Tekelec EAGLE® 5

Feature Manual - INP/AINPQ

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Chapter 1

Introduction

Topics:

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, EPAP status and alarm reporting, DSM status reporting to the EPAP, system hardware verification, system status reporting, and code and application data loading .

Related Publications

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

Documentation Availability, Packaging, and Updates

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

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

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

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

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

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

Documentation is updated when significant changes are made that affect system operation. Updates resulting from Severity 1 and 2 Problem Reports (PRs) are made to existing manuals. Other changes are included in the documentation for the next scheduled release. Updates are made by re-issuing an electronic file to the customer support site. Customers with printed documentation should contact their Sales Representative for an addendum. Occasionally, changes are communicated first with a Documentation Bulletin to provide customers with an advanced notice of the issue until officially released in the documentation. Documentation Bulletins are posted on the Customer Support site and can be viewed per product and release.

Documentation Admonishments

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

Table 1: Admonishments

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

Customer Care Center

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

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

Tekelec TAC Engineers are available to provide solutions to your technical questions and issues 7 days a week, 24 hours a day. After a CSR is issued, the TAC Engineer determines the classification of

the trouble. If a critical problem exists, emergency procedures are initiated. If the problem is not critical, normal support procedures apply. A primary Technical Engineer is assigned to work on the CSR and provide a solution to the problem. The CSR is closed when the problem is resolved.

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

Tekelec - Global

Email (All Regions): support@tekelec.com

- **USA and Canada**

  Phone:

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

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

  TAC Regional Support Office Hours:

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

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

  Phone:

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

  TAC Regional Support Office Hours (except Brazil):

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

  - **Argentina**

    Phone:

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  - **Brazil**

    Phone:

    0-800-891-4341 (toll-free)

    TAC Regional Support Office Hours:

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  - **Chile**

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  - **Colombia**

    Phone:

    01-800-912-0537

  - **Dominican Republic**

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  - **Software Solutions**

    Phone:

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- **Asia**

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Emergency Response

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

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

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

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

Locate Product Documentation on the Customer Support Site

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

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

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

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

Chapter 2

Feature Description

Topics:

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 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 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 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 Portabiltiy 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 Can be used with or without Service Portability. See *Service Portability*.
	NONE	

Parameter	Value	Description
DLTPFX - Delete Prefix	YES	If DLTPFX=yes, all formats that support a prefix will not include the prefix in the formatted digits.
	NO	If DLTPFX=no, all formats that support a prefix will include the prefix in the formatted digits.
DRA - Destination Routing Address If DLTPFX=no, all formats that support a prefix will include the prefix in the formatted digits. If DLTPFX=yes, all formats that support a prefix will not include the prefix in the formatted digits. NEC must be provisioned before any format that includes NEC can be selected. See the CUTNPASTE option for the use of the Connect message CutAndPaste parameter information when the DRA format contains the DN. See *Provisioning the Routing Number Prefix of the Node (Home RN)*.	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

Parameter	Value	Description
	RNASDNECDN	RN + ASD + [CDPNPFX] + NEC + DN in the INP Connect response messages
	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
DRANAI - Destination Routing Address Nature of Address Indicator	SUB	Subscriber Number
	UNKNOWN	Unknown
	NATL	National Significant Number
	INTL	International Number
	NTWK	Network

Parameter	Value	Description
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 *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*.
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.

Parameter	Value	Description
		If the DN digits have a leading country code (CC), the format is International.
	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: • 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
DEFRN - Default Routing Number used for own-network subscribers	1-15 hexadecimal digits	Used for own-network subscribers.
	NONE	

Parameter	Value	Description
DIALNAI - Digits Dialed Nature of Address See *Provisioning the INP/AINPQ Service NAI*.	0	National
	1	International
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)*.	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

Parameter	Value	Description
	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
	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

Parameter	Value	Description
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 *Provisioning the INP/AINPQ Service NAI* and *Provisioning the Routing Number Prefix of the Node (Home RN)*.	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.
	NONE	NAI value NONE

Parameter	Value	Description
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: • 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
	RNASDRN		RNASDRN
	ASDRNDN		ASDRNDN
	CCRNASDDN		CCRNASDDN
	CCASDRNDN		CCASDRNDN
	ASDRNCCDN		ASDRNCCDN
	RNASDCCDN		RNASDCCDN
	RNASDNECDN		RNASDNECDN
	ASDRNNECDN		ASDRNNECDN
SNAI	SUB	SNAI	SUB
	NATL		NATL
	INTL		INTL

INPOPTS		AINPOPTS	
Option	**Value**	**Option**	**Value**
	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
	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-based 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 RRWODGTS, 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 Mesage 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 UDTSor 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 that 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 (`natl`), 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

Service NAI	Number Format
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 in 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 the Destination Routing Address as RN or RN+DN, depending on the provisioned DRA option.
  - 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 as RN or RN+DN, depending on 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 as RN or RN+DN, depending on the provisioned RFMT option.
  - 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 as RN or RN+DN, depending on the

provisioned RFMT option. The RN in the AINPOPTS RFMT is interpreted as 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 IS41subscriber, (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 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 all NPP features do 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

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**
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
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

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**
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 or E5-SM4G cards) running the VSCCP application. The EAGLE 5 ISS can be equipped with:

- Up to 25 (24+1) Service Module cards when EPAP is running in a T1000 AS
- Up to 32 (31+1) Service Module cards when EPAP is running in a T1200 AS

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

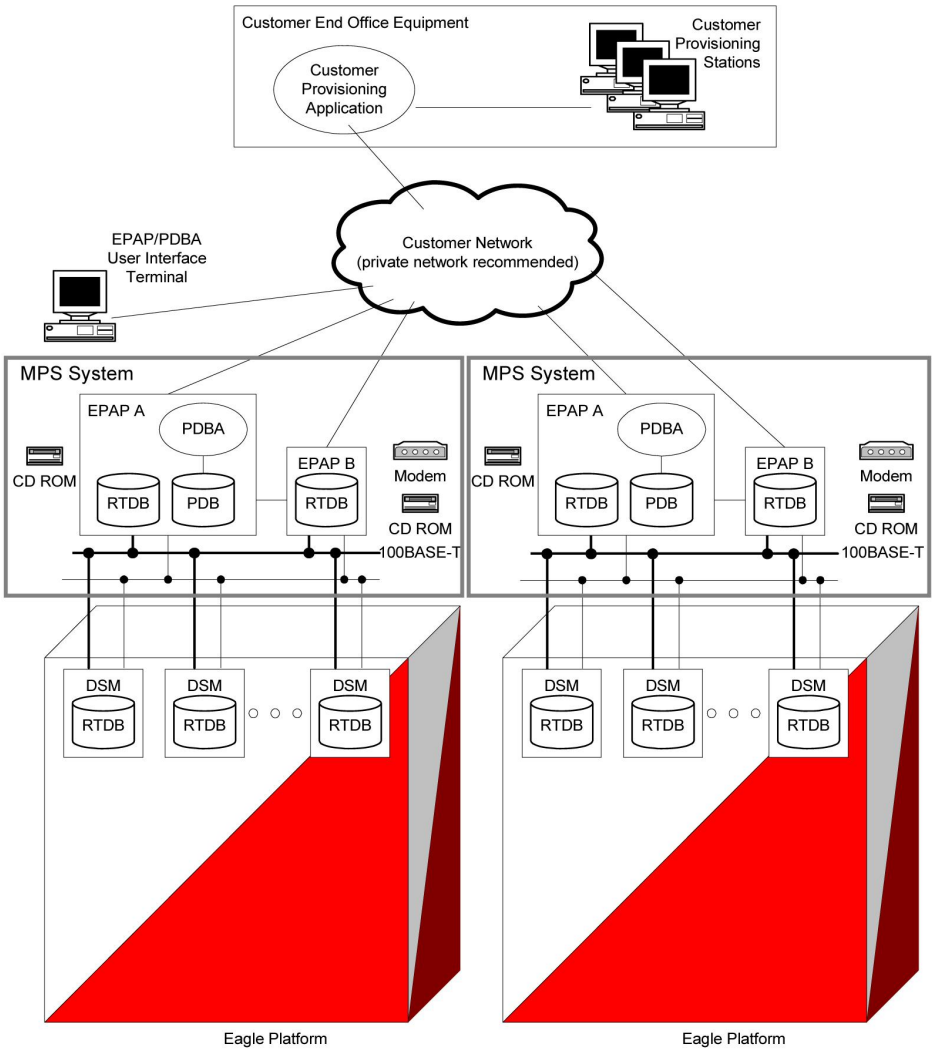
Tekelec provides the Multi-Purpose Server (MPS) platform as a subsystem of the EAGLE 5 ISS. The MPS provides support for EPAP-related features that perform Real Time Database (RTDB) lookups.

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 1000 Application Server Hardware Manual* or *Tekelec 1200 Application Server Hardware Manual*. The MPS provides the means of connecting the customer provisioning application with the EAGLE 5 ISS 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. It collects and organizes customer provisioning data, and forwards the data to the EAGLE 5 ISS Service Module cards. *Figure 1: MPS/EPAP Platform Architecture* shows the overall system architecture from customer provisioning through the MPS subsystem to the EAGLE 5 ISS Service Module card databases.

Note: In this manual, Service Module card refers to either a DSM card or an E5-SM4G card unless a specific card is required. For more information about the supported cards, refer to *EAGLE 5 ISS Hardware Manual*.

Figure 1: MPS/EPAP Platform Architecture



Design Overview and System Layout

Figure 1: MPS/EPAP Platform Architecture identifies the tasks, databases and interfaces which constitute the overall system architecture. The system consists of two mated MPS servers. Each MPS contains two EPAP platforms - EPAP A and EPAP B with each containing a Real Time Database (RTDB) , Provisioning Database (PDB), servers, optical media, modems, and either network hubs when using a T1000 AS system or network switches when using a T1200 AS system . Each MPS and its associated EPAPs is an EPAP system ; the EPAP system and the mated EAGLE 5 ISS are the mated EPAP system . Each EPAP system is either a T1000 AS or a T1200 AS system with a total of four Ethernet interfaces: one from each EPAP to the 100BASE-T Ethernet and one from each EPAP to either a 10BASE-T or a 100BASE-T Ethernet. Refer to *Table 8: Service Module Card Provisioning and Reload Settings* for the link speed.

On the EAGLE 5 ISS, a set of Service Module cards, which hold the RTDB, is part of the STP. Two high-speed Ethernet links connect the Service Module cards and the EPAPs. One of the links is a 100BASE-T Ethernet bus, and the other is either a 10BASE-T or a 100BASE-T Ethernet bus. Refer to *Table 8: Service Module Card Provisioning and Reload Settings* for the link speed.

The RTDB is provisioned and maintained through the EPAPs. EPAP A and EPAP B act as the active EPAP and the standby EPAP. One link serves as the active link, and the other link as the standby link. Only one EPAP and one link are active at a time. The database is provisioned through the active link by the active EPAP; the other EPAP provides redundancy.

If the active EPAP fails, the standby EPAP takes over the role of active EPAP and continues to provision the subscriber database. If the active link fails, the active EPAP switches to the standby link to continue provisioning the Service Module cards. The two Ethernet links are part of the DSM network.

Another 100BASE-T Ethernet link exists between the EPAPs; that link is called the EPAP Sync Network.

