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EAGLE**

Feature Manual - INP/AINPQ

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Chapter 1

Introduction

Topics:

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This manual presents an overview of the INP and AINPQ features that allow wireline and wireless operators to support service provider portability in telephone networks in locations worldwide except North America. The INP and AINPQ features allow subscribers in ITU networks to change to a new service provider while retaining their original phone number.

The Service Portability feature can be used with INP and AINPQ to allow subscribers to change to another technology within the same service provider.

The S-Port Subscriber Differentiation feature can be used with Service Portability for INP Message Relay, to allow use of ASD digits to provide an additional Routing Number per own-network subscriber. (ASD digits, if provisioned, are used in place of GRN digits.)

Overview

This manual presents an overview of the following features that allow wireline and wireless operators to support service provider portability in telephone networks in locations worldwide except North America. The following features allow subscribers in ITU networks to change to a new service provider while retaining their original phone number.

- INP (INAP-based Number Portability)
- AINPQ (ANSI-41 Number Portability Query)

The Service Portability feature can be used with the INP and AINPQ features to allow subscribers to change to another technology within the same provider while retaining their original phone number.

The S-Port Subscriber Differentiation feature can be used with Service Portability for INP Message Relay (INPMR) to allow use of ASD digits to provide an additional Routing Number per own-network subscriber. (ASD digits, if provisioned, are used in place of GRN digits.)

The INP Circular Route Prevention feature can be used with INP to detect and prevent circular routes that can occur due to inconsistency across the network.

The INP and AINPQ features have many functions in common. The Message Relay function is the same for both features. Both features support ported variable-length numbers up to 15 digits, without requiring the padding of numbers in the provisioning interfaces. The two features differ in how queries to the Real Time Database (RTDB) are made:

- The INP feature supports INAP (Intelligent Network Application Protocol) TCAP (Transaction Capabilities Application Part) queries.
- The AINPQ feature supports ANSI-41 (American National Standards Institute) TCAP queries.

To indicate which functions are common to both features and which are unique to a given feature, the following terminology is used in this manual:

- INP/AINPQ indicates functions that apply to either or both of the INP and AINPQ features
- INP, used by itself, indicates function that applies only to the INP feature
- AINPQ, used by itself, indicates function that applies only to the AINPQ feature

The INP and AINPQ features can be enabled independent of each other, or both can be enabled on one EAGLE 5 ISS node. Both features are mutually exclusive with North American LNP (Local Number Portability) on an EAGLE 5 ISS node.

Scope and Audience

This manual is intended for anyone responsible for installing, maintaining, and using the INP and/or AINPQ feature in the EAGLE 5 ISS. Users of this manual and the others in the EAGLE 5 ISS family of documents must have a working knowledge of telecommunications and network installations.

Manual Organization




This document is organized into the following chapters:


- [Introduction](#) contains general information about the INP and AINPQ documentation, organization of this manual, and how to get technical assistance.
- [Feature Description](#) describes the functions of INP and AINPQ and the INP and AINPQ message protocols. Use of the INP Circular Route Prevention feature and the Service Portability feature with INP are also described.
- [EAGLE 5 ISS Commands](#) describes the EAGLE 5 ISS commands that support the INP and AINPQ features.
- [INP/AINPQ Feature Configuration](#) describes the commands and procedures used to configure the INP and AINPQ features, the INP Circular Route Prevention feature, the INP local subsystem, and the Service Portability feature.
- [INP/AINPQ Measurements](#) describes INP / AINPQ-related measurements, measurements reports, and methods of collection.
- [INP/AINPQ Maintenance](#) describes INP / AINPQ-related UAMs and UIMs, commands that can be used for maintenance functions; and status and alarm reporting for the EAGLE 5 ISS, EPAP, Service Module cards, services, and the local subsystem.

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

Icon	Description
 DANGER	Danger: (This icon and text indicate the possibility of <i>personal injury</i> .)
 WARNING	Warning: (This icon and text indicate the possibility of <i>equipment damage</i> .)
 CAUTION	Caution: (This icon and text indicate the possibility of <i>service interruption</i> .)

Icon	Description
	Topple: (This icon and text indicate the possibility of <i>personal injury and equipment damage.</i>)

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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.

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A critical situation is defined as a problem with the installed equipment that severely affects service, traffic, or maintenance capabilities, and requires immediate corrective action. Critical situations affect service and/or system operation resulting in one or several of these situations:

- 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.

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.

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

Feature Description

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- [INP/AINPQ Message Protocol.....35](#)
- [INP Circular Route Prevention \(INP CRP\).....40](#)
- [Service Portability.....41](#)
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This chapter describes the following features:

- The INAP-based Number Portability (INP) and ANSI-41 Number Portability Query (AINPQ) features provide subscribers the ability to switch their telephone service to a new service provider while retaining their original telephone number.
- The Service Portability feature allows subscribers to change to another technology within the same service provider while retaining their original telephone number.
- The S-Port Subscriber Differentiation feature can be used with Service Portability for INP Message Relay (INPMR) to allow use of ASD digits to provide an additional Routing Number per own-network subscriber. (ASD digits, if provisioned, are used in place of GRN digits.)
- The INP Circular Route Prevention feature detects and prevents circular routes when used with the INP feature.

The chapter includes an overview of the EAGLE Provisioning Application Processor (EPAP). EPAP provides the Real Time Database (RTDB) that is used in the database lookup functions.

Overview

Throughout the world, wireline and wireless operators are receiving directives from their national regulators to support service provider number portability in their networks.

The INAP-based Number Portability (INP) and ANSI-41 Number Portability Query (AINPQ) features provide subscribers the ability to switch their telephone service to a new service provider while retaining their original telephone number.

The Service Portability feature can be used with INP and AINPQ to allow own-network subscribers to move between IS41 and GSM technology within the same network-operator while keeping the same subscriber number. Service Portability allows use of RTDB GRN Entity digits for own-network GSM and IS41 subscribers in place of the SP Entity digits (RN entity digits in case of RN/PT=0 own-network IS41 subscriber) used in INP and AINPQ digits formats. See [Service Portability](#).

The S-Port Subscriber Differentiation feature can be used with Service Portability and the INP Message Relay (INPMR) service to allow identification of subscribers for special processing, by assigning multiple Routing Numbers per in-network subscriber. For example, provisioned Additional Subscriber Data can be assigned as a subscriber's private Routing Number (for Message Relay) and the provisioned GRN can be assigned as the subscriber's public Routing Number (for Query/Response functions). Provisioned ASD digits are used in place of GRN digits when S-Port Subscriber Differentiation is on and Service Portability is applicable for the INPMR service.

The INP Circular Route Prevention feature is used only by INP, for both the INP Query and INP Message Relay services, for the detection and prevention of circular routes on the EAGLE 5 ISS. See [INP Circular Route Prevention \(INP CRP\)](#).

Note: Both INP and AINPQ are mutually exclusive with North American Local Number Portability (LNP), on an EAGLE 5 ISS node. If LNP is enabled on an EAGLE 5 ISS node, INP, AINPQ, or both cannot be enabled on that node, and if INP, AINPQ, or both are enabled on an EAGLE 5 ISS node, LNP cannot be enabled on that node.

The Tekelec implementation of an NPDB (Number Portability Database) is the Real Time database (RTDB). Both the INP and AINPQ features use the same RTDB for number portability processing. The Message Relay function is the same for both features. INP uses the INAP TCAP protocol and AINPQ uses the ANSI-41 TCAP protocol for Query functions.

The following functions are available for both the INP and AINPQ features:

- Ported number lengths up to 15 digits.
 - True variable-length numbers are supported without requiring padding of numbers in the provisioning and other input/output interfaces.
 - Number lengths vary between countries and may even vary within a country. The RTDB structure supports numbers of varying length without requiring software modifications.

- Number normalization

INP/AINPQ can be provisioned to accept queries with or without special prefixes on the DN. This capability allows INP/AINPQ to accommodate SSPs that do or do not include the prefix in their queries to the RTDB.

- INP/AINPQ can be provisioned to remove automatically a special prefix (such as an access code ' or 1). INP/AINPQ can strip off the prefix, perform a database query using the international

version of the DN, and return a response to the switch. (All RTDB queries are performed using the international version of the DN.)

- INP/AINPQ can be provisioned with options to map incoming NAI values to provisioned service NAI values for use in number conditioning.
- National Escape Code (NEC) removal
INP/AINPQ can be provisioned to automatically remove the National Escape Code (up to 5 hexadecimal digits).
- Additional Subscriber Data (ASD)
Destination Routing Address (DRA) formats can include Additional Subscriber Data from the RTDB lookup. One use of ASD is for CNL information.
Additional Subscriber Data is supported in the outgoing DRA in INAP Connect messages or in the ANSI-41 Return Result with Routing Digits, if configured.
- Generic Routing Number (GRN)
Destination Routing Address (DRA) formats can include the Generic Routing Number from the RTDB lookup.
The Generic Routing Number is supported in the outgoing DRA in INAP Connect messages or in the ANSI-41 Return Result with Routing Digits, if configured.
- Generic Routing Number use to store ROP information
In addition to the Routing Number normally seen for number porting, an additional piece of information called the CNL (small geographic area) can also be used when porting. Each ported subscriber needs to be associated with a CNL. In some cases, the number of supported CNLs (65K or more) can be problematic for routing and simple billing analysis. CNLs can be clustered into groups called ROPs. Configuration options can be provisioned to allow use of the Generic Routing Number (GRN) field for storing the ROP information. See [INP/AINPQ Configuration Options](#).
- CgPA Route-on Global Title support
CgPA Rt-on-GT is supported for both ITU INAP InitialDP query (for INP feature) and ANSI-41 NPREQ query (for AINPQ feature). GTT is performed on the CgPA of the query to determine the CdPA of the response message. See [CgPA Route-on-Global Title](#).

INP and AINPQ Functions and Considerations

INP and AINPQ Functions

INP and AINPQ functions minimize challenges for network operators while they plan to implement number portability for their subscribers.

INP and AINPQ can operate on the same node as Tekelec features G-Port, A-Port, and G-Flex. INP and AINPQ functions are:

- Because the number lengths can vary between countries (sometimes even within a country), INP and AINPQ support numbers of varying lengths in a flexible way, without requiring software modifications. The maximum number length of 15 digits for ported numbers is supported.
- INP performs number portability translations based on the received Called Party Number (CdPN) in the INAP portion of the message. For call-related messages, the database query is

performed by using the digits from the Called Party Number parameter after converting them to an international number, if the number is not already in international format.

- AINPQ performs number portability translations based on the received dialed digits (DGTSDIAL).
- The INP and AINPQ features can remove automatically the National Escape Code (NEC) that may be up to five hexadecimal digits.
- The INP and AINPQ features can help to avoid problem situations with number normalization.
 - Problems could occur where operators do not use NAI values that match the EAGLE 5 ISS standard number conditioning process. For example, a switch might send an NAI of a subscriber and expect the number to be treated as a National number, leading to problems.

Number normalization allows the user to specify how certain NAI (Nature of Address Indicator) values are to be treated. This value treatment is performed by setting up rules that map incoming NAI values to internal SNAI (Service Nature of Address Indicator) values for the purpose of number conditioning.

- In some networks, users dial a special prefix, such as a 0 or 1 (an “access code”), before dialing the digits for the party they are trying to reach. Some SSPs strip off this prefix and do not include it in the query to the RTDB. However, other SSPs send the query using the entire dialed number, including the prefix.

Number normalization lets INP and AINPQ accept queries either with or without special prefixes on the DN. Upon receipt, INP or AINPQ strips off the prefix if the DLTPFX configuration option is YES, converts the DN to an international number, performs the database query, and returns a response to the switch. The Called Party Number (for the INP feature) or the dialed digits (for the AINPQ feature) in the response can include the special prefix or not, depending on how the operator configures the feature.

INP/AINPQ Considerations

The following list contains considerations you should think over before installing and operating the INP and/or AINPQ feature:

1. The INP and the AINPQ features can co-exist on the same node if they share the same Subsystem Number (SSN).
2. INP and AINPQ responses are not routed by Global Title Translation.
3. The maximum length of the Application Context Name Object Identifier is 32 digits.
4. It is possible that PCs and/or PC + SSNs that are in the entity table of the database and are referenced by subscriber entries do not have the required data present on the EAGLE 5 ISS to route messages to them.

For example, the PC may not have a route, or the PC+SSN may not be in the MAP table for a final GTT. In these cases, a UIM is output only when a message is discarded due to the lack of data. These data problems can be reduced by careful provisioning of the route and MAP tables.

5. For INP Message Relay messages with E.164 numbers in the SCCP CdPA, it is assumed that no truncation occurred if and when the routing number was prepended and that SCCP CdPA has the full DN of the subscriber.

6. INP Message Relay to the EAGLE 5 ISS local subsystem is not supported. INP Message Relay messages are handled by the INPMR service, and not by the INP local subsystem.
7. Only the first 21 digits of the CdPA are decoded for INP Message Relay. For example, if the CdPA contains an RN prefixed to a DN, the RN is seven digits, and the DN is 15 digits, then the total is 22 digits, and the DN used for processing will be only 14 digits (21 total digits less 7 RN digits).
8. GTT currently handles decimal digits only. Thus, if an operator/country is using hexadecimal digits 'A' through 'F' in RNs and the operator is providing GTT to messages that have RN prefixes other than its own prefixes, the operator must enter the RN+DN number ranges as DN ranges in the INP/AINPQ database. The only problem with this is that the beginning and ending DNs can only be 15 digits, which may not be enough for an RN+DN.
9. If ported-in numbers use RN entity, replacing the CdPA GT with the entity address of a Signalling Point is not supported. There is at least one case where this is required: Subsequent GTT is desired, but the STP providing subsequent GTT does not have Number Portability capability.
10. If number normalization is provisioned with the DLTPFX configuration option set to YES, INP/AINPQ removes the specified prefix digits from the beginning of the DN before searching the database. The digit sequence of the specified prefix must never match the initial digit sequence of a valid DN. For example, if a valid DN without any special prefix is 5551234, then 55 should not be provisioned as a special prefix. If it were, INP/AINPQ would remove the first two digits from the DN, resulting in an invalid DN: 51234.

Other number normalization considerations include:

- INP and AINPQ features support up to 40 special prefixes per node.
- Special prefixes may not exceed 15 digits. All configurations of the 15 digit prefix are valid; that is, any digit from '0' to 'F' in any sequence is valid for the prefix.
- A configuration option (CDPNPFX in the INPOPTS table for INP; DIALPFX in the AINPOPTS table for AINPQ) lets an operator enter the prefix digits to be deleted from the Called Party Number or dialed digits before the database lookup.
- The operator can return either the complete Called Party Number or dialed digits in the response to the SSP including the special prefix, or the DN without the special prefix. The DLTPFX option can be provisioned for each prefix. Up to 40 prefix-response combinations are supported.
- The operator can specify mappings from NAI to SNAI (Service NAI). Up to five mappings (for five unique NAI values) are supported. The valid SNAI values are subscriber (sub), national (natl), international (intl), unknown, (and none (none, which is used to delete existing entries).
- INP/AINPQ searches for the specified prefix at the beginning of the DN:
 - If the beginning digits of the DN match the provisioned prefix, they are removed before conditioning the number to the international format.
 - If the beginning digits of the DN do not match the provisioned prefix, the unchanged number is conditioned to the international format, which is used for the database search.
 - If NEC is provisioned and the beginning digits of the DN match the provisioned NEC, they are removed before conditioning the number to the international format.
- If the Called Party Number NAI value received in the INP query matches a NAI value provisioned in the NAI to SNAI mapping table, the value of SNAI is used when conditioning the number to international format according to existing rules defined for INP.

- After the database search, the response to the SSP is constructed using either the complete number as received in the query (with special prefix), or just the DN (without a prefix). This handling of the prefix depends on the user's specification of various options during configuration, such as DLTPFX, DRA, and Response Type.

See [INP/AINPQ Configuration Options](#) and [Provisioning the INP/AINPQ Number Normalization](#) for information on provisioning configuration options for number normalization.

EPAP Data Provisioning Considerations for INP/AINPQ

The operator provisioning system (OPS) must address certain considerations when data is provisioned in the EPAP database for processing by the INP and AINPQ features.

Receiving INP/AINPQ Data from a National Database

The operator provisioning system (OPS) must address the following concerns when it gets its portability information from a national database:

- In a two-step querying process where all but the recipient network uses an RN that identifies the recipient network and the recipient network itself uses a RN that identifies a particular exchange within its network, the data from the national database is the RN identifying the recipient network.

If the operator is the recipient, the operator provisioning system must override the "national" RN with the "local" RN.

- The translation from the national database associated with an RN is to the point of interconnection (POI) for the recipient network. The recipient network operator provisioning system must override this translation with one that directs non-circuit-related messages to the correct signaling point within its network. If this is not done, the result will be either message discard or circular routing.

This problem also occurs when the national database provides RNs and associated translations for non-ported numbers. The provisioning system of the number range owner must take one of the following actions:

- Override the translations to its POI with a translation that directs non-circuit-related messages to the correct signaling points within its network.
 - Remove the RNs and the associated translations, to cause the messages to use normal GTT processing.
 - Replace the RN entities with SP entities when G-Flex is used.
- When bulk loading the national database, the OPS must not wipe out any G-Flex data or any data change done to resolve these concerns.

Signaling Point (SP) Entity ID

When the user wants a Message Relay translation for a DN that does not have an RN, an entity ID number for the signaling point must be provided to the PDB even if one is not normally assigned:

- Use the OPS to generate a unique ID number for an SP entity when it is entered, and use that number when communicating with the Provisioning Database (PDB), but identify the entity to the OPS user by other methods.

- If a number is desired that does not require the use of the OPS to correlate to a specific entity, use the PC (converted to a 5-digit decimal number) and SSN to identify the entity; the PC and SSN together are guaranteed to be unique within a network.

If an International PC is used, some method is required to set it off from the National PCs because it is a separate network. One way of doing this is to use an extra digit to specify the network. The examples in [Table 2: Entity ID Examples](#) show how to use a 1 to identify National PCs and a 2 to identify International PCs.

Table 2: Entity ID Examples

• Intermediate GTT to another STP whose PCN = 2345	EntityID = 102345
• Final GTT to an SCP whose PCN = 2346 and SSN = 5	EntityID = 102346005
• Final GTT to a different service (SSN = 7) on the same SCP	EntityID = 102346007
• Intermediate GTT to another STP whose PCI = 3-4-5	EntityID = 206181

INP/AINPQ Configuration Options

Configuration option data is loaded to the LIM cards and to Service Module cards that contain the RTDB. The option values influence number conditioning, response message formatting and generation, and Service Portability processing.

Note: Provisioning of the INPOPTS table is controlled by the INP feature; therefore, INP MR will operate with default INPOPTS option values DEFRN=none and SPORTTYPE=none if only the AINPQ feature is enabled.

Note: The Service Portability feature, the IDP A-party Blacklist feature, and support for ROP data all use GRN data for different purposes. The IDP A-party Blacklist feature is mutually exclusive with the Service Portability feature; the restriction is enforced in feature provisioning. There is no enforced restriction for the Service Portability feature and ROP data support to be mutually exclusive. It is expected that support for ROP and Service Portability will be not be used in the same EAGLE 5 ISS system.

See [EAGLE 5 ISS Commands](#) and the *Commands Manual* for a description of the EAGLE 5 ISS commands that are used to provision the option values.

[Table 3: INPOPTS Configuration Options](#) describes INP and Service Portability configuration options.

[Table 4: AINPOPTS Configuration Options](#) describes AINPQ and Service Portability configuration options.

[Table 5: INPOPTS and AINPOPTS Equivalents](#) describes the equivalence between INP options and AINPQ options.

[SCCP Options Configuration Option for S-Port Subscriber Differentiation](#) describes the SCCPOPTS SUBDFRN option for S-Port Subscriber Differentiation.

[Guidelines for S-Port and NPP Configuration Options](#) describes recommended configuration option values for features that use Service Portability and NPP.

