:fa1=<fa1> fa=<fa1> (not orig) fa=orig	See *Table 24: Formatting Actions*. Default = ORIG
	Formatting Actions	:fa1...fa12 fa=<fa1>,...<fa12> (fa1 not orig)	See *Table 24: Formatting Actions*. Default: Any unspecified fa(2-12)value defaults to NONE.
	Outgoing FNAI Class	ofnai	NPP FNAI Class used to map the outgoing NAI value. INTL NATL NAI1 NAI2 NAI3 UNKN

Command	Description	Parameters	Parameter Values
			INC = Value of incoming NAI Default = INC
`dlt-npp-as`	Delete an NPP Action Set		
	Action Set Name	asn	Ten-character string that uniquely identifies the Action Set.
`rtrv-npp-as`	Retrieve one or all NPP Action Sets		
	Action Set Name	asn	Ten-character string that uniquely identifies the Action Set. When the asn parameter is not specified, the command displays all Action Sets.

Provisioning Conditioning Actions

Conditioning Actions perform the following actions in processing the incoming digit string:

- Ignore the specified number of digits.
- Populate a Formatting Action value with the specified or remaining number of digits. The Formatting Action that will be populated must be provisioned in the Action Set. See *Provisioning Formatting Actions* .
- Populate a Formatting Action value with a provisioned STP option default value to be used in the outgoing digit string.

  Some calling services use provisioned default values for fields or digits in an outgoing message or digit string (such as Default Country Code and Default Network Destination Code). The default values must be provisioned before the NPP components are executed to process an incoming digit string from the calling service. Procedures for provisioning default digit values are included in the Feature Manual for the calling service. The Formatting Action that will be populated must be provisioned in the NPP Action Set. See *Provisioning Formatting Actions* .

Some Conditioning Action parameter values end in a number (such as ac3 or dn5). The number indicates the number of digits in the incoming digit string that will be processed by that Conditioning Action.

Table 22: Conditioning Actions describes Conditioning Action parameters, lists populated Formatting Actions, and indicates provisioning considerations. Up to 12 Conditioning Actions can be provisioned per Action Set.

- Enough Conditioning Actions must be provisioned in an Action Set to process the entire incoming digit string, in sequence from the beginning to the end of the string.
- For filters with FDL=* (wildcard), the associated Conditioning Action group must contain a ZNX, DNX, or SNX Conditioning Action. For filters with specific FDL (Filter Digit Length) values, the associated Conditioning Action group must process the entire number of digits (by either ignoring or processing them).
- At a minimum, one or more Conditioning Actions must be provisioned to populate one of the following sets of Formatting Actions:

  - Internationally formatted Dialed Number (ZN) ZN consists of the Country Code (CC), Area Code (AC),and Subscriber Number (SN)
  - Country Code (CC) + Directory Number (DN) DN consists of the Area Code (AC) and Subscriber Number (SN)
  - Country Code (CC) + Area Code (AC) + Subscriber Number

Conditioning Actions can be provisioned in two ways: Individual consecutively numbered parameters, or a comma-separated list of values for the ca parameter.

Individual Consecutively Numbered Parameters

The ca1 Conditioning Action parameter must be specified. Any additional Conditioning Action parameters in the command must be consecutively numbered following ca1.

The consecutively numbered Conditioning Action parameters must specify the Conditioning Actions in the order in which they are executed by NPP. The ca1 parameter value must be the first Conditioning Action that will be executed by NPP in the Conditioning Action group; the ca2 parameter value must be the second Conditioning Action that will be executed by NPP in the Conditioning Action group; and so on.

For example,

- :ca1=x:ca2=y is allowed (ca2 is the next consecutively numbered parameter after ca1)
- :ca1=y:ca5=x is not allowed (parameters ca2, ca3, and ca4 must be specified if ca5 is specified)
- :ca2=y:ca3=w is not allowed (ca1 was not specified).

The consecutively numbered Conditioning Action parameters can be specified in any position in the command, and the parameter numbers do not need to be consecutive in the command. For example,

- ent-npp-as:ca2=x:fa1=cc:ca1=y is allowed (the fa1 parameter can be specified between the ca2 and ca1 parameters)
- ent-npp-as:ca2=x:ca1=y is allowed (ca1 and ca2 are consecutively numbered parameters, but do not need to be specified consecutively in the command).

A Comma-Separated List

At least one value must be specified for the ca parameter. For any additional values, one comma must be entered between each two values.

The ca parameter values must specify the Conditioning Actions in the order in which they are executed by NPP. The first or only value for the ca parameter must be the first or only Conditioning Action that will be executed by NPP in the Conditioning Action group; the second value in the ca parameter list must be the second Conditioning Action that will be executed by NPP in the Conditioning Action group; and so on.

Table 22: Conditioning Actions

Conditioning Action	Formatting Action Populated	Description
AC[1..8]	AC	Area Code digits Use the specified number of digits (1-8) as the AC Formatting Action value. Provisioning Considerations: 1. Only one AC[1..8] Conditioning Action can be specified in an Action Set. 2. AC[1..8] cannot be specified in the same Action Set with (is mutually exclusive with) the ZNX Conditioning Action, any Conditioning Action that begins with DN, or any other Conditioning Action that begins with AC.
ACCgPN	AC	Area Code digits Skip over any Country Code digits (matching STPOPTS:DEFCC parameter value or Multiple CC value) and remove the next SCCPOPTS:ACLen number of digits from the beginning of the CgPN. Use the removed ACLen digits as the Area Code for the Called Party. If Formatting Action AC is specified, use these digits as the AC Formatting Action value. If no Calling Number was present, or the CgPN was less than the ACLen number of digits, then no replacement action is taken. Provisioning Considerations: • Used for IDP Relay services. • Used for TIF services. • Used for the MO SMS NPP Called Party services MOSMSGCDPN and MOSMSICDPN.
ACDEF	AC	Default Area Code digits Use the provisioned Default Network Destination Code (STPOPTS:DEFNDC parameter value) as the AC Formatting Action value. Provisioning Considerations: • The STPOPTS:DEFNDC parameter value must be provisioned before the service state is set to On to allow NPP processing for the service. • ACDEF can be specified only once in an Action Set. • ACDEF cannot be specified in the same Action Set with (is mutually exclusive with) the ZNX Conditioning Action, any

Conditioning Action	Formatting Action Populated	Description
		Conditioning Action that begins with DN, or any other Conditioning Action that begins with AC.
ACLAC	AC	Area Code digits Use the LAC field of the LAI as the AC Formatting Action value. Provisioning Considerations: IDP Relay-specific only with the IDPRCDPN Service Action.
CC[1..3]	CC	Country Code digits Use the next number of specified digits [1..3] as the CC Formatting Action value. Provisioning Considerations: 1. Only one CC[1..3] Conditioning Action can specified in an Action set. 2. CC[1..3] cannot be specified in the same Action Set with (is mutually exclusive with) the ZNX Conditioning Action or the CCDEF Conditioning Action.
CCDEF	CC	Default Country Code digits Use provisioned Default Country Code (STPOPTS:DEFCC parameter value) as the CC Formatting Action value. Provisioning Considerations: 1. The STPOPTS:DEFCC parameter value must be provisioned before the service state is set to On to allow NPP processing for the service. 2. CCDEF can be specified only once in an Action Set. 3. CCDEF cannot be specified in the same Action Set with (is mutually exclusive with) the ZNX Conditioning Action and any CC[1..3] Conditioning Action.
CCCGPN	CC	Country Code digits Indicates that the the Country Code (CC) digits need to be extracted from the Calling Party Number. The number of digits to extract is the SCCPOPTS CCLen option value. If CC Formatting Action is specified, the extracted CC digits will be used in the resulting CdPN. If a CC is not detected, then the CC digits will be empty in Formatting Action execution.

Conditioning Action	Formatting Action Populated	Description
		Used by IDP-related features.
DN[1..15]	DN RNOSPSDN	Dialed Number digits Use the specified number of digits [1..15] as the DN Formatting Action value. Provisioning Considerations: 1. Only one DN[1..15] Conditioning Action can be specified in an Action set. 2. DN[1..15] cannot be specified in the same Action Set with (is mutually exclusive with) any Conditioning Action that begins with AC, the DNX Conditioning Action, any Conditioning Action that begins with SN and the ZNX Conditioning Action. 3. The DN[1..15] or DNX Conditioning Action must be specified to populate the RNOSPODN Formatting Action value when an RN or SP is not found in the RTDB lookup.
DNX	DN RNOSPODN	Dialed Number digits Use the remaining digits as the DN Formatting Action value. Provisioning Considerations: 1. DNX can be specified only once in an Action Set. 2. DNX cannot be specified in the same Action Set with (is mutually exclusive with) any Conditioning Action that begins with AC, any DN[1..15] Conditioning Action, any Conditioning Action that begins with SN and the ZNX Conditioning Action. 3. The DN[1..15] or DNX Conditioning Action must be specified to populate the RNOSPODN Formatting Action value when an RN or SP is not found in the RTDB lookup.
FPFX	FPFX	Filter Prefix digits Use the provisioned Filter Prefix (FPFX) digits as the FPFX Formatting Action value. See Provisioning Service Rule Sets. Provisioning Considerations: 1. Must be the first Conditioning Action specified for the Action Set (ca1 parameter value) 2. FPFX can be specified only once in an Action set 3. Conditioning Action FPFX cannot be used when the NPP filter value is FPFX="*"
IGN[1..10]	N/A	Number of digits to ignore

Conditioning Action	Formatting Action Populated	Description
		Ignores 1 to 10 digits. Provisioning Considerations: • Can be specified more than once in an Action Set.
PFXA[1..8], PFXB[1..8], PFXC[1..8], PFXD[1..8], PFXE[1..8], PFXF[1..8]	PFXA, PFXB, PFXC, PFXD, PFXE, PFXF	Prefix A-F digits Use the next number of specified digits [1..8] as the corresponding Formatting Action value. Provisioning Considerations: 1. PFXA[1..8] can be specified only once in an Action Set. 2. PFXB[1..8] can be specified only once in an Action Set. 3. PFXC[1..8] can be specified only once in an Action Set. 4. PFXD[1..8] can be specified only once in an Action Set. 5. PFXE[1..8] can be specified only once in an Action Set. 6. PFXF[1..8] can be specified only once in an Action Set.
SN[1..15]	SN RNOSPOSN	Subscriber Number digits Use the specified number of digits [1..15] as the SN Formatting Action value. Provisioning Considerations: 1. SN[1..15] can be specified only once in an Action Set. 2. SN[1..15] cannot be specified in the same Action Set with (is mutually exclusive with) the SNX Conditioning Action, any Conditioning Action that begins with DN, or the ZNX Conditioning Action. 3. The SN[1..15] or SNX Conditioning Action must be specified to populate the RNOSPOSN Formatting Action value when an RN or SP is not found in the RTDB lookup.
SNX	SN RNOSPOSN	Subscriber Number digits Use the remaining digits as the SN Formatting Action value. Provisioning Considerations: 1. SNX can be specified only once in an Action Set. 2. SNX cannot be specified in the same Action Set with (is mutually exclusive with) any SN[1..15] Conditioning Action, any Conditioning Action that begins with DN, or the ZNX Conditioning Actions.