The major modules on the EPAP are:

- Service Module card provisioning module
- Maintenance module
- RTDB module
- PDB module

The Service Module card provisioning module is responsible for updating subscriber databases on the EAGLE 5 ISS Service Module cards using the Reliable Multicast Transport Protocol (RMTP) multicast. The maintenance module is responsible for the proper functioning of the EPAP platform. The PDB module is responsible for preparing and maintaining the Real Time Database, which is the *golden copy* of the subscriber database. The PDB module can run on one of the EPAPs of either mated EAGLE 5 ISS.

Functional Overview

The main function of the MPS/EPAP platform is to provision data from the customer network to the Service Module cards on the EAGLE 5 ISS. Subscriber database records are continuously updated from the customer network to the PDB. The PDB module communicates with the maintenance module and the RTDB task over a TCP/IP connection to provision the Service Module cards on the EAGLE 5 ISS. The maintenance module is responsible for the overall stability and performance of the system.

The RTDB on the EPAP contains a coherent, current copy of the subscriber database. If the current copy of the RTDB on the Service Module cards becomes *out-of-sync* because of missed provisioning or card rebooting, the EPAP Service Module card provisioning module sends database information through the provisioning link to the Service Module cards. The Service Module cards are reprovisioned with current subscriber information.

EPAP/PDBA Overview

The EAGLE Provisioning Application Processor (EPAP) platform and the Provisioning Database Application (PDBA), coupled with the Provisioning Database Interface (PDBI) facilitate the user database required for EAGLE 5 ISS EPAP-based features. The following functions are supported:

- Accept and store subscription data provisioned by the customer
- Update and reload subscriber databases on the Service Module cards

The PDBA operates on the master Provisioning Database (PDB). The EPAP and PDBA are both installed on the MPS hardware platform.

The EPAP platform performs the following:

- Maintains an exact copy of the real time database (RTDB) on the EPAP
- Distributes the subscription database to the Service Module cards
- Maintains a redundant copy of the RTDB database

The EPAP platform is a mated pair of processors (the upper processor, called EPAP A, and the lower processor, EPAP B) contained in one frame.

During normal operation, information flows through the EPAP/PDBA software with no intervention. Subscription data is generated at one or more operations centers and is delivered to the PDBA through a TCP socket interface (PDBI). The PDBA software stores and replicates data on EPAP A on the mated EPAP system. The data is then transmitted by the EPAPs across a private network to the Service Module cards located in the EAGLE 5 ISS frame.

The primary interface to the PDBA consists of machine-to-machine messages. The interface is defined by Tekelec and is described in the Provisioning Database Interface Manual. Provisioning software compatible with the EPAP socket interface can be created or updated using the interface described in that manual.

Additionally, a direct user interface is provided on each EPAP to allow for configuration, maintenance, debugging, and platform operations. A direct user interface is also provided by the PDBA for configuration and database maintenance.

The MPS/EPAP is an open-systems platform and easily accommodates the required high provisioning rates. Compared to the traditional OAM platform, the persistent database and provisioning in an open systems platform provides these benefits:

- Variety of hardware components and vendors
- Availability of third party communication and database tools
- Standard communication protocols
- Availability of personnel with related experience

Each EPAP server maintains a copy of the Real Time Database (RTDB) in order to provision the EAGLE 5 ISS Service Module cards. The EPAP server must comply with the hardware requirements in the *MPS Hardware Manual*. *Figure 1: MPS/EPAP Platform Architecture* illustrates the EPAP architecture contained in the MPS subsystem.

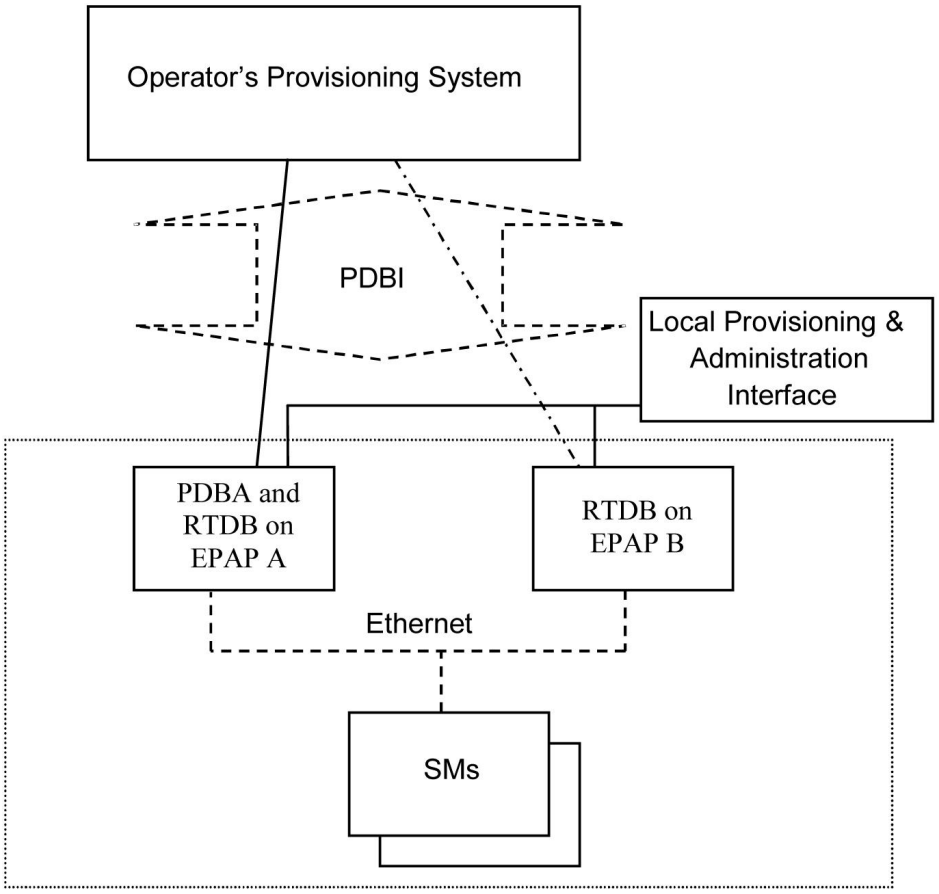
Each EPAP has a dedicated optical media drive. One EPAP per EAGLE 5 ISS platform has a modem capable of supporting remote diagnostics, configuration, and maintenance. These remote operations are performed through EPAP login sessions and are accessible across the customer network as well as through a direct terminal connection to the EPAP using an RS232 connection. Refer to *Tekelec 1000 Application Server Hardware Manual* or *Tekelec 1200 Application Server Hardware Manual* for details about the hardware devices and network connections.

Subscriber Data Provisioning

Figure 2: Subscriber Data Provisioning Architecture (High Level) shows a high-level view of the subscriber data provisioning architecture. Only those parts of the EAGLE 5 ISS platform that are relevant to subscriber data provisioning are shown. This section defines requirements for the Provisioning Database Interface (PDBI) between the EPAP and the operator's provisioning system (OPS). Provisioning clients

connect to the EPAPs via the PDBI. This interface contains commands that allow all of the provisioning and retrieval of subscription data. The PDBI is used for real-time provisioning of subscriber and network entity data only. Refer to *Provisioning Database Interface Manual* for more details.

Figure 2: Subscriber Data Provisioning Architecture (High Level)



A pair of active/standby EPAP servers provides the interface between the Real Time Database (RTDB) of the EAGLE 5 ISS Service Module cards and the OPS. EPAP A is equipped with both the PDB (Provisioning Database) and the RTDB, and EPAP B has only the RTDB. An EPAP with only the RTDB must be updated by the EPAP that is equpped with the PDB.

For more information about the EPAP, refer to *EPAP Administration Manual*. For more information about the MPS hardware, refer to *Tekelec 1000 Application Server Hardware Manual* or *Tekelec 1200 Application Server Hardware Manual* .

Distributed Administrative Architecture

This section describes, at a high level, the distributed administrative architecture for the EAGLE 5 ISS, including the EPAP.

Databases requiring high update and retrieval rates, such as the EPAP RTDB, are populated using redundant Ethernet connections to Service Module cards from an EPAP MPS platform.

An EPAP consists of a combined Provisioning (MySQL) and Real Time Database (RTDB). The Provisioning Database (PDB) responds to requests for updates by the active and standby RTDBs on

both mated EAGLE 5 ISSs. The active EPAP RTDB is responsible for initiating multi-cast updates of changed database records to the Service Module cards after the data has been committed to the EPAP disks. Furthermore, the PDB may accept and commit more database updates while the RTDBs are completing their previous updates.

It is this overlapping of database updates, coupled with an RTDB transactional database engine and fast download time, that allows larger amounts of data at a time to be transferred from the PDB. Committing larger amounts of data at a time to the RTDB (versus a single update at a time) allows faster overall transaction rates to be achieved. The boundaries of the transaction rates become more closely related to cache size and disk cache flush time than the disk access time of a single update. Thus, successful completion of EPAP database updates only guarantees that the PDB has been updated, but it does not mean the RTDB has completed the update and sent the new subscription data to the Service Module card.

The EPAP architecture contains a local provisioning terminal and a modem for remote access, as well as other functions. A backup device can be used to back up or restore the provisioning database. The local provisioning terminal is used to manually repair the standby EPAP RTDB or to turn the subscriber database audit on or off. For additional information, refer to *Tekelec 1000 Application Server Hardware Manual*, *Tekelec 1200 Application Server Hardware Manual*, and *EPAP Administration Manual*.

EPAP (EAGLE Provisioning Application Processor)

As shown in *Figure 1: MPS/EPAP Platform Architecture*, a single MPS system contains two EAGLE Provisioning Application Processor (EPAP) servers. At any given time, only one EPAP actively communicates with the Service Module cards on the EAGLE 5 ISS. The other EPAP server is in standby mode. In addition, two MPS systems can be deployed in a mated pair configuration.

The primary purpose of the EPAP system is to maintain the Real Time Database (RTDB) and Provisioning Database (PDB), and to download copies of the RTDB to the Service Module cards.