Table 3: INPOPTS Configuration Options

Parameter	Value	Description
CDPNNAI - Called Party Number Nature of Address Indicator	0-127	1 - Subscriber 2 - Unknown 3 - National 4 - International Must be specified with SNAI. Used to map or recast message CDPNNAI to SNAI. See Provisioning the INP/AINPQ Service NAI .
CDPNPFX - Called Party Number Prefix See Provisioning the INP/AINPQ Number Normalization .	1-15 hexadecimal digits	
CUTNPASTE - Indicator to include or not include the CutAndPaste parameter in the Connect message in response to the INP Query Used only by INP Query. See INP/AINPQ Message Protocol .	ON	Include the CutAndPaste parameter in the Connect message. If the DRA format includes the DN (as in dra=rndn), then the number of digits in the CutAndPaste NumDigits value is set to the number of digits in the incoming DN (CdPN). If the DRA format does not include the DN (as in dra=rn), then the CutAndPaste NumDigits value is set to 0.
	OFF	Do not include the CutAndPaste parameter in the Connect message. This is the default value.
DEFRN - Default Routing Number	1-15 hexadecimal digits	Used for own-network subscribers
	NONE	Can be used with or without Service Portability. See Service Portability .
DLTPFX - Delete Prefix	YES	If DLTPFX=yes, all formats that support a prefix will not include the prefix in the formatted digits.

Parameter	Value	Description
	NO	If DLTPFX=no, all formats that support a prefix will include the prefix in the formatted digits.
<p>DRA - Destination Routing Address</p> <p>If DLTPFX=no, all formats that support a prefix will include the prefix in the formatted digits.</p> <p>If DLTPFX=yes, all formats that support a prefix will not include the prefix in the formatted digits.</p> <p>NEC must be provisioned before any format that includes NEC can be selected.</p> <p>See the CUTNPASTE option for the use of the Connect message CutAndPaste parameter information when the DRA format contains the DN.</p> <p>See Provisioning the Routing Number Prefix of the Node (Home RN).</p>	RNDN	RN + [CDPNPFX] + DN in the INP Connect response messages
	RN	Routing Number in the INP Connect response messages
	CCRNDN	[CDPNPFX] + CC + RN + DN in the INP Connect response messages
	RNNECDN	RN + [CDPNPFX] + NEC + DN in the INP Connect response messages
	HOMERNDN	Home Routing Number in the INP Connect response messages
	RNASD	RN + ASD in the INP Connect response messages
	ASDRN	ASD + RN in the INP Connect response messages
	RNASDDN	RN + ASD + [CDPNPFX] + DN in the INP Connect response messages
	ASDRNDN	ASD + RN + [CDPNPFX] + DN in the INP Connect response messages
	CCRNASDDN	[CDPNPFX] + CC + RN + ASD + DN in the INP Connect response messages
	ASDRNCCDN	ASD + RN + [CDPNPFX] + CC + DN in the INP Connect response messages
	CCASDRNDN	[CDPNPFX] + CC + ASD + RN + DN in the INP Connect response messages
	RNASDCCDN	RN + ASD + [CDPNPFX] + CC + DN in the INP Connect response messages
	RNASDNECDN	RN + ASD + [CDPNPFX] + NEC + DN in the INP Connect response messages

Parameter	Value	Description
	ASDRNNECDN	ASD + RN + [CDPNPFX] + NEC + DN in the INP Connect response messages
	RNGRN	RN + GRN in the INP Connect response messages
	GRNRN	GRN + RN in the INP Connect response messages
	RNGRNDN	RN + GRN + [CDPNPFX] in the INP Connect response messages
	GRNRNDN	GRN + RN + [CDPNPFX] + DN in the INP Connect response messages
	CCRNGRNDN	[CDPNPFX] + CC + GRN + RN + DN in the INP Connect response messages
	CCGRNRNDN	CC+ GRN + RN + DN in the INP Connect response messages
	GRNRNCCDN	GRN + RN + [CDPNPFX] + CC + DN in the INP Connect response messages
	RNGRNCCDN	RN + GRN + [CDPNPFX] + CC + DN in the INP Connect response messages
	RNGRNNECDN	RN + GRN + [CDPNPFX] + NEC + DN in the INP Connect response messages
	GRNRNNECDN	GRN + RN + [CDPNPFX] + NEC + DN in the INP Connect response messages
	GRN	GRN in the INP Connect response messages
	GRNDN	GRN + [CDPNPFX] + DN in the INP Connect response messages
	CCGRNDN	[CDPNPFX] + CC + GRN + DN in the INP Connect response messages
DRANAI - Destination Routing Address Nature of Address Indicator	SUB	Subscriber Number
	UNKNOWN	Unknown
	NATL	National Significant Number
	INTL	International Number

Parameter	Value	Description
	NTWK	Network
DRANAIV - Destination Routing Address Nature of Address Indicator Value	0-127	1- Subscriber Number 2 - Unknown 3 - National Significant Number 4 - International Number 5 - Network
DRANP - Destination Routing Address Numbering Plan	E164	ISDN/Telephony Numbering Plan
	X121	Data Numbering Plan
	F69	Telex numbering plan
DRANPV - Destination Routing Address Numbering Plan Value	0-7	
NEC - National Escape Code Must be specified before a DRA format containing NEC can be selected. See Provisioning the INP/AINPQ Number Normalization .	1-5 digits	
	NONE	
RELCAUSE - Release Cause Reason for releasing the call when an INP Circular Route is detected. The INP Circular Route Prevention feature must be enabled to specify this option.	1-127	31 - Normal Unspecified For a complete list of values and meanings, refer to <i>ITU-T Recommendation Q.850, Usage of cause and location in the Digital Subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN User Part, May 1998, International Telecommunication Union</i> .
SNAI - Service Nature of Address Indicator Must be specified with CDPNNAI. See Provisioning the INP/AINPQ Service NAI and Provisioning the Routing Number Prefix of the Node (Home RN)	SUB	Subscriber Number
	NATL	National Significant Number
	INTL	International Number
	UNKNOWN	Unknown NAI value If the DN digits do not have a leading country code (CC), the format is National. If the DN digits have a leading country code (CC), the format is International.

Parameter	Value	Description
	NONE	NAI value NONE
SPORTTYPE - Service Portability Type	NONE	Service Portability is not performed for the feature
	GSM	Apply Service Portability prefix (RTDB GRN entity ID) for own-network GSM subscribers (Entity type = SP)
	IS41	Apply Service Portability prefix (RTDB GRN entity ID) for own-network IS41 subscribers (Entity type = RN with PT=0)
	ALL	Apply Service Portability prefix (RTDB GRN entity ID) for all own-network (IS41 and GSM) subscribers (Entity type = SP, or RN with PT=0)
SPRESTYPE - Service Portability Response Type The type of message sent if the following conditions exist: <ul style="list-style-type: none"> An IDP message is received for INP service. The DN digits match. The HLR ID is present. Either Entity Type = SP or Entity Type = RN with PT=0. Either the IGM feature is turned ON or the S-Port feature is enabled. 	CONNECT	Send a Connect message
	CONTINUE	Send a Continue message

The AINPOPTS table contains values for the following AINPQ configuration options:

Table 4: AINPOPTS Configuration Options

Parameter	Value	Description
DEFNRN - Default Routing Number used for own-network subscribers	1-15 hexadecimal digits	Used for own-network subscribers.
	NONE	
DIALNAI - Digits Dialed Nature of Address See Provisioning the INP/AINPQ Service NAI .	0	National
	1	International

Parameter	Value	Description
DIALPFX - Dialed (Called)Party Number Prefix See Provisioning the INP/AINPQ Number Normalization .	1-15 hexadecimal digits	
DLTPFX - Delete Prefix	YES	
	NO	
NEC - National Escape Code See Provisioning the INP/AINPQ Number Normalization .	1-15 hexadecimal digits	
	NONE	
RFMT - Routing Address Format See Provisioning the Routing Number Prefix of the Node (Home RN) . If DLTPFX=yes, all formats that support a prefix will not include the prefix in the formatted digits. If DLTPFX=no, all formats that support a prefix will include the prefix in the formatted digits.	RNDN	RN + [DIALPFX] + DN in the AINPQ Return Result response messages
	RN	Routing Number in the AINPQ Return Result messages
	CCRNDN	[DIALPFX] + CC+ RN + DN in the AINPQ Return Result response messages
	RNNECDN	RN+[DIALPFX] + NEC + DN in the AINPQ Return Result response messages
	HOMERNDN	Home Routing Number in the AINPQ Return Result messages
	RNASD	RN + ASD in the AINPQ Return Result response messages
	ASDRN	ASD + RN in the AINPQ Return Result response messages
	RNASDDN	RN + ASD + [DIALPFX] + DN in the AINPQ Return Result response messages
	CCRNASDDN	[DIALPFX] + CC + RN + ASD + DN in the AINPQ Return Result response messages
	ASDRNCCDN	ASD + RN + [DIALPFX] + CC + DN in the AINPQ Return Result response messages
	CCASDRNDN	[DIALPFX] + CC + ASD + RN + DN in the AINPQ Return Result response messages

Parameter	Value	Description
	RNASDCCDN	RN + ASD + [DIALPFX] + CC + DN in the AINPQ Return Result response messages
	ASDRNNECDN	RN + ASD + [DIALPFX] + NEC + DN in the AINPQ Return Result response messages
	RNGRN	ASD + RN + [DIALPFX] + NEC + DN in the AINPQ Return Result response messages
	GRNRN	GRN + RN in the AINPQ Return Result response messages
	RNGRNDN	RN + GRN + [DIALPFX] + DN in the AINPQ Return Result response messages
	RGNRNDN	GRN + RN + [DIALPFX] + DN in the AINPQ Return Result response messages
	GRNRNDN	GRN + RN + [DIALPFX] + DN in the AINPQ Return Result response messages
	CCRNGRNDN	[DIALPFX] + CC + RN + GRN + DN in the AINPQ Return Result response messages
	GRNRNCCDN	GRN + RN + [DIALPFX] + CC + DN in the AINPQ Return Result response messages
	RNGRNCCDN	RN + GRN + [DIALPFX] + CC + DN in the AINPQ Return Result response messages
	RNGRNNECDN	RN + GRN + [DIALPFX] + NEC + DN in the AINPQ Return Result response messages
	GRNRNNECDN	GRN + RN + [DIALPFX] + NEC + DN in the AINPQ Return Result response messages
	GRN	GRN in the AINPQ Return Result with Routing Digits response messages
	GRNDN	GRN + [DIALPFX] + DN in the AINPQ Return Result with Routing Digits response messages

Parameter	Value	Description
	CCGRNDN	[DIALPFX] + CC + GRN + DN in the AINPQ Return Result with Routing Digits response messages
RNAI - Routing Nature of Address Indicator	NATL	National Significant Number
	INTL	International Number
	FRMSG	NAI from the incoming message
RNAIV - Routing Nature of Address Indicator Value	0	National
	1	International
RNP - Routing Number Plan	UNKNOWN	IS41 Numbering Plan Unknown
	E164	IS41 Telephony Number
	E212	IS41 Land Mobile Number
	PRIV	IS41 Private Number
RNPV - Routing Number Plan Value	0-15	
SNAI - Service Nature of Address Indicator See <i>Provisioning the INP/AINPQ Service NAI</i> and <i>Provisioning the Routing Number Prefix of the Node (Home RN)</i> .	SUB	Subscriber Number Default Country Code (DEFCC) and Default Network Destination Code (DEFNDC) will be prepended to the DN to condition to International format for lookup.
	NATL	National Significant Number Default Country Code (DEFCC) will be prepended to the DN to condition to International format for lookup.
	INTL	International Number
	UNKNOWN	Unknown NAI value If the DN digits do not have a leading country code (CC), the format is National. The DEFCC will be prepended to the DN to condition to International format. If the DN digits have a leading country code (CC), the format is International.

Parameter	Value	Description
	NONE	NAI value NONE
SPORTTYPE - Service Portability Type performed for the feature	NONE	Service Portability is not performed for the feature
	GSM	Apply Service Portability prefix (RTDB GRN entity ID) for own-network GSM subscribers (Entity type = SP)
	IS41	Apply Service Portability prefix (RTDB GRN entity ID) for own-network Is41 subscribers (Entity type = RN with PT=0)
	ALL	Apply Service Portability prefix (RTDB GRN entity ID) for all own-network (GSM and IS41) subscribers (Entity type = SP, or RN with PT=0)
SPRESTYPE - Service Portability Response Type The type of message sent if the following conditions exist: <ul style="list-style-type: none"> • An NPREQ message is received. • The DN digits match. • The HLR ID is present. • The Entity type = SP, or RN with PT=0 • Either the IGM feature is on or the Service Portability feature is enabled. 	RRSDGTS	Send a Return Result with Digits message
	RRWODGTS	Send a Return Result without Digits message

Table 5: INPOPTS and AINPOPTS Equivalents

INPOPTS		AINPOPTS	
Option	Value	Option	Value
DRANAI	SUB	RNAI	FRMSG
	UNKNOWN		FRMSG
	NATL		NATL
	INTL		INTL
	NTWK		FRMSG
DRANAIV	0-2	RNAIV	2

INPOPTS		AINPOPTS	
Option	Value	Option	Value
	3		0
	4		1
	5-127		2
DRANP	(No equivalent)	RNP	UNKNOWN
	E164		(No equivalent)
	(No equivalent)		E164
	X121		(No equivalent)
	F69		(No equivalent)
	(No equivalent)		E212
	(No equivalent)		RIV
DRANPV	0-7	RNPV	0-7
	8-15 (Not supported)		8-15
DRA	RN	RFMT	RN
	RNDN		RN
	CCRNDN		CCRNDN
	RNNECDN		RNNECDN
	HOMERNDN		HOMERNDN
	RNASD		RNASD
	ASDRN		ASDRN
	RNASDDN		RNASDDN
	ASDRNDN		ASDRNDN
	CCRNASDDN		CCRNASDDN
	CCASDRNDN		CCASDRNDN
	ASDRNCCDN		ASDRNCCDN
	RNASDCCDN		RNASDCCDN
	RNASDNECDN		RNASDNECDN
	ASDRNNECDN		ASDRNNECDN
	RNGRN		RNGRN
	GRNRN		GRNRN
	RNGRNDN		RNGRNDN

INPOPTS		AINPOPTS	
Option	Value	Option	Value
	GRNRNDN		GRNRNDN
	CCRNGRNDN		CCRNGRNDN
	CCGRNRNDN		CCGRNRNDN
	GRNRNCCDN		GRNRNCCDN
	RNGRNCCDN		RNGRNCCDN
	RNGRNNECDN		RNGRNNECDN
	GRNRNNECDN		GRNRNNECDN
	GRN		GRN
	GRNDN		GRNDN
	CCGRNDN		CCGRNDN
SNAI	SUB	SNAI	SUB
	NATL		NATL
	INTL		INTL
	UNKNOWN		UNKNOWN
	NONE		NONE
SPRESTYPE	CONNECT	SPRESTYPE	RRWDGTS
	CONTINUE		RRWODGTS
CDPNNAI	0	DIALNAI	0
	1		1
	2-127		Not supported
CUTNPASTE	ON	Not supported	
	OFF		
DLTPFX	YES	DLTPFX	YES
	NO		NO
CDPNPFX	1-15 hexadecimal digits	DIALPFX	1-15 hexadecimal digits
	No digits		No digits
NEC	NONE	NEC	NONE
	1-5 hexadecimal digits		1-5 hexadecimal digits
RELCAUSE	1-127	Not supported	
SPORTTYPE	NONE	SPORTTYPE	NONE

INPOPTS		AINPOPTS	
Option	Value	Option	Value
	GSM		GSM
	IS41		IS41
	ALL		ALL
DEFRN	NONE	DEFRN	NONE
	1-15 hexadecimal digits		1-15 hexadecimal digits

SCCP Options Configuration Option for S-Port Subscriber Differentiation

The SCCPOPTS SUBDFRN option turns the S-Port Subscriber Differentiation function on and off in the system. The S-Port Subscriber Differentiation feature must be enabled and turned on before the option can be provisioned.

See [EAGLE 5 ISS Commands](#) and the Commands Manual for a description of the SCCPOPTS SUBDFRN option and the EAGLE 5 ISS chg/rtrv-sccpopts commands that are used to provision the option.

Provisioning the INP/AINPQ Service NAI

The MSU CdPN NAI value to check for is provisioned as the INPOPTS CDPNNAI option value for the INPQ feature and the AINPOPTS DIALNAI option value for the AINPQ feature. There is a one-to-one mapping from INPOPTS:CDPNNAI to INPOPTS:SNAI (and also similarly for AINPOPTS).

SNAI is a service NAI and indicates what kind of “service or conditioning” to apply to the extracted DN – whether the DN should be considered subscriber, national or international so that it can be appropriately conditioned to international format for RTDB lookup. All RTDB lookups use only the international DN. This SNAI is available in both the Service Selector table and the INPOPTS and AINPOPTS tables. The purpose though is the same.

This INPOPTS:SNAI and AINPOPTS:SNAI is different from the Service Selector table SNAI. The CdPN NAI from the incoming MSU is compared with the INPOPTS:CDPNNAI (for INP Query) or the AINPOPTS:DIALNAI (for AINPQ feature). If there is a match, then the corresponding mapped INPOPTS:SNAI or AINPOPTS:SNAI provisioned for that INPOPTS:CDPNNAI or AINPOPTS:DIALNAI entry is used as the SNAI for number conditioning. If there is no INPOPTS:SNAI or AINPOPTS:SNAI provisioned, or the CdPN NAI from the MSU does not match, then the CdPN NAI from the MSU is treated as an SNAI for number conditioning prior to RTDB lookup as follows:

- The MSU CdPN NAI of ‘subscriber’ shall be considered as the SNAI value of SUB.
- The MSU CdPN NAI of ‘international’ shall be considered as the SNAI value of INTL.
- Otherwise, the MSU CdPN NAI shall be considered as the SNAI value of ‘NATL’.

The SNAI value (either from INPOPTS or AINPOPTS, or the MSU CdPN in case of no match) is then used to condition the extracted DN (from TCAP layer) to international format prior to RTDB lookup. For INP and AINPQ Query services:

- If SNAI is ‘NATL’ the default country code is prefixed to the DN to condition it to international format.
- If SNAI is ‘SUB’ the default country code and the default national destination code are prefixed to the DN to condition it to international format.

- If SNAI is 'INTL', then no further conditioning is required as the extracted DN is already considered to be in international format.

For the INP message relay case, the service NAI from the Service Selector table is used to decide how the DN (extracted from SCCP CdPA) should be conditioned to international format prior to RTDB lookup. The INPOPTS:CDPNNAI and INPOPTS:SNAI are not used in this case.

Provisioning the Routing Number Prefix of the Node (Home RN)

When the portability cluster uses RN prefixes for relayed messages, a message for a ported-in number arrives at the EAGLE 5 ISS with an RN prefixed to the DN in the CdPA. In this case, the RN is one of the RNs for the EAGLE 5 ISS operator network.

Because the database contains only the DN, the following logic is performed to remove the RN before performing the database lookup:

- When the SNAI (from the provisioned SRVSEL table entry) for a message is RNSDN, RNNDN, or RNIDN, the EAGLE 5 ISS searches all provisioned Home RNs or a match with the same number of leading digits in the CdPA.
- If one or more matches are found, the match with the greatest number of digits is considered the Home RN for that message. The CdPA digits matching the Home RN are removed from the CdPA before the database lookup.
- If a matching Home RN is not found, the entire string of the received digits (except for any ST digit on the end) is considered for the database lookup. If the database does not contain that entry, the database lookup fails, resulting in the being handled by GTT.

The correct removal of the RN prefixes depends on the provisioned configuration options:

- Combinations of service selectors for incoming INP/AINPQ Message Relay messages with RN prefixes must have the appropriate SNAI (RNSDN, RNNDN, or RNIDN).
- RNs to be removed must be provisioned in the HOMERN table.

Messages without an RN prefix can, in some cases, use the same selector values as messages with RN prefixes. If so, the SNAI must be set to RNxDN, but the leading CdPA digits of the non-prefix messages *must not match* any Home RN entries. If the digits do match, the matching part of the DN is removed before database lookup, resulting in the database lookup failing to find the full DN.

Provisioning the INP/AINPQ Number Normalization

When the MSC/SSP uses a prefixed CdPN or DGTSDIAL in the queries, a message arrives for INPQ service with a prefixed CdPN number. All prefixes to be removed from the CdPN or DGTSDIAL must be provisioned as configuration option values using the `chg-inpopts` command or the `chg-ainpopts` command.

The correct removal of prefixes depends on the content of the data that is provisioned. It is possible that CdPNs or DGTSDIALs without a prefix can have the same first digits as the prefix digits. If the digits match a provisioned prefix, that portion of the DN would be removed before database look up. The database lookup would fail because the full DN is not found. A similar situation could occur if an NEC is provisioned and the digits match the provisioned NEC.

The following logic is performed to remove the prefix before performing the database lookup.