Conditioning Action	Formatting Action Populated	Description
		3. The SN[1..15] or SNX Conditioning Action must be specified to populate the RNOSPOSN Formatting Action value when an RN or SP is not found in the RTDB lookup.
ZNX	ZN RNOSPOZN	Remaining digits Use the remaining digits as the ZN Formatting Action value. Provisioning Considerations: 1. ZNX can be specified only once in an Action Set. 2. ZNX cannot be specified in the same Action Set with (is mutually exclusive with) any Conditioning Action that begins with CC, any Conditioning Action that begins with AC, any Conditioning Action that begins with SN, or any Conditioning Action that begins with DN. 3. The ZNX Conditioning Action must be specified to populate the RNOSPOZN Formatting Action value when an RN or SP is not found in the RTDB lookup.

Provisioning Service Actions

A Service Action performs service-specific behavior on the internationally formatted digit string that it receives from Conditioning Action execution. Service Action behavior is determined by feature-specific functions, state information, and provisioned data from the service that is using NPP. Such behavior can include database access, data evaluation, and any special handling for outgoing messages.

Each service must define the Service Actions that it supports and the sequence (precedence) in which the supported Service Actions must be executed. The service assigns a precedence value (a number between 0 and 100) to each Service Action. Higher precedence Service Actions are always executed before lower precedence Service Actions. NPP executes Service Actions of equal precedence in the order of the consecutive numbers of the provisioned SAx parameters, or in the sequence of the values in the SA parameter comma-separated list.

Table 23: Service Actions describes Service Actions, lists their precedence values, and indicates the calling services that support each Service Action. Up to 8 Service Actions can be provisioned per Action Set.

Formatting Action values can be populated by Service Actions. The Formatting Actions that are populated by the Service Actions in an Action Set must also be provisioned in the Action Set. See *Provisioning Formatting Actions* .

Service Actions can be provisioned in two ways: Individual consecutively numbered parameters, or a comma-separated list of values for the sa parameter.

Individual Consecutively Numbered Parameters

The sa1 Service Action parameter must be specified. Any additional Service Action parameters in the command must be consecutively numbered following sa1. For example,

- :sa1=x:sa2=y is allowed (sa2 is the next consecutively numbered parameter after sa1)
- :sa1=y:sa5=x is not allowed (parameters :sa2, sa3, and sa4 must be specified if sa5 is specified)
- sa2=y:sa3=w is not allowed (sa1 was not specified)

The consecutively numbered Service Action parameters can be specified in any position in the command, and the parameter numbers do not need to be consecutive in the command. For example,

- `ent-npp-as:sa2=x:fa1=cc:sa1=y` is allowed (the fa1 parameter can be specified between the sa2 and sa1 parameters)
- `ent-npp-as:sa2=x:sa1=y` is allowed (sa1 and sa2 are consecutively numbered parameters, but do not need to be specified consecutively in the command).

Consecutively numbered Service Action parameters must specify the Service Actions in the order in which they will be executed, from highest precedence value to lowest precedence value. See *Service Action Precedence* for examples of Service Action execution that depend on provisioning sequence.

- The sa1 parameter must specify the Service Action that has the highest precedence value in the Service Action group in the Action Set.
- The parameters with numbers consecutively following the sa1 parameter must specify the additional Service Actions in descending precedence value sequence.
- The parameters that specify Service Actions that have the same precedence values must be specified in the consecutively numbered parameter sequence in which the Service Actions will be executed. For example, if Service Action A and Service Action B have the same precedence value,
- Specifying :sa2=A:sa3=B results in executing Service Action A first, followed by executing Service Action B.
- Specifying :sa2=B:sa3=A results in executing Service Action B first, followed by executing Service Action A.

A Comma-Separated List

At least one value must be specified for the sa parameter. For Any additional values, one comma must be entered between each two values.

The sa parameter values must specify the Service Actions in the order in which they are executed by NPP, from highest precedence value to lowest precedence value. The first or only value for the sa parameter must be the first or only Service Action that will be executed by NPP in the Service Action group; the second value in the sa parameter list must be the second Service Action that will be executed by NPP in the Service Action group; and so on.

The Service Action parameter values must specify the Service Actions in the order in which they will be executed, from highest precedence value to lowest precedence value. The values that specify Service Actions that have the same precedence values must be specified in the list in the sequence in which the Service Actions will be executed. See *Service Action Precedence* for examples of Service Action execution that depend on provisioning sequence.

Table 23: Service Actions

Service Action	Feature Service	Precedence	Description
Info Analyzed Relay Base Called Party Service			

Service Action	*Feature* **Service**	Precedence	Description
CCNCCHK	*IAR Base* IARCDPN	100	Attempts to find a match between the first digits of the DN and one of the entries in the CCNC list of the CSL table. When a match is not found, causes NPP processing to fail so that the message on hand will be relayed without IAR modifications .
CDPNNP	*IAR NP* IARCDPN	80	Evaluates the result of an RTDB lookup based on the TATROPTS CDNPTYPE option value or TATROPTS SPORTTYPE option value. The Service Action will also populate the SRFIMSI Formatting Action value with the SRFIMSI associated with the RN or SP entity returned by the RTDB, if any. Applies Service Portability processing.
CGPNSVCRQD	*IAR Base* IARCDPN	60	Used by the IARCDPN service to invoke the IARCGPN service.
ASDLKUP	*IAR ASD* IARCDPN	50	Populates the ASD Formatting Action value with the ASD from the RTDB.
GRNLKUP	*IAR GRN* IARCDPN	50	Populates the GRN Formatting Action value using data from the RTDB.
CGPNASDRQD	*IAR ASD* IARCDPN	50	Used by the IARCDPN service to invoke the IARCGPN service, and populate the IARCDPN ASD Formatting Action value with the IARCGPN ASD Formatting Action value before IARCDPN Formatting Action Execution
CGPNGRNRQD	*IAR GRN* IARCDPN	50	Used by the IARCDPN service to invoke the IARCGPN service, and populate the IARCDPN GRN Formatting Action value with the IARCGPN GRN Formatting Action value before IARCDPN Formatting Action Execution.
Info Analyzed Relay Base Calling Party Service			
CGPNNP	*IAR NP* IARCGPN	80	Evaluates the result of an RTDB lookup based on the TATROPTS CGNPTYPE option value. The Service Action will also populate the SRFIMSI Formatting Action value with the SRFIMSI associated with the RN or SP entity returned by the RTDB, if any.

Service Action	*Feature* **Service**	Precedence	Description
ASKLKUP	*IAR ASD* IARCGPN	50	Populates the ASD Formatting Action using data from the RTDB.
GRNLKUP	*IAR GRN* IARCGPN	50	Populates the GRN Formatting Action using data from the RTDB.
IDP Relay feature Called Party Service			
CCNCCHK	*IDP Relay* IDPRCDPN	100	Verifies that the conditioned number is available under CSL CCNDC screening list. **Note:** Used ONLY for upgrade.
CDPNNP	*IDP Relay* IDPRCDPN	80	If RTDB lookup for conditioned number finds a DN, entity data is updated in RN or SP, as per the entity-type. If entity-type is SP, DFLTRN is configured and FA contains RN, RN is be replaced by DFLTRN. If RTDB lookup finds a Network Entity, then the SRFIMSI digits from the Network Entity populate the SRFIMSI Formatting Action.
CGPNSVCRQD	*IDP Relay* IDPRCDPN *IDP A-Party Blacklist* IDPRCDPN *IDP A-Party Routing* IDPRCDPN	60	Indicates whether the IDPRCGPN service is to be invoked. This implies that CgPN number conditioning, Service Actions, and formatting are done based on the configured CgPN Rules
LACCK	*IDP Relay* IDPRCDPN	60	Compares the LAC obtained for LAI with the Area Code present in the incoming DN. Used to format the outgoing number by removing the digit and length prefixes (filter prefix in NPP) from the outgoing digit string if LAC =AC.
ASDLKUP	*IDP Relay* IDPRCDPN	50	If DN is found in individual or range database lookup and ASD is present in the lookup result, the ASD populates the ASD Formatting Action value. If ASD is not

Service Action	Feature Service	Precedence	Description
			present, the ASD Formatting Action value is NONE and Service Action execution continues. This SA can be used with the CDPNNP SA.
CGPNASDRQD	*IDP Relay* IDPRCDPN	50	Indicates that IDPRCGPN service is to be invoked before the outgoing CdPN is formatted. This SA is used with CgPN ASDLKUP SA to populate the ASD Formatting Action value from CgPN lookup for CdPN formatting.
GRNLKUP	*IDP Relay* IDPRCDPN	50	If DN is found in individual or range database lookup and GRN is present in the lookup result, the GRN populates the GRN Formatting Action value. If GRN is not present, the GRN Formatting Action value is NONE and Service Action execution continues. This SA can be used with the IDPRCDPN CGPNGRNRQD SA to format the outgoing CdPN based on CgPN GRN lookup. This SA can be used with CGPNNP SA.
CGPNGRNRQD	*IDP Relay* IDPRCDPN	50	Indicates that IDPRCGPN service is to be invoked before the outgoing CdPN is formatted. This SA is used with CgPN GRNLKUP SA to populate the GRN Formatting Action value from CgPN lookup for CdPN formatting.
IDP Relay feature Calling Party service			
BLKLSTRLY	*IDP A-Party Blacklist* IDPRCGPN	90	Used when a query/response mode is desired only for the blacklist-match case. The blacklist-match case is where the RTDB lookup on the conditioned CgPN results in an entry in which the blacklist flag is on and GRN data is present. In the no-match case, the message is serviced through other applicable IDP Relay services or falls through to GTT. This SA is used only with the IDPRCGPN service, has the highest