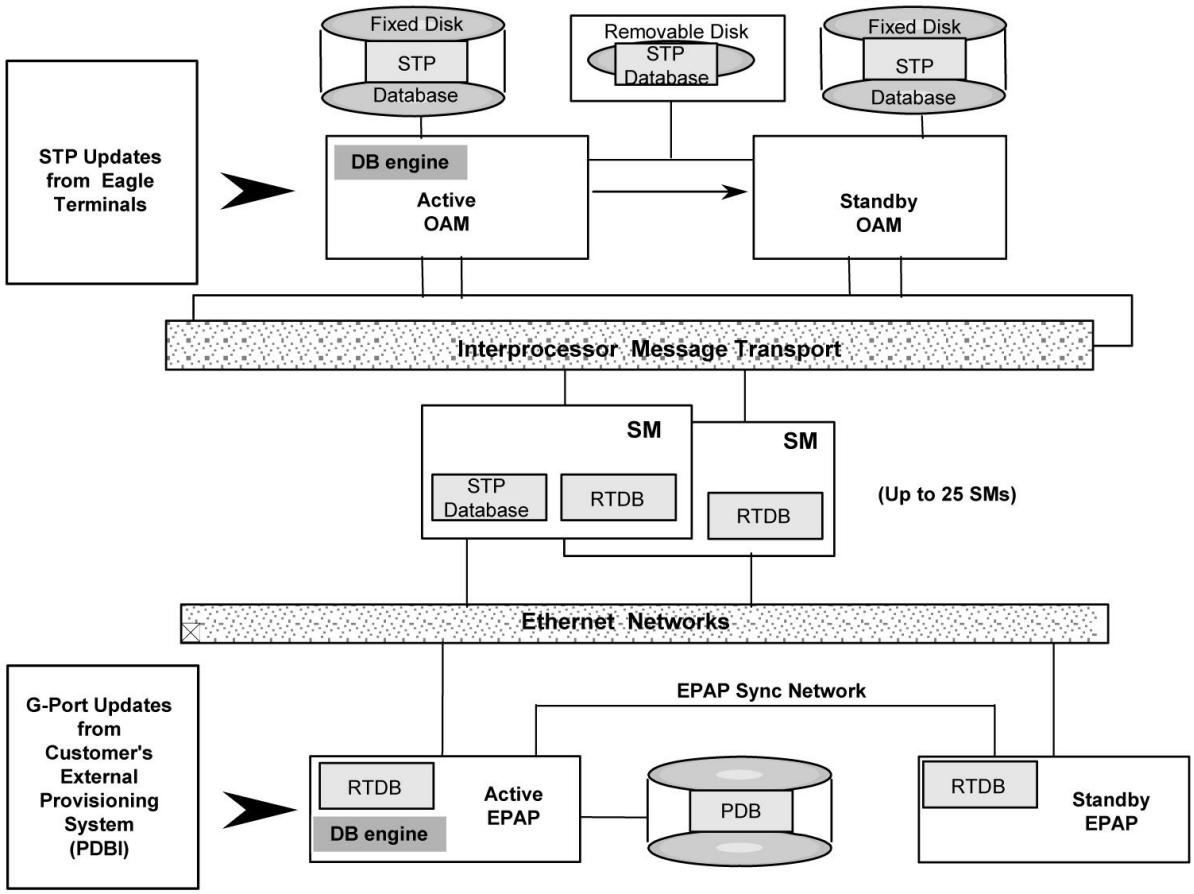
The PDB on the active EPAP receives subscription data from the customer network through the Provisioning Database Interface (PDBI), the external source of provisioning information. The Provisioning Database Application(PDBA) continually updates the PDB of the active EPAP. The PDB uses MySQL database software. After an update is applied to the active PDB, the data is sent to the RTDBs on the active and standby EPAPs.

Both the active and standby EPAPs maintain copies of the RTDB. Periodically, the Service Module card polls the active EPAP RTDB for any new updates. The active EPAP downloads the updates to the Service Module card which stores a resident copy of the RTDB.

A mated pair configuration has two mated MPS Systems, as shown in *Figure 1: MPS/EPAP Platform Architecture*. The PDB on the active EPAP automatically updates the PDB on the mate platform. The PDB on the mate platform then updates RTDBs on its EPAPs, which in turn update the RTDBs on the associated Service Module cards.

Provisioning of the EAGLE 5 ISS Service Module cards is performed through two interfaces using two different sets of commands. Provisioning is accomplished by the STP updates from EAGLE 5 ISS terminals and by updates from the customer's external provisioning system. This system of dual provisioning is illustrated in *Figure 3: Database Administrative Architecture*.

Figure 3: Database Administrative Architecture



Service Module Cards

A maximum number of Service Module cards can be provisioned with one or more EPAP-related features enabled.

- Up to 25 cards (24+1) with EPAP running on a T1000 AS
- Up to 32 cards (31+1) with EPAP running on a T1200 AS

EPAP-related features require that all Service Module cards contain 4 GB of memory. *Figure 3: Database Administrative Architecture* illustrates each Service Module card having two Ethernet links, the main DSM network on the 100BASE-T link and the backup DSM network . Refer to *Table 8: Service Module Card Provisioning and Reload Settings* for the link speed. The Service Module cards run the VSCCP software application.

The Service Module card Ethernet ports are linked to the EPAP system to receive the downloaded Real Time Database (RTDB). Multiple Service Module cards provide a means of load balancing in high-traffic situations. The RTDB on the Service Module card is in a format that facilitates rapid lookups.

Though the Service Module card copies of the RTDB are intended to be identical, the various databases may not be identical at all times for the following reasons:

- When a Service Module card is initialized, the card downloads the current copy of the database from the EPAP. While that card is being loaded, it cannot receive new updates that have arrived at the EPAP since reload began.
- Card databases can become out-of-sync with the EPAP RTDB when the EPAP receives updates from its provisioning source, but it has not yet sent the updates down to the Service Module cards. Updates are applied to the Provisioning Database (PDB) as they are received.

Two possible scenarios contribute to a condition where a Service Module card may not have enough memory to hold the entire database:

- The database is downloaded successfully to the Service Module card, but subsequent updates eventually increase the size of the database beyond the capacity of the Service Module card memory. In this situation, it is desirable for EPAP-related features to continue processing transactions, even though the database might not be up-to-date.
- When a Service Module card is booted and it is determined then that the card does not have enough memory for the entire database, the database is not loaded on that card. Each Service Module card is responsible for recognizing and reporting its out-of-memory conditions by means of alarms.

Overview of EPAP to Service Module Card Communications

Before discussing Service Module card status reporting or EPAP status reporting, it is helpful to understand the communications between the Service Module cards and the EPAP in broad terms.

- UDP - sending Service Module card status messages

  The Service Module cards and EPAPs create a UDP (User Datagram Protocol) socket which is used for status messages. One of the last things a Service Module card does when it is initialized is to send a status message to the EPAP, containing the Service Module ID, database level, and memory size. The EPAP maintains tables containing the last known status of each Service Module card. EPAP uses these to determine whether or not the Service Module card needs to download the database.

- IP - reporting EPAP maintenance data

  The Service Module cards create an TCP socket when they are initialized, and listen for connection requests. During initialization or after a loss of connectivity, the active EPAP chooses one of the Service Module cards and issues a *Connect* to establish the TCP/IP connection with that Service Module card which is referred to as the primary Service Module card. The purpose of this link is to provide a path for reporting EPAP alarms and to forward maintenance blocks to the Service Module card.

- IP Multicast - downloading GSM database

  Because of the large size of the database and the need to download it quickly on up to 32 Service Module cards, EPAP-related features use a technique known as IP multicasting. This technique is based on Reliable Multicast Transport Protocol-II (RMTP-II), a product of Globalcast Communications. IP multicasting downloads the RTDB and database updates to all of the Service Module cards simultaneously.

  The administration of IP multicasting is based on the concept of a “tree”, or stream of data, which is constantly being broadcast by the EPAP. Service Module cards that need to download the real time database or to receive database updates “join the tree”. Service Module cards can also “leave the tree”, typically when the database fills their available memory.

Service Module Card Provisioning and Reload

One of the core functions of the EPAP is to provision the Service Module cards with the Real Time Database (RTDB) updates. In order to provide redundancy for this feature, separate RMTP channels are created on each interface from each EPAP:

Table 8: Service Module Card Provisioning and Reload Settings

RMTP Channel	T1000	T1200 Running Only DSM cards	T1200 Running Only E5-SM4G cards	T1200 Running both DSM and E5-SM4G cards
EPAP A, Link A (on the main DSM network)	100BASE-T	100BASE-T	100BASE-T	100BASE-T
EPAP A, Link B (on the backup DSM network)	10BASE-T	10BASE-T	100BASE-T	10BASE-T
EPAP B, Link A (on the main DSM network)	100BASE-T	100BASE-T	100BASE-T	100BASE-T
EPAP B, Link B (on the backup DSM network)	10BASE-T	10BASE-T	100BASE-T	10BASE-T
Note: Full duplex mode is supported only when running all E5-SM4G cards on the T1200. In all other cases, half duplex mode is supported.				

Provisioning and other data is broadcast on one of these channels to all of the Service Module cards. Provisioning is done by database level in order to leave tables coherent between updates.

The Service Module cards do the following:

- Detect the need for incremental updates and send a status message to the EPAP.
- Discriminate between the various streams according to the database level contained in each message and accept updates based on the Service Module card database level.

Service Module Card Reload Model

Service Module cards may require a complete database reload in the event of reboot or loss of connectivity for a significant amount of time. The EPAP provides a mechanism to quickly load a number of Service Module cards with the current database. The database on the EPAP is large and may be updated constantly. The database sent to the Service Module card or cards will likely be missing some of these updates making it corrupt, in addition to being "back level."

EPAP Continuous Reload

It is important to understand how the EPAP handles reloading of multiple Service Module cards from different starting points. Reload begins when the first Service Module card requires it. Records are read sequentially from the Real Time Database (RTDB) from an arbitrary starting point, wrapping back to the beginning. If another Service Module card requires reloading at this time, it uses the existing record stream and notifies the Service Module card provisioning task of the first record it read. This continues until all Service Module cards are satisfied.

Service Module Card Database Levels and Reloading

The current database level when the reload started is of special importance during reload. When a Service Module card detects that the last record has been received, it sends a status message back to the EPAP indicating the database level at the start of reload. This action starts incremental loading. The Service Module card continues to reload until it is completely caught up with the current level of the RTDB. As database records are sent to the Service Module cards during reload, normal provisioning can change those records. All records changed between the start and end of reloading must be incrementally loaded before the database is coherent and usable by the Service Module card.

The following terminology is used here for the stages of database reload for a given Service Module card.

- **Stage 1 loading**: The database is being copied record for record from the golden RTDB in the EPAP to the Service Module card RTDB. The database is incoherent during stage 1 loading.
- **Incremental update**: The database is receiving all of the updates missed during stage 1 loading or some other reason, such as network outage, processor limitation, or lost communication. The database is coherent, but back-level during incremental update.
- **Current**: The database is receiving current updates from the Service Module card provisioning task.
- **Coherent:** The database is at a whole database level which means not currently updating records belonging to a database level.

EPAP Status and Error Reporting via 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 maintenance blocks eventually update EPAP Device Control Blocks (DCBs) located on the EAGLE 5 ISS. The DCBs provide the status information that is received when a `rept-stat-mps` command is issued.

Network Connections

Several customer and Tekelec-installed private networks are required to support the provisioning of subscription data. These networks are:

- *Customer Provisioning Network*
- *EPAP Sync Network*
- *DSM Networks*
- *Dial-Up PPP Network*

The following discussion is an overview of these private networks. It expands on the networks in the architecture diagram shown in *Figure 4: Customer Provisioning Network*. (For details about configuring these networks, refer to the EPAP *Administration Manual*.)