- The decoded INAP CdPN or DGTSDIAL digits are compared with the list of provisioned prefixes.
- If a matching prefix is found, INP/AINPQ strips the prefix digits from the number.
- After the prefixes are compared, the digits are also compared to any provisioned NEC value. If the beginning digits match the NEC, INP/AINPQ strips the matching digits.
- If a matching prefix is not found, the entire string of the received digits (except for any ST digit on the end) is considered for the database lookup without stripping the prefix.
- Number conditioning, if required, is applied after deleting the prefix, the NEC, or both.

The INP Local Subsystem

Local subsystems in the EAGLE 5 ISS are maintainable entities for query and response that are used when the STP acts as an SCP. Specific point codes can be defined for routing to local subsystems independently of the STP in the network. A local subsystem can be taken online and offline as needed in the system.

INP supports ITU INAP InitialDP query. AINPQ supports ANSI-41 NPREQ query. INP MR does not use the INP local subsystem. The INP local subsystem in the EAGLE 5 ISS processes UDT and unsegmented XUDT messages

For the INP local subsystem, EAGLE 5 ISS supports ITU-I and ITU-N capability point code types for Message Relay and only ITU-I capability point code types for Query. The EAGLE 5 ISS true point code cannot be an ITU-I or ANSI point code. ITU-N24 point codes are not supported. Capability point codes for the INP local subsystem can be configured only after the INP or AINPQ feature is enabled.

A Rt-on-GT INP Query to the INP CPC when the local subsystem is inhibited will cause a response-method TFP to be sent to the SSP. If the same CPC is used for Message Relay (MR), then the SSP will be prevented from sending MR messages to the EAGLE 5 ISS even though they can still be processed. MR messages to an INP CPC will not cause TFP messages when the subsystem is inhibited. For these reasons, it is recommended that customers use separate CPCs for MR and Query. For the most safety, MR should use CPCTYPE=STP instead of using separate INP CPCs in order to correctly handle any stray route-set-test message for the MR CPC. (if a RSTP message was received for a MR INP CPC and the subsystem was inhibited, a TFA would not be sent even though the EAGLE 5 ISS could still process MR messages.)

The INP local subsystem can have a mate subsystem and a concerned point code group assigned to it. The INP local subsystem cannot be set to Load Shared mode (as end nodes do not perform load sharing), but can be set only to Dominant or Solitary mode. The INP local subsystem can be provisioned in MAP table if the INP feature or AINPQ feature is enabled.

The INP local subsystem can be taken online and offline using the procedures in [Provisioning the INP Local Subsystem](#).

Messages for the INP Local Subsystem

Messages for the INP local subsystem can arrive Rt-on-SSN or Rt-on-GT. All MSUs must contain either the EAGLE 5 ISS true or secondary point code (TSPC), or the INP or STP capability point code (CPC) in the DPC field of the message.

Rt-on-SSN Handling - Messages that arrive Rt-on-SSN with the EAGLE 5 ISS INP subsystem number in the Called Party Subsystem field of the message are forwarded to the INP local subsystem.

Rt-on-GT Handling - Rt-on-GT MSUs can be received, with the result of translation being the EAGLE 5 ISS true point code and the the INP local subsystem. After GTT processing the messages are forwarded to the INP local subsystem.

Multiple Local Subsystems

The EAGLE 5 ISS supports provisioning Capability Point Codes for two or more local subsystems, allowing local subsystems for two or more EPAP-related features to operate at the same time in the system. For example, local subsystems for the INP feature and the EIR feature can coexist in the system. INP/ AINPQ and LNP are mutually exclusive in the same system.

INP/AINPQ Message Protocol

INP/ AINPQ support UDT SCCP messages and non-segmented XUDT messages.

INP and AINPQ support Rt-on-SSN and Rt-on GT messages. For Rt-on GT, GTA digits must be present.

INP and AINPQ support two TCAP protocols: INAP (for the INP feature) and ANSI-41 (for the AINPQ feature). The effective processing of the messages is the same for INAP and ANSI-41 protocols.

Primary INP/AINPQ Functions

INP and AINPQ provide the following main functions:

- *Message discrimination*: INP and AINPQ translate ported numbers, and consequently can differentiate between messages for INP or AINPQ or other services. Discrimination is performed using a Service Selector table where INP services (INPQ and INPMR) can be defined for a combination of selectors. These selectors define whether INP Message Relay or INP/ AINPQ Query is to be performed on an incoming message.
- *Number conditioning*: Because the subscriber database stores international DNs only, INP/ AINPQ can condition incoming numbers to be international DNs by inserting a default CC, a default NDC, or both, before performing a database look up. See [INP and AINPQ Functions and Considerations](#).
 - When a DN is extracted from the CdPN (TCAP layer), then the processing is for a Query service (INPQ or AINPQ). When the DN is extracted from the SCCP CdPA, then processing is for the INP Message Relay service.
 - If the service is INPMR and the SNAI is either a RNSDN or RNNDN or RNIDN, and the RN prefix matches the home network RN prefix, INPMR strips off the RN prefix and conditions the number, if needed, before performing a database lookup.
 - If the service is INPQ and the message is destined to the INP subsystem, INPQ does the following:
 - Strips off the CdPN prefix if it matches a cdpnpfx option value provisioned in the INPOPTS table.
 - Strips off the DGTSDIAL prefix if it matches the dialpfx option value provisioned in the AINPOPTS table.
 - Strips off any digits that match the NEC, if the NEC is provisioned.
 - Conditions the number to International format, if needed, before performing a database lookup.

- *INAP Connect Response:* INP generates a Connect response for an InitialDP message if the conditioned number is found in the RTDB lookup. INP uses the Routing Number (RN) associated with the DN entry to build the Destination Routing Address (DRA) number.
 - If the DLTPFX option value is NO, the prefix digits are included in the outgoing DRA digits.
 - If the DLTPFX option value is YES, the prefix digits are excluded from the outgoing DRA.
 - If the CUTNPASTE option value is ON, the CutAndPaste parameter is included in the CONNECT response to an InitialDP query.

If the DRA format contains the DN, the NumDigits value in the CutAndPaste parameter is set to the length of the incoming DN (CdPN) digit string. This indicates to the originating node to discard all of the original CdPN digits and use the DRA entirely as the Routing Number.

If the DRA format does not contain the DN, then the CutAndPaste NumDigits value is zero.

The supported formats are listed in the INPOPTS DRA option description in [INP/AINPQ Configuration Options](#).

- *INAP Continue Response:* A Continue response is generated for an InitialDP message if the conditioned number is not found in the RTDB lookup.
- *ANSI-41 Return Result with Routing Digits:* If the TCAP query is ANSI-41 protocol, AINPQ responds to the queries with a Return Result message. This message has the Routing Digits encoded. If the conditioned number is found in the RTDB and the NE is listed in the AINPOPTS RFMT option description in [INP/AINPQ Configuration Options](#), and the Response Type (SPRESTYPE) option is RRWDGTS, a Return Result with Routing Digits message will be the response. If the DLTPFX value is NO, the prefix digits are included in the outgoing RFMT digits. If the DLTPFX value is YES, the prefix digits are excluded from the outgoing RFMT.
- *ANSI-41 Return Result without Routing Digits:* If the query is ANSI-41 protocol and the conditioned number is not found in the RTDB, a Return Result without Routing Digits response is generated. If the conditioned number is found, and NE is not assigned, and the Response Type (SPRESTYPE) option is RRWDGTS, a Return Result without Routing Digits is generated.
- *INP Message Relay:* INP performs Message Relay when a combination of service selectors of like domain (ITU or ANSI), Global Title Indicator (GTI), Translation Type (TT), Numbering Plan (NP), and Nature of Address Indicator (NAI) indicate INP Message Relay is to be performed. (ANSI is not supported for INP Message Relay. The SCCP and MTP layers must be ITU-I or ITU-N.)

If the translation data exists, INP Message Relay does one of the following:

- Provides the ability to prefix the entity ID to the CdPA digits after deleting any home RN prefix
- Replaces the CdPA digits with the RN prefix
- Performs no change to the CdPA digits
- If the INP Circular Route Prevention feature is turned on and a circular route is detected (see [INP Circular Route Prevention \(INP CRP\)](#)),
 - UIM 1256: NP Circular Route detected is generated and the message falls through to GTT.
 - INP generates a Release Call response for an InitialDP message if the INP Circular Route Prevention feature is turned on and a circular route is detected. The CAUSE parameter in a Release Call message is encoded with the value of the RELCAUSE option provisioned in the INPOPTS table.

The Stages of INP/AINPQ Execution

INP/AINPQ is performed in the following stages:

1. The message arrives at EAGLE 5 ISS *route-on-gt*. The SCCP portion is decoded; the data is used to perform the service selection, based on the CdPA GT fields other than ES and GTAI. The result of this selection identifies the set of translations to be used for INP/AINPQ and also specifies whether INP Message Relay or INP/AINPQ Query is to be performed on the message. If a selector does not match the incoming GT fields, then GTT is performed.
2. If stage 1 indicates INP/AINPQ is required and the message is not a UDTS or XUDTS (Unitdata Service message or Extended Unitdata Service message) generated by EAGLE 5 ISS, the remaining SCCP portion is decoded. If INP/AINPQ Query is required, the TCAP and INAP portions are also decoded. If the message is a UDTS or XUDTS generated by the EAGLE 5 ISS, GTT is performed on the message.
3. If the service indicator is INP Message Relay:
 - a. If SNAI is CCRNDN or RNSDN or RNNDN or RNIDN, the leading digits of the DN number from the SCCP portion of the message are checked for the Home Routing Number (HOMERN), if any are provisioned. If found, INP/AINPQ strips off the HOMERN and condition the DN to be an international number.
 - b. The conditioned number's length is validated and the number is looked up in the subscriber database. First, the individual number database is searched. If the number is absent, the number range database is searched.
 - c. If the INP Circular Route Prevention feature is turned on and a circular route is detected, the message falls through to GTT.
 - d. If the number is found, the EAGLE 5 ISS uses the Message Relay GT information from the associated entity and prefixes the entity ID to the DN if specified, or, based on the option, can replace the CdPA digits with the entity ID or leave the DN unchanged. If no entity is associated with the DN or if the entity does not have translation (MR) data, then GTT is performed on the message.
 - e. If no match is found for the conditioned number in the subscriber database, GTT is performed on this message.
 - f. If the DPC in the translation data is the EAGLE 5 ISS point code or is for a different domain than the message (ANSI vs. ITU or ITU vs. ANSI), a UDTS or XUDTS is sent and the processing stops here.
4. If the service indicator is INP Query,
 - a. Two types of messages are allowed: messages with InitialDP as the INAP op-code and ANSI-41 messages with NPREQ op-code. During decoding, INP/AINPQ identifies whether the tcap-type is ANSI-41 or INAP from the package type field (second byte) of the TCAP portion of the message. The INP feature handles InitialDP messages; the AINPQ feature handles NPREQ messages.
 - b. If the INAP op-code is InitialDP, INP decodes the CdPN parameter and performs number conditioning to convert the INAP CdPN to an international number. This operation is performed in the following steps:

- a. Leading digits of the CdPN number from the INAP portion of the message are compared to provisioned prefixes. If matching prefix digits are found, INP strips the prefix from the CdPN digits if the INPOPTS DLTPFX option value is YES.
- b. If an NEC is provisioned and an NEC is present in the CdPN, strip off the NEC.
- c. Remove any stop digits that are present in the CdPN.
- d. After removing the prefix, ST Digits, and NEC, INP maps the CdPN NAI to the Service NAI by doing a lookup in the INPOPTS table. If the CdPN NAI is found in the INPOPTS table, its corresponding SNAI value is used for number conditioning. Otherwise, INP treats the number as national (nat1), unless the NAI field in the CdPN is subscriber (sub) or international (intl).
- e. If the INP Circular Route Prevention feature is turned on, the numbering format is determined using the Service NAI.

Table 6: Service NAI and Numbering Format

Service NAI	Number Format
International - DEFCC is provisioned and DEFCC matches the leading digits in the CdPN	CC+RN+DN
International - DEFCC is provisioned and DEFCC does not match the leading digits in the CdPN	RN+CC+DN
International - DEFCC is not provisioned	RN+CC+DN
National	RN+DN
Subscriber	RN+SN

- f. If the INP Circular Route Prevention feature is turned on, the RN is matched with the Home RNs in the HomeRN table. The Home RN that matches with the maximum number of leading digits of the CdPN is removed from the CdPN.
- c. If the ANSI-41 OPcode is NPREQ, AINPQ decodes the Dialed Digits number and performs number conditioning to convert the Dialed Digits to an international number.
 - a. The leading digits of the Dialed Digits from the TCAP portion of the message are compared to any provisioned prefixes (dialpfx). If found, the prefix is stripped from the Dialed Digits.
 - b. If an NEC is provisioned and a matching NEC is present in the Dialed Digits, strip off the NEC.
 - c. Remove any stop digits that are present in the Dialed Digits.
 - d. After removing the prefix, ST digits, and NEC from the Dialed Digits, the NAI is mapped to the Service NAI from the AINPOPTS table, and the corresponding SNAI value is used for number conditioning. If mapping is not found, AINPQ treats the number as National, unless the NAI field in the Dialed Digits is Subscriber or International.

5. The conditioned number's length is validated, and the number is looked up in the subscriber database.
6. The response depends on the implemented feature (INP or AINPQ), the Response Type (SPRESTYPE) option specified in the INPOPTS table (connect or continue) or in the AINPOPTS table (rrwdgts or rrwodgts), and on the result type of the query of the RTDB (RN or SP), as follows:
 - A Connect message (for the INP feature) or a Return Result with Digits message (for the AINPQ feature) is sent in the following cases:

For INP:

- The number is found, the associated entity type is RN and not own-network IS41 subscriber. The Connect message has a Destination Routing Address (DRA) format specified by the provisioned DRA option.

If GRN is returned in entity data, then GRN is included in the outgoing formats if specified in the provisioned DRA option.

If the provisioned DRA format includes the GRN and the GRN is not returned in entity data, the message processing shall continue with an empty GRN.

- The number is found, the associated entity type is SP or own-network IS41 subscriber (RN with PT=0 and the IGM feature on or the Service Portability feature enabled). The Connect message has the Destination Routing Address format specified by the provisioned DRA option. The RN in the INPOPTS DRA is interpreted as either the Generic Routing Number (GRN) from EPAP if required by Service Portability, or the Default RN (INPOPTS DEFRN option) if DEFRN is provisioned, or as entity ID (SP or RN).

For AINPQ:

- The number is found, the associated entity type is RN and not own-network IS41 subscriber. The Return Result with Digits message has the Destination Routing Address (DRA) format specified by the provisioned RFMT option.

If GRN is returned in entity data, then GRN is included in the outgoing formats if specified in the provisioned RFMT option.

If the provisioned RFMT format includes the GRN and the GRN is not returned in entity data, the message processing shall continue with an empty GRN.

- The number is found, the associated entity type is SP or own-network IS41 subscriber (RN with PT=0 and the IGM feature on or the Service Portability feature enabled). The Return Result with Digits message has the Routing Digits format specified by the provisioned RFMT option. The RN in the AINPOPTS RFMT is interpreted as either the Generic Routing Number (GRN) from EPAP if required by Service Portability, or the Default RN (AINPOPTS DEFRN option) if DEFRN is provisioned, or as entity ID (SP or RN).
- A Continue message (for the INP feature) or a Return Result without Digits message (for the AINPQ feature) is sent in the following cases:

For INP:

- The number is found and the entity type is SP or own-network IS41 subscriber, (RN with PT=0 and the IGM feature is on or the Service Portability feature is enabled) and the Response Type (SPRESTYPE) option is continue.
- The Generic Routing Number (GRN) was required for Service Portability, but was not provisioned. UIM 1426 is generated.

- The number is Not Found (in this case, the Response Type (SPRESTYPE) option does not matter).

For AINPQ:

- The number is found and the entity type is SP or own-network IS41 subscriber (RN with PT=0 and the IGM feature is on or the Service Portability feature is enabled) and the Response Type (SPRESTYPE) option is `rrwodgts`.
- The Generic Routing Number (GRN) was required for Service Portability, but was not provisioned. UIM 1426 is generated.
- The number is Not Found (in this case the Response Type (SPRESTYPE) option does not matter).
- If for INP messages, a circular route is detected, a TCAP END with Invoke Release Call operation is sent as the response. The CAUSE parameter in the Release Call is encoded as the value of the RELCAUSE option in the INPOPTS table.

CgPA Route-on-Global Title

CgPA Rt-on-GT is supported for both ITU INAP InitialDP query (for INP feature) and ANSI-41 NPREQ query (for AINPQ feature). GTT is performed on the CgPA of the query to determine the CdPA of the response message. INPQS and AINPQ support CgPA Rt-on-SSN and Rt-on-GT CgPA. For Rt-on-GT, GTA digits must be present.

Incoming message SCCP validation and decoding includes the following processing for CgPA Rt-on-GT:

- The CgPA SSN, if present, will be used as the CdPA SSN in response. If an SSN is not present, the default SSN=8 (MSC) will be used as the CdPA SSN of the response.
- The CgPA PC, if present, is stored as the SSP PC for generating the response. If the CgPA PC is not present, the MTP OPC is stored as the SSP PC to generate the response. If this SSP PC is not in the EAGLE 5 ISS Route table, the query will not be discarded. A subsequent GTT on the CgPA that will be performed at the time of response encoding could translate to a point code that has a valid route. If a valid route is not found at that time, then encode time error handling handles this error.

Encoding of fields in the INP Query response MTP/SCCP portion are either the incoming values or are set based on the result of GTT processing on the CgPA.

INP Circular Route Prevention (INP CRP)

If the INP CRP feature is on, a circular route is detected if the provisioned HomeRN matches the leading digits of the SCCP CdPA in an IDP message that is received for INPMR service, and one of the following conditions also occurs:

- The IGM feature is on or the Service Portability feature is enabled, and an individual or range DN match is found with NE = RN and PT not zero or with NE not specified and PT is none, 0, 1, 2, or 36.
- Individual or range DN match is found with NE = RN and PT is any value or with NE not specified and PT is none, 0, 1, 2, or 36.

For INPMR, UIM 1256 “NP Circular Route detected” is generated and the message falls through to GTT. GTT can generate a UDTs message if it cannot find any route entry for RN+DN CdPA digits.

For INPQ, a Release Call message is generated that contains the configured Release Cause (RELCAUSE option value).

Service Portability

Service Portability (S-Port) is an extension of Number Portability. Service Portability allows subscribers to move between IS41 and GSM technology within the same network-operator while keeping the same subscriber number. Service Portability applies to only own-network subscribers.

Service Portability allows use of RTDB GRN Entity digits for own-network GSM/IS41 subscribers in place of the SP Entity digits (RN entity digits in case of RN/PT=0 own-network IS41 subscriber) used in INP and AINPQ digits formats. The SPORTTYPE configuration option is provided to specify whether GRN should be used for own-network IS41 subscribers only, own-network GSM subscribers only, both, or neither cases.

A global Default Routing Number (INPOPTS and AINPOPTS DEFRN) option value can be used as a Routing Number (RN) in place of the EPAP Entity digits in encoding digits in the case of own-network subscribers. For instance, if the EPAP Entity Type of a subscriber is SP, the subscriber is considered to be an own-network subscriber and the SP entity digits are used in encoding routing digits in the format specified in configuration option values (INPOPTS DRA or AINPOPTS RFMT). This entity ID is typically an HLR E.164 address. In some applications, the HLR address may not be applicable (such as in billing and certain routing contexts), and the network operator may instead want a global Routing Number to be used instead of the SP entity digits for all own-network subscribers. The Default RN is applicable in general to Number Portability and can be used whether Service Portability is ON or OFF. Service Portability use of GRN in place of the routing digits will override Default RN usage and behavior.

S-Port Subscriber Differentiation

S-Port Subscriber Differentiation can be used with Service Portability to allow use of provisioned ASD digits in place of GRN digits as an alternative Routing Number for own-network subscribers. For example, the ASD can be used as the subscriber’s private routing number (for message relay features) and the GRN as the subscriber’s public routing number (for query/response features).

The S-Port Subscriber Differentiation controlled feature (Part Number P/N 893-0379-01) and the SCCPOPTS SUBDFRN configuration option control S-Port Subscriber Differentiation operation. The SUBDFRN option cannot be provisioned unless the S-Port Subscriber Differentiation feature is enabled and turned on.

When the Service Portability feature and option are on, the S-Port Subscriber Differentiation feature and option are on, and Service Portability is applicable, then provisioned ASD digits are used in place of GRN digits. Subscribers without ASD provisioned will follow standard Service Portability processing and will always use GRN.