Service Action	Feature Service	Precedence	Description
			precedence, and is mutually exclusive with the BLKLSTQRY NPP SA in the same rule.
BLKLSTQRY	*IDP A-Party Blacklist* IDPRCGPN	90	Used when a query/response mode is desired for both the blacklist-match and blacklist-no-match cases. The blacklist-match case is where the RTDB lookup on the conditioned CgPN results in an entry in which the blacklist flag is on and GRN data is present. The blacklist-no-match case is where an RTDB entry is not found for that CgPN, or where an entry is found but the blacklist flag is off or GRN data is not present. This SA is used only with the IDPRCGPN service, and is mutually exclusive with the rest of the IDPRCGPN NPP SAs in the same rule.
CGPNNP	*IDP Relay* IDPRCGPN	80	NPP SA does a RTDB lookup for the conditioned number and analyzes success criteria. If RTDB lookup is successful (DN is found), entity-data is updated in RN or SP, per the entity-type. If entity-type is SP, DFLTRN is configured, and FA contains RN, RN shall be replaced by DFLTRN. If RTDB lookup is successful, and a Network Entity is found, then the SRFIMSI digits from the Network Entity are used for the Formatting Action SRFIMSI value.
CGPNRTG	*IDP A-Party Routing* IDPRCGPN	80	Determines whether A-Party Routing, SK/BCSM Routing, or both should be attempted in post-NPP processing
ASDLKUP	*IDP Relay* IDPRCGPN	50	If DN is found in individual or range database lookup and ASD is present in the lookup result, the ASD populates the ASD Formatting Action value. If ASD is not present, the ASD Formatting Action value is NONE and Service Action execution continues.

Service Action	*Feature* **Service**	Precedence	Description
			This SA can be used with the IDPRCDPN CGPNASDRQD SA to format outgoing CDPN based on CgPN ASD lookup. This SA can be used with CGPNNP SA.
GRNLKUP	*IDP Relay* IDPRCGPN	50	If DN is found in individual or range database lookup and GRN is present in the lookup result, the GRN populates the GRN Formatting Action value. If GRN is not present, the GRN Formatting Action value is NONE and Service Action execution continues. This SA can be used with the IDPRCDPN CGPNGRNRQD SA to format the outgoing CDPN based on CgPN GRN lookup. This SA can be used with CGPNNP SA.
TIF and TIF feature services			
CRP	*TIF NP* TIF, TIF2, TIF3	92	Circular Route Prevention
NPNRLS	*TIF NP* TIF, TIF2, TIF3	91	Number Portability Release on No Match
CGPNSVCRQD	*TIF NP* TIF, TIF2, TIF3	80	Performs an RTDB lookup on the CgPN
NPRELAY	*TIF NP* TIF, TIF2, TIF3	80	Number Portability Relay
NPRLS	*TIF NP* TIF, TIF2, TIF3	80	Number Portability Release on Match
NSCdPN	*TIF NS* TIF, TIF2, TIF3	80	CdPN RTDB lookup for outgoing CdPN substitution
NSCgPN	*TIF NS* TIF, TIF2, TIF3	75	CgPN RTDB lookup for outgoing CgPN substitution

Service Action	Feature Service	Precedence	Description
ASDLKUP	*TIF ASD* TIF, TIF2, TIF3	90	Use of CdPN Additional Subscriber Data when formatting CdPN.
CGPNASDRQD	*TIF ASD* TIF, TIF2, TIF3	90	Use of CgPN Additional Subscriber Data when formatting CdPN.
CGPNGRNRQD	*TIF GRN* TIF, TIF2, TIF3	90	Use of CgPN Generic Routing Number when formatting CdPN.
GRNLKUP	*TIF GRN* TIF, TIF2, TIF3	90	Use of CdPN Generic Routing Number when formatting CdPN.
SNSCgPN	*TIF SNS* TIF, TIF2, TIF3	75	Simple Number Substitution
FWDSCS	*TIF SCS* TIF, TIF2, TIF3	5	Forward to SCS
MO SMS feature services			
FRAUDCHK	*MNP SMS* MOSMSGCGPN	80	CgPN RTDB lookup; discards message if subscriber is fraudulent.
PPRELAY	*PPSMS, MO SMS Prepaid Intercept on B-Party* MOSMSGCDPN	80	CdPN RTDB lookup; redirect message to prepaid subscriber if CdPN is prepaid. (PPSOPTS BPARTYCHK configuration option must be on)
	PPSMS MOSMSGCGPN	80	CgPN RTDB lookup; redirect message to prepaid subscriber if CgPN is prepaid. If the message is redirected to a Prepaid server, Formatting Action execution is skipped and the message can be routed without falling through to GTT.
CDPNNP	*MO-based GSM SMS NP* MOSMSGCDPN	60	Number portability for GSM Forward Short Message.

Service Action	Feature Service	Precedence	Description
	MO-based IS41 SMS NP MOSMSICDPN	60	Number portability for IS41 SMDPP
MIGRATE	*MO SMS IS41-to-GSM Migration* MOSMSICDPN	70	Determine from RTDB lookup whether subscriber is migrated
ASDLKUP	*MO SMS ASD* MOSMSGCDPN MOSMSGCGPN MOSMSICDPN MOSMSICGPN	50	If DN is found in individual or range database lookup and ASD is present in the lookup result, the ASD populates the ASD Formatting Action value.
CGPNASDRQD	*MO SMS ASD* MOSMSGCDPN	50	Indicates that the MOSMSGCGPN service is to be invoked before the outgoing CdPN is formatted. This SA is used with the MOSMSGCGPN ASDLKUP SA to populate the ASD Formatting Action value from CgPN lookup for CdPN formatting.
	MO SMS ASD MOSMSICDPN	50	Indicates that the MOSMSICGPN service is to be invoked before the outgoing CdPN is formatted. This SA is used with the MOSMSICGPN ASDLKUP SA to populate the GRN Formatting Action value from CgPN lookup for CdPN formatting
GRNLKUP	*MO SMS GRN* MOSMSGCDPN MOSMSGCGPN MOSMSICDPN MOSMSICGPN	50	If DN is found in individual or range database lookup and GRN is present in the lookup result, the GRN populates the GRN Formatting Action value.
CGPNGRNRQD	*MO SMS GRN* MOSMSGCDPN	50	Indicates that the MOSMSGCGPN service is to be invoked before the outgoing CdPN is formatted. This SA is used with the MOSMSGCGPN GRNLKUP SA to populate the GRN

Service Action	Feature Service	Precedence	Description
			Formatting Action value from CgPN lookup for CdPN formatting.
	MO SMS GRN MOSMSICDPN	50	Indicates that the MOSMSICGPN service is to be invoked before the outgoing CdPN is formatted This SA is used with the MOSMSICGPN GRNLKUP SA to populate the GRN Formatting Action value from CgPN lookup for CdPN formatting.
Service used by any feature or function that uses NPP			
CDIAL	Any service	10	Corrective Dialing Execute Formatting Actions even if the last Service Action indicates to skip Formatting Action execution.

Provisioning Formatting Actions

Formatting Action values are used to construct the outgoing digit string after Conditioning Action execution and Service Action execution are completed. Formatting Action values can be populated by Conditioning Actions and Service Actions. The Conditioning Action or Service Action that populates a Formatting Action in an Action Set must also be provisioned in the Action Set. See *Provisioning Conditioning Actions* and *Provisioning Service Actions*.

Table 24: Formatting Actions describes Formatting Actions, indicates population of the Formatting Action by a Conditioning Action or Service Action, and indicates provisioning considerations. Up to 12 Formatting Actions can be provisioned per Action Set.

Note: If the MIGRATE and CDPNNP Service Actions are both provisioned in the same Action Set for an MO SMS feature , the outgoing number format can be only a single format. For example, it is not possible for a migrated subscriber to be formatted as RN+DN and a ported subscriber to be formatted as CC+RN+DN by the same Action Set.

Formatting Actions can be provisioned in two ways: Individual consecutively numbered parameters, or a comma-separated list of values for the fa parameter.

Individual Consecutively Numbered Parameters

The fa1 Formatting Action parameter must be specified. Any additional Formatting Action parameters in the command must be consecutively numbered following fa1.

Consecutively numbered Formatting Action parameters must specify the Formatting Actions in the order in which they will be executed. The fa1 parameter value must be the first Formatting Action that will be executed by NPP in constructing the outgoing digit string; the fa2 parameter value must be the second Formatting Action that will be executed by NPP in the Formatting Action group; and so on.

For example,

- :fa1=x:fa2=y is allowed (fa2 is the next consecutively numbered parameter after fa1)
- :fa1=y:fa5=x is not allowed (parameters fa2, fa3, and fa4 must be specified if fa5 is specified)
- :fa2=y:fa3=w is not allowed (fa1 was not specified).

The consecutively numbered Formatting Action parameters can be specified in any position in the command, and the parameter numbers do not need to be consecutive in the command. For example,

- `ent-npp-as:fa2=x:ca1=cc:fa1=y` is allowed (the ca1 parameter can be specified between the fa2 and fa1 parameters)
- `ent-npp-as:fa2=x:fa1=y` is allowed (fa1 and fa2 are consecutively numbered parameters, but do not need to be specified consecutively in the command).
- `ent-npp-as:fa2=x:fa3=y` is not allowed (fa1 was not specified).

A Comma-Separated List

At least one value must be specified for the fa parameter. For Any additional values, one comma must be entered between each two values.