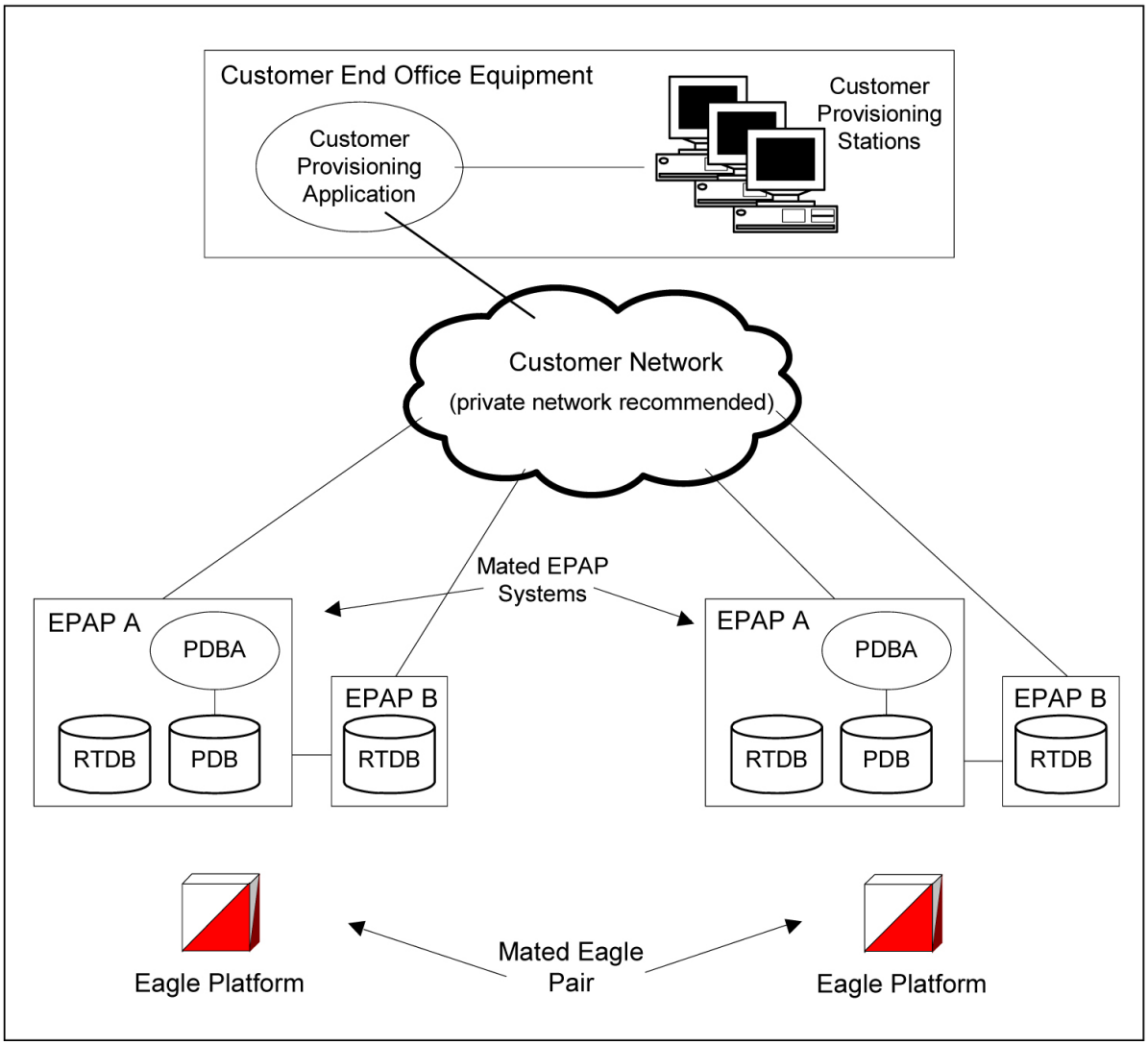
Customer Provisioning Network

The customer network carries the following traffic:

- Customer queries and responses to the PDB via the PDBI from the customer provisioning network
- Updates between PDBs of a mated EAGLE 5 ISS pair
- Updates between a PDB on one EAGLE 5 ISS and RTDBs on a mated EAGLE 5 ISS
- PDBA import/export (file transfer) traffic
- Traffic from a PDBA reloading from its mate
- EPAP and PDBA user interface traffic.

A typical customer network is shown in *Figure 4: Customer Provisioning Network*.

Figure 4: Customer Provisioning Network

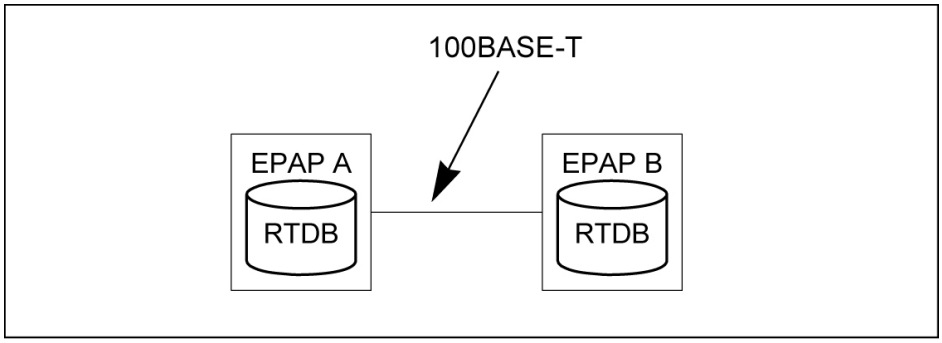


Although a dedicated network is recommended, it is possible that unrelated customer traffic can use the network as well. The determination, either to have a dedicated network or to allow other customer traffic, should be based on available external Ethernet bandwidth and network performance considerations.

EPAP Sync Network

The T1000 EPAP sync network carries RTDB and maintenance application traffic between active and standby EPAP servers on an MPS system. It synchronizes the contents of the RTDBs of both EPAP A and B. The EPAP Sync network is a single Ethernet connection between EPAP A and EPAP B running at 100BASE-T, as shown in *Figure 5: EPAP Sync Network*. The T1200 EPAP Sync network is truncated with the EPAP back up DSM connection and communicates through the switch.

Figure 5: EPAP Sync Network

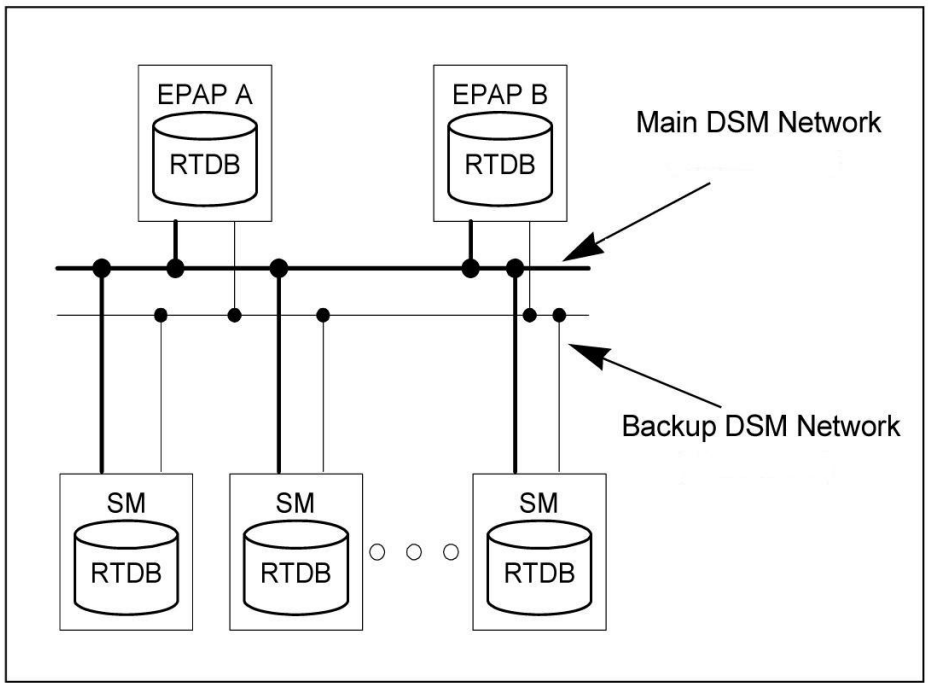


DSM Networks

The DSM networks are shown in *Figure 6: DSM Networks*. They carry provisioning data from the active EPAP RTDB to the Service Module cards. They also carry reload and maintenance traffic to the Service Module cards.

The DSM networks consist of two Ethernet networks: the main DSM network running at 100BASE-T, and the backup DSM network running at either 10BASE-T or 100Base-T. Refer to *Table 9: EPAP IP Addresses in the DSM Network* for the link speed. Both Ethernet networks connect EPAP A and EPAP B with every Service Module card on a single EAGLE 5 ISS platform.

Figure 6: DSM Networks



Maintenance information is sent from the active EPAP to an arbitrarily selected Service Module card. The selected Service Module card is known as the primary Service Module card. Static information is exchanged across this interface at initialization, and dynamic information is exchanged on occasion.

While much of the traditional OAM provisioning and database functionality is implemented on the EPAP, the maintenance reporting mechanism is still the OAM.

The first and second octets of the EPAP network addresses for this network are 192.168. (The first two octets for private class C networks are defined in RFC 1918.)

The third octet is customer specifiable for each DSM network. It is important to select values that do not interfere with the customer's network addressing scheme.

The fourth octet of the address is specified as follows:

- If the EPAP is configured as “EPAP A”, the fourth octet has a value of 100.
- If the EPAP is configured as “EPAP B”, the fourth octet has a value of 200.

Table 9: EPAP IP Addresses in the DSM Network summarizes the contents of each octet.

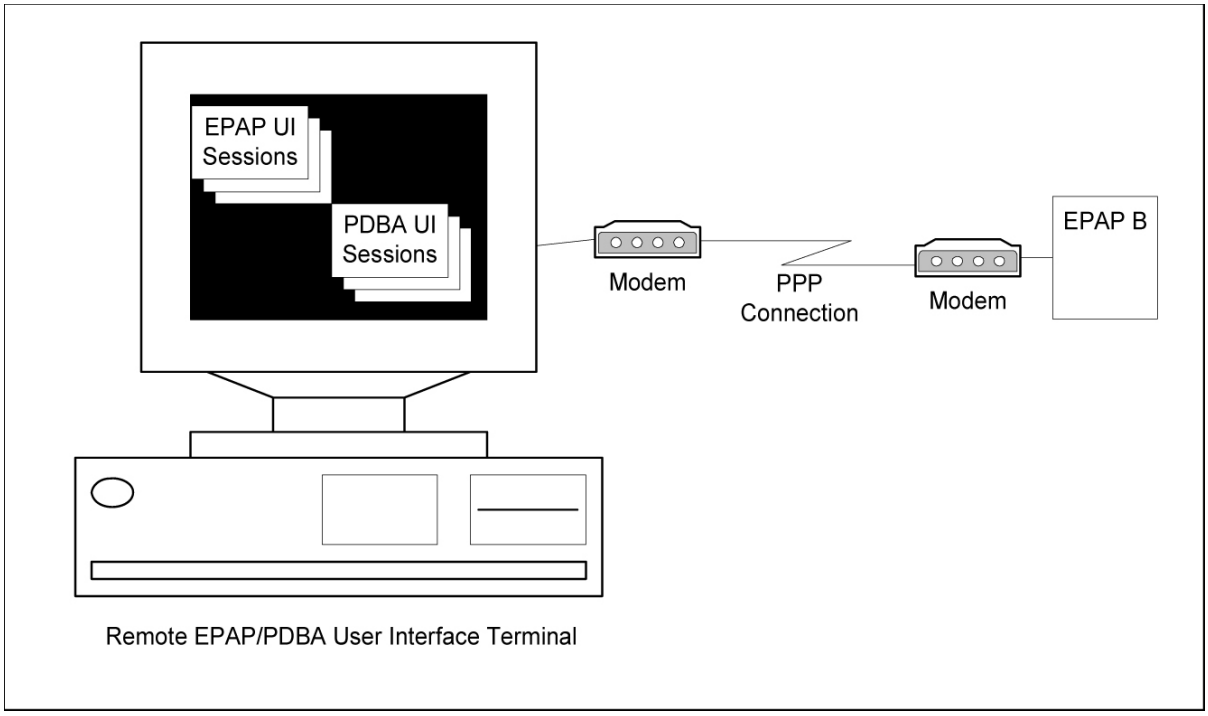
Table 9: EPAP IP Addresses in the DSM Network

Octet	Value
1	*192*
2	*168*
3	One customer-provisioned value for DSM network A and another for DSM network B
4	*100* for EPAP A and *200* for EPAP B

Dial-Up PPP Network

The dial-up PPP network allows multiple user-interface sessions to be established with the EPAP. The network connects a remote EPAP/PDBA user interface terminal with the EPAP in the EAGLE 5 ISS's MPS subsystem. The dial-up PPP network is illustrated in *Figure 7: Dial-Up PPP Network*.