Guidelines for S-Port and NPP Configuration Options

Feature-specific configuration options, EPAP, and EAGLE 5 ISS data and NPP Formatting Actions work together to produce the “routing tag” that is used to modify digits in applicable messages. A “routing tag” is the Number Portability or Service Portability digits chosen to prefix the DN. Own-network GSM and IS41 subscribers can be tagged with the GRN (from EPAP entity data), the DFLTRN configuration option value, SP (EPAP entity digits), or no tag. OLO subscribers can be tagged with the RN (EPAP entity digits) or no tag.

[Table 7: Recommended Provisioning for “Routing Tags”](#) indicates the recommended provisioning for features that use NPP, based on how the subscriber numbers will be tagged. Service Portability provides the capability to use the GRN to tag own-network GSM and IS41 subscribers. A few potential combinations are not supported, because standard Number Portability processing does not differentiate between GSM and IS41 subscribers.

The following acronyms are used in the table header for feature-specific configuration options. The option names are not the same across all features that use NPP, but each feature does provide a similar option:

- NPTYPE - determines lookup success criterion
- SPORTTYPE - determines which own-network subscribers to tag with the GRN prefix (IS41, GSM, all, or none)
- DFLTRN – specifies feature-specific value for a default Routing Number
- SPFILL – specifies whether NPP should populate both SP and RN Formatting Action values even when DFLTRN or GRN is being used for local subscribers. In some scenarios, setting SPFILL to YES can cause double digits to be present. IS41 digits (RN/PT=0) are considered SP, because they should contain an E.164 HLR ID.

Because S-Port Subscriber Differentiation operates within the Service Portability call flow, when both are on and Service Portability is applicable, then ASD digits are used, if provisioned, in place of GRN digits. If ASD digits are not provisioned, then standard Service Portability processing is used. Wherever GRN appears in [Table 7: Recommended Provisioning for “Routing Tags”](#), provisioned ASD digits will be used if S-Port Subscriber Differentiation and Service Portability are ON.

Table 7: Recommended Provisioning for “Routing Tags”

Requested Tagging			Recommended Feature Configuration for NPP and S-Port Processing				
GSM (SP/any PT)	IS41 (RN/PT=0)	OLO	NPTYPE	SPORTTYPE	DFLTRN	SPFILL	NPP Formatting Action
GRN	GRN	RN	RNSP	ALL	N/A	N/A	RN+DN
DFLTRN	GRN	RN	RNSP	IS41	DFLTRN	N/A	RN+DN
SP	GRN	RN	RNSP	IS41	None	No	RN+SP+DN
None	GRN	RN	RNSP	IS41	None	N/A	RN+DN
GRN	DFLTRN	RN	RNSP	GSM	DFLTRN	N/A	RN+DN
DFLTRN	DFLTRN	RN	RNSP	None	DFLTRN	N/A	RN+DN

Requested Tagging			Recommended Feature Configuration for NPP and S-Port Processing				
GSM (SP/any PT)	IS41 (RN/PT=0)	OLO	NPTYPE	SPORTTYPE	DFLTRN	SPFILL	NPP Formatting Action
SP	DFLTRN	RN	Not supported: Use SP/GRN instead				
None	DFLTRN	RN	Not supported: Use None/GRN instead				
GRN	SP	RN	RNSP	GSM	None	No	RN+SP+DN
DFLTRN	SP	RN	Not supported: Use GRN/SP instead				
SP	SP	RN	RNSP	None	None	N/A	RN+SP+DN
None	SP	RN	Not supported: NP does not differentiate tags for own-network subscribers				
GRN	None	RN	RNSP	GSM	None	N/A	RN+DN
DFLTRN	None	RN	Not supported: Use GRN/None				
SP	None	RN	Not supported: NP does not differentiate tags for own-network subscribers				
None	None	RN	RN	N/A	N/A	N/A	RN+DN
GRN	GRN	None	SP	ALL	N/A	N/A	RN+DN
DFLTRN	GRN	None	SP	IS41	DFLTRN	N/A	RN+DN
SP	GRN	None	SP	IS41	None	No	RN+SP+DN
None	GRN	None	SP	IS41	None	N/A	RN+DN
GRN	DFLTRN	None	SP	GSM	DFLTRN	N/A	RN+DN
DFLTRN	DFLTRN	None	SP	None	DFLTRN	N/A	RN+DN
SP	DFLTRN	None	Not supported: Use SP/GRN instead				
None	DFLTRN	None	Not supported: Use None/GRN instead				
GRN	SP	None	SP	GSM	None	No	RN+SP+DN
DFLTRN	SP	None	Not supported: Use GRN/SP instead				
SP	SP	None	SP	None	None	N/A	SP+DN
None	SP	None	Not supported: NP does not differentiate tags for own-network subscribers				
GRN	None	None	SP	GSM	None	N/A	RN+DN
DFLTRN	None	None	Not supported: Use SP/GRN instead				
SP	None	None	Not supported: NP does not differentiate tags for own-network subscribers				
None	None	None	N/A	N/A	N/A	N/A	DN

Hardware Requirements

EPAP-related features that perform an RTDB lookup require Service Module cards (DSM cards, E5-SM4G cards, or E5-SM8G-B cards) running the VSCCP application. The EAGLE 5 ISS can be equipped with up to 32 (31+1) Service Module cards.

Features that do not perform an RTDB lookup require Service Module cards only for GTT processing that might be performed for the feature. These features can coexist in systems with EPAP, but do not require an EPAP connection.

MPS/EPAP Platform

Tekelec provides the Multi-Purpose Server (MPS) platform as a subsystem of the EAGLE 5. The MPS provides support for EPAP-related features that perform Real Time Database (RTDB) lookups.

The MPS is composed of hardware and software components that interact to create a secure and reliable platform. For details about the MPS hardware, refer to *Tekelec 1200 Platform Hardware Manual* and *E5-APP-B Hardware and Installation Manual*. The MPS provides the means of connecting the customer provisioning application with the EAGLE 5 and accepts the customer number portability data, while accommodating numbers of varying lengths.

The EAGLE Provisioning Application Processor (EPAP) is software that runs on the MPS hardware platform. EPAP collects and organizes customer provisioning data, and forwards the data to the EAGLE 5 Service Module cards. Refer to *EPAP Administration Manual* for detailed information about EPAP.

In this manual, Service Module card refers to a DSM card, an E5-SM4G card, or an E5-SM8G-B card unless a specific card is required. For more information about the supported cards, refer to *Hardware*. DSM cards are not supported with E5-APP-B based EPAP systems.

Chapter 3

EAGLE 5 ISS Commands

Topics:

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This chapter describes the EAGLE 5 ISS Commands that can be used for configuration of the INP and AINPQ features.

EAGLE 5 ISS Commands

This section describes the commands that can be used for configuration of the INP and AINPQ features.

Refer to the *Commands Manual* for complete descriptions of the commands listed in [Table 8: Commands used for the INP and AINPQ Features](#), including parameter names, valid values, and output examples.

Table 8: Commands used for the INP and AINPQ Features

Type	Commands
System Serial Number	ent/rtrv-serial-num
Card	ent/dlt/rtrv/alw/inh/init/rept-stat-card
Feature Control	chg/rtrv-feat, enable/chg/rtrv-ctrl-feat
EAGLE 5 ISS Self Identification	chg/rtrv-sid
STP Options	chg/rtrv-stpopts
INP Options	chg/rtrv-inpopts
AINPQ Options	chg/rtrv-ainpopts
Home RN	ent/dlt/rtrv-homern
Concerned Signaling Point Code	ent/dlt/rtrv-cspc
Local Subsystem Application	ent/chg/dlt/rtrv-ss-appl
Service Selector	chg/dlt/ent/rtrv-srvsel
Local Subsystem Activation	alw/inh-map-ss

enable/chg/rtrv-ctrl-feat

These commands are used to enable, turn on, and display the on/off status of controlled features in the EAGLE 5 ISS.

chg/rtrv-stpopts

The STP system options commands are used to provision system-wide options for the EAGLE 5 ISS.

ent/dlt/chg/rtrv-srvsel

The service selector commands are used to enter, change, remove, and display service selectors for the INPQ and INPMR services.

ent/dlt/rtrv-homern

These commands are used to change, remove, and display the up-to-100 routing number prefixes for the operating network in the HOMERN table.

chg/rtrv-sid

These commands are used to change and display the self-identification and capability point codes of the EAGLE 5 ISS. The self-identification identifies the EAGLE 5 ISS to other signaling points in the network.

ent/dlt/chg/rtrv-map

These commands are used to provision, remove, change, and display the mate point code and subsystem number and its attributes. A mate point code defines an adjacent signaling point, which is considered the mated signal transfer point (STP) to the EAGLE 5 ISS.

alw/inh-map-ss

The `alw-map-ss` command is used to allow the INP subsystem which brings the subsystem online. The command is rejected if the subsystem specified with the SSN parameter is for not the INP subsystem. The current state of the INPQ subsystem must be OOS-MT-DSBLD (out of service maintenance disabled) in order for the command to be accepted.

When the `inh-map-ss` is entered for the INP subsystem, a coordinated shutdown is attempted. If the coordinated shutdown fails, a UIM is generated indicating the shutdown failed. If the `FORCE` parameter is specified, the specified subsystem is forced to shutdown. A coordinated shutdown is not performed.

ent/chg/dlt/rtrv-ss-appl

These commands are used to provision, remove, change, and display the entry of a subsystem number for a local subsystem application and set the application status online or offline. Only one subsystem can be defined per application, and the application must be unique.

ent/dlt/rtrv-cspc

These commands are used to provision, remove, and display the broadcast concerned signaling point code groups. These point codes are notified of the receipt by EAGLE 5 ISS of subsystem-prohibited and subsystem-allowed SS7 SCCP management messages from an application at an adjacent signaling point and subsystem.

chg/rtrv-inpopts

These commands are used to change and display the INP-specific data. These commands provision and display the contents of the INPOPTS table.

chg/rtrv-ainpopts

These commands are used to change and display the AINPQ-specific data. These commands provision and display the contents of the AINPOPTS table.

Chapter 4

INP/AINPQ Feature Configuration

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- *Enabling the INP and AINPQ Features.....53*
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This chapter describes prerequisites and procedures for configuration of the INP and AINPQ features on the EAGLE 5 ISS. The INP and AINPQ features can be enabled and turned on independently or together in the system. This chapter also includes procedures for configuration of the Service Portability feature for use with INP, and for enabling and turning on the INP Circular Route Prevention (INP CRP) feature.

Introduction

This chapter describes prerequisites and procedures for configuration of the INP and AINPQ features on the EAGLE 5 ISS. The INP and AINPQ features can be enabled and turned on independently or together in the system. This chapter also includes procedures for configuration of the Service Portability feature for use with INP and AINPQ, and for enabling and turning on the INP Circular Route Prevention (INP CRP) feature.

INP and AINPQ Configuration Procedure lists the steps for enabling and turning on the features, and for the provisioning required for the features. Each step contains a link or reference to information and procedures to use to complete the step. Feature provisioning can be performed only after the INP or AINPQ feature is turned on.

Note: The INP feature, AINPQ feature, and other related features are optional and must be purchased from Tekelec before they can be used in your system. If you are not sure whether you have purchased a specific feature, contact your Tekelec Sales or Account Representative.



Caution: For an in-service environment, contact the *Customer Care Center* before continuing to configure either the INP feature or the AINPQ feature. For an environment that is not yet in-service, continue with the configuration.

System Prerequisites

Before any feature that is described in this manual can be enabled, the prerequisites listed in *Table 9: System Prerequisites* are required in the system.

Table 9: System Prerequisites

Prerequisite	Verification and Provisioning
<p>The system serial number must be correct and locked.</p> <p>For new installations, the system is shipped with an unlocked serial number. The serial number can be changed if necessary and must be locked after the system is on-site.</p> <p>For systems that are being upgraded, the serial number is usually already verified and locked.</p>	<p>Note: The serial number cannot be changed after it is entered and locked in the system.</p> <p>Locate the serial number for the system on a label affixed to the control shelf (1100).</p> <p>Enter the <code>rtrv-serial-num</code> command to display the serial number and its locked status.</p> <p>Verify that the displayed serial number is correct for the system.</p> <p>If no serial number is displayed, enter the <code>ent-serial-num</code> command (without the <code>lock</code> parameter) to provision the serial number that appears on the control shelf label. Enter the <code>rtrv-serial-num</code> command and verify that the serial number was entered correctly.</p> <p>Enter the <code>ent-serial-num</code> command with the <code>lock=yes</code> parameter to lock the serial number in the system.</p>

Prerequisite	Verification and Provisioning
<p>A sufficient number of Service Module cards must be equipped.</p> <p>Some features require only E5-SM4G cards and cannot use DSM cards. See specific feature prerequisites, if any, in this section.</p> <p>Refer to the <i>Dimensioning Guide for EPAP Advanced DB Features</i> for information on the dimensioning rules and the database capacity requirements for EPAP-related features.</p>	<p>Enter the <code>rept-stat-card:appl=vsccp</code> command to list the Service Module cards in the system.</p> <p>If more cards or cards of a different type are needed, refer to the procedures in the <i>Database Administration Manual - GTT</i> to add Service Module cards or remove DSM cards.</p>
<p>The GTT feature must be on in the system.</p> <p>Some features require an additional GTT-related feature such as EGTT. See the specific feature prerequisites in this section.</p>	<p>Enter the <code>rtrv-feat</code> command to display the GTT feature status.</p> <p>If the GTT feature is on, the <code>gtt=on</code> entry appears in the output.</p> <p>If the <code>gtt=off</code> entry appears in the output, use the procedures in the <i>Database Administration Manual - GTT</i> to turn on and provision the GTT feature and any other GTT-related features and functions that will be used in the system.</p>

INP and AINPQ Feature Prerequisites

Before the INP feature or the AINPQ feature can be enabled, the following prerequisites are required in the system:

Table 10: INP and AINPQ Feature Prerequisite

Prerequisite	Verification and Provisioning
The LNP feature cannot be on in the system	<p>Enter the <code>rtrv-ctrl-feat</code> command.</p> <p>If the LNP feature is on, shown with a quantity greater than zero for the LNP ported TNs entry in the command output, features described in this manual cannot be enabled.</p>
The system must be configured for HLR destinations.	<p>The system must be configured to communicate with the system of the HLR database. See Configure the System for HLR Destinations.</p>

INP and AINPQ Configuration Procedure

The EAGLE 5 ISS configuration of the INP feature and the AINPQ feature consists of the following steps. The steps contain links and references to detailed procedures and information needed to complete each step.

EPAP Provisioning

It is recommended that EPAP entity (SP or RN) administration not be done until after the point code and/or subsystem number has been entered into the EAGLE 5 ISS MAP table (see Step 8).

- EPAP-administered entity data can possibly become out-of-sync with the EAGLE 5 ISS MAP table when the creation of point codes and/or subsystem numbers in the MAP table is performed after EPAP database administration.
 - If this mismatch is discovered in real-time operations, a UIM (such as SCCP did not route - DPC not in MAP tbl or SCCP did not route - SS not in MAP tbl) is sent to the EAGLE 5 ISS maintenance terminal.
1. Verify, and provision if needed, the system prerequisites. See [System Prerequisites](#).
 2. Verify, and provision if needed, the feature prerequisites. See [INP and AINPQ Feature Prerequisites](#).
 3. Enable the INP feature, the AINPQ feature, or both features. See [Enabling the INP and AINPQ Features](#).
 4. Turn on the INP feature, the AINPQ feature, or both features. See [Turning On the INP and AINPQ Features](#).
 5. If the INP CRP feature will be used with INP, enable the INP CRP feature. See [Enabling the INP Circular Route Prevention \(INP CRP\) Feature](#).
 6. If the INP CRP feature is enabled, turn on the INP CRP feature. See [Turning On the INP Circular Route Prevention \(INP CRP\) Feature](#).
 7. Provision capability point codes for INP Query service (used by INP and AINPQ). See [Provisioning True Point Codes and Capability Point Codes](#).
 8. Refer to the procedures in the *Database Administration Manual - Global Title Translation* to provision the following items in the Mated Application (MAP) table for the INP local subsystem:
 - Translation types and mappings
 - Concerned signaling point code (CSPC) of the EAGLE 5 ISS mate and of any nodes that will send Route-on-SSN queries to the INP local subsystem for INPQ queries (for INP and AINPQ)
 - Mated Application table entries for entity point codes and/or subsystem numbers for the INP local subsystem. Only solitary and dominant loadsharing are supported.
 9. Provision the state and subsystem number for the INP local subsystem (used by both INP and AINPQ for Query processing). See [Provisioning the INP Local Subsystem](#).
 10. Provision the service selector mechanism to route MSUs to the INP subsystem. See [Provisioning the INP Service Selectors](#).

The INP services are inpq and inpmr.

The Translation Type and Subsystem Number are the values assigned for the INP local subsystem when the MAP table entries were defined. See Step 8 in this procedure.

INPQ supports the ITU-N Global Title Indicator; ANSI and ITU-I are not supported. INPQ does not support the Service Nature of Address Indicator and the Service Numbering Plan.

INPMR support ITU-I and ITU-N Global Title Indicators. ANSI is not supported. The Service Nature of Address (SNAI) must be ccrndn, rnidn, rndnd, or rnsdn. The Service Numbering Plan must be e164.

Note: If the AINPQ feature is enabled and the INP feature is not enabled, the INPMR service selector can still be provisioned, but the INPOPTS table cannot be provisioned. INPMR service will still be available and MSUs will be processed, but default values of the INPOPTS table will be used. To provision the INPOPTS table, the INP feature must be enabled.

11. If non-international numbers need to be handled, verify that the STPOPTS values for the Default Country Code (DEFCC parameter) and the Default Network Destination Code (DEFNDC parameter) are not none. Refer to the `chg-stpopts` and `rtrv-stpopts` command descriptions in the *Commands Manual* to change and display the STPOPTS DEFCC and DEFNDC values.
12. Enable the Service Portability feature, if it will be used with the INP or AINPQ feature. See [Enabling the Service Portability Feature](#).
13. Turn on the Service Portability feature, if it will be used with the INP feature, the AINPQ feature, or both features. See [Turning On the Service Portability Feature](#).
14. Provision option values for the feature or features that will be used in the system - INPOPTS options for the INP feature, AINPOPTS options for the AINPQ feature, options used for Service Portability, and options used for the INP CRP feature. See [Provisioning the INP and AINPQ Options](#).
15. Enable the S-Port Subscriber Differentiation feature, if it will be used with Service Portability for the INP feature with the INPMR service. See [Enabling the S-Port Subscriber Differentiation Feature](#).
16. Turn on the S-Port Subscriber Differentiation feature if it will be used with the Service Portability feature. See [Turning On the S-Port Subscriber Differentiation Feature](#).
17. Provision the SCCPOPTS option for S-Port Subscriber Differentiation if it will be used with Service Portability for the INP feature with the INPMR service. See [Provisioning the S-Port Subscriber Differentiation SCCPOPTS Option](#).
18. Provision Home RNs that are prefixed to DNs for incoming INPQ and INP MR messages. See [Provisioning HOMERN Entries](#).
19. Provision the INPQ service selector, the INPMR service selector , or both service selectors. See [Provisioning the INP Service Selectors](#).
20. Activate the INP local subsystem. See [Activating the INP Local Subsystem](#).
21. Initialize the Service Module cards to load the RTDB, OAM, GPL, and GTT data to the cards. Refer to the procedures in the *Database Administration Manual - Global Title Translation*.
22. Verify the operating status of the system, using the `rept-stat-sccp`, `rept-stat-mps`, and `rept-stat-db:display=all` commands.

EPAP can now be used to administer INP and AINPQ entity objects and subscribers. For the details about performing these actions, refer to the *EPAP Administration Manual*.

Configure the System for HLR Destinations

This section describes the configuration of the system for HLR destinations, so that the system can communicate with the system of the HLR database. The route to this database may already be configured.

Perform the steps in the following procedure to verify that all HLR destinations for INP/AINPQ are entered, and make configuration changes as needed. The steps contain links and references to procedures and information that is needed to complete each step.

Refer to the command descriptions in the *Commands Manual* for valid parameter values, input examples, rules for entering a command correctly, and output examples.

