

# *Tekelec EAGLE<sup>®</sup> 5 Integrated Signaling System*

**Release 40.0**

## **Feature Manual - TIF**

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### U.S. Patent Numbers:

5,732,213; 5,953,404; 6,115,746; 6,167,129; 6,324,183; 6,327,350; 6,456,845; 6,606,379; 6,639,981; 6,647,113; 6,662,017; 6,735,441; 6,745,041; 6,765,990; 6,795,546; 6,819,932; 6,836,477; 6,839,423; 6,885,872; 6,901,262; 6,914,973; 6,940,866; 6,944,184; 6,954,526; 6,954,794; 6,959,076; 6,965,592; 6,967,956; 6,968,048; 6,970,542; 6,987,781; 6,987,849; 6,990,089; 6,990,347; 6,993,038; 7,002,988; 7,020,707; 7,031,340; 7,035,239; 7,035,387; 7,043,000; 7,043,001; 7,043,002; 7,046,667; 7,050,456; 7,050,562; 7,054,422; 7,068,773; 7,072,678; 7,075,331; 7,079,524; 7,088,728; 7,092,505; 7,108,468; 7,110,780; 7,113,581; 7,113,781; 7,117,411; 7,123,710; 7,127,057; 7,133,420; 7,136,477; 7,139,388; 7,145,875; 7,146,181; 7,155,206; 7,155,243; 7,155,505; 7,155,512; 7,181,194; 7,190,702; 7,190,772; 7,190,959; 7,197,036; 7,206,394; 7,215,748; 7,219,264; 7,222,192; 7,227,927; 7,231,024; 7,242,695; 7,254,391; 7,260,086; 7,260,207; 7,283,969; 7,286,516; 7,286,647; 7,286,839; 7,295,579; 7,299,050; 7,301,910; 7,304,957; 7,318,091; 7,319,857; 7,327,670

### Foreign Patent Numbers:

EP1062792; EP1308054; EP1247378; EP1303994; EP1252788; EP1161819; EP1177660; EP1169829; EP1135905; EP1364520; EP1192758; EP1240772; EP1173969; CA2352246

## **Ordering Information**

Your Tekelec Sales Representative can provide you with information about how to order additional discs.

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# Chapter 1

## Introduction

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### Topics:

- [Introduction Page 2](#)
- [Scope and Audience Page 2](#)
- [Manual Organization Page 3](#)
- [Related Publications Page 3](#)
- [Documentation Availability, Packaging, and Updates Page 3](#)
- [Documentation Admonishments Page 4](#)
- [Customer Care Center Page 4](#)
- [Emergency Response Page 7](#)

This chapter contains a brief description of the Triggerless ISUP Framework (TIF) and the features that use TIF. The contents include sections about the manual scope, audience, and organization; how to find related publications; and how to contact Tekelec for assistance.

## Introduction

The Triggerless ISUP Framework (TIF) and the EAGLE 5 ISS features that use TIF (see [TIF Features](#) on page 12) build on the capabilities of the existing EAGLE 5 ISS features that support ISUP number portability.

The ISUP NP with EPAP feature supports only IAM relay, and always used the RNDN for Called Party number portability.

The Triggerless ISUP Number Portability (TINP) feature added Release message capability and several additional formats for the Called Party number.

TIF and the TIF features add the following capabilities:

- Complex prefix usage, where prefixed can be used to customize actions.
- Non-NAI-compliant digit handling
- Complex outgoing digit formats
- Calling number portability
- Concurrent Release and Relay support
- Circular route prevention

TIF uses some of the concepts provided by TINP, and uses the Numbering Plan Processor (NPP) for much of the digit manipulation and service controls.

The TIF features use TIF and NPP for the following functions:

- Called Number Portability
- Calling Number Portability
- Circular Route Prevention
- Simple Called Number Substitution
- Message Forwarding to SCS

Most of the TIF features require EPAP provisioning data from the Realtime Database (RTDB). Subscriber data is transferred from customer databases to the EPAP. The EPAP formats the RTDB and loads it to each Service Module card on the EAGLE 5 ISS. The RTDB data is used in obtaining number portability information and in determining how to correctly format the ATI ACK response message. See [MPS/EPAP Platform](#) on page 25 in this manual for more information about EPAP.

## Scope and Audience

This manual is intended for anyone responsible for installing, maintaining, and using the features in the EAGLE 5 ISS that use the Triggerless ISUP Framework (TIF). 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](#) on page 1 contains general information about the TIF documentation, the organization of this manual, and how to get technical assistance.
- [Triggerless ISUP Framework \(TIF\)](#) on page 9 provides a functional description of the Triggerless ISUP Framework, including configuration options, protocol handling, ISUP IAM message decoding and encoding, IAM/SAM splitting, and NPP Services.
- [TIF Features](#) on page 29 describes the functions and use of the EAGLE 5 ISS features that use TIF.
- [EAGLE 5 ISS Commands for TIF Features](#) on page 52 describes the EAGLE 5 ISS configuration, maintenance, debug, and test commands that are used for the TIF features.
- [TIF Feature Configuration](#) on page 67 describes Eagle 5 ISS provisioning for the TIF features, and the TIF Test Tool that is used to verify provisioning without affecting live traffic.
- [Maintenance](#) on page 89 describes maintenance information for TIF and EPAP, including status and alarms, hardware verification messages, TSM emulation mode, EPAP-based system status reports and commands, 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 ([support.tekelec.com](http://support.tekelec.com)). 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 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**

	<p><b>DANGER:</b> (This icon and text indicate the possibility of <i>personal injury</i>.)</p>
	<p><b>WARNING:</b> (This icon and text indicate the possibility of <i>equipment damage</i>.)</p>
	<p><b>CAUTION:</b> (This icon and text indicate the possibility of <i>service interruption</i>.)</p>

## 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:

0-800-555-5246 (toll-free)

- **Brazil**

Phone:

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

TAC Regional Support Office Hours:

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- **Chile**

Phone:

1230-020-555-5468

- **Columbia**

Phone:

01-800-912-0537

- **Dominican Republic**
  - Phone:  
1-888-367-8552
- **Mexico**
  - Phone:  
001-888-367-8552
- **Peru**
  - Phone:  
0800-53-087
- **Puerto Rico**
  - Phone:  
1-888-367-8552 (1-888-FOR-TKLC)
- **Venezuela**
  - Phone:  
0800-176-6497
- **Europe, Middle East, and Africa**
  - **Signaling**
    - Phone:  
+44 1784 467 804 (within UK)
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  - **Software Solutions**
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  - **India**
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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.





## Triggerless ISUP Framework (TIF)

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### Topics:

- [TIF Description Page 10](#)
- [TIF Features Page 12](#)
- [TIF Configuration Options Page 13](#)
- [TIF Services That Call NPP Page 13](#)
- [Protocol Handling Page 15](#)
- [IAM/SAM Splitting Page 23](#)
- [MSU Sequencing Page 24](#)
- [ISUP Decode and Encode Errors Page 25](#)
- [MPS/EPAP Platform Page 25](#)

This chapter describes the functions provided by the Triggerless ISUP Framework, including ISUP IAM protocol handling, NPP processing for TIF, and response message formatting.