Figure 7: Dial-Up PPP Network



Service Module Card Reload Requirements

Service Module cards may require a complete database reload if there is a reboot or loss of connectivity for a significant amount of time. The EPAP provides a mechanism to quickly load a number of Service Module cards with the current database. The RTDB on the EPAP is large and can be updated constantly from the customer's provisioning network. As the RTDB is sent to the Service Module cards, it can possibly miss some updates, making it inconsistent as well as back level.

The upload process is divided into two stages, one that sequentially sends the initial database records and another that sends any updates missed since the beginning of the first stage. The Service Module card reload stream uses a separate RMTP channel from the provisioning and incremental update streams. This allows Service Module card multicast hardware to filter out the high volume of reload traffic from Service Module cards that do not require it.

Service Module cards do the following:

- Detect the need for stage 1 loading and send a status message to the EPAP.
- Identify the first record that the Service Module card was able to read in the above status message if a record stream is already in progress.

- Handle the record stream regardless of the starting point (that is, accommodate records starting with the middle record of the middle table).
- Expect tables to be sent in a particular order and therefore detect any gap in the record stream.
- Send a status message if a gap is detected. Stage1 loading is essentially reset to the last update received.
- Handle wrapping from the last record from the last table to the first record of the first table.
- Know when they have received all the required records to proceed to stage 2 loading.
- Send a status message when stage 1 loading is complete, indicating the database level at the beginning of stage 1.
- Detect when the master RTDB crosses a memory boundary during stage 1 loading; the card automatically reboots and then auto-inhibits.

Chapter 3

EAGLE 5 ISS Commands

Topics:

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

EAGLE 5 ISS Commands

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

Refer to the *Commands Manual* for complete descriptions of the commands listed in *Table 10: Commands used for the INP and AINPQ Features*, including parameter names, valid values, and output examples.

Table 10: 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
Retrieve, Report Status, and Maintenance	chg-th-alm, ent-trace, init-network, init-sys, rept-stat-alm, rept-stat-db, rept-stat-mps, rept-stat-sccp, rept-stat-sys, rep-stat-trbl, rtrv-data-rtdb, rtrv-tbl-capacity

`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 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.

Maintenance Commands

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

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

Table 11: 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 subsystem operating status, CPU usage, and Service Module card status. When the loc parameter is specified, the command displays detailed card traffic statistics. See the section in this manual for each feature that describes the use of the `rept-stat-sccp` command for that feature.
rept-stat-mps	Displays the overall status of the 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 DSM/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 databases. It reports database exception status such as corrupted, incoherent, or inconsistent, as well as providing the birth dates and levels. It shows the status of the PDB and RTDB databases when an EPAP-based 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	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. The `alw-card` 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.
inh-alm/unhb-alm	Used to allow and inhibit alarms on the Service Module card ports. The commands allow both Port A and Port B to be specified.

Command	Description
rtrv-data-rtdb	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. If the loc parameter is specified and the target card is an active Service Module card, the RTDB data is retrieved from that card. If the loc parameter is not specified, the RTDB data is retrieved on the active Service Module card that has the lowest IMT address. The RTDB status on the active Service Module card can be coherent or incoherent.

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 12: 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 12: 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	Not an ITU-N message type. Not an SCCP UDT or non--segmented XUDT message TCAP Type is not ANSI-41 or INAP. TCAP Type is ANSI-41 and AINPQ feature is not enabled.

Statistic	Service or Function	Reason to Increment Count
		TCAP Type is INAP, and INPQ service is not provisioned.
	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.

Statistic	Service or Function	Reason to Increment Count
		DPC not a true point code. GTT required on CgPA, but GTI is not 2 or 4. GTT of CgPA failed for Bad GT Type (“No Translation). GTT of CgPA failed for No Translation. Could not encode CdPA or CgPA in response. Outgoing formatted CdPN digits exceed the maximum allowed limit (32 digits in ITU TCAP Connect, 21 digits for routing digits in ANSI-41).
	INPQ Service	INP CRP on: Call has a circular route detected and results in unsuccessful encoding of an INAP RELEASECALL message.
	INPMR Service	Default CC or default NDC not provisioned, during number conditioning to International format. Invalid length of conditioned digits
WARNINGS	INPQ Service	GRN data required to encode digits in CONNECT response and GRN not provisioned in entity data. INP CRP on: Detection of circular route by INPQS.
	INPMR Service	GRN data required for own-network subscriber and GRN not provisioned in entity data. INP CRP on: Detection of circular route by INPMR.
	AINPQ-specific	GRN data required to encode digits in RRWDGTS response

Statistic	Service or Function	Reason to Increment Count
		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.
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: 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.

Chapter 4

INP/AINPQ Feature Configuration

Topics:

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 13: System Prerequisites* are required in the system.

Table 13: System Prerequisites

Prerequisite	Verification and Provisioning
The system serial number must be correct and locked. 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. For systems that are being upgraded, the serial number is usually already verified and locked.	**Note:** The serial number cannot be changed after it is entered and locked in the system. Locate the serial number for the system on a label affixed to the control shelf (1100). Enter the `rtrv-serial-num` command to display the serial number and its locked status. Verify that the displayed serial number is correct for the system. If no serial number is displayed, enter the `ent-serial-num` command (without the lock parameter) to provision the serial number that appears on the control shelf label. Enter the rtrv-serial-num command and verify that the serial number was entered correctly.

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

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 14: INP and AINPQ Feature Prerequisite

Prerequisite	Verification and Provisioning
The LNP feature cannot be on in the system	Enter the `rtrv-ctrl-feat` command. 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.
The system must be configured for HLR destinations.	The system must be configured to communicate with the system of the HLR database. See *Configure the System for HLR Destinations*.

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*.

Adding a Service Module Card

This procedure is used to add Service Module cards to the database to support GTT-related features and EPAP-related features.

EPAP-based features require Service Module cards running the VSCCP application. The following cards can be used as Service Module cards running the VSCCP application in the system:

- DSM 4G – a DSM card with 4 gigabytes of memory

- E5-SM4G - an EPM-based card with 4 gigabytes of memory

The system can contain a maximum number of Service Module cards for EPAP-related features:

- Up to 25 (24+1) Service Module cards if EPAP is running in a T1000 AS
- Up to 32 (31+1) Service Module cards if EPAP is running in a T1200 AS
  - The following Warning appears when more than 25 Service Module cards have been provisioned in the system and the `enable-ctrl-feat` command is entered to enable the first EPAP-related feature in the system:

    ```
    Warning: The Eagle must be connected to an EPAP T1200 or higher
    ```

  - The following Caution appears when the `ent-card` commend is entered to add the 26th Service Module card to the database and any EPAP-related feature is enabled in the system:

    ```
    CAUTION: Please ensure EPAP Application Server is running on
             hardware supporting 32 SCCP cards e.g.: T1200.
             Re-enter command within 30 seconds to confirm change.
    ```

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

A Service Module card occupies two card slots. A Service Module card can be inserted only in an odd/even numbered pair of empty card slots of an EAGLE 5 ISS shelf. The even-numbered card slot to the right of the odd-numbered slot where the Service Module card is to be inserted must be empty. A Service Module card cannot be inserted in slots 09 and 10 because slots 09 and 10 of each shelf contain HMUX cards, HIPR cards, or HIPR2 cards. The Service Module card is connected to the network through the odd-numbered card slot connector.

Note: Service Module cards can be inserted only in slots 01, 03, 05, 07, and 11 of the control shelf (1100).

Table 15: Service Module Card Locations

Location of the Service Module Card	Empty Card Location
Slot 01	Slot 02
Slot 03	Slot 04
Slot 05	Slot 06
Slot 07	Slot 08
Slot 11	Slot 12
Slot 13	Slot 14
Slot 15	Slot 16
Slot 17	Slot 18

Prerequisites

Before a Service Module card can be added, the prerequisites in *Table 16: System Prerequisites for Adding a Service Module Card* must be present in the system.

Table 16: System Prerequisites for Adding a Service Module Card

Prerequisite	Verification and Actions
The shelf to which the card is to be added must already be provisioned in the database.	Enter the `rtrv-shlf` command. If the shelf is not in the database, refer to the procedure for adding a shelf in the *Database Administration Manual – System Management*.
The odd/even slots in which the card will be inserted must not have a card already assigned in the database.	Enter the `rtrv-card` command. If a slot has a card assigned to it, use the dlt-card command to remove the card from the database. Refer to the `dlt-card` command description in the *Commands Manual*.
The GTT feature must be on.	Enter the `rtrv-feat` command to display the GTT feature status. If the GTT feature is on, the gtt=on entry appears in the output. If the gtt=off entry appears in the output, use the procedures in the *Database Administration Manual - GTT* to turn on and provision the GTT feature and any other GTT-related features and functions that will be used in the system.
To add more than 25 Service Module cards to the database, the EPAP that is connected to the EAGLE 5 ISS must be running on a T1200 AS.	Use visual inspection or contact the *Customer Care Center* for assistance to determine the EPAP hardware type.

Before an E5-SM4G Service Module card can be added, the prerequisite in *Table 17: Prerequisite for Adding an E5-SM4G Service Module Card* must be present in the system.

Table 17: Prerequisite for Adding an E5-SM4G Service Module Card

Prerequisite	Verification and Actions
Slots 09 and 10 in the shelf to which the E5-SM4G card will be added must contain either HIPR cards or HIPR2 cards.	Enter the `rept-stat-gpl:gpl=hipr` command and the `rept-stat-gpl:gpl=hipr2` command to list the installed HIPR cards and HIPR2 cards in the system. If the shelf does not contain HIPR cards or HIPR2 cards, refer to procedures in the *Installation Manual*

Prerequisite	Verification and Actions
	- *EAGLE 5 ISS* to install HIPR cards or HIPR2 cards in the shelf.

Refer to the *Commands Manual* for complete descriptions of the commands that are used in this procedure. The complete descriptions include all valid parameter values and output examples.

1. Display the cards in the system by entering the `rtrv-card` command. Odd-even pairs of card locations that do not contain cards (are not listed in the output) and do not contain HMUX, HIPR, or HIPR2 cards can be used for Service Module cards.

```
   rlghncxa03w 08-03-15 16:34:56 EST  EAGLE 39.2.0
   CARD   TYPE      APPL      LSET NAME     LINK SLC LSET NAME     LINK SLC
   1201   LIMDS0    SS7ANSI   LS1           A    0   LS1           B
   1102   DSM       VSCCP     ------------  A    --  ------------  B    --
   1113   GPSM      OAM
   1114   TDM-A
   1115   GPSM      OAM
   1116   TDM-B
   1117   MDAL

;
```

2. Verify that the Service Module card to be added has been physically installed in the correct card location.

CAUTION: If the version of the BPDCM GPL on the Service Module card does not match the BPDCM GPL version in the database when the Service Module card is inserted into the card slot, UAM 0002 is generated indicating that these GPL versions do not match. If UAM 0002 has been generated, perform the alarm clearing procedure for UAM 0002 in the *Unsolicited Alarm and Information Messages* manual before proceeding with this procedure.