1. Display and note current system settings for point codes (PCs) and capability point codes (CPCs), destination point codes (DPCs), routes, and linksets.
 - Enter the `rtrv-stpopts` command to display the ITU-N point code format if the network is an ITU-N network.
 - Enter the `rtrv-sid` command to display current PCs and CPCs by network type.
 - Enter the `rtrv-dstn` command to display current DPCs.
 - Enter the `rtrv-rte` command to display current route configurations.
2. Identify PCs and CPCs; determine new PCs and CPCs to be entered.
3. Remove the system PC from the MAP table if necessary (refer to the *Database Administration Manual - Global Title Translation*, "Removing A Mated Application").
4. Change PC, CPC, DPC, route, linkset, and LIM card configurations for the HLR database.
 - Refer to the procedures in the *Database Administration Manual - SS7* to configure PCs and CPCs by network type.
 - Refer to the procedures in the *Database Administration Manual - SS7* to configure DPCs for HLR destinations.
 - Refer to the procedures in the *Database Administration Manual - System Management* to provision LIM cards in the system, if needed.
 - Refer to the procedures in the *Database Administration Manual - SS7* to assign DPCs and configure linksets, signaling links, and routes for HLR destinations.
 - Refer to the procedures in the *Database Administration Manual - Global Title Translation* to configure mated applications.
5. Allow LIM card operation in the system and verify the card operating status. Refer to the procedures in the *Database Administration Manual - System Management*.
6. Allow the operation of the signaling links in the system and verify the link operating status. Refer to the procedures in the *Database Administration Manual - SS7*.

Enabling the INP and AINPQ Features

This procedure is used to enable the INP and AINPQ features in the EAGLE 5 ISS.

Each feature must be enabled using its feature part number and a feature access key.

- INP - Part Number 893017901
- AINPQ - Part Number 893017801

Note: Controlled features must be purchased before you can receive the feature access key to use to enable the feature. If you are not sure if you have purchased a feature and received the feature access key, contact your Sales Representative or Account Representative.

When each feature is enabled, it is permanently enabled. The features cannot be temporarily enabled.

Provisioning of INP and AINPQ options and other information can be done after each feature is enabled and before each feature is turned on.

After a feature has been enabled and database provisioning is complete, the feature status must be set to on (the feature must be “turned on”) See [Turning On the INP and AINPQ Features](#).

1. Display the status of the features that are controlled with feature access keys. Enter the `rtrv-ctrl-feat` command. The output lists the enabled features in the system and shows the on/off status for each feature.

If the entry for the feature that you want to enable appears in the `rtrv-ctrl-feat` output with status on, performing this procedure is not necessary.

2. Enable the feature, by entering the `enable-ctrl-feat` command and specify the part number and feature access key for the feature.

```
enable-ctrl-feat:partnum=<893xxxxx>:fak=<feature access key>
```

Note: The feature access key is provided when the feature is purchased. If you do not have the controlled feature part number or the feature access key for a feature, contact your Sales Representative or Account Representative.

When the feature is enabled, the entry for the enabled feature appears in the output of the `rtrv-ctrl-feat` command. The feature Status is off.

```
rlghncxa03w 09-06-29 16:40:40 EST EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name      Partnum      Status      Quantity
HC-MIM SLK Capacity 893012707    on          64
INP                893017901    off         ----
AINPQ              893017801    off         ----
;
```

3. Back up the database changes, by entering the following command.

```
chg-db:action=backup:dest=fixed
```

The following messages appear; the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED) : MASP A - Backup starts on active MASP.
BACKUP (FIXED) : MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED) : MASP A - Backup starts on standby MASP.
BACKUP (FIXED) : MASP A - Backup on standby MASP to fixed disk complete.
```

Turning On the INP and AINPQ Features

Before the INP or AINPQ feature can be turned on, the feature must be enabled in the EAGLE 5 ISS.

Provisioning of INP or AINPQ options and other information can be done after the feature is enabled and before the feature is turned on.

After each feature has been enabled and database provisioning is complete, the feature status must be set to on (the feature must be “turned on”). MSUs will not be processed by the feature until the feature is turned on.

This procedure is used to turn on the INP and AINPQ features in the EAGLE 5 ISS. Each feature must be turned on using its feature part number.

- INP - Part Number 893017901
- AINPQ - Part Number 893017801

After the features are enabled and turned on, they cannot be turned off again.

1. Display the status of the features that are controlled with feature access keys. Enter the `rtrv-ctrl-feat` command. The output lists the enabled features in the system and shows the on/off status for each feature.

```
rlghncxa03w 09-03-29 16:40:40 EST  EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name      Partnum      Status      Quantity
HC-MIM SLK Capacity  893012707    on          64
INP                893017901    off         ----
AINPQ              893017801    off         ----
;
```

If the entry for the feature that you want to turn on appears in the `rtrv-ctrl-feat` output with status on, performing this procedure is not necessary.

If the status of the feature in the output is off, continue with [Step 2](#).

2. Turn on the feature, by entering the `chg-ctrl-feat` command.
`chg-ctrl-feat:partnum=<893xxxxxx>:status=on`

When the feature is turned on, the feature status changes to on in the `rtrv-ctrl-feat` command output.

```
rlghncxa03w 09-06-29 16:40:40 EST  EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name      Partnum      Status      Quantity
HC-MIM SLK Capacity  893012707    on          64
INP                893017901    on          ----
AINPQ              893017801    on          ----
;
```

3. Back up the database changes, by entering the following command.
`chg-db:action=backup:dest=fixed`

The following messages appear; the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED) : MASP A - Backup starts on active MASP.
BACKUP (FIXED) : MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED) : MASP A - Backup starts on standby MASP.
BACKUP (FIXED) : MASP A - Backup on standby MASP to fixed disk complete.
```

Provisioning True Point Codes and Capability Point Codes

This procedure explains briefly how to provision EAGLE 5 ISS true point codes and capability point codes (CPCs) for EPAP-related features. Refer to the detailed procedures in the *Database Administration Manual - SS7* for provisioning true and capability point codes, and the CLI if needed.

The INP Query service is used by both INP and AINPQ. The INP Message Relay service is used only by INP.

INP Message Relay (INPMR) and INP Query (INPQ) services should be given separate CPCs. See x.

- For the INP Query service (INPQ), use CPCTYPE=INP.
- For the INP Message Relay service (INPMR), use CPCTYPE=STP.

INP Query processing supports queries from ITU-N point codes, and supports use of the ITU National Duplicate Point Code feature.

INP Message Relay processing supports ITU-I and ITU-N point codes, including group codes and use of the ITU National Duplicate Point Code feature.

This procedure explains how to provision EAGLE 5 ISS true point codes and INP capability point codes.

1. Display the true and capability point codes in the system. Enter the `rtrv-sid` command.

```
tekelecstp 08-07-22 15:07:48 EST EAGLE 39.2.0

PCA          PCI          PCN          CLLI          PCTYPE
-----      -
;            tekelecstp  ANSI
```

2. Verify that the desired EPAP-related feature is enabled and turned on, by entering the `rtrv-ctrl-feat` command.

```
rlghncxa03w 09-06-29 16:40:40 EST EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name      Partnum      Status      Quantity
HC-MIM SLK Capacity 893012701  on          64
INP                893017901  on          ----
AINPQ              893017801  on          ----
;
```

- If the feature entry appears in the command output, and the feature status is on, continue with [Step 3](#).
 - If the feature entry does not appear in the command output or if the feature status in the entry is off, go to the procedures in this manual to enable and turn on the EPAP-related feature. Then continue with [Step 3](#).
3. Add or change the true point codes and capability point codes as needed, using the `chg-sid` command.

Refer to the procedures in the *Database Administration Manual - SS7* for changing the Self-Identification of the EAGLE 5 ISS. The system might need to be initialized for the point code changes to take effect. This must be done carefully to minimize traffic loss.

4. Verify the changes with the `rtrv-sid` command.

```
tekelecstp 08-08-22 15:07:48 EST EAGLE 41.1.0

PCA          PCI          PCN          CLLI          PCTYPE
001-001-001  2-002-2      01234        tekelecstp    ANSI

CPCA (INP)
004-004-004

CPCI (STP)
```



```
5-012-0
```

```
;
```

5. Back up the changes using the `chg-db:action=backup:dest=fixed` command.

The following messages appear, the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED): MASP A - Backup starts on active MASP.
BACKUP (FIXED): MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED): MASP A - Backup starts on standby MASP.
BACKUP (FIXED): MASP A - Backup on standby MASP to fixed disk complete.
```

Provisioning the INP Local Subsystem

The following procedures in this section are used to add or remove a local subsystem application:

- [Adding the INP Local Subsystem Application](#)
- [Removing a Local Subsystem Application](#)

See the procedures in [Changing the State of a Subsystem Application](#) to take the subsystem application online or offline.

Note: The EAGLE 5 ISS supports the operation of two or more local subsystems for EPAP-related features in the system at one time. For example, the local subsystems for INP and EIR can coexist in the system.

Adding the INP Local Subsystem Application

This procedure is used to define the INP subsystem application. The subsystem application can be taken online when it is defined or later in the configuration process (see [Changing the State of a Subsystem Application](#)).

Before the INP subsystem application can be added to the database, the following conditions must exist in the system:

Table 11: INP Local Subsystem Prerequisites

Prerequisite	Verification
The INP feature or AINPQ feature must be enabled and turned on.	Enter the <code>rtrv-ctrl-feat</code> command. If the INP entry or AINPQ entry with Status of on does not appear in the output, see the Enabling the INP and AINPQ Features and Turning On the INP and AINPQ Features procedures.
The application specified by the <code>appl</code> parameter (<code>inp</code>) cannot already be in the database.	Enter the <code>rtrv-ss-appl</code> command.

Prerequisite	Verification
	If the INP entry appears in the output, this procedure cannot be performed.
EAGLE 5 ISS true point codes, STP capability point code for INPMR, and INP capability point codes for INPQ must be defined, and entered in the Mated Application table with a subsystem number to be used for the INP subsystem application.	<p>Only one subsystem number for the application can be defined, and must be used for all point code types assigned to the local subsystem.</p> <p>Enter the <code>rtrv-sid</code> command, and verify that the true and capability point codes needed for the feature are correct. If changes are required, see Provisioning True Point Codes and Capability Point Codes.</p> <p>Enter the <code>rtrv-map</code> command, and verify that the MAP table entries are correct for the INP local subsystem. If changes are required, refer to the procedures in the <i>Database Administration Manual – Global Title Translation</i> for provisioning solitary and dominant mated applications.</p>

The examples in this procedure reserve the subsystem number 100 for the INP subsystem application and set the INP subsystem application status to online.

1. Add the INP application and subsystem number, using the `ent-ss-appl` command.

If the `stat` parameter is not specified, the status defaults to offline.

```
ent-ss-appl:appl=inp:ssn=100:stat=online
```

2. Verify the changes, by entering the `rtrv-ss-appl` command.

```
tekelecstp 08-07-25 08:02:22 EST EAGLE 39.2.0
APPL  SSN  STAT
INP    100  online

SS-APPL TABLE IS 25% FULL (1 OF 4)
;
```

3. Back up the changes using the `chg-db:action=backup:dest=fixed` command. The following messages appear, the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED): MASP A - Backup starts on active MASP.
BACKUP (FIXED): MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED): MASP A - Backup starts on standby MASP.
BACKUP (FIXED): MASP A - Backup on standby MASP to fixed disk complete.
```

Removing a Local Subsystem Application

This procedure is used to remove a subsystem application from the database. The subsystem application to be removed must be in the database and the subsystem must be out of service.

1. Display the subsystem application number for the local subsystem application in the database, by entering the `rtrv-ss-appl` command.

2. Display the operating status of the local subsystem, by entering the `rept-stat-sccp` command. If the subsystem is out of service, shown by an entry containing OOS-MT-DSBLD for the subsystem in the `rept-stat-sccp` output, go to [Step 5](#).

3. Place the local subsystem application out of service. Enter the `inh-map-ss` command and specify the subsystem number displayed in [Step 1](#).
`inh-map-ss:ssn=11`

```
rlghncxa03w 08-06-28 14:42:38 GMT EAGLE 39.2.0
Inhibit map subsystem command sent to all SCCP cards.
Command Completed.
```

When this command has successfully completed, the following message appears. If the `force=yes` parameter is not specified, wait for a message that indicates the subsystem is inhibited.

```
rlghncxa03w 08-06-28 14:42:38 GMT EAGLE 39.2.0
Inhibit map subsystem command sent to all SCCP cards.
Command Completed.
```

4. Verify that the local subsystem is out of service (OOS-MT-DSBLD), by entering the `rept-stat-sccp` command. If the local subsystem is not out of service, return to [Step 3](#) and enter the `inh-map-ss` command with the `force=yes` parameter specified.
5. Remove the local subsystem application from the database, by entering the `dlt-ss-appl` command.
`dlt-ss-appl:appl=<subsystem>`
6. Verify the changes by entering the `rtrv-ss-appl` command. The deleted entry should not appear in the output.

```
tekelecstp 08-07-25 08:02:22 EST EAGLE 39.2.0
APPL SSN STAT

SS-APPL TABLE IS 0% FULL (0 OF 4)
;
```

7. Back up the changes using the `chg-db:action=backup:dest=fixed` command. The following messages appear, the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED): MASP A - Backup starts on active MASP.
BACKUP (FIXED): MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED): MASP A - Backup starts on standby MASP.
BACKUP (FIXED): MASP A - Backup on standby MASP to fixed disk complete.
```

Provisioning the INP and AINPQ Options

This procedure is used to provision the configuration options for the INP feature, the AINPQ feature, or both features, and the options required for using Service Portability .

See [INP/AINPQ Configuration Options](#) for information and considerations about provisioning INP and AINPQ configuration options.

Refer to the command descriptions in the *Commands Manual* for valid parameter values, input examples, rules for entering the commands correctly, and output examples for the commands used in this procedure.

1. Verify that the INP or AINPQ feature is enabled, by entering the `rtrv-ctrl-feat` command.
 - If the feature is not enabled (the entry does not appear in the output), go to [Enabling the INP and AINPQ Features](#) to enable the feature. Then continue with [Step 2](#).
 - If the feature is enabled or turned on (the feature status is off or on in the entry), continue with [Step 2](#).

```
rlghncxa03w 09-06-29 16:40:40 EST  EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name          Partnum    Status    Quantity
HC-MIM SLK Capacity   893012707  on        64
INP                   893017901  off       ----
AINPQ                 893017801  off       ----
;
```

2. Display the current settings of the feature options.

Enter the `rtrv-inpopts` command for INP options.

Enter the `rtrv-ainpopts` command for AINPQ options.
3. Change the options for one or both features to the required settings. If Service Portability will be used with one or both features, change the options that apply to Service Portability to the required settings.

Enter the `chg-inpopts` command for INP options.

Enter the `chg-ainpopts` command for AINPQ options.
4. Verify the changes.

Enter the `rtrv-inpopts` command for INP options.

Enter the `rtrv-ainpopts` command for AINPQ options.
5. Back up the changes, using the `chg-db:action=backup:dest=fixed` command.

These messages appear, the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED) : MASP A - Backup starts on active MASP.
BACKUP (FIXED) : MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED) : MASP A - Backup starts on standby MASP.
BACKUP (FIXED) : MASP A - Backup on standby MASP to fixed disk complete.
```

Enabling the INP Circular Route Prevention (INP CRP) Feature

If INP Circular Route Prevention will be used with INP, use this procedure to enable the INP CRP feature in the EAGLE 5 ISS.

The INP CRP feature must be enabled using the feature part number 893028501 and the feature access key.

Note: Controlled features must be purchased before you can receive the feature access key to use to enable the feature. If you are not sure if you have purchased a feature and received the feature access key, contact your Sales Representative or Account Representative.

When the INP CRP feature is enabled, it is permanently enabled. The INP CRP feature cannot be temporarily enabled. After the INP CRP feature is enabled and turned on, the INP CRP feature can be turned off again.

After the S-Port feature has been enabled, the INP CRP feature status must be set to on (the feature must be “turned on”) before INP CRP processing will occur.

1. Display the status of the features that are controlled with feature access keys. Enter the `rtrv-ctrl-feat` command. The output lists the enabled features in the system and shows the on/off status for each feature.

```
rlghncxa03w 09-06-29 16:40:40 EST  EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name          Partnum    Status    Quantity
HC-MIM SLK Capacity   893012707  on        64
INP                   893017901  on        ----
;
```

2. Enable the INP CRP feature, by entering the `enable-ctrl-feat` command.
`enable-ctrl-feat:partnum=893028501:fak=<feature access key>`

Note: The feature access key (the fak parameter) is provided by Tekelec. If you do not have the controlled feature part number or the feature access key for the feature, contact your Tekelec Sales Representative or Account Representative.

When the feature is enabled, the INP CRP entry appears in the output of the `rtrv-ctrl-feat` command.

```
rlghncxa03w 09-06-29 16:40:40 EST  EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name          Partnum    Status    Quantity
HC-MIM SLK Capacity   893012707  on        64
INP                   893017901  on        ----
INP CRP               893028501  off       ----
;
```

3. Back up the database changes, by entering the following command.
`chg-db:action=backup:dest=fixed`

The following messages appear; the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED) : MASP A - Backup starts on active MASP.
BACKUP (FIXED) : MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED) : MASP A - Backup starts on standby MASP.
BACKUP (FIXED) : MASP A - Backup on standby MASP to fixed disk complete.
```

Turning On the INP Circular Route Prevention (INP CRP) Feature

This procedure is used to turn on the INP CRP feature in the EAGLE 5 ISS, using the feature part number 893028501.

Before the INP CRP feature can be turned on, the feature must be enabled in the EAGLE 5 ISS.

After the INP CRP feature has been enabled, the INP CRP feature status must be set to on (the feature must be “turned on”). MSUs will not be processed by the INP CRP feature until the feature is turned on.

1. Display the status of the features that are controlled with feature access keys. Enter the `rtrv-ctrl-feat` command. The output lists the enabled features in the system and shows the on/off status for each feature.

```
rlghncxa03w 09-06-29 16:40:40 EST EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name      Partnum      Status      Quantity
HC-MIM SLK Capacity 893012707    on          64
INP                893017901    on          ----
INP CRP           893028501    off         ----
;
```

If the entry for the INP CRP feature appears in the `rtrv-ctrl-feat` output with status on, performing this procedure is not necessary.

If the status of the INP CRP feature in the output is off, continue with [Step 2](#).

2. Turn on the INP CRP feature, by entering the `chg-ctrl-feat` command.
`chg-ctrl-feat:partnum=893028501:status=on`

When the feature is turned on, the feature status changes to on in the `rtrv-ctrl-feat` command output.

```
rlghncxa03w 09-08-29 16:40:40 EST EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name      Partnum      Status      Quantity
HC-MIM SLK Capacity 893012707    on          64
INP                893017901    on          ----
INP CRP           893028501    on          ----
;
```

3. Back up the database changes, by entering the following command.
`chg-db:action=backup:dest=fixed`

The following messages appear; the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED) : MASP A - Backup starts on active MASP.
BACKUP (FIXED) : MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED) : MASP A - Backup starts on standby MASP.
BACKUP (FIXED) : MASP A - Backup on standby MASP to fixed disk complete.
```

Provisioning HOMERN Entries

The `ent-homern` command is used to provision the prefix RNs in the HOMERN table.

Enter any Home RNs that are prefixed to DNs for incoming INPQ and INPMR messages, and that are used to determine INP Circular Routes. This command can be used to enter up to 100 routing number prefixes for the operating network into the HOMERN table.

1. Display the HOMERN table entries, by entering the `rtrv-homern` command.
2. Enter the home routing number prefixes that will be used for INP/AINPQ. Use the following command for each prefix:
`ent-homern:rn=<routing number>`
3. Verify the changes by entering the `rtrv-homern` command.
4. Back up the changes, using the `chg-db:action=backup:dest=fixed` command.
These messages appear, the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED) : MASP A - Backup starts on active MASP.
BACKUP (FIXED) : MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED) : MASP A - Backup starts on standby MASP.
BACKUP (FIXED) : MASP A - Backup on standby MASP to fixed disk complete.
```

Provisioning the INP Service Selectors

The procedures in this section describe how to add, change, and remove a service selector. The information is indicated that is specific to INP.

The commands that are used in these procedures are described briefly in [EAGLE 5 ISS Commands](#), and in detail in the *Commands Manual*.

Adding Service Selectors for INP and AINPQ

This procedure is used to add service selectors that are used by the INP and AINPQ features.

The INP or the AINPQ feature must be enabled and turned on before an INP service selector can be added.

1. Verify that the INP feature or the AINPQ feature is enabled and turned on, by entering the `rtrv-ctrl-feat` command. If the feature is enabled and turned on, the status of the entry is on.