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

## TIF Description

For TIF features, TIF provides an overall structure that allows the EAGLE 5 ISS to intercept ISUP messages that would normally be through-switched and apply special processing to them. For example, an IAM message could be intercepted and have the called number prefix replaced based on portability information.

At least one TIF feature must be enabled and turned on before TIF functions are available in the system.

TIF processing consists of two main sections:

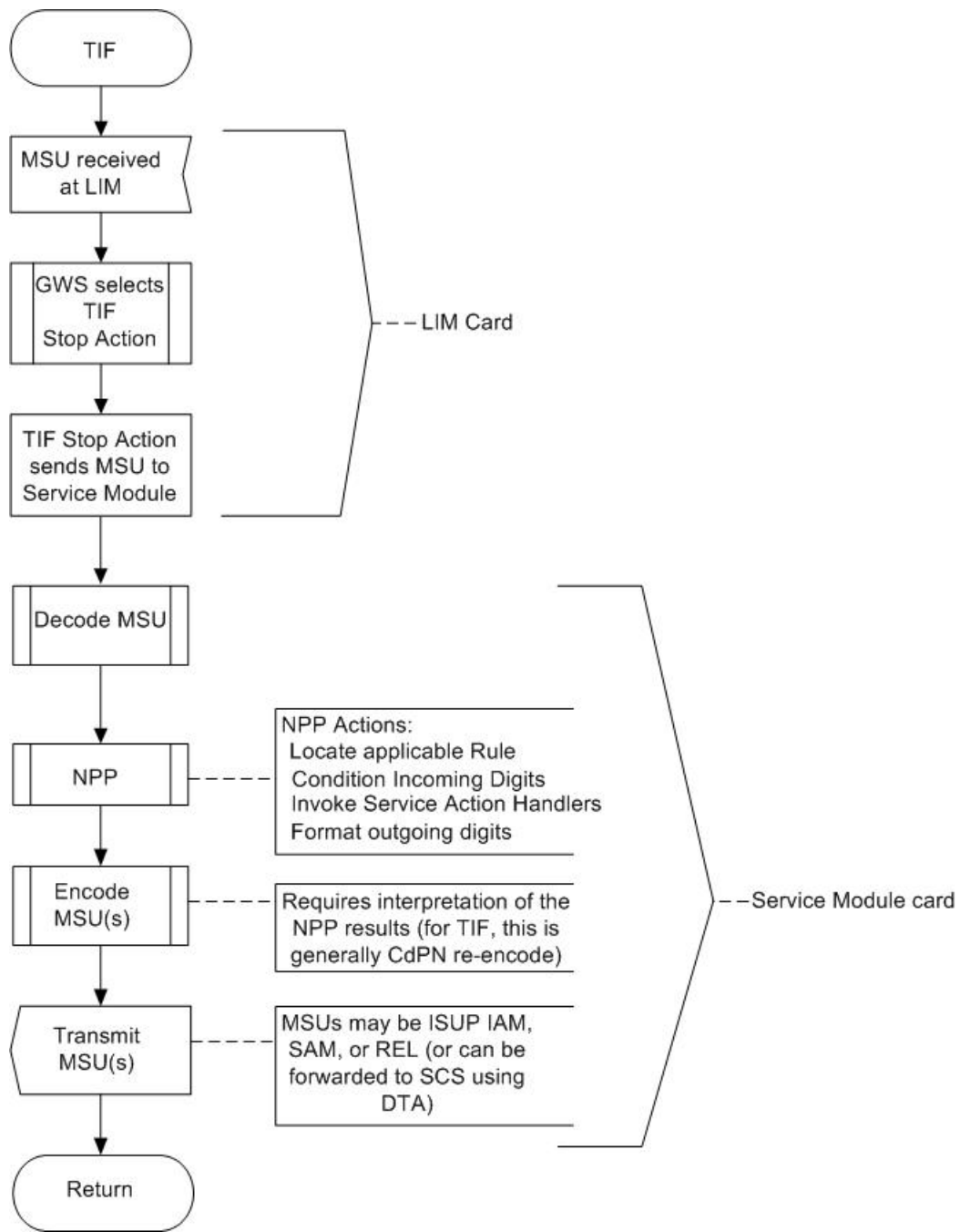
- On the LIM cards, TIF uses Gateway Screening (GWS) to select an ISUP MSU for processing, and forwards the MSU to Service Module cards for processing.
- On the Service Module cards, TIF decodes the MSU, invokes the Numbering Plan Processor (NPP), and encodes the results.

TIF features provide NPP with Service Action Handlers to perform database access, data evaluation, and any feature-specific handling for the MSU.

**Note:** Only customers that had the TINP feature enabled before upgrading to TIF will be able to use TINP after the upgrade occurs. See [TIF and TINP Relationship](#) on page 11.

A high-level overview of TIF processing is shown in [Figure 1: TIF Overview](#) on page 10 .

**Figure 1: TIF Overview**



### TIF and TINP Relationship

Only customers that had the TINP feature enabled before upgrading to the TIF Number Portability feature can still use TINP after the upgrade..

The TINP feature part number 893018901 now appears for the TIF Number Portability feature and provides access to TINP functions. For example, the TINP Common Screening List (CSL) acscode and escscode lists are accessed by entering the feature="TIF Number Portability" parameter or the partnum=893018901 parameter.

TINP configuration options are provisioned into the TINPOPTS table, and are associated with the TINP Gateway Screening Stop Action. (TINP and CNCF are mutually exclusive within Gateway Screening Stop Action Sets.) The TINP Stop Action and the `chg-tinpopts` command can be used only in systems that had the TINP feature enabled before upgrading to TIF.

TIF configuration options are provisioned into the TIFOPTS table, and are associated with the TIF, TIF2, and TIF3 Gateway Screening Stop Actions. TINP or any TIF feature must be enabled to allow provisioning into the TIFOPTS table. The `rtrv-tifopts` and `rtrv-tinpopts` commands can be entered even if no TIF or TINP features are enabled. The default values will appear in the output.

DTA, TINP, TIF, TIF2, and TIF3 Stop Actions are all mutually exclusive in Stop Action Sets, and all must be the last Stop Action for the set.

## TIF Features

All of the features that are listed in [Table 2: TIF Features](#) on page 12 use TIF ("TIF features"). Chapter 3 in this manual describes each TIF feature.

The GTT feature and the Gateway Screening feature (GWS) must be turned on before a TIF feature can be enabled in the system.

**Table 2: TIF Features**

Part Number	Description	Other Dependencies/Notes
893-0189-01	TIF Number Portability (The existing TINP feature and TIF Number Portability Relay and Release all use functions of this part number.)	Requires EPAP for RTDB lookup. Mutually exclusive with ELAP.
893-0222-01	TIF SCS Forwarding	Does not require RTDB for lookup - Can be enabled with EPAP or ELAP in the system.
893-0240-01	TIF Simple Number Substitution	Does not require RTDB for lookup - Can be enabled with EPAP or ELAP in the system.
893-0245-01	TIF Additional Subscriber Data	Requires EPAP for RTDB lookup. Mutually exclusive with ELAP.
893-0255-01	TIF Generic Routing Number	Requires EPAP for RTDB lookup. Mutually exclusive with ELAP.