3. Perform this step only if the card being added will be the 26th Service Module card in the system.

   If the card is NOT the 26th Service Module card, continue to *Step 4*.

   Note: The same `ent-card` command must be entered twice within 30 seconds to complete the provisioning of the card.

   a) Enter the `ent-card` command the first time for the 26th card.

   `ent-card:loc=<card location>:type=dsm:appl=vsccp`

   When the command executes the first time and any EPAP-related feature is enabled, the following caution appears :

```
CAUTION: Please ensure EPAP Application Server is running on
         hardware supporting 32 SCCP cards e.g.: T1200.
         Re-enter command within 30 seconds to confirm change.
```

   b) Enter the same `ent-card` command the second time for the 26th card to complete the provisioning of the card.

   c) Go to *Step 5*.

4. Add the Service Module card to the database, using the `ent-card` command.

   `ent-card:loc=<card location>:type=dsm:appl=vsccp`

5. For an E5-SM4G card, verify the temperature threshold settings by performing the "Changing the High-Capacity Card Temperature Alarm Thresholds" procedure in *Database Administration Manual - SS7*.
6. Verify the change by entering the `rtrv-card` command with the card location specified.
   `rtrv-card:loc=<card location>`

```
   rlghncxa03w 08-03-15 16:34:56 EST  EAGLE 39.2.0
   CARD   TYPE      APPL      LSET NAME     LINK SLC LSET NAME     LINK SLC
   1301   DSM       VSCCP     ------------  A    --  ------------  B
;
```

7. Change the IP Address to MPS for the added card.
   `chg-ip-lnk:port=<a/b>:submask=255.255.255.0:mcast=yes:speed=100:loc=<odd-numbered card location>:ipaddr=<EPAP DSM IP address>:duplex=full`
8. Allow the added card to begin operation in the system.
   `alw-card:loc=<odd-numbered card location>`
9. Back up the database changes, by entering the following command.
   `chg-db:action=backup:dest=fixed`

   The following messages should 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.
```

10. Repeat this procedure for each Service Module card that needs to be added to the system.

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 Tekelec 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 by Tekelec 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 Tekelec 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-based features. Refer to the detailed procedures in the *Database Administration Manual - SS7* for provisioning true and capability point codes, and the CLLI 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-based 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-based 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 18: INP Local Subsystem Prerequisites

Prerequisite	Verification
The INP feature or AINPQ feature must be enabled and turned on.	Enter the `rtrv-ctrl-feat` 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 appl parameter (inp) cannot already be in the database.	Enter the `rtrv-ss-appl` command. 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.	Only one subsystem number for the application can be defined, and must be used for all point code types assigned to the local subsystem. Enter the `rtrv-sid` 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*. Enter the `rtrv-map` 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 *Database Administration Manual – Global Title Translation* for provisioning solitary and dominant mated applications.

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 Tekelec 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=inpmr` 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 inpmr

: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 parameater 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 wit the `chg-srvsel` command.

   If the gtii/gtin/gtin24 parameter value is 4, eiher 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 commnand 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 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 19: Subsystem Allow/Inhibit

Command\ Subsystem State	Offline	Online
`alw-map-ss`	Command is rejected.	Attempts to make the local subsystem active.
inh-map-ss	Command accepted, but no action because offline implies inhibited.	Attempts to inhibit the local subsystem. Use of the force=yes parameter bypasses the SOR/SOG exchange and inhibits immediately.
`chg-ss-appl :appl=inp :nstat=online`	Command is rejected, because the subsystem must be online to be in the allowed state.	Changes local subsystem database status to online.
`chg-ss-appl :appl=inp :nstat=offline`	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 Tekelec 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 Tekelec 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 SCCPOPTS configuration option can be done only after the feature is enabled and turned on. See *Provisioning the S-Port Subscriber Differentiation SCCPOPTS 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.
```

The 1100 TPS/DSM for ITU NP Feature

When only DSM cards or a mixture of DSM cards and E5-SM4G cards (Service Module cards) are equipped in the system, all of the cards are normally rated at 850 transactions per second (TPS). The 1100 TPS/DSM for ITU NP feature increases the TPS rate for a Service Module card from 850 TPS to 1100 TPS.

The feature can be enabled when the equipped Service Module cards include DSM cards and one or more of the EPAP-related features listed in *Table 21: Feature Prerequisites* are enabled and turned on.

When the maximum number of Service Module cards is installed in the EAGLE 5 ISS, the maximum processing capacity of SCCP traffic for an EAGLE 5 ISS processing traffic for EPAP-related features is increased to 34,100 TPS.

Note: The increased capacity to 1100 TPS per DSM card assumes incoming traffic consists of at least 30% of GTT routed traffic that does not require EPAP-based lookup. If more than 70% of incoming traffic requires EPAP-based lookup, Group Ticket Voucher (TVG) may shutdown and overall TVG capacity of 1100 for the card may not be met.

The 1100 TPS/DSM for ITU NP feature must be enabled using the feature part number 893018001 and a feature access key (FAK). Based on the feature part number and the serial number of the EAGLE 5 ISS, the feature access key is site-specific.

Note: The feature access key for the 1100 TPS/DSM for ITU NP feature is provided by Tekelec when the feature is purchased. Contact your Tekelec Sales Representative or Account Representative before beginning the feature configuration procedure if you do not have the feature access key for this feature. The 1100 TPS/DSM for ITU NP feature cannot be enabled with a temporary feature access key.

After the 1100 TPS/Service Module card for ITU NP feature has been enabled, the feature must be turned on to begin operation in the system. The feature is an On/Off feature, it can be turned off again after it has been turned on.

System Prerequisites

Before the 1100 TPS/DSM for ITU NP feature can be enabled, the prerequisites listed in *Table 20: System Prerequisites* are required in the system.

Table 20: System Prerequisites

Prerequisite	Verification and Provisioning
For new installations, the system serial number must be verified and locked. 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. For systems that are being upgraded, the serial number has already been verified and locked.	Enter the `rtrv-serial-num` command to display the serial number and its lock status. Verify that the displayed serial number is correct for the system. The serial number is shown on a label affixed to the control shelf (shelf 1100). If no serial number is displayed, or if the displayed serial number is not locked, refer to the `ent-serial-num` command description in *Commands Manual* for instructions to enter and lock the serial number.

Prerequisite	Verification and Provisioning
The GTT feature must on in the system.	Enter the `rtrv-feat` command. If the GTT feature is on, the `gtt=on` entry appears in the output. If the `gtt=off` entry appears in the output, use the procedures in *Database Administration Manual – Global Title Translation* to turn on and provision the GTT feature and any related features and functions.

Feature Prerequisites

Before the 1100 TPS/DSM for ITU NP feature can be enabled, the prerequisites shown in *Table 21: Feature Prerequisites* are required in the system.

Table 21: Feature Prerequisites

Prerequisite	Verification and Provisioning
Service Module cards running the VSCCP application must be equipped. The cards can be all DSM cards, or a mixture of DSM cards and E5-SM4G cards. There must be at least one DSM card.	Enter the `rept-stat-gpl:gpl=vsccp` command and the `rept-stat-gpl:gpl=sccphc` command to list the Service Module cards in the system. If the number of cards is not sufficient, use the procedure *Adding a Service Module Card* to add Service Module cards.
The ANSIGFLEX system option cannot be set to Yes.	Enter the `rtrv-stpopts` command. Verify that the ANSIGFLEX entry does not appear in the command output or that the ANSI GFLEX entry shows a value of No.
The LNP feature cannot be on in the system.	Enter the `rtrv-ctrl-feat` command. If the LNP feature is on, shown with a quantity greater than zero for the `LNP ported TNs` entry in the command output, the 1100 TPS/DSM for ITU NP feature cannot be enabled
At least one of the following EPAP-related features must be enabled and turned on: • G-Port • A-Port • INP • AINPQ • IGM	Enter the `rtrv-ctrl-feat` command and verify that an entry for at least one of the listed EPAP-related features with Status `on` is present in the output. If no listed EPAP-related features are on, use the procedures in this manual or another Feature Manual for an EPAP-related feature that you will

Prerequisite	Verification and Provisioning
• EIR • IDP Relay • V-Flex • IAR (NP, ASD, GRN) • MO-based GSM SMS NP • MO-based IS41SMS NP • TIF (NP, ASD, GRN, Number Substitution)	use in the system, to enable and turn on the EPAP-related feature.

This section provides the following procedures for the 1100 TPS/DSM for ITU NP feature:

- *Enable the 1100 TPS/DSM for ITU NP Feature*
- *Turn On the 1100 TPS/DSM for ITU NP Feature*
- *Turn Off the 1100 TPS/DSM for ITU NP Feature*

Refer to the *Commands Manual* for descriptions of the commands used in the procedures, including parameter names and valid values, rules for using the command correctly, and output examples.

Enable the 1100 TPS/DSM for ITU NP Feature

This procedure is used to enable the 1100 TPS/DSM for ITU NP feature.

1. Enable the 1100 TPS/DSM for ITU NP feature with part number 893018001 and the feature access key.

   ```
   enable-ctrl-feat:partnum=893018001:fak=<feature access key>
   ```

2. Verify the change by entering the `rtrv-ctrl-feat` command with the 1100 TPS/DSM for ITU NP feature part number 893018001.

   ```
   rtrv-ctrl-feat:partnum=893018001
   ```

   ```
   rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
   The following features have been permanently enabled:
   Feature Name              Partnum    Status  Quantity
   HC-MIM SLK Capacity       893012707  on            64
   Prepaid SMS Intercept Ph1 893006701  on          ----
   1100 TPS/DSM for ITU NP   893018001  off         ----
   ;
   ```

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.
   ```

Turn On the 1100 TPS/DSM for ITU NP Feature

This procedure is used to turn on the 1100 TPS/DSM for ITU NP feature, after it has been enabled or turned off.

Note: If the EPAP-based traffic is higher than 70% of all traffic on the EAGLE 5 ISS, the DSM card performance may not reach 1100 TPS per DSM card.

1. Enter the `chg-ctrl-feat` command the first time and specify the 1100 TPS/DSM feature part number 893018001and the `status=on` parameter value.

   ```
   chg-ctrl-feat:partnum=893018001:status=on
   ```

   The following message is displayed:

   ```
   CAUTION: Rated TPS for this feature supports an engineered GTT
   traffic mix of no more than 70 percent EPAP-based traffic.
   Re-enter the command within 30 seconds to confirm change.
   ```

2. Re-enter the command the second time within 30 seconds to turn on the 1100 TPS/DSM for ITU NP feature.

   ```
   chg-ctrl-feat:partnum=893018001:status=on
   ```

3. Verify the change by entering the `rtrv-ctrl-feat` command with the 1100 TPS/DSM for ITU NP feature part number.

   ```
   rtrv-ctrl-feat:partnum=893018001
   ```

   ```
   rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
   The following features have been permanently enabled:
   Feature Name              Partnum    Status  Quantity
   HC-MIM SLK Capacity       893012707  on            64
   Prepaid SMS Intercept Ph1 893006701  on          ----
   1100 TPS/DSM for ITU NP   893018001  on          ----
   ;
   ```

4. Back up the database 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.
   ```

Turn Off the 1100 TPS/DSM for ITU NP Feature

This procedure is used to turn off the 1100 TPS/DSM for ITU NP feature, after it has been enabled and turned on.

1. Enter the `chg-ctrl-feat` command the first time and specify the 1100 TPS/DSM feature part number 893018001 and the status=off parameter value.