```
rlghncxa03w 09-06-29 16:40:40 EST  EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name          Partnum    Status    Quantity
HC-MIM SLK Capacity   893012707  on        64
INP                   893017901  on        ----
AINPQ                 893017801  on        ----
;
```

- If the INP or AINPQ feature is not enabled or turned on, go to [Enabling the INP and AINPQ Features](#) and [Turning On the INP and AINPQ Features](#) to enable and turn on at least one of the features. Then continue with [Step 2](#).
 - If the INP or AINPQ feature is enabled and turned on, continue with [Step 2](#).
2. Display any existing INP service selectors in the database, by entering the `rtrv-srvsel:serv=inpq` command and the `rtrv-srvsel:serv=inpqr` command.
 3. Add new INP service selectors, using the `ent-srvsel` command.
 4. Verify the changes by entering the `rtrv-srvsel` command with the parameters and values used in [Step 3](#).
 5. Back up the changes using the `chg-db:action=backup:dest=fixed` command.
The following messages appear, the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED): MASP A - Backup starts on active MASP.
BACKUP (FIXED): MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED): MASP A - Backup starts on standby MASP.
BACKUP (FIXED): MASP A - Backup on standby MASP to fixed disk complete.
```

Removing a Service Selector

This procedure is used to remove a service selector from the database.

To remove a service selector, the GTI, GTII, GTIN, tt, and ssn parameter values must be entered as shown in the `rtrv-srvsel` output.

These parameters can also be used to limit the amount of information displayed with the `rtrv-srvsel` command.

1. Display the service selectors in the database, by entering the `rtrv-srvsel` command.
2. Remove the service selector from the database, using the `dlt-srvsel` command.
3. Verify the changes by entering the `rtrv-srvsel` command with the parameters and values used in [Step 2](#).
4. Back up the changes using the `chg-db:action=backup:dest=fixed` command.
The following messages appear, the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED): MASP A - Backup starts on active MASP.
BACKUP (FIXED): MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED): MASP A - Backup starts on standby MASP.
BACKUP (FIXED): MASP A - Backup on standby MASP to fixed disk complete.
```

Changing an Existing Service Selector to an INP Service Selector

This procedure is used to change an existing non-INP service selector to an INP service selector.

The only parameters that can be changed using this procedure are:

:nserv

New DSM service type, `inpq` or `inpqr`

:nsnp

The inpq service selector cannot contain an SNP value; if the service selector being changed contains an SNP value, this value must be changed to none with this parameter.

The snp value for the inpmr service selector must be e164.

:nsnai

The inpq service selector cannot contain an SNAI value; if the service selector being changed contains an SNAI value, this value must be changed to none with this parameter.

The snai value for the inpmr service selector must be ccrndn, rndnd, rnndn, or rnsdn.

The `chg-srvsel` command requires that the following parameters be specified with the values shown in the `rtrv-srvsel` output for the service selector that is being changed. If any of these parameter values need to be changed for a new INP service selector, use the the procedure in [Removing a Service Selector](#) to remove the existing service selector. Then use the procedure in [Adding Service Selectors for INP and AINPQ](#) to add the new INP service selector with the new parameter information.

:gtii/gtin/gtin24

Global title indicator for ITU international (gtii) and ITU national using 14-bit point codes (gtin).

:tt

Translation type

:ssn

Subsystem number

:nai

Nature of address indicator

:naiv

Nature of address indicator value

:np

Numbering plan

:npv

Numbering plan value

1. Display the service selectors in the database, using the `rtrv-srvsel` command.

Note: If the `rtrv-srvsel` output shows INP service selectors, go to [Step 3](#).

2. Verify that the INP feature or AINPQ feature is enabled and turned on, by entering the `rtrv-ctrl-feat` command. If the feature is enabled and turned on, the status of the entry is on.

```
rlghncxa03w 09-06-29 16:40:40 EST  EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name      Partnum      Status      Quantity
HC-MIM SLK Capacity  893012707    on          64
INP                893017901    on          ----
AINPQ              893017801    on          ----
;
```

- If the INP or AINPQ feature is not enabled or turned on, go to [Enabling the INP and AINPQ Features](#) and [Turning On the INP and AINPQ Features](#) to enable and turn on at least one of the features. Continue with [Step 3](#).
 - If the INP or AINPQ feature is enabled and turned on, continue with [Step 3](#).
3. Change the service selector, using the `chg-srvsel` command.
 If the `snp` or `snai` parameter values are shown as dashes in the `rtrv-srvsel` output, these parameter cannot be specified with the `chg-srvsel` command.
 If the `gtii/gtin/gtin24` parameter value is 2, the `np`, `nai`, `npv`, and `naiv` parameters cannot be specified with the `chg-srvsel` command.
 If the `gtii/gtin/gtin24` parameter value is 4, either the `np` and `nai` parameters, or the `npv` and `naiv` parameters must be specified with the `chg-srvsel` command.
 The `np` and `nai` parameters can be specified in place of the `npv` and `naiv` parameters, and the `npv` and `naiv` parameters can be specified in place of the `np` and `nai` parameters, as long as the parameter values being specified correspond to the values shown in the `rtrv-srvsel` output.
 Refer to the `chg-srvsel` command description in the Commands Manual.
 4. Verify the changes by entering the `rtrv-srvsel` command with the `serv=inpq` parameter or the `serv=inpmr` parameter and the values for the other parameters that were used in [Step 3](#).
 5. Back up the changes using the `chg-db:action=backup:dest=fixed` command.
 The following messages appear, the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED): MASP A - Backup starts on active MASP.
BACKUP (FIXED): MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED): MASP A - Backup starts on standby MASP.
BACKUP (FIXED): MASP A - Backup on standby MASP to fixed disk complete.
```

Activating the INP Local Subsystem

The procedure in this section explains how to activate the INP local subsystem.

INP and AINPQ share operation of the INP local subsystem in the EAGLE 5 ISS.

When all configuration is complete for the feature or features, the INP subsystem application must be taken online and the local subsystem must be activated to allow it to begin operation.

When the local subsystem operating state is Inhibited, the `chg-ss-appl:appl=inp` command can be used to specify the value `online` or the value `offline` to control the persistent setting for the local subsystem. The `rtrv-ss-appl` command always displays the online or offline provisioned value. When the first Service Module card is loaded, this state tells whether the subsystem should be considered allowed (online) or inhibited (offline). This is a database state. If the command is accepted, then the change is made to the tables and can be read after an `init-sys` command is entered to initialize the system.

When the Service Module cards are in-service and the subsystem application is online, the `alw/inh-map-ss` commands can be used to change the dynamic operating state of the local subsystem.

The `inh-map-ss` command does not necessarily force a state change, because it can fail if the mate does not send SOG. The `force=yes` parameter must be specified to bypass the SOR/SOG exchange and inhibit immediately. (There is no `rtrv-map-ss` command.)

The procedures in [Changing the State of a Subsystem Application](#) explain how to take a local subsystem online and offline.

Table 12: Subsystem Allow/Inhibit

Command\ Subsystem State	Offline	Online
<code>alw-map-ss</code>	Command is rejected.	Attempts to make the local subsystem active.
<code>inh-map-ss</code>	Command accepted, but no action because offline implies inhibited.	Attempts to inhibit the local subsystem. Use of the <code>force=yes</code> parameter bypasses the SOR/SOG exchange and inhibits immediately.
<code>chg-ss-appl :appl=inp :nstat=online</code>	Command is rejected, because the subsystem must be online to be in the allowed state.	Changes local subsystem database status to online.
<code>chg-ss-appl :appl=inp :nstat=offline</code>	Command is rejected because the subsystem must be inhibited to go offline.	Changes local subsystem database status to offline.

1. Display the status of the INP subsystem application, by entering the `rtrv-ss-appl` command.

```
tekelecstp 07-07-25 08:02:22 EST EAGLE 37.6.0
APPL  SSN  STAT
INP    11  offline

SS-APPL TABLE IS 25% FULL (1 OF 4)
;
```

2. Change the INP subsystem to status to online.
`chg-ss-appl:appl=inp:nstat=online`
3. Enter the command to allow the INP subsystem to begin operation.
`alw-map-ss:ssn=<INP ssn>`

```
integrat40 00-05-24 10:37:22 EST EAGLE5 37.6.0
Allow map subsystem command sent to all SCCP cards.
Command Completed.
;
```

4. Display the operating status of the INP subsystem, by entering the `rept-stat-sccp` command.

Changing the State of a Subsystem Application

The procedures in this section are used to set the state of an existing subsystem application to either online or offline.

The online or offline status of the subsystem application is shown in the STAT field of the `rtrv-ss-appl` command output.

The `rept-stat-sccp` command displays the operating state (in or out of service) of the subsystem.

If the subsystem application is to be taken online, the subsystem application must be offline.

When the subsystem is taken online (regardless of how the subsystem was taken offline), the EAGLE 5 ISS sends SNR/SSA. A UAM is generated, indicating that the subsystem is ALLOWED.

If the subsystem application is to be taken offline, the subsystem application must be online. The subsystem must be taken out of service (OOS-MT-DSBLD) with the `inh-map-ss` command before it can be taken offline.

A subsystem application can be taken offline using coordinated state change, or forced offline without using coordinated state change.

When the `inh-map-ss` command is entered for the subsystem, a coordinated shutdown is attempted. If the coordinated shutdown fails, a UIM is generated, indicating that the shutdown failed. If the force parameter is specified, the subsystem is forced to shut down; a coordinated shutdown is not performed.

For coordinated state change, SCMG sends an SOR message to the mated subsystem and will start a T_{coord} timer (30 seconds). If SCMG receives an SOG message from the mated subsystem before the T_{coord} timer expires, SCMG will broadcast SSPs to the concerned point code group, send SBR/SSP, and take the subsystem offline. A UAM is generated, indicating that the subsystem is PROHIBITED. If the SOG is not received before T_{coord} expires, then the inhibit request is denied and a UIM is generated.

When the subsystem is taken offline without coordinated state change, the EAGLE 5 ISS sends SBR/SSPs. A UAM is generated, indicating that the subsystem is PROHIBITED.

When the EAGLE 5 ISS receives an SOR message from its mated subsystem, it will reply with an SOG message if both of the following conditions are met:

- The local subsystem is available
- The total load on the DSM subsystem is less than 45% of its capacity

If either of these conditions is not met, the EAGLE 5 ISS will not reply to the SOR message.

Taking the Subsystem Application Offline

Use the procedure in this section to take a subsystem application offline.

1. Verify the online or offline state of the subsystem application, by entering the `rtrv-ss-appl` command.

```
tekelecstp 08-07-25 08:02:22 EST EAGLE 39.2.0
APPL  SSN  STAT
INP    11  online

SS-APPL TABLE IS 25% FULL (1 OF 4)
;
```

If the INP subsystem application is offline, this procedure does not need to be performed.

2. Verify the operating status of the subsystem by entering the `rept-stat-sccp` command.
3. Place the subsystem out of service. Specify the subsystem number displayed in the output in [Step 1](#).

```
inh-map-ss:ssn=11
```

```
rlghncxa03w 08-06-28 14:42:38 GMT EAGLE 39.2.0
Inhibit map subsystem command sent to all SCCP cards.
Command Completed.
;
```

4. Verify that the subsystem is out of service, by entering the `rept-stat-sccp` command.
5. Take the subsystem offline. Enter the `chg-ss-appl` command with the `nstat=offline` parameter.
`chg-ss-appl:appl=inp:nstat=offline`
6. Verify the changes by entering the `rtrv-ss-appl` command.

```
tekelecstp 08-07-25 08:02:22 EST EAGLE 39.2.0
APPL  SSN  STAT
INP    11  offline

SS-APPL TABLE IS 25% FULL (1 OF 4)
;
```

7. Back up the new changes using the `chg-db:action=backup:dest=fixed` command.
The following messages appear, the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED): MASP A - Backup starts on active MASP.
BACKUP (FIXED): MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED): MASP A - Backup starts on standby MASP.
BACKUP (FIXED): MASP A - Backup on standby MASP to fixed disk complete.
```

Taking the Subsystem Application Online

Use the procedure in this section to take the subsystem application online.

1. Verify the state of the subsystem application - online or offline, by entering the `rtrv-ss-appl` command.

```
tekelecstp 08-07-25 08:02:22 EST EAGLE 39.2.0
APPL  SSN  STAT
INP    11  offline

SS-APPL TABLE IS 25% FULL (1 OF 4)
;
```

If the INP subsystem is online, this procedure does not need to be performed.

2. Display the operating status of the subsystem by entering the `rept-stat-sccp` command.
3. Take the subsystem application online. Enter the `chg-ss-appl` command with the `nstat=online` parameter.
`chg-ss-appl:appl=inp:nstat=online`

4. Verify the changes by entering the `rtrv-ss-appl` command.

```
tekelecstp 08-07-25 08:02:22 EST EAGLE 39.2.0
APPL  SSN  STAT
INP    11  online

SS-APPL TABLE IS 25% FULL (1 OF 4)
;
```

5. Back up the new changes using the `chg-db:action=backup:dest=fixed` command.

The following messages appear, the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED): MASP A - Backup starts on active MASP.
BACKUP (FIXED): MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED): MASP A - Backup starts on standby MASP.
BACKUP (FIXED): MASP A - Backup on standby MASP to fixed disk complete.
```

Service Portability Feature Configuration Procedures

The procedures in this section are used for configuration of the Service Portability (S-Port) feature.

Enabling the Service Portability Feature

If Service Portability can be applied to the messages processed by a feature described in this manual, use this procedure to enable the Service Portability feature in the EAGLE 5 ISS.

The Service Portability feature must be enabled using the feature part number 893034301 and a feature access key.

Note: Controlled features must be purchased before you can receive the feature access key to use to enable the feature. If you are not sure if you have purchased a feature and received the feature access key, contact your Sales Representative or Account Representative.

When the S-Port feature is enabled, it is permanently enabled. The S-Port feature cannot be temporarily enabled. After the S-Port feature is enabled and turned on, the S-Port feature can be turned off again.

Provisioning of S-Port options can be done after the feature is enabled and before the feature is turned on.

After the S-Port feature has been enabled and database provisioning is complete, the S-Port feature status must be set to on (the feature must be “turned on”) before S-Port processing will occur.

1. Display the status of the features that are controlled with feature access keys. Enter the `rtrv-ctrl-feat` command. The output lists the enabled features in the system and shows the on/off status for each feature.

```
rlghncxa03w 09-06-29 16:40:40 EST EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name      Partnum  Status  Quantity
HC-MIM SLK Capacity 893012707 on      64
;
```

If the Service Portability entry appears in the `rtrv-ctrl-feat` output, performing this procedure is not necessary.

2. Enable the S-Port feature, by entering the `enable-ctrl-feat` command.
`enable-ctrl-feat:partnum=893034301:fak=<feature access key>`

When the feature is enabled, the Service Portability entry appears in the output of the `rtrv-ctrl-feat` command.

```
rlghncxa03w 09-06-29 16:40:40 EST  EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name           Partnum   Status   Quantity
HC-MIM SLK Capacity    893012707 on        64
Service Portability    893034301 off       ----
;
```

3. Back up the database changes, by entering the following command.
`chg-db:action=backup:dest=fixed`

The following messages appear; the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED) : MASP A - Backup starts on active MASP.
BACKUP (FIXED) : MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED) : MASP A - Backup starts on standby MASP.
BACKUP (FIXED) : MASP A - Backup on standby MASP to fixed disk complete.
```

Turning On the Service Portability Feature

This procedure is used to turn on the Service Portability feature in the EAGLE 5 ISS, using the feature part number 893034301.

Before the Service Portability (S-Port) feature can be turned on, the feature must be enabled in the EAGLE 5 ISS.

Provisioning of S-Port options can be done after the feature is enabled and before the feature is turned on.

After the S-Port feature has been enabled and database provisioning is complete, the Service Portability feature status must be set to on (the feature must be “turned on”). MSUs will not be processed by the Service Portability feature until the feature is turned on.

After the Service Portability feature is enabled and turned on, it can be turned off again. Service Portability processing can occur only when the Service Portability feature is on and a feature that uses S-Port is on.

1. Display the status of the features that are controlled with feature access keys. Enter the `rtrv-ctrl-feat` command. The output lists the enabled features in the system and shows the on/off status for each feature.
 - If the entry for the Service Portability feature appears in the `rtrv-ctrl-feat` output with status on, performing this procedure is not necessary.
 - If the status of the Service Portability feature in the output is off, continue with [Step 2](#).
2. Turn on the S-Port feature, by entering the `chg-ctrl-feat` command.

```
chg-ctrl-feat:partnum=893034301:status=on
```

When the feature is turned on, the feature status changes to on in the `rtrv-ctrl-feat` command output.

```
rlghncxa03w 09-08-29 16:40:40 EST  EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name      Partnum      Status      Quantity
HC-MIM SLK Capacity 893012707    on          64
ATINP             893022101    on          ----
Service Portability 893034301    on          ----
;
```

3. Back up the database changes, by entering the following command.

```
chg-db:action=backup:dest=fixed
```

The following messages appear; the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED) : MASP A - Backup starts on active MASP.
BACKUP (FIXED) : MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED) : MASP A - Backup starts on standby MASP.
BACKUP (FIXED) : MASP A - Backup on standby MASP to fixed disk complete.
```

Turning Off the Service Portability Feature

Before the Service Portability (S-Port) feature can be turned on and off, the feature must be enabled in the EAGLE 5 ISS.

This procedure is used to turn off the Service Portability feature, using its feature part number 8930343001.

Note: MSUs will not be processed by a feature when the feature is turned off in the system.

1. Display the status of the features that are controlled with feature access keys. Enter the `rtrv-ctrl-feat` command. The output lists the enabled features in the system and shows the on/off status for each feature.

```
rlghncxa03w 09-06-29 16:40:40 EST  EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name      Partnum      Status      Quantity
HC-MIM SLK Capacity 893012707    on          64
TIF Number Portability 893018901    on          ----
Service Portability 893034301    on          ----
;
```

If the entry for the Service Portability feature appears in the `rtrv-ctrl-feat` output with status off, performing this procedure is not necessary.

If the status of the Service Portability feature in the output is on, continue with [Step 2](#).

2. Turn off the S-Port feature, by entering the `chg-ctrl-feat` command.
`chg-ctrl-feat:partnum=<893034301>:status=off`

When the feature is turned off, the feature status changes to off in the `rtrv-ctrl-feat` command output.

```
rlghncxa03w 09-05-29 16:40:40 EST  EAGLE5 41.1.0
The following features have been permanently enabled:
Feature Name          Partnum    Status  Quantity
HC-MIM SLK Capacity   893012707  on      64
TIF Number Portability 893018901  on      ----
Service Portability   893034301  off     ----
;
```

3. Back up the database changes, by entering the following command.

```
chg-db:action=backup:dest=fixed
```

The following messages appear; the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED) : MASP A - Backup starts on active MASP.
BACKUP (FIXED) : MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED) : MASP A - Backup starts on standby MASP.
BACKUP (FIXED) : MASP A - Backup on standby MASP to fixed disk complete.
```

S-Port Subscriber Differentiation Feature Configuration Procedures

The procedures in this section are used for configuration of the S-Port Subscriber Differentiation feature.

Enabling the S-Port Subscriber Differentiation Feature

If S-Port Subscriber Differentiation will be used with Service Portability for the messages processed by a feature described in this manual, use this procedure to enable the S-Port Subscriber Differentiation feature in the EAGLE 5 ISS.

The S-Port Subscriber Differentiation feature must be enabled using the feature part number 893037901 and a feature access key.

Note: Controlled features must be purchased before you can receive the feature access key to use to enable the feature. If you are not sure if you have purchased a feature and received the feature access key, contact your Sales Representative or Account Representative.

When the S-Port Subscriber Differentiation feature is enabled, it is permanently enabled. The S-Port Subscriber Differentiation feature cannot be temporarily enabled.

After the S-Port Subscriber Differentiation feature has been enabled, the S-Port Subscriber Differentiation feature status must be set to on (the feature must be “turned on”). See [Turning On the S-Port Subscriber Differentiation Feature](#). The S-Port Subscriber Differentiation feature cannot be turned off again.

Provisioning of the S-Port Subscriber Differentiation SCCOPTS configuration option can be done only after the feature is enabled and turned on. See [Provisioning the S-Port Subscriber Differentiation SCCOPTS Option](#).

Before S-Port Subscriber Differentiation processing of MSUs can occur, the Service Portability feature, the S-Port Subscriber Differentiation feature, the S-Port Subscriber Differentiation option, and a feature that uses Service Portability must be on.

1. Display the status of the features that are controlled with feature access keys. Enter the `rtrv-ctrl-feat` command. The output lists the enabled features in the system and shows the on/off status for each feature.