## TIF Configuration Options

The TIFOPTS table contains option values associated with the TIF, TIF2, and TIF3 Gateway Screening Stop Actions. The TIF option data is loaded to the LIM cards and to Service Module cards that contain the RTDB database.

See [EAGLE 5 ISS TIF Options Commands](#) on page 54 for a description of the TIF options and the EAGLE 5 ISS commands that are used to configure the options.

## TIF Services That Call NPP

For the following TIF services, NPP processes traffic filtered by the corresponding Gateway Screening Stop Action. Three services for TIF features allow NPP Rules to be defined for handling different types of traffic, such as inter-carrier traffic and local traffic.

**Table 3: NPP Service Name to GWS Stop Action Mapping**

TIF Service Name	GWS Stop Action Name
TIF	TIF
TIF2	TIF2
TIF3	TIF3

See the *Numbering Plan Processor (NPP) Overview* manual for more information about NPP components and processing.

## NPP Service Actions

The NPP Service Actions listed in [Table 4: Service Actions used by TIF Features](#) on page 13 are used by the indicated TIF features. Before an NPP Rule can be provisioned with an Action Set containing a Service Action for a TIF feature, the TIF feature must be enabled. The precedence indicates the sequence of execution if more than one Service Action is used by a service.

**Table 4: Service Actions used by TIF Features**

Service Action	Description	Required Part Number	Precedence
CRP	Circular Route Prevention	TIF Number Portability	92
NPNRLS	Number Portability Release on No Match	TIF Number Portability	91
ASDLKUP	Use of CdPN Additional Subscriber Data when formatting CdPN	TIF Additional Subscriber Data	90

Service Action	Description	Required Part Number	Precedence
CgPNASDRqd	Use of CgPN Additional Subscriber Data when formatting CdPN	TIF Additional Subscriber Data	90
GRNLKUP	Use of CdPN Generic Routing Number when formatting CdPN	TIF Generic Routing Number	90
CgPNGRNRqd	Use of CgPN Generic Routing Number when formatting CdPN	TIF Generic Routing Number	90
CgPNNPRqd	Calling Number Lookup	TIF Number Portability	80
NPRELAY	Number Portability Relay	TIF Number Portability	80
NPRLS	Number Portability Release on Match	TIF Number Portability	80
SNSCgPN	Simple Number Substitution	TIF Simple Number Substitution	75
CDIAL	Corrective Dialing	NPP basic functions; no TIF feature is required	10
FWDSCS	Forward to SCS	TIF SCS Forwarding	5

## NPP Conditioning Actions

TIF supports all Conditioning Actions provided by NPP. TIF provides the ACCgPN Conditioning Action.

**Table 5: TIF Conditioning Action**

Name	Description	Mnemonic
Area Code from Calling Party	Area code needs to be extracted from the Calling Party Number	ACCgPN

The ACCgPN Conditioning Action skips over any country code digits (matching DefCC or Multiple CC) and removes the number of digits specified in the ACLEN configuration option from the beginning of the CgPN. These digits will be used as the Area Code (AC) to condition the Called Party digits for any subsequent Service Action or Formatting Action.

If the ACCgPN Conditioning Action is invoked, but the Calling Party is not present or has fewer digits than the ACLEN option value (after any CC digits), then no change to Area Code will be made.

## NPP Formatting Actions

TIF supports all Formatting Actions provided by NPP. TIF does not provide any additional Formatting Actions.

## Protocol Handling

TIF protocol processing consists of the following functions:

- Gateway Screening of the MSU received by a LIM card selects a TIF Stop Action, encapsulating the MSU as SCCP data, and forwarding the MSU to Service Module cards for processing .
- On the Service Module card, TIF decodes the message, passes information to NPP services for processing, and formats and sends the resulting message.

### LIM Card Processing

When a LIM card receives an MSU, the following TIF processing occurs (see the LIM processing shown in [Figure 1: TIF Overview](#) on page 10):

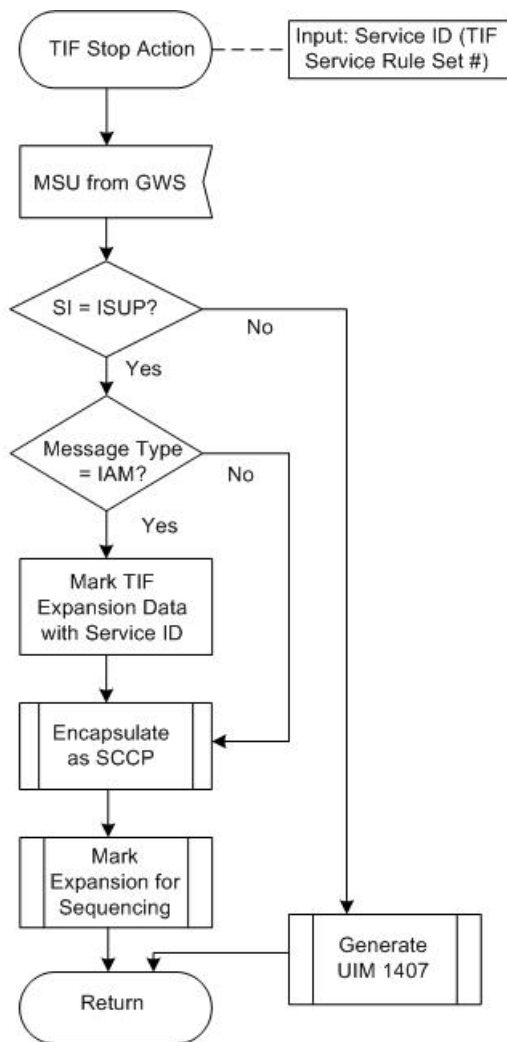
- The Gateway Screening (GWS) feature filters messages for ISUP, and ISUP messages with SI=5 are screened for selection of a TIF Stop Action.
- Selected ISUP IAM messages are marked for sequencing, encapsulated as SCCP messages, and forwarded to Service Modules for processing. TIF supports proper sequencing of IAM/SAM messages. See [IAM/SAM Splitting](#) on page 23 for details.

All other ISUP MSUs delivered to TIF for processing are marked for sequencing and routed.

MSUs that are TUP or not ISUP (SI=5) are routed without modification. UIM 1407 Unexpected SI in TIF Stop Action is generated.

The TIF Stop Action processing flow is shown in [Figure 2: TIF Stop Action Processing](#) on page 15.

### Figure 2: TIF Stop Action Processing



Gateway Screening supports the following TIF Stop Actions: TIF, TIF2, and TIF3. Existing GWS rules are used to separate ISUP traffic for TIF processing. The GWS rule must end with a Stop Action that contains TIF, TIF2, or TIF3.