   ```
   chg-ctrl-feat:partnum=893018001:status=off
   ```

   The following message is displayed:

   ```
   CAUTION: This command decreases the total TPS of the SCCP system from 1100 to
   850 TPS for each DSM card.
   ```

2. Re-enter the command the second time within 30 seconds to turn off the 1100 TPS/DSM for ITU NP feature.
3. Back up the database 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 E5-SM4G Throughput Capacity Feature

The E5-SM4G Throughput Capacity feature quantities are used to increase the processing capacity of the E5-SM4G card and of system SCCP traffic for an EAGLE 5 ISS that contains E5-SM4G cards only (no DSM cards). The achievable TPS maximums are shown in *Table 22: Maximum E5-SM4G Card and System TPS Capacity*.

Table 22: Maximum E5-SM4G Card and System TPS Capacity

Feature Quantity Part Number	Maximum TPS Capacity per E5-SM4G Card	Maximum System TPS Capacity
893019101 - Feature Quantity 5000	3125	• 75,000 TPS with one or more EPAP-related features and 24+1 cards • 96,875 TPS with one or more EPAP-related features and 31+1 cards (EPAP running on T1200 AS)
	5000	• 150,000 TPS with no EPAP-related or ELAP-related feature traffic and 31+1 cards • 120,000 TPS with G-Flex and the ANSIGFLEX STP option and 24+1 cards • 155,00 TPS with G-Flex and the ANSIGFLEX STP option and 31+1 cards (EPAP running on T1200 AS) • 40,000 TPS with ELAP and 8+1 cards • 85,000 TPS with ELAP and 17+1 cards
893019102 - Feature Quantity 6800	6800	• 210,800 TPS with no EPAP-related or ELAP-related feature traffic and 31+1 cards • 163,200 TPS with one or more EPAP-related features and 24+1 cards • 210,800 TPS with one or more EPAP-related features and 31+1 cards (EPAP running on T1200 AS) • 54,400 TPS with ELAP and 8+1 cards • 115,600 TPS with ELAP and 17+1 cards

An E5-SM4G Throughput Capacity quantity feature must be enabled using an E5-SM4G Throughput Capacity feature part number (893019101 or 893019102) and a feature access key.

The feature access key is based on the feature part number and the serial number of the EAGLE 5 ISS, making the feature access key site-specific.

Note: The E5-SM4G Throughput Capacity quantity feature must be purchased to receive the feature access key used to enable the feature. Contact your Tekelec Sales Representative or Account Representative before beginning this procedure if you have purchased the E5-SM4G Throughput Capacity quantity feature, but do not have the feature access key. A temporary feature access key is not available for this feature.

After an E5-SM4G Throughput Capacity feature is enabled and turned on, the E5-SM4G Throughput Capacity feature cannot be turned off. When the E5-SM4G Throughput Capacity feature is enabled, it is permanently enabled. The E5-SM4G Throughput Capacity feature cannot be temporarily enabled.

System Prerequisites

Before the E5-SM4G Throughput Capacity feature can be enabled, the prerequisites listed in *Table 23: System Prerequisites* are required in the system.

Table 23: System Prerequisites

Prerequisite	Verification and Provisioning
For new installations, the system serial number must be verified and locked. 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. For systems that are being upgraded, the serial number has already been verified and locked.	Enter the `rtrv-serial-num` command to display the serial number and its lock status. Verify that the displayed serial number is correct for the system. The serial number is shown on a label affixed to the control shelf (shelf 1100). If no serial number is displayed, or if the displayed serial number is not locked, refer to the `ent-serial-num` command description in the *Commands Manual* for instructions to enter and lock the serial number.
The GTT feature must on in the system.	Enter the `rtrv-feat` command. If the GTT feature is on, the gtt=on entry appears in the output. If the gtt=off entry appears in the output, use the procedures in the *Database Administration Manual – Global Title Translation* to turn on and provision the GTT feature and any related features and functions.

E5-SM4G Throughput Capacity Feature Prerequisite

Before the E5-SM4G Throughput Capacity feature can be enabled, the prerequisite shown in *Table 24: E5-SM4G Throughput Capacity Feature Prerequisite* is required in the system.

Table 24: E5-SM4G Throughput Capacity Feature Prerequisite

Prerequisite	Verification and Provisioning
E5-SM4G cards running the VSCCP application must be equipped. The required number of cards depends on the desired total system TPS to be achieved by the cards. See *Table 22: Maximum E5-SM4G Card and System TPS Capacity*.	Enter the `rept-stat-gpl:gpl=sccphc` command to list the E5-SM4G cards in the system. If the number of cards is not sufficient, use the procedure in *Adding a Service Module Card* to add E5-SM4G cards.

The following procedure explains how to enable an E5-SM4G Throughput Capacity quantity feature.

Note: After a quantity feature has been enabled, a feature for a higher quantity can be enabled; a feature for a lower quantity cannot be enabled. Quantity features are automatically turned on when they are enabled.

Refer to the *Commands Manual* for descriptions of the commands used in the procedure, including parameter names and valid values, rules for using the command correctly, and output examples.

1. Display the status of the features that are controlled by feature access keys. Enter the `rtrv-ctrl-feat` command.

```
    rlghncxa03w 09-07-29 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
    E5-SM4G Throughput Cap    893019101  on         5000
;
```

   - If the `rtrv-ctrl-feat` output shows that the correct E5-SM4G Throughput Capacity quantity feature is enabled and its status is on, no further action is necessary.
   - If no E5-SM4G Throughput Capacity feature quantity is enabled or a higher quantity needs to be enabled, continue with step *Step 2*.

2. Enable the E5-SM4G Throughput Capacity quantity feature by entering the `enable-ctrl-feat` command with the correct part number and FAK for the desired quantity.
3. Verify the status of the E5-SM4G Throughput Capacity quantity feature by entering the `rtrv-ctrl-feat` command with the feature part number that was just enabled (893033501 or 893019102).

   `rtrv-ctrl-feat:partnum=893019102`

```
    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
    E5-SM4G Throughput Cap    893019102  on         6800
;
```

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.
```

Chapter 5

INP/AINPQ Measurements

Topics:

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 he 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 25: 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 25: Pegs for Per System INP/AINPQ Measurements

Event Name	Description	Type	Unit
INPQRCV	Number of total queries received by INPQS; he 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: INPQRCV = INPQDSC + INPQTCPE + 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:	System	Peg count

Event Name	Description	Type	Unit
	• Either INP Connect or INP Continue for the INP feature • 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 The following equation applies: INPSREP = INPQSCONN + INPQSCONT		

Table 26: 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 26: 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 27: 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 27: MTCD and MTCDTH 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:

This chapter describes the EAGLE 5 ISS maintenance functions for the INP and AINPQ features. This chapter also provides an overview of the interaction between the EPAP in the MPS subsystem and the EAGLE 5 ISS.

Introduction

This chapter describes maintenance functions for the INP and AINPQ features. This chapter also provides an overview of the interaction between the EPAP in the MPS subsystem and the EAGLE 5 ISS.

INP/AINPQ Subsystem-Related Alarms

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

Refer to the *T1000 MPS Platform Software and Maintenance Manual* or the *EPAP Alarms on T1200 Platform* manual for information and corrective procedures for MPS-related alarms.

Table 28: 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 29: 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 29: 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 `inh-map-ss` command did not take the local subsystem off-line.	Enter the `inh-map-ss` command with the force 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 `chg-stpopts :defcc=xxx`
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=xxxxx`
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.

EPAP Status and Alarm Reporting

The EPAPs have no direct means of accepting user input or displaying output messages on EAGLE 5 ISS terminals; maintenance, measurements, and status information must be routed through a Service Module card. The EPAP sends two types of messages to the Service Module card:

- EPAP maintenance blocks
- Service Module card status requests

EPAP 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-sccp` command and the .`rept-stat-mps` command. Refer to the descriptions of these commands in the *Commands Manual* for output examples.

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 so this information can be forwarded to the EPAP A Device Control Block (DCB), where it is 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 so this information can be forwarded to the EPAP B DCB, where it is 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. The EPAP must ensure that no more than one maintenance block per second is sent to the primary Service Module card if the only reason is to report a change in congestion status.
- 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 utilized by the RTDB.

DSM Status Requests

When the EPAP needs to know the status of a Service Module card, it sends a DSM status request to that Service Module card. Because status messages are sent over UDP, the EPAP broadcasts the DSM status request (to all Service Module cards) and each Service Module card returns its status to the EPAP.

DSM Status Reporting to the EPAP

The sections that follow describe the DSM status reporting for the EPAP.

DSM Status Messages – When Sent

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 database, for example, if the Service Module card determines that the RTDB needs to be downloaded (for instance, if the database is totally corrupted), or if a craftsperson requests that the database be reloaded.
- The Service Module card starts receiving database downloads or database updates. When a Service Module card starts downloading the RTDB or accepting database 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.

DSM Status Messages Fields

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 Technical Reference* for important information on the dimensioning rules and the Service Module card database capacity requirements.
- **Load Mode Status**. This indicator indicates whether or not 80% 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"
;
```

Service Module Hardware Verification

Service Module card loading verifies the validity of the hardware configuration for Service Module cards. The verification of the hardware includes:

- Validity of the main board
- Verification of applique memory size

Service Module Card Main Board Verification

An AMD-K6 (or better) main board is required to support the VSCCP application on the Service Module card. EAGLE 5 ISS maintenance stores the validity status of the VSCCP card main board configuration. The EAGLE 5 ISS prevents EPAP-related features from being enabled if the hardware configuration is invalid.

Service Module Card Applique Memory Verification

The VSCCP application performs two types of memory validation to determine whether a Service Module card has enough memory to run an EPAP-related feature.

1. Local Memory Validation

   When the feature is first enabled, or when the feature is enabled and the Service Module card is initializing, the VSCCP application checks to see if the Service Module card has at least 4G of memory. An EPAP-related feature cannot be enabled if any Service Module card has less than 4GB of memory installed.

2. Real-time Memory Validation

   When communication is established between the Service Module card and EPAP and the Service Module card has joined the RMTP tree, the EPAP starts downloading its copy of the RTDB to the Service Module card. The EPAP includes the size of the current RTDB in all records sent to the Service Module card.

The Service Module card compares the size required with the amount of installed memory; it issues a minor alarm if the database exceeds 80% of the Service Module card memory. If the database completely fills the Service Module card memory, an insufficient memory alarm is issued, the Service Module card leaves the RMTP tree, and the Service Module card status changes to *IS-ANR/Restricted*.

Actions Taken When Hardware Determined to be Invalid

When the hardware configuration for a Service Module card is determined to be invalid for the VSCCP application, the SCM (System Configuration Manager) automatically inhibits loading that specific Service Module card. A major alarm is generated, indicating that card loading for that Service Module card has failed and has been automatically inhibited, that is, prevented from reloading again. Refer to the *Unsolicited Alarm and Information Messages* manual for information about the alarms that are generated.

When card loading is inhibited, the primary state of the card is set to OOS-MT-DSBLD and the secondary state of the card is set to MEA (Mismatch of Equipment and Attributes).

The following actions apply to a Service Module card determined to be invalid:

- The Service Module card does not download the EAGLE 5 ISS (STP) databases.
- The Service Module card does not download the Real Time Database (RTDB) from the EPAP.
- The Service Module card does not accept RTDB updates (such as *add*, *change*, *delete*) from the EPAP.