```
rlghncxa03w 10-06-29 16:40:40 EST  EAGLE5 42.0.0
The following features have been permanently enabled:
Feature Name      Partnum      Status      Quantity
HC-MIM SLK Capacity  893012707   on          64
Service Portability  893034301   off         ----
;
```

If the S-Port Sub Dfrntiation entry appears in the `rtrv-ctrl-feat` output, performing this procedure is not necessary.

2. Enable the S-Port Subscriber Differentiation feature, by entering the `enable-ctrl-feat` command.
`enable-ctrl-feat:partnum=893037901:fak=<feature access key>`

When the feature is enabled, the S-Port Sub Dfrntiation entry appears in the output of the `rtrv-ctrl-feat` command.

```
rlghncxa03w 10-06-29 16:40:40 EST  EAGLE5 42.0.0
The following features have been permanently enabled:
Feature Name      Partnum      Status      Quantity
HC-MIM SLK Capacity  893012707   on          64
Service Portability  893034301   off         ----
S-Port Sub Dfrntiation  893037901   off         ----
;
```

3. Back up the database changes, by entering the following command.
`chg-db:action=backup:dest=fixed`

The following messages appear; the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED) : MASP A - Backup starts on active MASP.
BACKUP (FIXED) : MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED) : MASP A - Backup starts on standby MASP.
BACKUP (FIXED) : MASP A - Backup on standby MASP to fixed disk complete.
```

Turning On the S-Port Subscriber Differentiation Feature

This procedure is used to turn on the S-Port Subscriber Differentiation feature in the EAGLE 5 ISS, using the feature part number 893037901.

Before the S-Port Subscriber Differentiation feature can be turned on, the feature must be enabled in the EAGLE 5 ISS.

After the S-Port Subscriber Differentiation feature has been enabled, the S-Port Subscriber Differentiation feature status must be set to on (the feature must be “turned on”). After the S-Port Subscriber Differentiation feature is enabled and turned on, it cannot be turned off again.

Provisioning of the S-Port Subscriber Differentiation option can be done only after the feature is enabled and turned on. The S-Port Differentiation option can be turned on and off.

MSUs will not be processed by the S-Port Subscriber Differentiation feature until the feature and the option are turned on. S-Port Subscriber Differentiation processing can occur only when the Service Portability feature, the S-Port Subscriber Differentiation feature, the S-Port Differentiation option, and a feature that uses Service Portability are all on.

1. Display the status of the features that are controlled with feature access keys. Enter the `rtrv-ctrl-feat` command. The output lists the enabled features in the system and shows the on/off status for each feature.

```
rlghncxa03w 10-06-29 16:40:40 EST EAGLE5 42.0.0
The following features have been permanently enabled:
Feature Name          Partnum    Status    Quantity
HC-MIM SLK Capacity   893012707  on        64
Info Analyzed Relay Base 893034201  off       ----
Service Portability    893034301  off       ----
S-Port Sub Dfrntiation 893037901  off       ----
;
```

If the S-Port Sub Dfrntiation entry appears in the `rtrv-ctrl-feat` output with Status of on, performing this procedure is not necessary.

If the status of the S-Port Subscriber Differentiation feature in the output is off, continue with [Step 2](#).

2. Turn on the S-Port Subscriber Differentiation feature, by entering the `chg-ctrl-feat` command.
`chg-ctrl-feat:partnum=893037901:status=on`

When the feature is turned on, the feature status changes to on in the `rtrv-ctrl-feat` command output.

```
rlghncxa03w 10-08-29 16:40:40 EST EAGLE5 42.0.0
The following features have been permanently enabled:
Feature Name          Partnum    Status    Quantity
HC-MIM SLK Capacity   893012707  on        64
Info Analyzed Relay Base 893034201  off       ----
Service Portability    893034301  off       ----
S-Port Sub Dfrntiation 893037901  on        ----
;
```

3. Back up the database changes, by entering the following command.
`chg-db:action=backup:dest=fixed`

The following messages appear; the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED) : MASP A - Backup starts on active MASP.
BACKUP (FIXED) : MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED) : MASP A - Backup starts on standby MASP.
BACKUP (FIXED) : MASP A - Backup on standby MASP to fixed disk complete.
```

Provisioning the S-Port Subscriber Differentiation SCCPOPTS Option

This procedure is used to provision the SCCPOPTS configuration option for the S-Port Subscriber Differentiation feature.

The S-Port Subscriber Differentiation feature must be enabled and turned on before SCCPOPTS SUBDFRN option can be provisioned.

1. Verify that the S-Port Subscriber Differentiation feature is enabled and on, by entering the `rtrv-ctrl-feat` command.

```
rlghncxa03w 10-06-29 16:40:40 EST  EAGLE5 42.0.0
The following features have been permanently enabled:
Feature Name          Partnum    Status    Quantity
HC-MIM SLK Capacity   893012707  on        64
Info Analyzed Relay Base 893034201  off       ----
Service Portability    893034301  off       ----
S-Port Sub Dfrntiation 893037901  on        ----
;
```

- If the S-Port Sub Dfrntiation feature is enabled and turned on, continue with [Step 2](#).
 - If the S-Port Sub Dfrntiation entry does not appear in the output, go to [Enabling the S-Port Subscriber Differentiation Feature](#) and [Turning On the S-Port Subscriber Differentiation Feature](#) to enable and turn on the feature. Then continue with [Step 2](#).
 - If the feature is enabled but not turned on (the entry shows Status off), go to [Turning On the S-Port Subscriber Differentiation Feature](#) to turn on the feature. Then continue with [Step 2](#).
2. Display the current settings of the SCCPOPTS options, using the `rtrv-sccpopts` command.
 3. Change the SCCPOPTS SUBDFRN option to the required setting (on or off), by entering the `chg-sccpopts` command with the `subdfrn` option parameter specified.
Refer to the `chg-sccpopts` command description in the *Commands Manual* for valid parameter values, input examples, and rules for entering the command correctly.
 4. Verify the changes, by entering the `rtrv-sccpopts` command.
 5. Back up the changes, using the `chg-db:action=backup:dest=fixed` command.
These messages appear, the active Maintenance and Administration Subsystem Processor (MASP) appears first.

```
BACKUP (FIXED) : MASP A - Backup starts on active MASP.
BACKUP (FIXED) : MASP A - Backup on active MASP to fixed disk complete.
BACKUP (FIXED) : MASP A - Backup starts on standby MASP.
BACKUP (FIXED) : MASP A - Backup on standby MASP to fixed disk complete.
```

Chapter 5

INP/AINPQ Measurements

Topics:

- [*INP/AINPQ Measurements.....78*](#)

This chapter describes the measurements that can be collected and generated for the INP and AINPQ features.

INP/AINPQ Measurements

The EAGLE 5 ISS Measurements system supports the collection and retrieval of measurements for the INP and AINPQ features. The INP/AINPQ measurements can be collected and reported with the following collection methods:

- OAM-based (UI) measurements collection - INP and INP CRP measurements are available using the File Transfer Area (FTA) and not directly to EAGLE 5 ISS UI terminals.
- The Measurements Platform feature enabled and the Measurements Platform collection option on
- The E5-OAM Integrated Measurements feature enabled and on and the E5-OAM Integrated Measurements collection option on

Refer to *Measurements* manual for detailed descriptions of measurements and measurements reports.

Refer to the *Commands Manual* for descriptions of the commands used to enable and turn on features, turn on measurements collection options, and schedule and generate measurements reports.

Refer to the procedures in the *Database Administration Manual - System Management* to configure the Measurements Platform feature or E5-OAM Integrated Measurements feature for use with the INP and AINPQ features.

Per System and Per SSP INP/AINPQ measurements are available in the Daily (MTCD) and Hourly (MTCH) reports for Entity Type NP.

[Table 13: Pegs for Per System INP/AINPQ Measurements](#) describes the Per System measurement peg counts of INP/AINPQ MSUs (Message Signalling Units) that are supported for the INP and AINPQ features. The pegs include counts used for the INP Circular Route Prevention (INP CRP), the INP Query Service (INPQS), and the INP Message Relay service (INPMR).

Table 13: Pegs for Per System INP/AINPQ Measurements

Event Name	Description	Type	Unit
INPQRCV	Number of total queries received by INPQS; the total count of the number of the NPREQ and IDP queries received if either the INP feature, the AINPQ feature, or both, are turned on. The following equation applies: $\text{INPQRCV} = \text{INPQDSC} + \text{INPQTCPE} + \text{INPSREP}$	System	Peg count
INPQDSC	Number of invalid queries that are discarded as no reply can be generated	System	Peg count
INPQTCPE	Number of error replies with TCAP error code	System	Peg count
INPQSCRD	Total number of circular routes detected by INPQS.	System	Peg count
INPSREP	Number of successful replies to INP/AINPQ queries. These replies will be: <ul style="list-style-type: none"> • Either INP Connect or INP Continue for the INP feature 	System	Peg count

Event Name	Description	Type	Unit
	<ul style="list-style-type: none"> Either Return Result with Digits or Return Result without Digits for the AINPQ feature. Incremented every time a successful INAP RELEASECALL response is generated due to circular route detection by INPQS <p>The following equation applies: $\text{INPSREP} = \text{INPQSCONN} + \text{INPQSCONT}$</p>		

Table 14: Pegs for Per SSP INP/AINPQ Measurements describes the Per SSP measurement peg counts of INP / AINPQ MSUs that are supported for the INP and AINPQ features. The pegs include counts used for the INP Circular Route Prevention (INP CRP), the INP Query Service (INPQS), and the INP Message Relay service (INPMR).

Table 14: Pegs for Per SSP INP/AINPQ Measurements

Event Name	Description	Type	Unit
INPQSCONN	Number of non-errored QS messages with QS	Point Code	Peg count
INPQSCONT	Number of non-errored QS messages with QS Continue or Return Result without Digits responses	Point Code	Peg count
INPMRTR	Number of messages sent to INPMR that receive MR translation	Point Code	Peg count
INPMRGTT	Number of messages sent to INPMR that fall through to GTT, including those that are due to circular route detection by INPMR	Point Code	Peg count
INPMRCRD	Number of messages sent to INPMR that meet the condition for circular route detection by INPMR.	Point Code	Peg count
INPQSREL	Total number of INAP RELEASECALL responses successfully generated due to circular route detection by INPQS	Point Code	Peg Count
INPQSCRD	Total number of circular route detected by INPQS	Point Code	Peg count

The measurement events described in *Table 15: MTCD and MTCDTH Measurements* are included on the STP Daily Maintenance (MTCD) and the STP Day-to-Hour (MTCDTH) measurement reports; the events include peg counts for INP / AINPQ MSUs. These reports are similar to those used for GTT. The existing GTT/SCCP measurements are used for both GTT and INP / AINPQ and appear in the same reports.

This implementation does not discriminate between the MSSCCPFL, GTTUN0NS, GTTUN1NT, or GTTPERFD pegs for INP / AINPQ or GTT applications. For example, a search failure could result from a problem in either the INP / AINPQ or GTT database.

Table 15: MTCD and MTCATH Measurements

MSSCCPFL	MSUs discarded due to SCCP routing failure Also includes INP/AINPQ MSUs that got a match from either the INP/AINPQ or GTT database, but cannot be routed because of PC (Point Code) or SS (Subsystem) congestion, PC or SS unavailable, SS unequipped, or an unqualified error.
GTTUN0NS	GTT unable to perform; no such type Also includes INP/AINPQ Message Relay MSUs that did fall through to GTT but did not match on GTT selectors
GTTUN1NT	GTT unable to perform: no translation on this address Also includes INP/AINPQ Message Relay MSUs that fell through to GTT, obtained a GTT selector match but still did not match on the GTA.
GTTPERFD	Number of GTT performed Also includes INP/AINPQ MSUs that got a match in either the INP/AINPQ or GTT database.

Chapter 6

INP/AINPQ Maintenance

Topics:

- [*INP/AINPQ Subsystem-Related Alarms.....82*](#)
- [*INP/AINPQ Subsystem-Related UIMs.....82*](#)
- [*Maintenance Commands.....83*](#)
- [*EAGLE 5 ISS Debug Commands.....88*](#)
- [*Status Reporting and Problem Identification.....89*](#)

This chapter describes commands and reports that can be used for INP and AINPQ maintenance, including status reporting and problem identification.

INP/AINPQ Subsystem-Related Alarms

Refer to *Unsolicited Alarm and Information Messages* for a complete description and the associated corrective procedure for each INP/AINPQ-related UAM, and for information about other EAGLE 5 alarms.

Refer to *T1200 Integrated Application Platform Maintenance Manual*, *EPAP Alarms on the T1200 Platform*, or *EPAP Alarms and Maintenance on the E5-APP-B Platform* for information and corrective procedures for MPS-related alarms.

Table 16: INP/AINPQ Subsystem-Related UAMs

UAM	Severity	Message Text
0394	None	Local Subsystem is available
0395	Critical	Local Subsystem is not available
0396	Critical	Local Subsystem is disabled
0397	None	Local Subsystem is removed
0398	Minor	Local Subsystem normal, card(s) abnormal

INP/AINPQ Subsystem-Related UIMs

The UIMs (Unsolicited Information Messages) listed in [Table 17: INP/AINPQ Subsystem UIMs](#) support the INP/AINPQ subsystem. The INP/AINPQ UIMs are generated to the Application Subsystem (APSS) Output Group.

Refer to the *Unsolicited Alarm and Information Messages* manual for a complete description of all UIM text and formats.

Table 17: INP/AINPQ Subsystem UIMs

UIM	Text	Description	Action
1174	Inh INP SS request alrdy outstanding	A second attempt to inhibit the INP subsystem has been made while the first attempt is still being processed.	No action is necessary. The second attempt will be ignored.
1175	Failure Inhibiting INP SS	The <code>inh-map-ss</code> command did not take the local subsystem off-line.	Enter the <code>inh-map-ss</code> command with the <code>force</code> parameter.
1242	Conv to intl num - Dflt CC not found	Conversion to international number failed because default CC was not found	Define the default CC with <code>chg-stpopts :defcc=xxx</code>

UIM	Text	Description	Action
1243	Conv to intl num - Dflt NC not found	Conversion to international number failed because default NC was not found	Define the default NDC with chg-stpopts :defndc=xxxxxx
1246	Invalid length of conditioned digits	Invalid length of conditioned digits (length of conditioned international number is less than 5 or greater than 15)	Use an international number with length in the acceptable range
1295	Translation PC is EAGLE 5 ISSs	PC translation is invalid because it is one of the point codes of the EAGLE 5 ISS	Change the point code
1296	Translation PC type is ANSI	PC translation is invalid because it is an ANSI point code	Change the point code
1297	Invalid length of prefix/suffix digits	Attempted digit action of prefixing or suffixing the entity ID is invalid because the combined length of entity ID and GT digits is greater than 21 digits.	Change the attempted digit action or decrease the length of the entity ID and/or GT digits
1382	Too many digits for DRA parameter	Outgoing formatted digits exceeds the maximum allowed limit (32 for ITU TCAP Connect response and 21 for routing digits in ANSI-41 Return result).	Decrease the number of RN digits or modify the querying node to send fewer digits in DN.

Two UIMs for One MSU

An MSU that is invalid for INP Message Relay (INPMR), which consequently falls through to GTT, might result in two UIMs being issued. For example, the first UIM results from INP Message Relay due to a number conditioning error. The second results from the GTT, due to a routing failure or a translation not provisioned for the GTAI.

In these cases, one UIM may not be generated because of frequency limiting. For example, the frequencies for an INPMR UIM and a PC Unavailable UIM are one message every 200 milliseconds. In the case of two problems with one MSU, the UIMs occur within microseconds of each other, so that one of the UIMs is not generated. It is the timing of UIMs with regard to any UIMs for other MSUs that determines which, if either, is generated. In the example, assuming no UIMs occurred in the previous 200 ms for any other MSUs, the INPMR UIM is generated first.

Maintenance Commands

The following commands can be used for maintenance when an EPAP-related feature is on.

Refer to *Commands Manual* for complete descriptions of the commands, including parameters, valid parameter values, rules for using the commands, and output examples.

Table 18: Maintenance Commands

Command	Description
rept-stat-sys	Reports the status of system entities, including cards. The output includes the number of Service Module cards that are in service (IS-NR) and how many are in another state (IS-ANR, OOS-MT, OOS-MT-DSBLD).
rept-stat-sccp	Reports operating status of services and subsystems, CPU usage, and Service Module card status. When the loc parameter is specified, the command displays detailed card traffic statistics, including cards that are denied SCCP service. See the section in this manual that describes the use of the <code>rept-stat-sccp</code> command.
rept-stat-mps	Displays the overall status of the EPAP application running on the MPS (multi-purpose server). Command output for the various reports of this command include overall MPS alarm status and card status, and status for a specific Service Module card when a feature is on.
rept-stat-trbl	Includes a summary of any trouble notifications (UAMs) for local subsystems, cards, and linksets. The severity of each alarm is indicated in the output report.
rept-stat-alm	Displays the alarm counts and totals for local subsystems and Service Module card/EPAP IP links.
rept-stat-db	Displays the status information for the EAGLE 5 ISS databases. This includes the level information for each Service Module card, and for the active and standby EPAP RTDB. The command reports database exception status such as corrupted, incoherent, or inconsistent, as well as providing the birth dates and levels. It shows the status of each PDB and RTDB when an EPAP-related feature is enabled.
rtrv-tbl capacity	Retrieves table use capacity summary information. For each table listed, the number of table entry elements in use and the total allowed number of table elements is presented, along with a percent (%) full value. Information is shown for some tables only if the feature that uses the table is enabled.
inh-card/alw-card	<p>The <code>inh-card</code> command is used to change the operating state of the card from In-Service Normal (IS-NR) to Out-of-Service Maintenance-Disabled (OOS-MT-DSBLD). A craftsperson then can test the card or physically remove it from the shelf.</p> <p>The <code>alw-card</code> command is used to change the card from OOS-MT-DSBLD (Out-of-Service Maintenance-Disabled) to IS-NR (In-Service Normal) if card loading is successful.</p>
inh-alm/unhb-alm	Used to allow and inhibit reporting of alarms for a given device, including the Service Module card ports. The commands allow both Port A and Port B to be specified. Inhibited alarms will not generate UAMs or cause alarm indicators to be turned on. All <code>rept-stat-xxx</code> commands continue to display the alarms with an indication that the device has its alarms inhibited.

Command	Description
rtrv-data-rtdb	<p>Retrieves Entity data, DN data, IMEI data, IMSI data, TN data, NPANXX data, and LRN data from the RTDB on an active Service Module card.</p> <p>If the loc parameter is specified and the target card is an active Service Module card, the RTDB data is retrieved from that card.</p> <p>If the loc parameter is not specified, the RTDB data is retrieved on the active Service Module card that has the lowest IMT address.</p> <p>The RTDB status on the active Service Module card can be coherent or incoherent.</p>

rept-stat-sccp

The `rept-stat-sccp` command provides statistics for Service Module cards and for the services that execute on the cards. The statistics can be displayed for all Service Module cards, or for a specified card.

Refer to the command descriptions in the *Commands Manual* for a complete descriptions of the `rept-stat-sccp` command, including parameters, valid values, and output examples.

If multiple error conditions are found during MSU processing, `rept-stat-sccp` will display the counter for the most severe condition. The order will be ERRORS, WARNINGS, SUCCESS.

[Table 19: *rept-stat-sccp* Statistics for INP and AINPQ](#) describes the incrementing of the `rept-stat-sccp` statistics counters for the INP and AINPQ features and services.

Table 19: *rept-stat-sccp* Statistics for INP and AINPQ

Statistic	Service or Function	Reason to Increment Count
SUCCESS	INPQS	INP CRP on: Calls has a circular route detected and results in successful encoding of an INAP RELEASECALL message.
	Outgoing Message Encoding Errors	Service Portability: GRN data required for own-network subscriber and GRN not provisioned in entity data.
ERRORS	INP Query Verification - SCCP Decoding	<p>Not an ITU-N message type.</p> <p>Not an SCCP UDT or non-segmented XUDT message</p> <p>TCAP Type is not ANSI-41 or INAP.</p> <p>TCAP Type is ANSI-41 and AINPQ feature is not enabled.</p> <p>TCAP Type is INAP, and INPQ service is not provisioned.</p>

Statistic	Service or Function	Reason to Increment Count
	INP Query Verification - INAP TCAP Decoding	Message type is not supported, invalid, or unknown. TCAP components are missing or invalid.
	INP Query Verification - ANSI-41 TCAP Decoding	Message type is not supported, invalid, or unknown. TCAP components are missing or invalid.
	INAP Query Processing	Op code is not INITALDP or NPREQ. Service Key is missing. Parameters out of sequence. Called Party Number errors. SNAI is Subscriber and Default NDC is not provisioned. SNAI is not International and the Default Country Code is not provisioned. Conditioned number is too short or too long.
	INP-specific Decode Errors	Segmented XUDT. MSU is not UDT, UDTS, XUDT, or XUDTS. MSU is UDT or XUDT, is not MTP-routed, and SCCP message class is not 0 or 1. MSU is UDTS or XUDTS and CdPA is Rt-on-GT. MSU is UDTS or XUDTS and CdPA is Rt-on-SSN
	Outgoing Message Encoding Errors	Cannot route to CgPA GTT information. GTT of CgPA attempted network crossing. DPC not a true point code. GTT required on CgPA, but GTI is not 2 or 4.

Statistic	Service or Function	Reason to Increment Count
		<p>GTT of CgPA failed for Bad GT Type ("No Translation).</p> <p>GTT of CgPA failed for No Translation.</p> <p>Could not encode CdPA or CgPA in response.</p> <p>Outgoing formatted CdPN digits exceed the maximum allowed limit (32 digits in ITU TCAP Connect, 21 digits for routing digits in ANSI-41).</p>
	INPQ Service	INP CRP on: Call has a circular route detected and results in unsuccessful encoding of an INAP RELEASECALL message.
	INPMR Service	<p>Default CC or default NDC not provisioned, during number conditioning to International format.</p> <p>Invalid length of conditioned digits</p>
WARNINGS	INPQ Service	<p>GRN data required to encode digits in CONNECT response and GRN not provisioned in entity data.</p> <p>INP CRP on: Detection of circular route by INPQS.</p>
	INPMR Service	<p>GRN data required for own-network subscriber and GRN not provisioned in entity data.</p> <p>INP CRP on: Detection of circular route by INPMR.</p>
	AINPQ-specific	GRN data required to encode digits in RRWDGTS response and GRN not provisioned in entity data.
	Outgoing Message Encoding Errors	Service Portability on: GRN data required for own-network subscriber and GRN not provisioned in entity data.

Statistic	Service or Function	Reason to Increment Count
FORWARD TO GTT	INPMR Service	Message falls through to GTT because GRN data was not provisioned for an own-network subscriber. INP CRP on: Message falls through to GTT because of circular route detection.
TOTAL	INPQ Service	INP CRP on: Equals ERRORS plus SUCCESS (does NOT include WARNINGS)
	INPMR Service	INP CRP on: Equals ERRORS plus SUCCESS plus FORWARD TO GTT (does NOT include WARNINGS)

EAGLE 5 ISS Debug Commands

The *Commands Manual* contains descriptions of debug commands that can be used in assessing and modifying system status and operation. Most of the debug commands are used only under the direction of Tekelec support personnel.

Refer to the *Commands Manual* for a complete description of the debug commands, including the `ent-trace` command.

INP and AINPQ use the `ent-trace` command to provide a trap-and-trace function for MSUs on the Service Module cards.



CAUTION

Caution: This command can cause OAM to reset if too many MSUs are trapped.

The `ent-trace` command can be used to create an MSU trigger on the Service Module card with one or more of the following criteria. When multiple trigger criteria are entered, the MSU is trapped when any one of the criteria is satisfied.

- **RN or SP address (Entity ID)** - Trap messages immediately after performing the RTDB lookup. If the RN or SP obtained from the database lookup matches the Entity ID provisioned in the command, the message is trapped. This parameter supports a variable number of hexadecimal digits from 1 to 15 digits, and the Entity ID specified must be the one stored in the RTDB.
- **E.164 MSISDN number (DN)** - Trap messages immediately before performing a search based on the MSISDN numbers defined in the RTDB. This parameter accepts a range of digits, from 5 to 15. The number specified must be an International E.164 number (MSISDN or Entity Number).
- **Global Title digits (GT)** - Trap messages based on CdPA Global Title Address (that is, either MSISDN (+ST) number or RN + MSISDN (+ST)) present in the SCCP part of the message.

- **Origination point code** (SSPI/SSPN) – Trap messages based on CgPA SPC present in the SCCP part of the message. If no point code is present in the CgPA SPC, the criteria is matched with the OPC present in the MTP part of the message.

A trace must be set on all Service Module cards; specify the card=sccp-all parameter. Use a repetition parameter (rep) to control the number of MSUs that are trapped.

MSUs that satisfy any trigger criteria are trapped on the Service Module card, forwarded to OAM, and displayed.

Status Reporting and Problem Identification

EAGLE 5 commands can be used to obtain status and statistics for the EAGLE 5 system, the EPAP systems, system devices including Service Module cards, EPAP-related features, local subsystems, and SCCP services.

Refer to *Commands Manual* for complete descriptions of the commands, including parameters and valid values, rules for using the commands correctly, and output examples.

Refer to *Unsolicited Alarm and Information Messages* for descriptions and recovery procedures for UAMs and UIMs.

Refer to *EPAP Administration Manual* for descriptions of EPAP functions and operation.

Refer to *EPAP Alarms on the T1200 Platform* or *EPAP Alarms and Maintenance on the E5-APP-B Platform* for descriptions and recovery procedures for EPAP alarms.

Refer to the appropriate Feature Manual for information about the functions and operation of EPAP-related features.

Table 20: Status Reporting for EPAP-Related Features

Reports, Status, and Statistics	Command
EAGLE 5 ISS	
Maintenance Status Report - indicates whether Maintenance, Routing, and SCCP Baselines have been established.	rept-stat-sys
Alarms and operating state for system devices, including Service Module ("SCCP") cards.	rept-stat-sys
Unsolicited Alarm Messages (UAMs) and Unsolicited Information Messages (UIMs)	rept-stat-alm rept-stat-trbl
EPAP/MPS (from the EAGLE 5 ISS)	
EPAP code version and operating state for each EPAP.	rept-stat-mps
MPS hexadecimal alarm strings for the active and standby EPAPs.	rept-stat-mps

Reports, Status, and Statistics	Command
Operating state and alarm status of equipped Service Module cards and their DSM ports and IP connections.	rept-stat-mps rept-stat-mps:loc=<Service Module card location>
Amount of memory used by the RTDB on the specified card, as a percent of available Service Module card memory.	rept-stat-mps:loc=<Service Module card location>
EPAP Provisioning Database (PDB), EPAP Real Time Database (RTDB), and Service Module card RTDB status information - Coherent, birthdate (date and time of creation), and exception (condition when a problem was detected).	rept-stat-db rept-stat-db:db=mps
Service Module Cards, EPAP-Related Features, Services, Local Subsystems	
Status of the Service Module cards, and the services executing on the cards for EPAP-related features that are turned on. Includes Service Report, Subsystem Report, and Alarm Status; Total Service Statistics.	rept-stat-sccp
Operating state and alarm status of equipped Service Module cards and their DSM ports and IP connections; EPAP-related feature status per card.	rept-stat-mps:loc=<Service Module card location>
Alarms and operating state for Service Module ("SCCP") cards.	rept-stat-sys rept-stat-mps
Any cards that are denied SCCP service.	rept-stat-sccp
Detailed view of the status of SCCP services provided by the specified Service Module card. Includes Card Alarm Status, Card Service Statistics	rept-stat-sccp:loc=<Service Module card location>
General SCCP traffic performance for Service Module cards. Message rates for TVG performance.	rept-stat-sccp:mode=perf
Statistics for EPAP-related feature local subsystems - Subsystem Report	rept-stat-sccp
Statistics for EPAP-related features	rept-stat-sccp

EPAP Status and Alarm Reporting

Because EPAP has no direct means of accepting user input or displaying output messages on EAGLE 5 ISS terminals, EPAP maintenance, measurements, and status information are routed through a

Service Module card. EPAP sends two types of messages to the Service Module card: *EPAP Maintenance Blocks* and *DSM Status Requests and DSM Status Messages*. Each message type is discussed in the following sections.

EPAP Maintenance Blocks

The EPAP forwards all status and error messages to the Service Module cards in maintenance blocks. Maintenance blocks are asynchronously sent whenever the EPAP has something to report. The status information that is displayed when a `rept-stat-mps` command is issued includes information that came from the maintenance blocks.

The active EPAP generates and sends maintenance blocks to the primary Service Module card. One maintenance block is sent as soon as the IP link is established between the active EPAP and the primary Service Module card. Additional maintenance blocks are sent whenever the EPAP needs to report any change in status or error conditions. The information returned in maintenance blocks is included in the output of the `rept-stat-mps` and `rept-stat-sccp` commands.

The EPAP sends maintenance blocks that contain at least the following information:

- Status of EPAP 'A' - actual states are active, standby, and down (inoperative). Maintenance blocks include a field for this information so that it can be available for the output of the `rept-stat-mps` command.
- Status of EPAP 'B' - actual states are active, standby, and down (inoperative). Maintenance blocks include a field for this information so that it can be available for the output of the `rept-stat-mps` command.
- Identification of Active EPAP - a field to identify the active EPAP.
- Congestion Indicator - an indicator showing provisioning link congestion. The link between the EPAPs and the external source of provisioning data can become congested in high-provisioning traffic situations. When this occurs and subsequently as the congestion clears, the EPAP sends maintenance blocks to the Service Module card.
- Alarm Conditions - an error code field. If the EPAP needs to report an alarm condition, it puts an appropriate UAM identifier in this field.
- Current MPS Database Size - a field indicating the current RTDB size. The Service Module card uses this information to calculate the percentage of memory used by the RTDB.

DSM Status Requests and DSM Status Messages

When the EPAP needs to know the status of a Service Module card, it sends a DSM Status Request to all Service Module cards, and each Service Module card returns its status to the EPAP.

Service Module cards send a DSM Status Message to the EPAP when any the following events occur in the Service Module card:

- The Service Module card is booted.
- The Service Module card receives a DSM Status Request message from the EPAP
- The Service Module card determines that it needs to download the entire RTDB; for example, the Service Module card determines that the RTDB needs to be downloaded because it is totally corrupted, or a craftsperson requests that the RTDB be reloaded. The Service Module card sends a Full Download Request message to the EPAP

- The Service Module card starts receiving RTDB downloads or updates. When a Service Module card starts downloading the RTDB or accepting updates, it sends a DSM Status Message informing the EPAP of the first record received. This helps the EPAP keep track of downloads in progress.

The DSM Status Message provides the following information to the EPAP:

- **DSM Memory Size.** When the Service Module card is initialized, it determines the amount of memory present. The EPAP uses the value to determine if the Service Module card has enough memory to hold the RTDB.

Refer to the *Dimensioning Guide for EPAP Advanced DB Features* for important information on the dimensioning rules and the Service Module card database capacity requirements.

- **Load Mode Status.** This indicator indicates whether or not a sufficient number of the IS-NR (In-Service Normal) LIMs have access to SCCP services.

Hourly Maintenance Report

The Hourly Maintenance Report, generated automatically, includes the alarm totals of the INP / AINPQ subsystem and Service Module card / EPAP IP links. A sample follows.