The DTA, TIF, TIF2, and TIF3 Stop Actions are all mutually exclusive in Stop Action Sets, and each of these Stop Actions must be the last Stop Action for the set.

[Table 6: TIF Stop Action Rules](#) on page 16 defines the processing of messages within TIF Stop Actions.

**Table 6: TIF Stop Action Rules**

Protocol	Message Type	Encapsulate	Sequence	Action
ISUP	IAM	Yes	Yes	Send to Service Module card
	Other	No	Yes	Send to sequencer
Other	N/A	No	No	Route Message



Each TIF Stop Action encapsulates the incoming MSU as SCCP data and forwards the new MSU to a Service Module card for processing. The expanded data portion of the MSU is marked with the TIF Stop Action number so that the appropriate Service Rule Set can be invoked on the Service Module card.

Each TIF Stop Action is associated with a different NPP Service Rule Set, so that different actions can be taken on identically formatted messages that encounter different Gateway Screening rules. This allows for customized handling based on the incoming linkset, OPC, DPC, or other GWS criteria.

Each Stop Action is assigned to the corresponding NPP Service: TIF > TIF, TIF2 > TIF2, TIF3 > TIF3.

Although TIF will not impose any size limitations on the incoming MSU size, the FWDSCS Service Action Handler for the TIF SCS Forwarding feature does have some encapsulation limits imposed by DTA processing of the message. Refer to the *Database Administration Manual - Features* for information about DTA, and see [TIF SCS Forwarding Feature](#) on page 43 for a description of the FWDSCS Service Action Handler processing.

### Service Module Card Processing

As shown in [Figure 3: SCRC Processing of TIF Messages](#) on page 17, SCRC provides a common entry point on Service Module cards to process SCCP messages. In LIM handling, TIF Stop Actions forward only ISUP IAM messages to Service Module cards. Because the messages from TIF are actually ISUP messages encapsulated within an SCCP header, the messages are sent to a TIF handler instead of normal SCRC processing (normally GTT or Local Subsystem handling).

[Figure 3: SCRC Processing of TIF Messages](#) on page 17 shows the basic SCRC processing for ISUP messages from TIF.

### Figure 3: SCRC Processing of TIF Messages

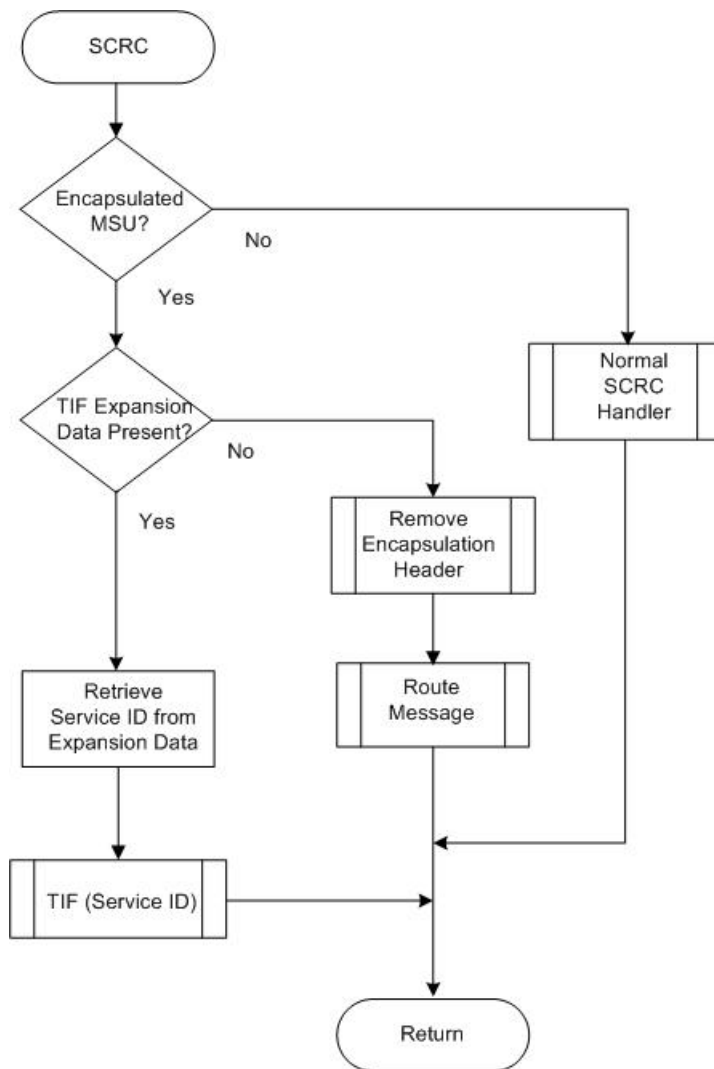
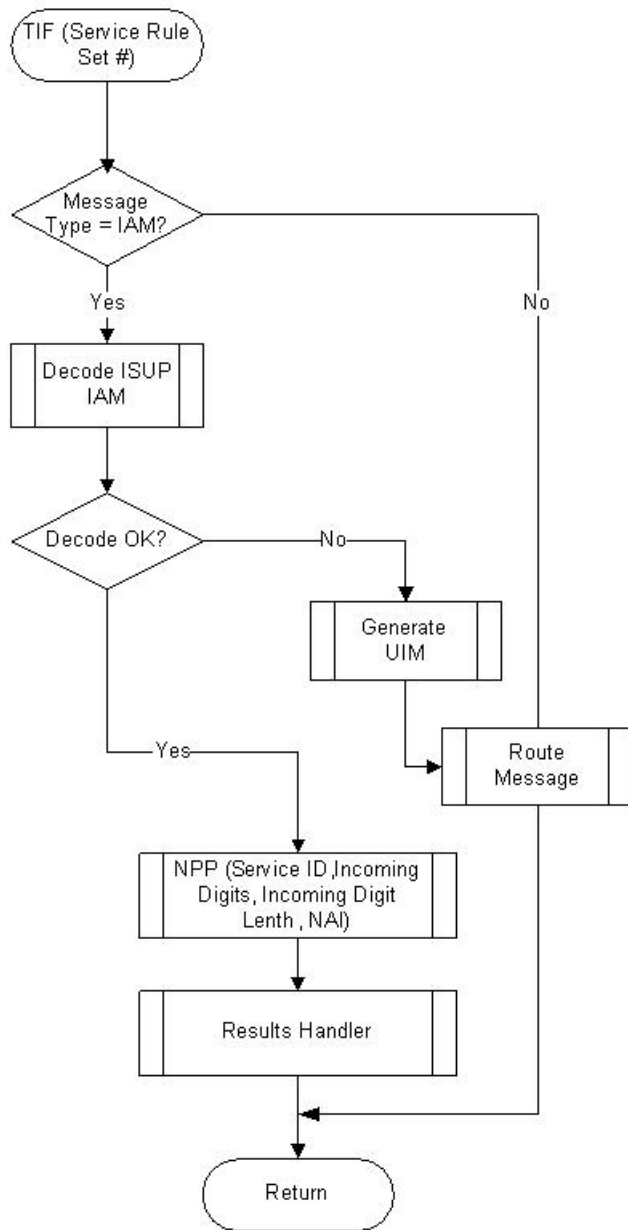


Figure 4: TIF Service Module Processing Main Flow on page 18 shows the overall TIF flow for Service Module processing. NPP provides the majority of the message processing, and is responsible for calling all Service Action Handlers, as shown in Figure 5: Basic NPP Processing on page 20.