The fa parameter values must specify the Formatting Actions in the order in which they are executed by NPP. The first or only value for the fa parameter must be the first or only Formatting Action that will be executed by NPP in the Formatting Action group; the second value in the fa parameter list must be the second Formatting Action that will be executed by NPP in the Formatting Action group; and so on.

Table 24: Formatting Actions

Formatting Action	Populated By	Description
AC	CA AC[1…3], ACDEF, or ACCgPN	Area Code digits Adds the AC Formatting Action value to the outgoing digit string. Provisioning Considerations: 1. The EAGLE 5 ISS prevents the AC Formatting Action from being provisioned if the AC is not populated during Conditioning Action execution (by AC[1..3] , ACDEF, ACCgPN, or some other AC-loading Conditioning Action). 2. The AC Formatting Action cannot be specified with (is mutually exclusive with) the DN and ZN Formatting Actions in the same Action Set.
ASD	Service Action execution	Additional Subscriber Data Adds the ASD Formatting Action value to the outgoing digit string. The ASD Formatting Action is populated during Service Action execution. If the ASD Formatting Action is not populated during Service Action execution, the ASD Formatting Action does not modify the outgoing digit string.

Formatting Action	Populated By	Description
		Provisioning Considerations: None.
CC	CA CC[1..3], CCDEF, or CCCGPN	Country Code digits Adds the CC Formatting Action value to the outgoing digit string. Provisioning Considerations: 1. The EAGLE 5 ISS prevents the CC Formatting Action from being provisioned if the CC is not populated during Conditioning Action execution (by CC[1..3] or CCDEF or some other CC-loading Conditioning Action). 2. The CC Formatting Action cannot be specified with (is mutually exclusive with) the ZN Formatting Action in the same Action Set.
DLMA, DLMB, DLMC, DLMD, DLME, DLMF, DLMG, DLMH, DLMI, DLMJ, DLMK, DLMM, DLMN, DLMO, DLMP	Default Delimiter digits Service Action execution	Adds the corresponding Delimiter Formatting Action value to the outgoing digit string. The Delimiter Formatting Action values are populated from the NPP Service State delimiter values during Service Action execution. If a Delimiter Formatting Action value is not populated during Service Action execution, the outgoing digit string is not modified for that Formatting Action. **Note:** If a TIF or IDP Relay service has DLMA-DLMC values that are not NONE in the TIFOPTS or TTROPTS table, the values from the TIFOPTS or TTROPTS table will be used in NPP processing. The maximum length of the Delimiter Formatting Actions is 16 digits. Provisioning Considerations: None.
DN	CA DN[1..15] or DNX	Dialed Number Adds the DN Formatting Action value to the outgoing digit string. Provisioning Considerations: 1. When the DN Formatting Action is specified in the Action Set, the DN[1..15] or DNX Conditioning Action must be specified in the corresponding Conditioning Action group. 2. The DN Formatting Action cannot be specified with (is mutually exclusive with) the ZN, SN, and AC Formatting Actions in the same Action set.
FPFX	CA FPFX	Filter Prefix digits

Formatting Action	Populated By	Description
		Adds the FPFX Formatting Action value to the outgoing digit string. Provisioning Considerations: When the FPFX Formatting Action is specified, the FPFX Conditioning Action must be specified in the Action Set to populate FPFX during Conditioning Action execution.
GRN	Service Action execution	Generic Routing Number Adds the Generic Routing Number digit string to the outgoing digit string. The GRN Formatting Action value is populated during Service Action execution. If the GRN Formatting Action is not populated during Service Action execution, the GRN Formatting Action does not modify the outgoing digit string. Provisioning Considerations: None.
NONE	Default Formatting Action value	Do not perform any formatting for this Formatting Action. Provisioning Considerations: The NONE value is the default value for all Formatting Actions in an Action Set. The NONE Formatting Action value indicates the end of Formatting Actions in a Formatting Action group.
ORIG		Original incoming digit string Adds the incoming digit string (unmodified) to the outgoing digit string. The ORIG Formatting Action is always available. Provisioning Considerations: None.
PFXA, PFXB, PFXC, PFXD, PFXE, PFXF	CA PFX[A..F]	Prefix digits (1-8 digits) Adds the PFX[A..F] Formatting Action value to the outgoing digit string. Provisioning Considerations: When a PFX[A..F] Formatting Action is specified, the PFX[A..F] Conditioning Action must be specified to populate the Formatting Action value during Conditioning Action execution.
RN	Service Action execution	Routing Number digits Adds the RN Formatting Action value to the outgoing digit string. The RN Formatting Action value is populated during Service Action execution. If the RN Formatting Action is not populated

Formatting Action	Populated By	Description
		during Service Action execution, the RN Formatting Action does not modify the outgoing digit string. Provisioning Considerations: None.
RNOSPODN	RN or SP from RTDB lookup, or CA DN[1..15] or DNX	RN or SP if found in the RTDB lookup; if not found, a DN Conditioning Action value populates this Formatting Action. Provisioning Considerations: A DN Conditioning Action must be provisioned when the RNOSPODN Formatting Action is provisioned.
RNOSPOSN	RN or SP from RTDB lookup, or CA SN[1..15] or SNX	RN or SP if found in the RTDB lookup; if not found, an SN Conditioning Action value populates this Formatting Action. Provisioning Considerations: An SN Conditioning Action must be provisioned when the RNOSPOSN Formatting Action is provisioned.
RNOSPOZN	RN or SP from RTDB lookup, or CA ZNX	RN or SP if found in the RTDB lookup; if not found, the ZN Conditioning Action value populates this Formatting Action. Provisioning Considerations: The ZNX Conditioning Action must be provisioned when the RNOSPOZN Formatting Action is provisioned.
SN	CA SN[1..15] or SNX	Subscriber Number Adds the SN Formatting Action value to the outgoing digit string. Provisioning Considerations: 1. The EAGLE 5 ISS prevents the SN Formatting Action from being provisioned if the SN[1..15] or SNX is not specified in the corresponding Conditioning Action Set. 2. The SN Formatting Action cannot be specified with (is mutually exclusive with) the ZN and DN Formatting Actions in the same Action Set.
SP	Service Action execution	Service Provider digits Adds the SP Formatting Action value to the outgoing digit string. The SP Formatting Action is populated during Service Action execution. If the SP Formatting Action is not populated during Service Action execution, the SP Formatting Action does not modify the outgoing digit string. Provisioning Considerations None.

Formatting Action	Populated By	Description
SRFIMSI	Service Action execution	Signaling Relay Function International Mobile Subscriber Identity

Adds the SRFIMSI Formatting Action value to the outgoing digit string.

The SRFIMSI Formatting Action value is populated during Service Action execution. If the SRFIMSI Formatting Action is not populated during Service Action execution, the SRFIMSI Formatting Action does not modify the outgoing digit string.

Provisioning Considerations: None. |
| VMID | Service Action execution | Voice Mail Identifier digits

Adds the VMID Formatting Action value to the outgoing digit string. The VMID Formatting Action is populated during Service Action execution. If the VMID Formatting Action is not populated during Service Action execution, the VMID Formatting Action does not modify the outgoing digit string.

Provisioning Considerations: None. |
| ZN | CA ZNX | Internationally formatted Dialed Number

Adds the ZN Formatting Action value to the outgoing digit string.

Provisioning Considerations:

1. The EAGLE 5 ISS prevents the ZN Formatting Action from being provisioned if the ZNX is not specified in the corresponding Conditioning Action Set.
2. The ZN Formatting Action cannot be specified with (is mutually exclusive with) the DN, SN, AC, and CC Formatting Actions in the same Action Set. |

Provisioning the Outgoing FNAI

After successful Formatting Action execution, NPP sends an outgoing NAI value with the outgoing digit string to the calling service.

The provisioned OFNAI parameter value in each Action Set indicates the value to use for the outgoing NAI value: either a provisioned FNAI Class value that NPP maps to the outgoing NAI value, or the NAI that was sent to NPP with the incoming digit string. See *Outgoing FNAI Class*.

Action Set Provisioning Procedures

Use the following procedures to create, change, and delete Action Sets.

Although there is a step to enter each group of Actions, the consecutively numbered parameters for a group) do not need to be entered sequentially in the command or in consecutive parameter number order in the command. The parameters with comma-separated lists do not need to be entered in a specific sequence. The values in a comma-separated list must be entered in the order in which the values will be used in execution. The steps just indicate the types of Actions and other components that must be provisioned.

Each procedure builds one command. Do not press ENTER to execute the command until a procedure step instructs you to press ENTER.

For example, an Action Set named ACTSET1 contains Conditioning and Formatting Actions to construct the International digit format CC+AC+SN, the CdPNNP Service Action, and an outgoing FNAI value of INTL. The following procedure steps could be used to enter the complete command to create the Action Set; the last step indicates that Enter can be pressed to execute the command.

1. Enter the command keyword; the command line contains `ent-npp-as`
2. Enter the asn parameter to specify the Action Set Name; the command line contains
   `ent-npp-as:asn=actset1`
3. Enter the Conditioning Actions; the command line contains

   ```
   ent-npp-as:asn=actset1:ca1=cc2:ca2=ac3:ca3=sn7
   ```

   or

   ```
   ent-npp-as:asn=actset1:ca=cc2,ac3,sn7
   ```

4. Enter the Service Action; the command line contains

   ```
   ent-npp-as:asn=actset1:ca1=cc2:ca2=ac3:ca3=sn7:sa1=cdpnnp
   ```

   or

   ```
   ent-npp-as:asn=actset1:ca=cc2,ac3,sn7:sa=cdpnnp
   ```

5. Enter the Formatting Actions; the command line contains

   ```
   ent-npp-as:asn=actset1:ca1=cc2:ca2=ac3:ca3=sn7:sa1=cdpnnp:fa1=cc:fa2=ac:fa3=sn
   ```

   or

   ```
   ent-npp-as:asn=actset1:ca1=cc2,ac3,sn7:sa=cdpnnp:fa=cc,ac,sn
   ```

6. Enter the OFNAI value; the command line contains the complete command to create the Action Set:

   ```
   ent-npp-as:asn=actset1:ca1=cc2:ca2=ac3:ca3=sn7:sa1=cdpnnp:fa1=cc:fa2=ac:fa3=sn:ofnai=intl
   ```

   or

   ```
   ent-npp-as:asn=actset1:ca=cc2,ac3,sn7:sa=cdpnnp:fa=cc,ac,sn:ofnai=intl
   ```

7. Press ENTER to execute the command.

Create a New Action Set

Use the following procedure to provision a new Action Set.