```
eagle10506 99-10-10 16:00:01 EST EAGLE 41.0.0
5072.0000 REPT COND GSM SS
"GSM SS :0440,MTCEINT-0,SA,99-10-10,16:00:01,,,,*C"
;
eagle10506 99-10-10 16:00:01 EST EAGLE 41.0.0
5073.0000 REPT COND INP SS
"INP SS :0440,MTCEINT-0,SA,99-10-10,16:20:01,,,,*C"
;
eagle10506 99-10-10 16:00:01 EST EAGLE 41.0.0
5077.0000 REPT COND EPAPDSM
"EPAPDSM :0084,MTCEINT-0,SA,99-10-10,16:00:01,,,,**"
;
eagle10506 99-10-10 16:00:01 EST EAGLE 41.0.0
5007.0000 REPT COND CARD
"CARD 1102:0422,SCMMA,SA,99-10-10,16:00:01,,,,**"
;
eagle10506 99-09-13 16:00:01 EST EAGLE 41.0.0
3561.0000 REPT COND ALARM STATUS
"ALARMS:PERM. INHIBITED,0,0,0"
"ALARMS:TEMP. INHIBITED,0,0,0"
"ALARMS:ACTIVE,10,14,3"
"ALARMS:TOTAL,10,14,3"
;
```

A

AINPQ

ANSI-41 INP Query

ANSI

American National Standards
Institute

An organization that administers
and coordinates the U.S. voluntary
standardization and conformity
assessment system. ANSI develops
and publishes standards. ANSI is
a non-commercial,
non-government organization
which is funded by more than 1000
corporations, professional bodies,
and enterprises.

C

CC

Connection Confirmed
Country Code
Composite Clock

CdPA

Called Party Address

The field in the SCCP portion of the
MSU that contains the additional
addressing information of the
destination of the MSU. Gateway
screening uses this additional
information to determine if MSUs
that contain the DPC in the routing
label and the subsystem number in
the called party address portion of
the MSU are allowed in the
network where the EAGLE 5 ISS is
located.

D

DN

Directory number

D

A DN can refer to any mobile or wireline subscriber number, and can include MSISDN, MDN, MIN, or the wireline Dialed Number.

E**EPAP**

EAGLE Provisioning Application Processor

EPAP-related features

Features that require EPAP connection and use the Real Time Database (RTDB) for lookup of subscriber information.

- ANSI Number Portability Query (AINPQ)
- ANSI-41 AnalyzedInformation Query – no EPAP/ELAP (ANSI41 AIQ)
- Anytime Interrogation Number Portability (ATI Number Portability, ATINP)
- AINPQ, INP, G-Port SRI Query for Prepaid, GSM MAP SRI Redirect, IGM, and ATINP Support for ROP
- A-Port Circular Route Prevention (A-Port CRP)
- Equipment Identity Register (EIR)
- G-Flex C7 Relay (G-Flex)
- G-Flex MAP Layer Routing (G-Flex MLR)
- G-Port SRI Query for Prepaid
- GSM MAP SRI Redirect to Serving HLR (GSM MAP SRI Redirect)
- GSM Number Portability (G-Port)
- IDP A-Party Blacklist
- IDP A-Party Routing
- IDP Relay Additional Subscriber Data (IDPR ASD)

E

- IDP Relay Generic Routing Number (IDPR GRN)
- IDP Service Key Routing (IDP SK Routing)
- IDP Screening for Prepaid
- INAP-based Number Portability (INP)
- Info Analyzed Relay Additional Subscriber Data (IAR ASD)
- Info Analyzed Relay Base (IAR Base)
- Info Analyzed Relay Generic Routing Number (IAR GRN)
- Info Analyzed Relay Number Portability (IAR NP)
- INP Circular Route Prevention (INP CRP)
- IS41 Mobile Number Portability (A-Port)
- IS41 GSM Migration (IGM)
- MNP Circular Route Prevention (MNPCRP)
- MO-based GSM SMS NP
- MO-based IS41 SMS NP
- MO SMS Generic Routing Number (MO SMS GRN)
- MO- SMS B-Party Routing
- MO SMS IS41-to-GSM Migration
- MT-based GSM SMS NP
- MT-based GSM MMS NP
- MT-based IS41 SMS NP
- MTP Routed Messages for SCCP Applications (MTP Msgs for SCCP Apps)
- MTP Routed Gateway Screening Stop Action (MTPRTD GWS Stop Action)
- Portability Check for MO SMS
- Prepaid IDP Query Relay (IDP Relay, IDPR)
- Prepaid SMS Intercept Phase 1 (PPSMS)
- Service Portability (S-Port)

E

- S-Port Subscriber Differentiation
- Triggerless ISUP Framework Additional Subscriber Data (TIF ASD)
- Triggerless ISUP Framework Generic Routing Number (TIF GRN)
- Triggerless ISUP Number Portability (TIF NP)
- Triggerless ISUP Framework Number Substitution (TIF NS)
- Triggerless ISUP Framework SCS Forwarding (TIF SCS Forwarding)
- Triggerless ISUP Framework Simple Number Substitution (TIF SNS)
- Voice Mail Router (V-Flex)

F

FTA

File Transfer Area

A special area that exists on each OAM hard disk, used as a staging area to copy files to and from the EAGLE 5 ISS using the Kermit file-transfer protocol.

G

GT

Global Title Routing Indicator

I

ID

Identity, identifier

INAP

Intelligent Network Application Part

A standardized interface for intelligent networks (IN). This interface allows Service Providers to offer their own services.

I

INP	<p>INAP-based Number Portability</p> <p>Tekelec's INP can be deployed as a stand-alone or an integrated signal transfer point/number portability solution. With Tekelec's stand-alone NP server, no network reconfiguration is required to implement number portability. The NP server delivers a much greater signaling capability than the conventional SCP-based approach.</p> <p>Intelligent Network (IN) Portability</p>
IP	<p>Intelligent Peripheral</p> <p>Internet Protocol</p> <p>IP specifies the format of packets, also called datagrams, and the addressing scheme. The network layer for the TCP/IP protocol suite widely used on Ethernet networks, defined in STD 5, RFC 791. IP is a connectionless, best-effort packet switching protocol. It provides packet routing, fragmentation and re-assembly through the data link layer.</p>
ISS	<p>Integrated Signaling System</p>
ITU	<p>International Telecommunications Union</p> <p>An organization that operates worldwide to allow governments and the private telecommunications sector to coordinate the deployment and operating of telecommunications networks and services. The ITU is responsible for regulating, coordinating and developing international telecommunications, and for harmonizing national political interests.</p>

L

LNP

Local Number Portability

The ability of subscribers to switch local or wireless carriers and still retain the same phone number.

M

MPS

Multi-Purpose Server

The Multi-Purpose Server provides database/reload functionality and a variety of high capacity/high speed offboard database functions for applications. The MPS resides in the General Purpose Frame.

Messages Per Second

A measure of a message processor's performance capacity. A message is any Diameter message (Request or Answer) which is received and processed by a message processor.

N

NAI

Nature of Address Indicator

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

Network Access Identifier

The user identity submitted by the client during network authentication.

NC

Network Cluster

Network Code

Not Compliant

North Carolina

NDC

Network destination code

Network Data Collection

N

NEC

National Escape Code

NPDB

Number Portability Database

Database that holds ported numbers. Tekelec implementation is the Real Time Database (RTDB).

P

PC

Point Code

The identifier of a signaling point or service control point in a network. The format of the point code can be one of the following types:

- ANSI point codes in the format network indicator-network cluster-network cluster member (**ni-nc-ncm**).
- Non-ANSI domestic point codes in the format network indicator-network cluster-network cluster member (**ni-nc-ncm**).
- Cluster point codes in the format network indicator-network cluster-* or network indicator-*-*.
- ITU international point codes in the format **zone-area-id**.
- ITU national point codes in the format of a 5-digit number (**nnnnn**), or 2, 3, or 4 numbers (members) separated by dashes (**m1-m2-m3-m4**) as defined by the Flexible Point Code system option. A group code is required (**m1-m2-m3-m4-gc**) when the ITUDUPPC feature is turned on.
- 24-bit ITU national point codes in the format main signaling

P

area-subsignaling area-service point (**msa-ssa-sp**).

PDB

Provisioning Database

Q

QS

Query Service

R

RN

Routing Number

The number provided by the Freephone Service Provider (FSP) to the Access Service Provider (ASP) to enable a pre-determined routing of traffic to a specific network/carrier/customer.

RTDB

Real Time Database

S

SCCP

Signaling Connection Control Part

The signaling connection control part with additional functions for the Message Transfer Part (MTP) in SS7 signaling. Messages can be transmitted between arbitrary nodes in the signaling network using a connection-oriented or connectionless approach.

SNAI

Service Nature of Address Indicator

An internal G-Port parameter that allows a user to specify how to interpret the signaling connection control part (SCCP) called party address (CdPA) GTA of a LOCREQ/SMSREQ message.

S

SOG	Subsystem Out-of-Service Grant Service Order Gateway
SOR	Support of Optimal Routing System Out of Service Request
SP	Service Provider Signaling Point A set of signaling equipment represented by a unique point code within an SS7 domain.
SSN	SS7 Subsystem Number The subsystem number of a given point code. The subsystem number identifies the SCP application that should receive the message, or the subsystem number of the destination point code to be assigned to the LNP subsystem of the EAGLE 5 ISS. Subsystem Number A value of the routing indicator portion of the global title translation data commands indicating that no further global title translation is required for the specified entry. Subsystem Number Used to update the CdPA.

T

TCAP	Transaction Capabilities Application Part A protocol in the SS7 protocol suite that enables the deployment of advanced intelligent network services by supporting non-circuit related information exchange
------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

T

between signaling points using the Signaling Connection Control Part connectionless service. TCAP also supports remote control - ability to invoke features in another remote network switch.

U**UAM****Unsolicited Alarm Message**

A message sent to a user interface whenever there is a fault that is service-affecting or when a previous problem is corrected. Each message has a trouble code and text associated with the trouble condition.