Figure 4: TIF Service Module Processing Main Flow



### IAM Message Decoding

Fields in the incoming MSU identify the message as ISUP, IAM, and either ITU or ANSI. TIF decodes the following information in the incoming ITU ISUP IAM message:

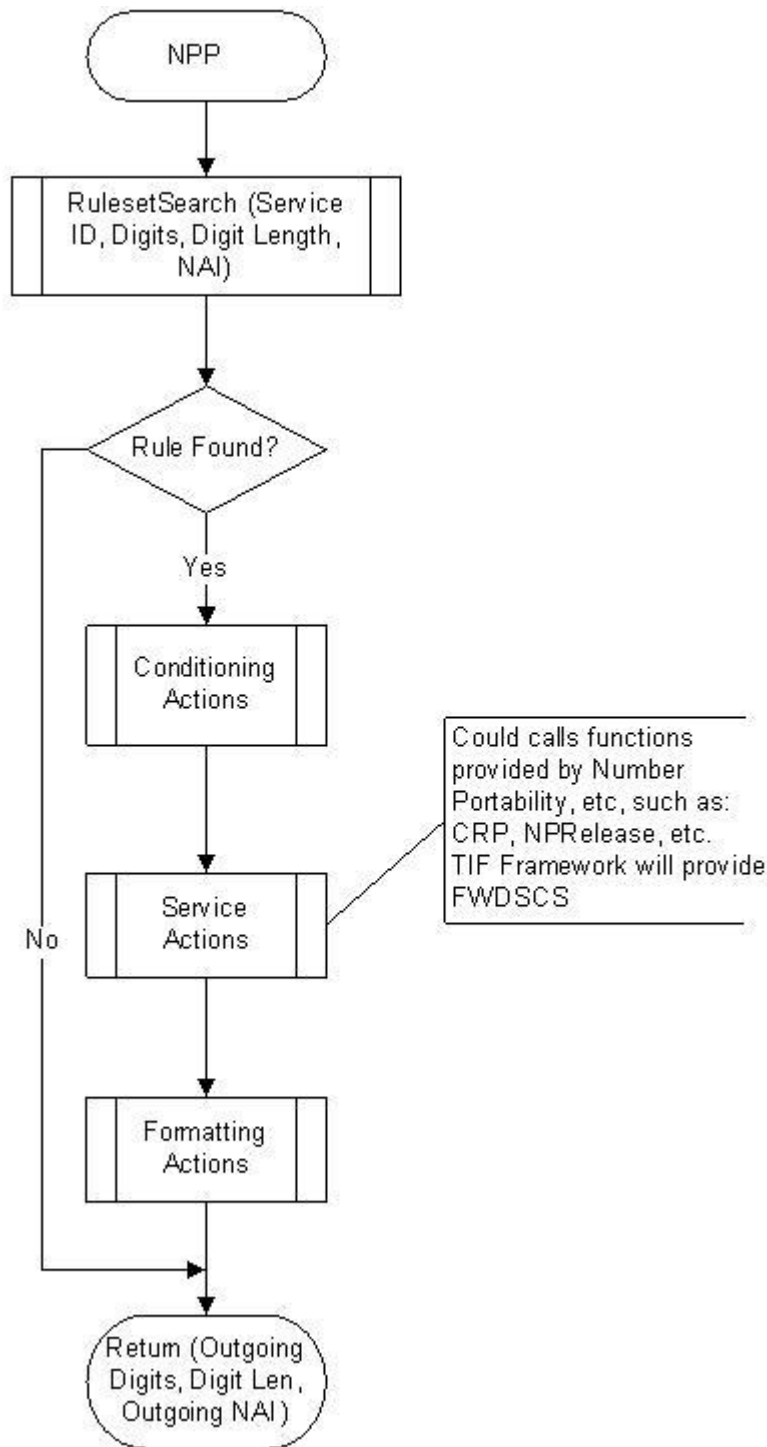
- Called Party digits and NAI values that are passed to NPP for processing
- Calling Party digits and NAI value
- Called Party and Calling Party information that is used for RTDB lookup
- NM Bits (from the Forward Call Indicator field) that indicate whether RTDB lookup has been performed. (see [Use of NM Bits](#) on page 38)
- Point codes and other information that are used in encoding the outgoing message.

### NPP Processing for TIF

TIF invokes NPP, and passes the TIF service name, Called Party digits and length, and the incoming NAI values to NPP. NPP conditions the Called Party digits for RTDB lookup, calls Service Action Handlers for service-specific processing, and formats the outgoing digit string.

Refer to the *Numbering Plan Processor (NPP) Overview* manual for additional information on NPP processing. [Figure 5: Basic NPP Processing](#) on page 20 shows the basic NPP processing flow.

### Figure 5: Basic NPP Processing



### TIF Post-NPP Processing

After NPP processing is complete, the TIF post-NPP Results Handler performs the following functions:

- Evaluates results from NPP Service Actions and Formatting Actions
- Determines whether to generate a Release (REL) message or to relay the IAM message.

If Relay is indicated, the Results Handler performs the following functions:

- Updates the Called Party digits, the Calling Party digits, or both, if needed. If ISUP IAM Called Party digits terminate with a Stop Digit (F), the Stop Digit is present to terminate those digits in the relayed IAM message. If the CONDCGPN option value is ADDCC, the provisioned STPOPTS Default Country Code (DEFCC) value is pre-pended to the Calling Party digits.
- Handles IAM/SAM splitting (see [IAM/SAM Splitting](#) on page 23)
- Routes one IAM message, or an IAM message and a SAM message.
- Invokes any indicated TIF feature-specific Results Handlers

If Release is indicated by a Service Action Handler, the Results Handle generates an ISUP Release message. The message includes the Cause Value specified in the TIF RCAUSENP configuration option value. The Redirection Number is included in the Release message if the TIF RNRQD configuration option value is YES. After the Release message is generated, the original IAM message is discarded and processing terminates.

- For a Release message on a successful lookup, the message includes the Cause Value specified in the TIF RCAUSENP configuration option value. The Redirection Number is included in the Release message if the TIF RNRQD configuration option value is YES.
- For a Release message on an unsuccessful lookup, the message includes the Cause Value specified in the TIF RCAUSENPFx configuration option value. The Redirection Number is not included in the Release message.

The flow of the TIF Results Handler is shown in [Figure 6: TIF Post-NPP Results Handler](#) on page 23.

The following examples illustrate post-NPP results handling:

#### **Corrective Dialing**

1. IAM Relay is indicated.
2. Calling Number has not changed; replacement of the CgPN is not required.
3. CdPN number has changed; the CdPN is replaced.
4. No IAM/SAM splitting is required.
5. The FWDSCS Formatting Action is not indicated; DTA is not invoked.
6. The IAM message is routed.