To activate loading of a Service Module card which has been automatically inhibited, the craftsperson must enter the following command: `alw-card:loc=xxxx`.

Unstable Loading Mode

At some point, having some number of invalid Service Module cards results in some of the LIMs being denied SCCP services. A threshold must be monitored; if the number of valid Service Module cards is insufficient to provide service to at least 80% of the in-service (IS-NR) LIMs, the system is in an unstable loading mode. There are other reasons why an EAGLE 5 ISS might be in an unstable Loading Mode; see *Loading Mode Support* for further information.

System Status Reporting

Refer to the *Commands Manual* for descriptions of the commands that are used for system status reporting.

The `rept-stat-mps` command reports the status of the EPAP application running on the MPS.

The `rept-stat-sccp` command reports EPAP-related feature statistics.

The `rept-stat-sys` command output includes the number of Service Module cards that are in service, and in other states.

Service Module Card Memory Capacity Status Reporting

As described in *DSM Status Reporting to the EPAP*, the Service Module card sends a message to the EPAP defining the Service Module card memory size. The EPAP determines whether the Service

Module card has enough memory to store the RTDB and responds to the Service Module card with and ACK or NACK, indicating whether the Service Module card memory is large enough.

When the EPAP sends database updates to the Service Module cards, the update messages include a field that contains the new memory requirements. Each Service Module card monitors the database size requirements, and issues a minor alarm if the size of the database exceeds 80% of its memory. If a database increases to the point that it occupies 100% of the Service Module card memory, an insufficient memory major alarm is issued.database

The `rept-stat-mps:loc=xxxx` command displays the amount of memory used by the RTDB as a percent of available memory on the specified Service Module card.

Loading Mode Support Status Reporting

The OAM application can determine whether the system is in an unstable loading mode because it knows the state of all LIM and Service Module cards in the system. When the loading mode is unstable, the `rept-stat-sys` command reports the existence of the unstable loading mode and the specific conditions that caused it. See *Loading Mode Support* for additional information.

Code and Application Data Loading

In general, administrative updates can occur while a Service Module card is loading. The Service Module card should also remain in an in-transition state if the EAGLE 5 ISS portion of the database has completed loading and is waiting for the RTDB to download.

Service Module Code Loading

The EAGLE 5 ISS OAM performs code loading of the Service Module card.

EPAP Application Data Loading

The INP/AINPQ feature requires that new TDM-resident data tables be loaded in addition to those currently supported by EAGLE 5 ISS. The GPL and data loading support this additional table loading while maintaining support for loading the existing EAGLE 5 ISS tables.

In order to support both RTDB and EAGLE 5 ISS data loading, the Service Module card GPL verifies its hardware configuration during initialization to determine if it has the capacity to support the RTDB.

The Service Module card GPL application data loader registers all tables for loading, independent of the INP/AINPQ feature provisioning and main board / applique hardware configuration. As a result, load requests are always identical. During loading, multiple Service Module card load requests are combined into a single download, reducing the overall download time. The Service Module card stores or discards RTDB table data based on whether or not it has RTDB-capable hardware for features like G-Port, G-Flex, INP, and EIR.

The OAM, on the other hand, downloads or sets memory boundaries for the INP/AINPQ options, HOMERN, and service selector tables only if the INP/AINPQ feature is provisioned. When the INP/AINPQ feature is not provisioned, the OAM does not attempt to read these tables from disk. Instead, empty tables (i.e., tables without entries) are downloaded. All other tables requested for loading are read from disk and downloaded routinely.

Non INP/AINPQ Data Initialization

If the Service Module card's hardware configuration cannot support the RTDB, the INP/AINPQ tables are marked as absent during Service Management System initialization. Memory is not reserved for the INP/AINPQ table data. INP/AINPQ tables are registered with the application data loader (ADL), specifying a data discard function. INP/AINPQ table data is discarded during loading by the ADL discard function, rather than storing it in memory.

EPAP-Service Module Card Loading Interface

The Service Module card must convey to the EPAP that it needs to download the RTDB. This occurs when the Service Module card sends a Full Download Request message to the EPAP.

Loading Mode Support

No more than 16 LIMs can be serviced by each Service Module card.

80% Threshold of Support

Loading mode is based on the ability of the system to provide SCCP service to at least 80% of the LIMs.

Service Module Card Capacity

An insufficient number of Service Module cards that are in the IS-NR (In Service - Normal) or OOS-MT-DSBLD (Out of Service - Maintenance Disabled) relative to 80% of the number of provisioned LIMs is called a “failure to provide adequate SCCP capacity.”

Insufficient SCCP Service

It is also possible for LIMs or Service Module cards to be inhibited or to have problems that prevent them from operating normally. If enough Service Module cards are out of service, it may not be possible for the remaining is-nr Service Module cards to service at least 80% of the number of is-nr LIMs. This is called “insufficient SCCP service.” When this occurs, some of the LIMs are denied SCCP service. It is possible to inhibit LIMs to bring the ratio back to 16:1 (or better).

Conditions That Create an Unstable Loading Mode

The current system implementation interrupts and aborts card loading upon execution of an STP database `chg` command. Loading mode support denies the execution of EAGLE 5 ISS database `chg` commands when the system is in an unstable loading mode. An unstable loading mode exists when any of the following conditions are true:

- The system's maintenance baseline has not been established.
- Less than 80% of the number of LIMs provisioned are IS-NR or OOS-MT-DSBLD.
- The number of IS-NR and OOS-MT-DSBLD Service Module cards running the VSCCP application is insufficient to service at least 80% of all provisioned LIMs.
- Insufficient SCCP service occurs when an insufficient number of is-nr Service Module cards are available to service at least 80% of the number of is-nr LIMs.
- LIM cards are being denied SCCP service and any Service Module cards are in an abnormal state (oos-mt or IS-ANR).

Effects of System in an Unstable Loading Mode

- No affect on RTDB downloads or updates.

  Unstable loading mode has no impact on RTDB downloads or the stream of RTDB updates.

- `rept-stat-sys` reports unstable loading mode.

  When the loading mode is unstable, the `rept-stat-sys` command response reports the existence of the unstable loading mode and the specific trigger that caused it.

- No STP database updates allowed.

  After an STP database has been loaded, that database can be updated (as long as the system is not in an unstable loading mode). However, if an STP update arrives during STP database loading, the Service Module card aborts the current loading, issues a class 01D7 obit, and reboots.

Using the force Option

Use the force option to force the execution of commands that would put the system in unstable loading mode (such as the `ent-card` and `inh-card` commands).

Glossary

A

ADL	Application Data Loader
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	Country Code
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

Database	All data that can be administered by the user, including cards, destination point codes, gateway screening tables, global title translation tables,

D

	links, LNP services, LNP service providers, location routing numbers, routes, shelves, subsystem applications, and 10 digit telephone numbers.
DCB	Device Control Block
DN	Directory number A DN can refer to any mobile or wireline subscriber number, and can include MSISDN, MDN, MIN, or the wireline Dialed Number.

E

EIR	Equipment Identity Register A network entity used in GSM networks, as defined in the 3GPP Specifications for mobile networks. The entity stores lists of International Mobile Equipment Identity (IMEI) numbers, which correspond to physical handsets (not subscribers). Use of the EIR can prevent the use of stolen handsets because the network operator can enter the IMEI of these handsets into a 'blacklist' and prevent them from being registered on the network, thus making them useless.
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)

E

- 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)
- 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)

E

- 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)
- 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

F

	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

G-Flex	GSM Flexible numbering A feature that allows the operator to flexibly assign individual subscribers across multiple HLRs and route signaling messages, based on subscriber numbering, accordingly.
GPL	Generic Program Load Software that allows the various features in the system to work. GPLs and applications are not the same software.
G-Port	GSM Mobile Number Portability A feature that provides mobile subscribers the ability to change the GSM subscription network within a portability cluster, while retaining their original MSISDN(s).
GSM	Global System for Mobile Communications
GT	Global Title Routing Indicator

H

HOMERN	Home Network Routing Number Prefix

I

ID	Identity, identifier
INAP	Intelligent Network Application Part

I

INP	INAP-based Number Portability 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. Intelligent Network (IN) Portability
IP	Internet Protocol 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.
ISS	Integrated Signaling System
ITU	International Telecommunications Union

L

LIM	Link Interface Module Provides access to remote SS7, IP and other network elements, such as a Signaling Control Point (SCP) through a variety of signaling interfaces (DS0, MPL, E1/T1 MIM, LIM-ATM, E1-ATM, IPLIMx, IPGWx). The LIMs consist of a main assembly and possibly, an interface appliqué board. These appliqués provide level one and some level

L

	two functionality on SS7 signaling links.
Link	Signaling Link Signaling Link Carries signaling within a Link Set using a specific Association. A Link can belong to only one Link Set and one Association. There is generally one Link per Association in a Link Set.
LNP	Local Number Portability

M

MEA	Mismatch of Equipment and Attributes
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.

N

NAI	Nature of Address Indicator Standard method of identifying users who request access to a network.
NC	Network Cluster Network Code Not Compliant
NDC	Network destination code

N

NEC	National Escape Code
NPDB	Number Portability Database

O

OAM	Operations, Administration, and Maintenance The application that operates the Maintenance and Administration Subsystem which controls the operation of the EAGLE 5 ISS.
OOS-MT	Out of Service - Maintenance The entity is out of service and is not available to perform its normal service function. The maintenance system is actively working to restore the entity to service.
OPS	Operator Provisioning System

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**.

P

	• 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 area-subsignaling area-service point (**msa-ssa-sp**).
PDB	Provisioning Database
PDBA	Provisioning Database Application There are two Provisioning Database Applications (PDBAs), one in EPAP A on each EAGLE 5 ISS. They follow an Active/Standby model. These processes are responsible for updating and maintaining the Provisioning Database (PDB).
PDBI	Provisioning Database Interface The interface consists of the definition of provisioning messages only. The customer must write a client application that uses the PDBI request/response messages to communicate with the PDBA.
PPP	Point-to-Point Protocol

Q

QS	Query Service

R

RFC	Request for Comment

R

	RFCs are standards-track documents, which are official specifications of the Internet protocol suite defined by the Internet Engineering Task Force (IETF) and its steering group the IESG.
RMTP	Reliable Multicast Transport Protocol
RN	Routing Number
RTDB	Real Time Database

S

SCCP	Signaling Connection Control Part
SCM	System Configuration Manager System Configuration Matrix.
Service Module card	DSM card or E5-SM4G card that contains the Real Time Database (RTDB) downloaded from an EPAP or ELAP system.
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.
SOG	Subsystem Out-of-Service Grant Service Order Gateway
SOR	Support of Optimal Routing

S

	System Out of Service Request
SP	Signaling Point A set of signaling equipment represented by a unique point code within an SS7 domain.
SSN	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. 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.
STP	Signal Transfer Point STPs are ultra-reliable, high speed packet switches at the heart of SS7 networks, which terminate all link types except F-links. STPs are nearly always deployed in mated pairs for reliability reasons. Their primary functions are to provide access to SS7 networks and to provide routing of signaling messages within and among signaling networks.

T

TCAP	Transaction Capabilities Application Part
TCP	Transfer Control Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol

T

TDM	Terminal Disk Module

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.
UDP	User Datagram Protocol

V

VSCCP	VxWorks Signaling Connection Control Part The application used by the Service Module card to support EPAP-related features and LNP features. If an EPAP-related or LNP feature is not turned on, and a Service Module card is present, the VSCCP application processes normal GTT traffic.