Enter each part of one command as described in each step of the procedure. A step near the end of the procedure instructs you to press ENTER to execute the command when the complete command has been entered. See an example in *Action Set Provisioning Procedures* .

1. Enter `ent-npp-as` (the command keyword).
2. Enter the asn parameter to specify the Action Set Name.
3. Enter the Conditioning Action parameters for the Action Set. See the provisioning considerations in *Provisioning Conditioning Actions*, and refer to the command description in the Commands Manual.
4. Enter the Service Actions for the Action Set. See the provisioning considerations in *Provisioning Service Actions*, and refer to the command description in the Commands Manual.
5. Enter the Formatting Actions for the Action Set. See the provisioning considerations in *Provisioning Formatting Actions* , and refer to the command description in the Commands Manual.
6. Enter the OFNAI parameter. See the provisioning considerations in *Provisioning the Outgoing FNAI* , and refer to the command description in the Commands Manual.
7. Press **Enter** to execute the command.
8. Enter the `rtrv-npp-as` command and verify the Action Set entries in the output.

Add an Action to an Existing Group

Use the following procedure to add a Conditioning, Service, or Formatting Action to an existing group in an Action Set.

Note: An Action Set cannot be changed if it is associated with any Rules in Service Rule Sets. Either:

- Delete every Rule that contains the Action Set from the Service Rule Sets, change the Action Set, and add the Rules back into the Service Rule Sets.
- Create a new Action Set that contains the desired changes, and create new Rules that contain the new Action Set in the appropriate Service Rule Sets.

Enter each part of one command as described in each step of the procedure. A step near the end of the procedure instructs you to press ENTER to execute the command when the complete command has been entered. See an example in *Action Set Provisioning Procedures* .

Considerations for adding Actions to a group:

- The new Actions must be supported by the specified service.
- The correct execution sequence of the Actions must be maintained in the consecutively numbered parameters.
- For Service Actions, a new Service Action must be in the correct high-to-low precedence sequence in the consecutively numbered parameters.
- The groups in the Action Set must contain corresponding Actions. For example, if a Conditioning Action populates a Formatting Action, that Formatting Action must be provisioned in the Action Set.

1. Enter the rtrv-npp-as command and specify the Action Set name to display the existing group of Actions.
2. Enter `chg-npp-as` (the command keyword).

3. Enter the asn parameter to specify the Action Set Name.

4. Enter the Action parameters for the group in the Action Set. See the provisioning considerations in *Provisioning Action Sets*, and refer to the command description in the *Commands Manual*.

   Include a parameter for each new Action in the group, in the correct consecutively numbered parameter position for Action execution.

   Renumber existing parameters if needed to maintain the correct consecutively numbered parameter sequence.

5. Press **Enter** to execute the command.

6. Enter the `rtrv-npp-as` command and verify the Action Set entries in the output.

Change an Action in an Existing Group

Use the following procedure to change Conditioning, Service, or Formatting Actions in an existing group in an Action Set.

Note: An Action Set cannot be changed if it is associated with any Rules in Service Rule Sets. Either:

- Delete every Rule that contains the Action Set from the Service Rule Sets, change the Action Set, and add the Rules back into the Service Rule Sets.
- Create a new Action Set that contains the desired changes, and create new Rules that contain the new Action Set in the appropriate Service Rule Sets.

To change one or more Conditioning, Service, or Formatting Action parameter values in an Action Set, the entire group of Action parameters in the existing group for the Action Set must be specified in the `chg-npp-as` command (including the parameters that are not changing values). The new value is specified for each parameter that needs to change value.

Individual Consecutively Numbered Parameters

For example, (Conditioning Actions are shown; the consideration is the same for Service and Formatting Actions)

- Conditioning Actions :ca1=ign1:ca2=ac1:ca3=cc3:ca4=sn2 are specified in the existing Conditioning Action group.
- To change "ca2=ac1" to "ca2=ac3", the following command can be entered:

      chg-npp-as:asn=asn7:ca1=ign1:ca2=ac3:ca3=cc3:ca4=sn2

A Comma-Separated List

For example, (Conditioning Actions are shown; the consideration is the same for Service and Formatting Actions)

- Conditioning Actions ign1, ac1, cc3, and sn2 are specified in the existing Conditioning Action group.
- To change "ac1 to "ac3", the following command can be entered:

      chg-npp-as:asn=asn7:ca=ign1,ac3,cc3,sn2

Considerations for changing Actions in a group:

- The new value must be supported by the specified service.

- The correct execution sequence of the Actions must be maintained in the consecutively numbered parameter.
- For Service Actions, the new Service Action must be in the correct high-to-low precedence sequence in the consecutively numbered parameters.
- The groups in the Action Set must contain corresponding Actions. For example, if a Conditioning Action populates a Formatting Action, that Formatting Action must be provisioned in the Action Set.

1. Enter the `rtrv-npp-as` command and specify the name of the Action Set that contains the group with the Action or Actions to be changed.

2. Enter `chg-npp-as` (the command keyword).

3. Enter the asn parameter to specify the name of the Action Set.

4. Enter all of the Action parameters in the group that are shown in the output in *Step 1*.

   Specify the existing value for each Action parameter that will not change.

   Specify the new value for each Action parameter that will change.

5. Press Enter to execute the command.

6. Enter the `rtrv-npp-as` command and specify the name of the Action Set, to verify the changes.

Remove an Action from an Existing Group

To remove from an Action Set the last Conditioning, Service, or Formatting Action that is executed in a group, the entire group of Action parameters must specified in the command – except for the parameter for the Action that is to be removed.

Individual Consecutively Numbered Parameters

For example, (Conditioning Actions are shown; the consideration is the same for Service and Formatting Actions)

- An Action Set contains Conditioning Actions ca1=x, ca2=y and ca3=w.
- To delete the ca3=w Conditioning Action from the Action Set, enter the following Conditioning Actions in the command:

      chg-npp-as:ca1=x:ca2=y

When the ca3=w parameter is omitted from the command; the w Conditioning Action is removed from the Action Set. The entire group of specified Conditioning Action parameter values replaces the entire previously defined group of values.

To remove from an Action Set an Action that is not the last one that is executed, the entire group of Action parameters must specified in the command – except for the parameter for the Action that is to be removed. The parameters that are consecutively numbered following the removed parameter must be renumbered, so that the entire group of Action parameters is again consecutively numbered.

For example,

- An Action Set contains Conditioning Actions ca1=x, ca2=y and ca3=w.
- To delete the ca2=y Conditioning Action from the Action Set, enter the following command:
  chg-npp-as:ca1=x:ca2=w

When the ca2 parameter is omitted from the command and the ca3 parameter is changed to ca2, the y Conditioning Action is removed from the Action Set. The entire group of specified Conditioning Action parameter values replaces the entire previously defined group of values.

A Comma-Separated List

For example, (Conditioning Actions are shown; the consideration is the same for Service and Formatting Actions)

- An Action Set contains Conditioning Actions x, y, and w.
- To delete the w Conditioning Action from the Action Set, enter the following Conditioning Actions in the command:

      chg-npp-as:ca=x,y

When the w value is omitted from the list; the w Conditioning Action is removed from the Action Set. The entire group of specified Conditioning Action parameter values replaces the entire previously defined group of values.

To remove from an Action Set an Action that is not the last one that is executed, the entire group of Action parameters must specified in the command – except for the parameter for the Action that is to be removed.

For example:

- An Action Set contains Conditioning Actions x, y, and w.
- To delete the y Conditioning Action from the Action Set, enter the following command:

      chg-npp-as:ca=x,w

When the y value is omitted from the list, the y Conditioning Action is removed from the Action Set. The entire group of specified Conditioning Action parameter values replaces the entire previously defined group of values.

Use the following procedure to remove an Action from an Action Set.

Note: An Action Set cannot be changed if it is associated with any Rules in Service Rule Sets. Either:

- Delete every Rule that contains the Action Set from the Service Rule Sets, change the Action Set, and add the Rules back into the Service Rule Sets.
- Create a new Action Set that contains the desired changes, and create new Rules that contain the new Action Set in the appropriate Service Rule Sets.

1. Enter chg-npp-as (the command keyword).
2. Enter the asn parameter to specify the Action Set Name.
3. Enter the consecutively numbered Action parameters or the comma-separated list of values in the group for the Action Set, except for the Action or Actions that are removed. See the provisioning considerations in *Provisioning Action Sets*, and refer to the command description in the *Commands Manual*.

   Renumber any consecutively numbered parameters that follow the removed parameters, to maintain the consecutively numbered parameter sequence.

4. Press **Enter** to execute the command.
5. Enter the rtrv-npp-as command and verify the Action Set entries in the output.

Provisioning Service Rule Sets

A Service Rule Set is collection of Rules associated with a service. A Rule is an association of a filter and an Action Set. Each Rule is provisioned to indicate the Action Set that will be executed for an incoming digit string that matches the filter in the Rule. The combined FNAI Class, Filter Prefix, and Filter Digit Length values of a filter in a Rule determine whether NPP will process an incoming digit string.

When the digit string matches a filter in a Rule for the calling service, the incoming digit string is processed by NPP through the associated Action Set.

If the digit string does not find a filter match in the Rules for the calling service, NPP does not process the string and exits to the calling service.

Up to 20 Service Rule Sets can be provisioned per system. Up to 4096 Rules can be provisioned for one Service Rule Set. Up to 8192 Rules can be provisioned per system. The following commands are used to provision Rules in NPP Service Rule Sets. Each execution of a command creates or modifies one Rule in the Service Rule Set for a service.