#### **NP Relay**

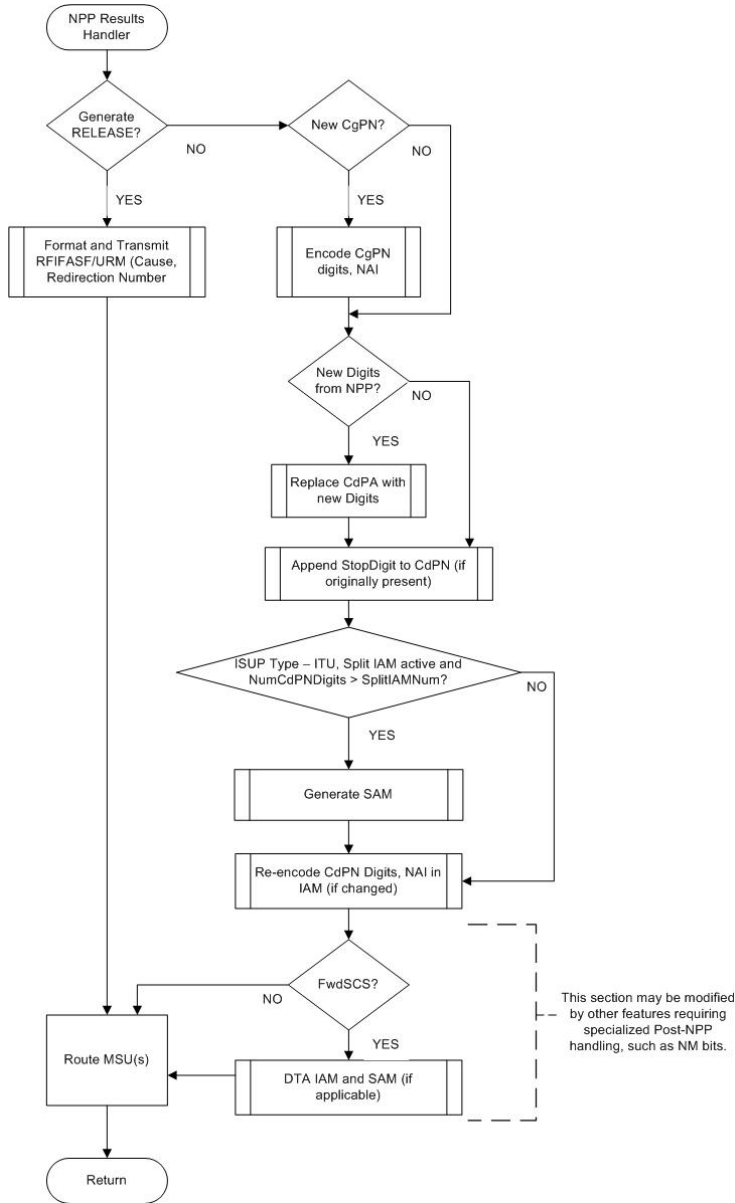
1. IAM Relay is indicated.
2. Calling Number has changed; replacement of the CgPN is performed.
3. CdPN number has changed; the CdPN is replaced.
4. The FWDSCS Formatting Action is not indicated; DTA is not invoked.
5. The NP-specific result handler is invoked for IAM Relay to update the NM bits in the ISUP IAM message.
6. The IAM is routed.

#### **NP Circular Routing**

1. Release is indicated.
2. No Redirection Number is encoded in the release message.

3. The release cause is set to a provisioned value.
4. The message is routed.

Figure 6: TIF Post-NPP Results Handler



## IAM/SAM Splitting

When the CdPN parameter in the ISUP message grows too long after TIF services have added Routing Numbers (RNs) or other prefixes or delimiters, the ISUP message needs to be split. TIF

provides the SPLITIAM configuration option for determining when to split an internationally formatted ITU ISUP IAM message into one IAM message and one SAM message.

- When the number of Called Party digits is greater than the number of digits specified in the SPLITIAM option value (15-31 digits), the IAM message is split.
- The IAM message is encoded with the number of leading Called Party digits specified in the SPLITIAM option value.
- The SAM message is encoded with the remaining Called Party digits, up to the number of digits specified in the SPLITIAM option value.
- Any Called Party digits that remain after the ISM and SAM encoding are discarded.
- The SAM message is encoded with the same OPC, DPC,SLS, and CIC that are in the IAM message.

When the SPLITIAM option value is NONE, IAM/SAM splitting is not enabled. Up to 32 Called Party digits are encoded in the IAM message and any remaining digits are discarded.

The SPLITIAM option is not applicable to ANSI ISUP messages; ANSI does not support SAM messages. Up to 32 Called Party digits are always encoded for ANSI ISUP messages.

## MSU Sequencing

During TIF Stop Action processing, all messages are marked for sequencing on the incoming LIM card.

Sequencing of MSUs delivered to a TIF Stop Action is provided by the existing Class 1 Sequencing capabilities.

If the message is sent to the Service Module card, then the message must be returned to the incoming LIM card before actual transmission.

On the Service Module card, there are several potential actions:

- An error occurs, and the Service Module card does not generate an MSU for transmission. In this unexpected case, but the LIM card times out and transmits all pending messages.
- The Service Module card relays the IAM message. Because the original sequence information is still present, sequencing will occur as expected.
- The Service Module card generates a response message, such as REL. The sequence information from the original MSU is transferred to the response message, and sequencing is still maintained.
- The Service Module card generates multiple messages, which can occur if the Called Party digits are increased and the IAM/SAM splitting action is invoked (see [IAM/SAM Splitting](#) on page 23). An IAM message and a SAM message will be generated. The SAM message must follow the IAM message. Both MSUs will be given the same sequence number and sent back to the original LIM card on the same path.

If the message does not require Service Module card processing, the message is sent directly to the sequencer on the card. The message will wait in the sequencer for any preceding messages to complete processing before it is transmitted.



## ISUP Decode and Encode Errors

The UIMs listed in [Table 18: TIF UIMs](#) on page 92 indicate TIF encode and decode errors.

The UIMs listed in [Table 19: Existing ISUP Decode Errors](#) on page 92 are used to handle ISUP decode and encode error cases.

Refer to the *Unsolicited Alarm and Information Messages* manual for information about EAGLE 5 ISS UIMs.

## MPS/EPAP Platform

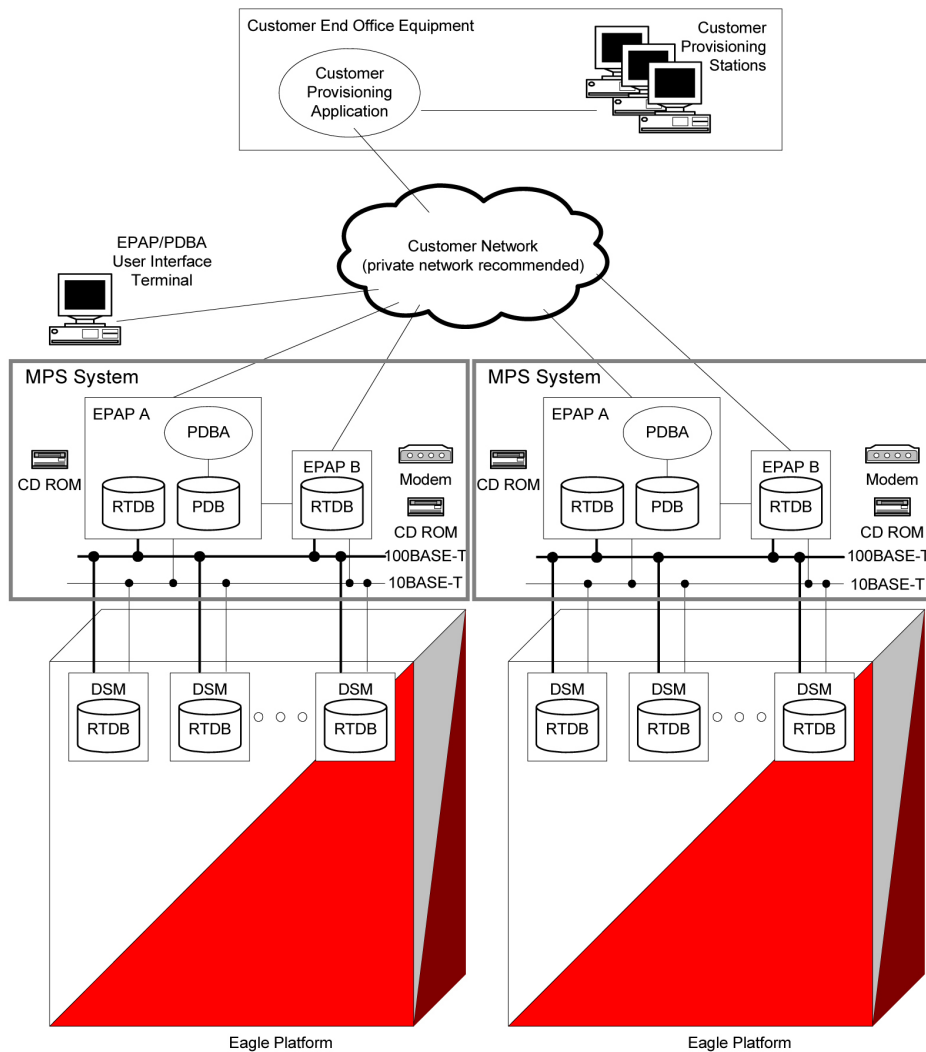
Tekelec provides the MPS (Multi-Purpose Server) platform as a subsystem of the EAGLE 5 ISS. The MPS provides support for EPAP-based features.

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 the *Tekelec 1000 Application Server Hardware Manual*.) The MPS provides the means of interfacing the customer provisioning application with the EAGLE 5 ISS. It connects the customer 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 it to the EAGLE 5 ISS Service Module cards (DSM cards and E5-SM4G cards). [Figure 7: MPS/EPAP Platform Architecture](#) on page 25 shows the overall system architecture, providing a graphic overview of MPS/EPAP platform from customer provisioning through the MPS subsystem to the EAGLE 5 ISS DSM databases on Service Module cards.

**Note:** The EAGLE 5 ISS supports more than one type of hardware card that provides the DSM function. The term Service Module card is used to mean any hardware card that supports the DSM function. If a Service Module card or an E5-SM4G card is specifically required, the required card is indicated. For more information about the hardware cards that support the DSM function, refer to the *Hardware Manual - EAGLE 5 ISS*.

**Figure 7: MPS/EPAP Platform Architecture**



**Design Overview and System Layout**

*Figure 7: MPS/EPAP Platform Architecture* on page 25 illustrates the overall system architecture and identifies the different tasks, databases and interfaces involved. The system consists of two mated MPS servers. Each MPS contains two EPAP platforms, EPAP A and EPAP B, each containing a Realtime Database (RTDB), a Provisioning Database (PDB), servers, optical media, modems, and network hubs. Each MPS and its EPAPs may be thought of as an ‘EPAP system’; the EPAP system and the mated EAGLE 5 ISS is referred to as the ‘mated EPAP system’. Each EPAP system is a T1000 AS system with a total of four Ethernet interfaces: one from each EPAP to the 100Base-T Ethernet and one from each EPAP to the 10Base-T Ethernet.

On the EAGLE 5 ISS platform side, a set of Service Module cards, which hold the RTDB database, 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 a 10BASE-T Ethernet bus.

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 as the standby

link. At any given time, there is only one active EPAP and one active link. The database is provisioned through the active link by the active EPAP; the other EPAP provides redundancy.

In case of failure of the active EPAP, the standby EPAP takes over the role of active EPAP and continues to provision the subscriber database. In the case where 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.

Major modules on the EPAP are the

- DSM provisioning module
- Maintenance module
- RTDB module
- PDB module

The DSM 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 Realtime Database (RTDB), which is the “golden copy” of the subscriber database. The PDB module can run on one of the EPAPs of either of the mated EAGLE 5 ISSs.

### Functional Overview

The main function of the MPS/EPAP platform is to provision the 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.

It is possible for the current copy of the RTDB on the Service Module cards to get out-of-sync due to missed provisioning or card rebooting. Therefore, the RTDB on the EPAP contains a coherent, current copy of the subscriber database. The EPAP-DSM provisioning task sends database information out on the provisioning link. The Service Module cards act as the receivers and are re-provisioned.

### 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 EPAP-based features. It performs the following two basic functions in support of EPAP-based features:

- Accept and store 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 maintains an exact copy of the Realtime Database (RTDB) required by the EAGLE 5 ISS Service Module cards, provisions the EAGLE 5 ISS Service Module cards, and maintains redundant copies of both databases on mated EPAP hardware. 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. 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 across a private network to the Service Module cards located in the EAGLE 5 ISS frame by the EPAPs.

The primary interface to the PDBA consists of machine-to-machine messages. The interface is defined by Tekelec and is available in the *Provisioning Database Interface Manual*. Use that manual to update or create provisioning software compatible with the EPAP socket interface.

A direct user interface is provided on each EPAP to allow 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 high provisioning rates that EPAP-based features require. Implementing the persistent database and provisioning as an open systems platform, compared to the traditional OAM 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 RTDB in order to provision the EAGLE 5 ISS Service Module cards. The EPAP server must comply with the hardware requirements in the *T1000 Application Server Hardware Manual*. [MPS/EPAP Platform](#) on page 25 illustrates the EPAP architecture contained in the MPS subsystem.

Each EPAP has a dedicated CD-ROM drive. One EPAP per EAGLE 5 ISS platform has a modem capable of supporting remote diagnostics, remote configuration, and remote maintenance; these remote operations are performed through EPAP login sessions. These sessions are accessible across the customer network as well as through an RS232 direct terminal connection to the EPAP. Refer to the *T1000 Application Server Hardware Manual* for details about the hardware devices and network connections.