Table 25: NPP Service Rule Set Commands

Command	Description	Parameter(s)	Parameter Values
`ent-npp-srs` `chg-npp-srs`	Create an NPP Rule in a Service Rule Set Change the Action Set name in a Rule		
	Service Name	srvn	TTR, TIF, TIF2, TIF3, IARCDPN, IARCGPN, IDPRCDPN, IDPRCGPN, MOSMSGCDPN, MOSMSGCGPN, MOSMSICDPN, MOSMSICGPN, NPPT
	Filter NAI	fnai	INTL: filter messages with NAI=INTL. NATL: filter messages with NAI=NATL. NAI1: filter messages with NAI=NAI1. NAI2: filter messages with NAI=NAI2. NAI3: filter messages with NAI=NAI3. UNKN: filter messages with NAI=UNKN.
	Filter Prefix	fpfx	1 to 16 digit hexadecimal digit string (including single digit wildcard [?]), or wildcard [*].
	Filter Digit Length	fdl	Specific or variable length of the incoming digit string. Decimal value [1..32] or wildcard [*].

Command	Description	Parameter(s)	Parameter Values
	Action Set Name	asn	Ten-character string that uniquely identifies the Action Set to associate with this Rule.
dlt-npp-srs	Delete a Rule from an NPP Service Rule Set		
	Service Name	srvn	TTR, TIF, TIF2, TIF3, IARCDPN, IARCGPN, IDPRCDPN, IDPRCGPN, MOSMSGCDPN, MOSMSGCGPN, MOSMSICDPN, MOSMSICGPN, NPPT
	Filter NAI	fnai	INTL: filter messages with NAI=INTL. NATL: filter messages with NAI=NATL. NAI1: filter messages with NAI=NAI1. NAI2: filter messages with NAI=NAI2. NAI3: filter messages with NAI=NAI3. UNKN: filter messages with NAI=UNKN.
	Filter Prefix	fpfx	Specific or variable length of the incoming digit string. 1 to 16 digit hexadecimal string (including single digit wildcard [?]), or wildcard [*].
	Filter Digit Length	fdl	Decimal value [1..32] or wildcard [*].
rtrv-npp-srs	Retrieve all NPP Service Rule Sets or the Rules with the specified content		
	Service Name	srvn	TTR, TIF, TIF2, TIF3, IARCDPN, IARCGPN, IDPRCDPN, IDPRCGPN, MOSMSGCDPN, MOSMSGCGPN, MOSMSICDPN, MOSMSICGPN, NPPT
	Filter NAI	fnai	INTL: Display Rules with NAI=INTL. NATL Display Rules with NAI=NATL. NAI1: Display Rules with NAI=NAI1. NAI2: Display Rules with NAI=NAI2. NAI3: Display Rules with NAI=NAI3. UNKN: Display Rules with NAI=UNKN.

Command	Description	Parameter(s)	Parameter Values
	Filter Prefix	fpfx	Specific or variable length of the incoming digit string. 1 to 16 digit hexadecimal string (including single digit wildcard [?]), or wildcard [*].
	Filter Digit Length	fdl	Decimal value [1..32] or wildcard [*].
	Action Set Name	asn	Added new parameter Ten-character string that uniquely identifies the Action Set associated with the Rule(s).

Considerations for provisioning Rules (Refer to the command descriptions in the *Commands Manual* for detailed dependencies and valid parameter values for provisioning Rules):

- A Rule cannot be provisioned with an OFNAI-Class value that is not supported by the specified service. For example, if NAI1=NONE for the service, a Rule for the service cannot contain an OFNAI Class value of NAI1.
- A Rule that is provisioned with FDL=* must be associated with a Conditioning Action group that contains the ZNX, DNX, or SNX Conditioning Action.
- A Rule that is provisioned with FDL=<specific value> cannot be associated with a Conditioning Action group that contains Conditioning Actions that process more than <specific value> number of digits.
- A Rule cannot be associated with an Action Set that contains Service Actions that are not supported by the service for the Service Rule Set
- A Rule cannot be associated with an Action Set that contains Service Actions with precedence values that are not valid for the specified service.
- A Rule cannot be associated with an Action Set that contains Formatting Actions that are not supported by the specified service.
- A Rule cannot be provisioned with an FPFX digit length greater than the specified FDL value when both the FPFX and FDL values are specific values (not wildcard values).

Provisioning the Filter NAI Class (FNAI Class)

The Filter NAI Class indicates the mnemonic that has the numeric value that must match the incoming NAI value before NPP processing will continue.

NPP maps the incoming service-specific NAI value to an FNAI Class mnemonic (NATL, INTL, NAI1, NAI2, NAI3, UNKN). Each mnemonic is assigned a number value. The incoming NAI value is mapped to the mnemonic with the matching number. For example, if the incoming NAI of 4 indicates an internationally formatted incoming digit string, the INTL mnemonic must be provisioned with the value 4 and the FNAI Class value for the filter must be INTL.

If the service does not need support for an FNAI Class, the mnemonic value is provisioned to NONE. (The digit string formatting is inferred based on a protocol-specific NAI value.) A Rule cannot specify that FNAI Class in the FNAI parameter value.

Provisioning an FNAI Class mnemonic value to NONE for a service can be done only if the Service Rule Set for the service is empty.

Provisioning the Filter Prefix (FPFX)

The Filter Prefix is a hexadecimal digit string. When an FPFX value is provisioned, the digits at the beginning of an incoming digit string must match the FPFX digits for NPP processing to continue.

The provisioned FPFX value can be a wildcard (*) to consider any digits in the incoming string to be a match.

The provisioned FPFX digits can contain single digit wildcard characters (?) in any positions of the value except the last digit. The total number of single digit wildcard characters in all of the filter prefixes in the Service Rule Set for a service cannot exceed 25.

The FPFX string can be populated to the FPFX Formatting Action value when the FPFX Conditioning Action is provisioned in the associated Action Set in the Rule. The FPFX digit string will provide the first digits to be inserted in the outgoing digit string by the Formatting Action processing. The FPFX value in the Rule cannot be a wildcard (*) when the FPFX Conditioning Action is provisioned.

Provisioning the Filter Digit Length (FDL)

The Filter Digit Length specifies how many digits the incoming digit string must have to match the filter and continue NPP processing. The FDL value can be a wildcard (*) to allow any number of digits to match the filter.

For Rules with FDL=*, the associated Conditioning Action group must contain the ZNX, DNX, or SNX Conditioning Action. For Rules with specific FDL values (not wildcard) the associated Conditioning Action group must process the entire number of digits (by ignoring digits with the IGN Conditioning Actions, by other Conditioning Action processing, or both).

Validating Conditioning Actions during Rule Provisioning

During NPP Rule provisioning, NPP validates that Conditioning Action execution can be successful with the Conditioning Actions provisioned in the Action Set and the filter values associated with the Rule. Refer to the *Commands Manual* for provisioning considerations for Rules, including the following considerations:

- The Action Set must contain Conditioning Actions, Service Actions in correct precedence sequence, and Formatting Actions that are supported by the calling service that uses the Rule.
- For Rules with FDL=*, the associated Conditioning Action group must contain the ZNX, DNX, or SNX Conditioning Action for Conditioning Action execution to be considered successful.
- For Rules with specific FDL values (not wildcard) the associated Conditioning Action group must process the entire number of digits (by ignoring digits with the IGN Conditioning Actions, by other Conditioning Action processing, or both). For example, if the NPP Rule filter consists of FPFX='0123', FNAI=INTL and FDL=16, the associated Conditioning Action Set would need to process all 16 digits of the incoming digit string for Conditioning Action execution to be considered successful.

Service Rule Set Provisioning Procedures

Use the following procedures to create, change, and delete a Rule in a Service Rule Set for the specified service. The entry of one command operates on one Rule in the Service Rule Set.

Although there is a step to enter each component of the Rule, the parameters for a Rule do not need to be entered in the command in the sequence shown in the procedure. The steps just indicate the types of components that must be provisioned.

Each procedure builds one command. Do not press ENTER to execute the command until a procedure step instructs you to press ENTER.

For example, a Rule for the TIF service contains a Filter of FNAI=INTL, match any prefix, and match variable digit lengths. The Rule uses the ACTSET1 Action Set. The following procedure steps could be used to enter the complete command to create the Rule; the last step indicates that ENTER can be pressed to execute the command.

1. Enter the command keyword; the command line contains `ent-npp-srs`
2. Enter the name of the calling service; the command line contains `ent-npp-srs:srvn=tif`
3. Enter the FNAI value; the command line contains `ent-npp-srs:srvn=tif:fnai=intl`
4. Enter the Filter Prefix value; the command line contains
   `ent-npp-srs:srvn=tif:fnai=int:fpfx=*`
5. Enter the Filter digit Length value; the command line contains
   ent-npp-srs:srvn=tif:fnai=int:fpfx=*:fdl=*
6. Enter the Action Set name to be associated with the Filter; the command line contains
   `ent-npp-srs:srvn=tif:fnai=int:fpfx=*:fdl=*:asn=actset1`
7. Press ENTER to execute the command.

Create a New Rule in a Service Rule Set

Use the following procedure to provision a new Rule in a Service Rule Set for the specified service. The Rule provisioning validates that the Conditioning Actions in the associated Action Set can execute successfully for the incoming digit string selected by the Rule filter (see Validating Conditioning Actions during Rule Provisioning).

Enter each part of one command as described in each step of the procedure. A step near the end of the procedure instructs you to press ENTER to execute the command when the complete command has been entered. See an example in *Service Rule Set Provisioning Procedures* .

1. Enter ent-npp-srs (the command keyword).
2. Enter the srvn parameter to specify the name of the calling service that will use the Rule.
3. Enter the FNAI filter parameter. See the provisioning considerations in *Provisioning the Filter NAI Class (FNAI Class)*, and refer to the command description in the Commands Manual.
4. Enter the Filter Prefix parameter. See the provisioning considerations in *Provisioning the Filter Prefix (FPFX)*, and refer to the command description in the Commands Manual.
5. Enter the Filter Digit Length parameter. See the provisioning considerations in *Provisioning the Filter Digit Length (FDL)*, and refer to the command description in the Commands Manual.
6. Enter the Action Set Name parameter to specify the Action Set that is associated with this Rule.
7. Press **Enter** to execute the command.

8. Enter the `rtrv-npp-srs` command with the calling service name and verify the Rule entry in the output.

Change the Action Set Name in a Rule

Use the following procedure to change the Action Set Name in a Rule. All of the parameters must be specified in the command. Specify the new Action Set Name in the asn parameter. The Rule provisioning validates that the Conditioning Actions in the associated Action Set can execute successfully for the incoming digit string selected by the Rule Filter (see Validating Conditioning Actions during Rule Provisioning).

Enter each part of one `chg-npp-srs` command as described in each step of the procedure. A step near the end of the procedure instructs you to press ENTER to execute the command when the complete command has been entered. See an example in *Service Rule Set Provisioning Procedures* .

Note: Only the Action Set Name can be changed in a Rule. If any Filter values need to be changed for use with the same Action Set, a new Rule must be created with the new Filter values and the same Action Set Name. The existing Rule can be deleted, or it can remain in the Service Rule Set if it does not adversely affect the filtering process for the service.

1. Enter the `rtrv-npp-srs` command with the service name to display the existing values for the Rule that needs to change for the service, and press ENTER.
2. Enter `chg-npp-srs` (the command keyword).
3. Enter the srvn parameter to specify the name of the calling service that uses the Rule.
4. Enter the fnai parameter, with the existing value. See the provisioning considerations in *Provisioning the Filter NAI Class (FNAI Class)*, and refer to the command description in the Commands Manual.
5. Enter the fpfx parameter, with the existing value. See the provisioning considerations in *Provisioning the Filter Prefix (FPFX)*, and refer to the command description in the Commands Manual.
6. Enter the fdl parameter, with the existing value. See the provisioning considerations in *Provisioning the Filter Digit Length (FDL)*, and refer to the command description in the Commands Manual.
7. Enter the asn parameter to specify the name of the new Action Set that is to be associated with this Rule.
8. Press ENTER to execute the command.
9. Enter the `rtrv-npp-srs` command with the calling service name and verify the Rule entry in the output.

Remove a Rule from a Service Rule Set

Use the following procedure to remove a Rule from a Service Rule Set. Note: This procedure builds one dlt-npp-srs command. DO NOT PRESS ENTER to execute the command until a procedure step instructs you to press **Enter**.

Enter each part of one `dlt-npp-srs` command as described in each step of the procedure. A step near the end of the procedure instructs you to press ENTER to execute the command when the complete command has been entered. See an example in *Service Rule Set Provisioning Procedures* .

1. Enter the `rtrv-npp-srs` command with the service name to display the existing values for the Rule that needs to be removed for the service, and press ENTER.
2. Enter `dlt-npp-srs` (the command keyword).
3. Enter the srvn parameter to specify the name of the calling service that uses the Rule.

4. Enter the fnai parameter, with the existing value. See the provisioning considerations in *Provisioning the Filter NAI Class (FNAI Class)*, and refer to the command description in the Commands Manual.

5. Enter the fpfx parameter, with the existing value. See the provisioning considerations in *Provisioning the Filter Prefix (FPFX)*, and refer to the command description in the Commands Manual.

6. Enter the fdl parameter, with the existing value. See the provisioning considerations in *Provisioning the Filter Digit Length (FDL)*, and refer to the command description in the Commands Manual.

7. Press ENTER to execute the command.

8. Enter the `rtrv-npp-srs` command with the calling service name and verify that the Rule was removed for the service.

Provisioning Service Data

The procedures in this section describe how to change the On or Off status of the specified service, define Delimiter values to use in formatting the outgoing digit string, and define the FNAI Class mapping value for the outgoing NAI.

Note: For the IDP Relay services, the FNAI mapping parameter values in the Service Data commands should not be changed from the default values if:

• For the IDPRCDPN service, the TTROPTS SNAI option value is not INCOMING.
• For the IDPRCGPN service, the FNAI mapping parameter values in the Service Data commands should not be changed from the default values if the TTROPTS CGSNAI option value is not INCOMING.

The following commands are used to provision Service Data:

Table 26: NPP Service Data Commands

Command	Description	Parameter(s)	Parameter Values
`chg-npp-serv`	Change Service State, NAI-to-FNAI class mappings, and Delimiter values.		
	Service Name	srvn	NPPT, TIF, TIF2, TIF3, IARCDPN, IARCGPN, IDPRCDPN, IDPRCGPN, MOSMSGCDPN, MOSMSGCGPN, MOSMSICDPN, MOSMSICGPN
	Service On/Off Status	status	OFF: disable ON: enable
	Delimiter digits used in NPP Formatting Action execution	dlma, dlmb, dlmc, dlmd, dlme, dlmf, dlmg, dlmh, dlmi, dlmj, dlmk, dlml, dlmm, dlmn, dlmo, dlmp	1 to 16 hexadecimal digits or NONE Default value for all services is NONE. **Note:** If a TIF or IDP Relay service has DLMA-DLMC values that are not NONE in the TIFOPTS or TTROPTS table, those values from TIFOPTS or TTROPTS will be used by Formatting Action execution. The TIFOPTS and TTROPTS

Command	Description	Parameter(s)	Parameter Values
			delimiter values are set by the chg-tifopts and chg-ttropts commands.
	FNAI=INTL NAI mapping	intl	Decimal value [0..255] or NONE.
	FNAI=NATL NAI mapping	natl	Decimal value [0..255] or NONE.
	FNAI=NAI1 NAI mapping	nai1	Decimal value [0..255] or NONE.
	FNAI=NAI2 NAI mapping	nai2	Decimal value [0..255] or NONE.
	FNAI=NAI3 NAI mapping	nai3	Decimal value [0..255], or NONE.
	Outgoing NAI mapping value for OFNAI-Class =UNKN.	unkn	Decimal value [0.255].
rtrv-npp-serv	Retrieve service Status for one or all services, NAI to FNAI-class mappings, Delimiter values, and Service Action precedence.		
	Service name	srvn	NPPT, TIF, TIF2, TIF3, IARCDPN, IARCGPN, IDPRCDPN, IDPRCGPN, MOSMSGCDPN, MOSMSGCGPN, MOSMSICDPN, MOSMSICGPN
	Output mode	mode	Output is for all services if the Service Name is not specified. FULL: Full output contains Service Name, service status, Service Actions, Service Action precedence, 6 NAI values, and Delimiter values. DEFAULT: Output contains service name, status, Service Actions, and Service Action precedence.

Provisioning the Service Status

The status for a service must be set to On before NPP will process incoming digit strings from the service:

Before the service status can be set to On, at least one Rule must be provisioned in the Service Rule Set for the service.

The service status should be Off until all service provisioning is complete and NPP is ready to receive and process digit strings for the service.

Provisioning FNAI Class Mnemonic Values

NPP maps the incoming service-specific NAI value to an FNAI Class mnemonic (NATL, INTL, NAI1, NAI2, NAI3, UNKN). Each mnemonic is assigned a number value. The incoming NAI value is mapped to the mnemonic with the matching number. For example, if the incoming NAI of 4 indicates an internationally formatted incoming digit string, the INTL mnemonic must be provisioned with the value 4.

Any NAI value that is not mapped to an FNAI-Class is interpreted as UNKN (Unknown). The UNKN (Unknown) mnemonic cannot have a value of NONE.

If the service does not need support for an FNAI Class, the mnemonic value is provisioned to NONE. (The digit string formatting is inferred based on a protocol-specific NAI value.)

A Rule cannot specify an FNAI Class mnemonic that has a value of NONE in the FNAI filter parameter value.

Provisioning an FNAI Class mnemonic value to NONE for a service can be done only if the Service Rule Set for the service is empty.

Provisioning Delimiter Digits

TIF and IDP Relay feature-specific delimiters (DLMA through DLMC) can be provisioned in the TIFOPTS table or TTROPTS table.

NPP initializes 16 delimiters (DLMA through DLMP) by extracting data values from the NPP service delimiters, and replaces the NPP DLMA thru DLMC values with feature-specific DLMA through DLMC delimiter values that are not none from the TIFOPTS table and the TTROPTS table. This replacement applies only to TIF services (TIF, TIF2, TIF3) and IDP Relay services (IDPRCDPN, IDPRCGPN). The DLMA through DLMC values from the TIFOPTS or TTROPTS tables will be used in NPP processing. (The feature-specific provisioning of DLMA through DLMC will be removed in a future EAGLE 5 ISS release.)

Service Data Provisioning Procedures

Use the following procedures to change the On or Off status of the specified service, define Delimiter values to use in formatting the outgoing digit string, and define FNAI Class mnemonic mapping values for the outgoing NAI.

Each procedure builds one command. Do not press ENTER to execute the command until a procedure step instructs you to press ENTER.

For example, the following procedure steps could be used to enter FNAI mnemonic values for the TIF service; the last step indicates that ENTER can be pressed to execute the command.

- Enter the command keyword; the command line contains `chg-npp-serv`
- Enter the name of the calling service; the command line contains `chg-npp-serv:srvn=tif`

- Enter each FNAI mnemonic parameter; the command line contains
  `chg-npp-serv:srvn=tif:intl=3:natl=4`
- Press ENTER to execute the command.

Change the Status of a Service

The service Status cannot be changed to on if the Service Rule Set contains no Rules for the service.

Enter each part of one `chg-npp-serv` command as described in each step of the procedure. A step near the end of the procedure instructs you to press ENTER to execute the command when the complete command has been entered. See an example in *Service Data Provisioning Procedures*.

1. Enter the `rtrv-npp-srs` command with the srvn parameter to display the Service Rule Set for the service.
2. If at least one Rule is listed in the Service Rule Set for the service, go to *Step 4*.
3. If no Rules for the service are shown in the output from *Step 1*, use the procedure described in *Create a New Rule in a Service Rule Set* to provision at least one Rule for the service. Then continue with *Step 4*.
4. Enter `chg-npp-serv` (the command keyword).
5. Enter the srvn parameter to specify the name of the calling service.
6. Enter the status parameter and specify the new status of the service (on or off).
7. Press ENTER to execute the command.
8. Enter the `rtrv-npp-serv` command with the name of the service in the srvn parameter, and verify the new Status of the service in the output.

Change FNAI Class Mnemonic Values

Use this procedure to change FNAI Class mnemonic values for a calling service.

The value of an FNAI Class mnemonic cannot be changed to NONE if the Service Rule Set contains any Rules for the service.

Enter each part of one command as described in each step of the procedure. A step near the end of the procedure instructs you to press ENTER to execute the command when the complete command has been entered. See an example in *Service Data Provisioning Procedures*.

1. Enter the `rtrv-npp-serv` command with the srvn parameter to display the FNAI Class mnemonic values for the service.
2. Enter `chg-npp-serv` (the command keyword).
3. Enter the srvn parameter to specify the name of the calling service.
4. Enter one or more FNAI Class mnemonic parameters with the new value for each changing parameter.
5. Press ENTER to execute the command.
6. Enter the `rtrv-npp-serv` command with the name of the service in the srvn parameter, and verify the changes in the output.

Change Delimiter Values

Use this procedure to change the value of one or more Delimiter digit strings (DLMA-DLMP parameters) for a service.

Enter each part of one command as described in each step of the procedure. A step near the end of the procedure instructs you to press ENTER to execute the command when the complete command has been entered. See an example in *Service Data Provisioning Procedures*.

1. Enter the `rtrv-npp-serv` command with the srvn parameter to display the Delimiter values for the service.
2. Enter `chg-npp-serv` (the command keyword).
3. Enter the srvn parameter to specify the name of the calling service.
4. Enter one or more Delimiter parameters with the new value for each parameter.
5. Press ENTER to execute the command.
6. Enter the `rtrv-npp-serv` command with the name of the service in the srvn parameter, and verify the new values in the output.

NPP Test Service

The NPP Test Service is a function that provides provisioning and testing of NPP Action Sets and Rules associated with the NPPT Service Rule Set. Execution of an NPPT `tst-npp-msg` command injects a test message through an interface to validate the provisioned NPPT Service Rule Set, without affecting live traffic.

The test message execution produces EAGLE 5 ISS terminal output that contains the following information:

- The service
- The Rule in the Service Rule Set that NPP selected as a match (if any)
- The Conditioning Actions executed (if any)
- The Service Actions executed (if any)
- The Formatting Actions executed (if any)
- The original digit string
- The conditioned digit string
- The outgoing digit string
- The continuation indicators from each executed Service Action
- The formatting indicators from each executed Service Action

When Action Sets and Rules have been validated using NPPT, they can be used in production processing by provisioning the same Action Sets and Rules for "real" services, but including the supported Service Actions and FNAI values for the calling services.

Note: Each feature or function that uses NPP has its own test message provisioning and use of the `tst-msg` command to validate service-specific NPP provisioning. Refer to the *Feature Manual* for each feature for more information.

NPPT Provisioning

NPPT uses the Service Actions, precedences, and behavior shown in *Table 27: NPPT Service Actions*.

An EPAP-based feature must be enabled in the system before an NPPT Service Action (except CDIAL) can be provisioned in an Action Set.

Table 27: NPPT Service Actions

Service Action Name	Precedence	Behavior
RTDBTRNSP	100	Looks for DN in RTDB; looks for SP or RN in found DN; checks for Formatting Action processing
RTDBTSP	50	Looks for DN in RTDB; looks for SP in found DN
RTDBTRN	50	Looks for DN in RTDB; looks for RN in found DN
CDIAL	10	Corrective Dialing Checks for Formatting Action processing

NPPT Provisioning Examples

The following examples for a given numbering plan show the difference between provisioning for incoming calls starting with '9090' and those that start with '060'. Refer to the command descriptions, parameter values, and output examples and descriptions in the *Commands Manual* for more information about the commands used for NPPT and the test message output.

SCENARIO 1: PREFIX '9090'

DESCRIPTION:

- Incoming digit strings contain a Country Code (CC), an Area Code (AC) and a Subscriber Number (SN).
- Incoming digit strings beginning with '9090' will have the FNAI Class set to international and the Filter Digit Length set to 16 digits.

RULES TO APPLY:

- Provision an Action Set that conditions the incoming digits, applies the Service Action RTDBTRN, and formats the outgoing digits according to an international format.
- Provision an NPP rule with FPFX='9090', FDL=16 and FNAI=INTL.

PROVISIONING PROCESS:

- Provision the NPP Action Set:

  ```
  ent-npp-as:asn=set1:ca1=IGN4:ca2=CC2:ca3=DN10:sa1=RTDBTRN
  :fa1=CC:fa2=RN:fa3=DN:ofnai=INTL
  ```

  or

```
ent-npp-as:asn=set1:ca=IGN4,CC2,DN10:sa=RTDBTRN:fa=CC,RN,DN:ofnai=INTL
```

- Provision the NPP Rule:

  ent-npp-srs:srvn=nppt:fnai=INTL:fpfx=9090:fdl=16:asn=set1

- Provision the NPP Service State:

  chg-npp-serv:srvn=nppt:intl=7:natl=5:nai1=12:nai2=13:nai3=14

  chg-npp-serv:srvn=nppt:status=ON

- Send an NPPT test message:

  tst-npp-msg:loc=<Service Module card location>:digs=9090920292252645:nai=7:mode=full

The following results assume that the RTDB contains the following entry:

- DN 209192252645 with an RN entity containing the digits abcd

<u>Test message output:</u>

```
          1         2         3         4         5         6         7         8
1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
SERVICE NAME = nppt SERVICE STATUS = ON
     INC DIGITS = 9090920292252645
     NAI = 7 FNAI = intl FDIGLEN = 16

MATCHING RULE
     FNAI = intl FDIGLEN = 16 FPFX = 9090
     ACTION SET NAME = set1

CONDITIONING RESULT
     CA1 = ign4       EXECUTED = Y RESULT = PASS
     CA2 = cc2        EXECUTED = Y RESULT = PASS
     CA3 = dn10       EXECUTED = Y RESULT = PASS
     INC DIGITS = 9090920292252645
     COND DIGITS = 920292252645

SERVICE APPLICATION
     SA1 = rtdbtrn    EXECUTED = Y FORMAT = Y

FORMATING RESULT
     FA1 = cc         EXECUTED = Y RESULT = PASS
     FA2 = rn         EXECUTED = Y RESULT = PASS
     FA3 = dn         EXECUTED = Y RESULT = PASS
     OUTG DIGITS = 92abcd0292252645
     OUTG FNAI = intl
;
```

SCENARIO 2: PREFIX '060'

<u>DESCRIPTION:</u>

- Incoming digit string contains an Area Code (AC) and a Subscriber Number (SN).
- Incoming digit strings starting with '060' will have FNAI Class set to National and Filter Digit Length set to 16 digits.

<u>RULES TO APPLY:</u>

- Provision an Action Set that conditions the incoming digits, applies the Service Action RTDBTRNSP, and formats the outgoing digits by pre-pending the RN or the SP to the original digits.
- Provision an NPP rule with FPFX='060', FDL=13 and FNAI=NATL

PROVISIONING PROCESS:

- Provision the NPP Action Set:

```
ent-npp-as:asn=set2:ca1=CCDEF:ca2=IGN3:ca3=DN7:sa1=RTDBTRNSP:
fa1=RN:fa2=SP:fa3=ORIG:ofnai=NATL
```

or

```
ent-npp-as:asn=set2:ca=CCDEF,IGN3,DN7:sa=RTDBTRNSP:
fa=RN,.SP,ORIG:ofnai=NATL
```

- Provision the NPP Rule:

  ent-npp-srs:srvn=nppt:fnai=NATL:fpfx=060:fdl=13:asn=set2

- Provision the NPP service state:

  chg-npp-serv:srvn=nppt:intl=7:natl=5:nai1=12:nai2=13:nai3=14

  chg-npp-serv:srvn=nppt:status=ON

- Send an NPPT test message:

  tst-npp-msg:loc=<Service Module card location>:digs=0609192252645:nai=5

The following results assume that the RTDB contains the following entry:

- DN 989192252645 with an SP entity containing the digits 1

Test message output:

```
          1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
SERVICE NAME = nppt SERVICE STATUS = ON
     INC DIGITS = 0609192252645
     NAI = 5 FNAI = natl FDIGLEN = 13

MATCHING RULE
     FNAI = natl FDIGLEN = 13 FPFX = 060
     ACTION SET NAME = set2

CONDITIONING RESULT
     CA1 = ccdef       EXECUTED = Y RESULT = PASS
     CA2 = ign3        EXECUTED = Y RESULT = PASS
     CA3 = dn10        EXECUTED = Y RESULT = PASS
     INC DIGITS = 0609192252645
     COND DIGITS = 989192252645

SERVICE APPLICATION
     SA1 = rtdbtrnsp  EXECUTED = Y FORMAT = Y

FORMATING RESULT
     FA1  = rn         EXECUTED = Y RESULT = PASS
     FA2  = sp         EXECUTED = Y RESULT = PASS
     FA3  = orig       EXECUTED = Y RESULT = PASS
     OUTG DIGITS = 1bce0609192252645
     OUTG FNAI = natl
```

Glossary

A

Action Set
    A collection of NPP CAs, FAs, and SAs.

C

CA
    Conditioning Action

    NPP CAs indicate what digit conditioning actions to execute when processing a digit string.

E

EPAP
    EAGLE Provisioning Application Processor

F

FA
    Framework Advisory

    NPP Formatting Action

    FAs determine how the outgoing digit string is formatted.

FDL
    Filter Digit Length

FNAI
    Filter Nature of Address Indicator

    Class values depicted as mnemonics for specifying a filter, represented by an enumerated type as NATL, INTL, NAI1, NAI2, NAI3, UNKN.

FPFX
    Filter Prefix

    Digit string used to classify incoming digit strings.

N

NAI
    Nature of Address Indicator

N

Standard method of identifying
users who request access to a
network.

NPP

Numbering Plan Processor

Provides the flexible service
application behavior that satisfies
the needs of customers resident in
complex signaling networks. It is
used for number conditioning,
RTDB lookup, and outgoing
number formatting.

O

OFNAI

Outgoing FNAI

P

Prepaid IDP Query Relay

A feature (IDP Relay) that provides
a mechanism to insure correct
charging for calls from prepaid
subscribers in a portability
environment.

S

SA

Service Action

Indicates what service-specific
behaviors to execute when
processing a digit string.

Service Rule Set

A collection of rules associated
with a service.

T

TIF

Triggerless ISUP Framework