# Chapter 3

## TIF Features

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### Topics:

- [TIF Number Portability Feature Page 30](#)
- [TIF SCS Forwarding Feature Page 43](#)
- [TIF Simple Number Substitution Feature Page 44](#)
- [TIF Additional Subscriber Data Feature Page 46](#)
- [TIF Generic Routing Number Feature Page 48](#)

This chapter describes the EAGLE 5 ISS features that use the Triggerless ISUP Framework (TIF) and the Numbering Plan Processor (NPP) to process ISUP messages:

- TIF Number Portability (TIF NP)
- TIF SCS Forwarding (TIF SCS)
- TIF Simple Number Substitution (TIF SNS)
- TIF Additional Subscriber Data (TIF ASD)
- TIF Generic Routing Number (TIF GRN)

## TIF Number Portability Feature

The TIF Number Portability (TIF NP) feature, along with the Numbering Plan Processor (NPP) and the Triggerless ISUP Framework (TIF), provide the following capabilities:

- Complex prefix usage, where prefixes can be used to customize actions
- Non-NAI-compliant digit handling
- Complex outgoing digit formats
- Calling number portability
- Concurrent Release and Relay support
- Circular route prevention (CRP)
- IAM/SAM splitting

The TIF NP feature is built upon the services provided by TIF and NPP to support ISUP messages.

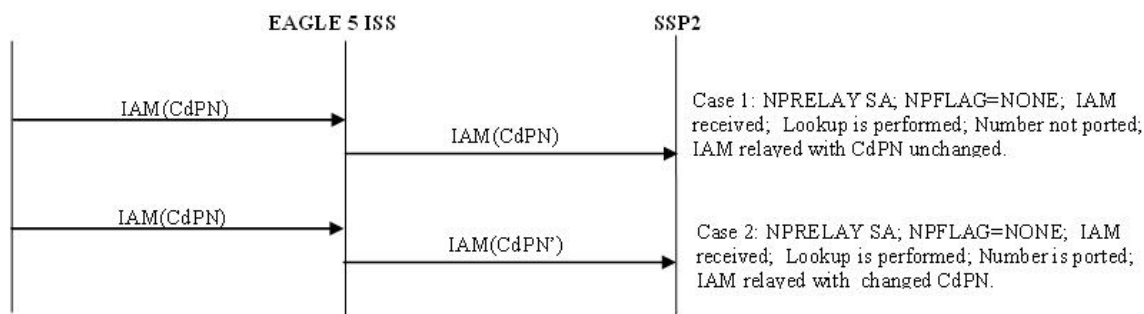
TIF NP provides the following functions:

- Definition of feature-specific pre-NPP processing to be performed by TIF
- Service Action specification (including Service Action names and precedence)
- Service Action Handlers
- Feature-specific post-NPP processing, if needed

## TIF NP Message Flows

*Figure 8: ISUP Message Flows for TIF NP CdPN Relay* on page 30 shows basic TIF NP CdPN Relay use cases.

**Figure 8: ISUP Message Flows for TIF NP CdPN Relay**



*Figure 9: ISUP Message Flows for TIF NP CdPN Relay, with Optional NM Bits* on page 30 shows TIF NP Relay cases where NM bits are used in the ISUP IAM message. In the sequence diagrams, the NM bits are shown as binary values. Refer to *Use of NM Bits* on page 38 for details on the use of NM bits.

**Note:** Use of NM bits in the IAM message is an optional part of TIF NP.

**Figure 9: ISUP Message Flows for TIF NP CdPN Relay, with Optional NM Bits**

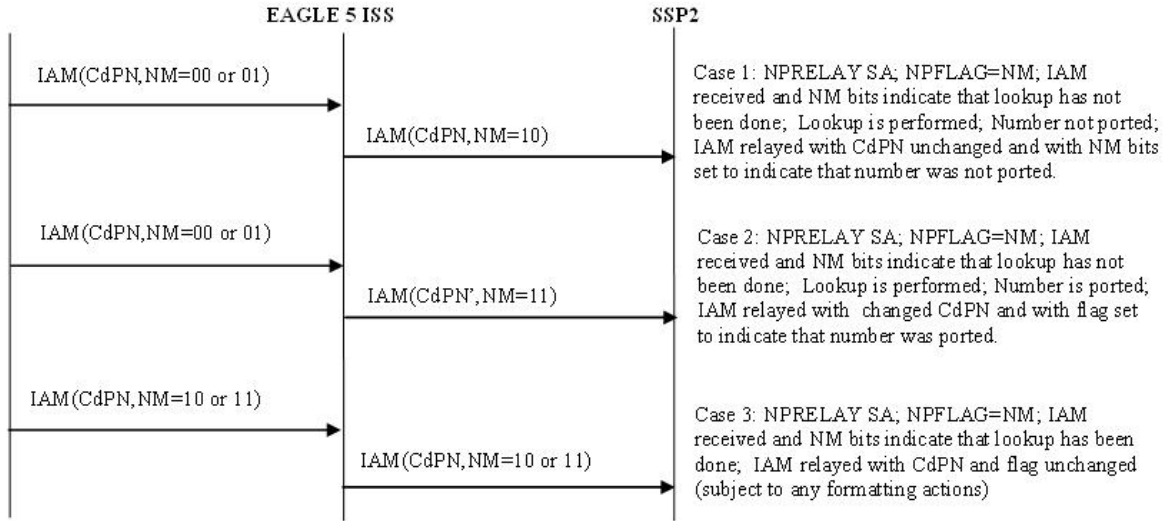


Figure 10: ISUP Message Flows for TIF NP CgPN Portability on page 31 shows basic TIF NP CgPN portability use cases.

Figure 10: ISUP Message Flows for TIF NP CgPN Portability

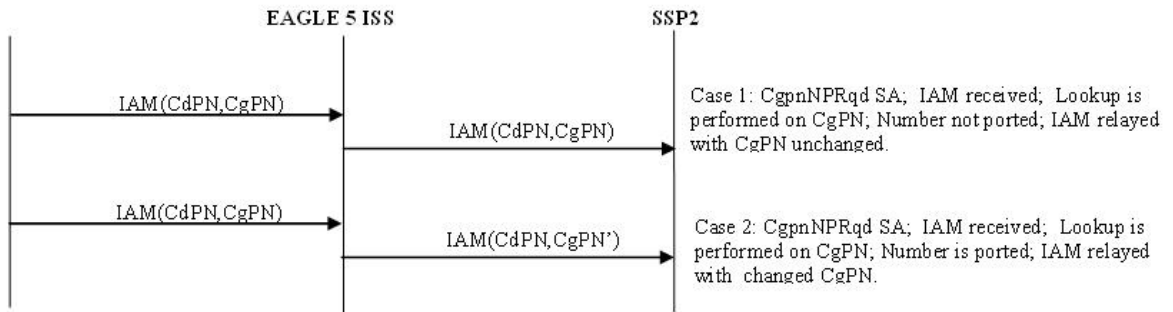


Figure 11: ISUP Message Flows for TIF NP Release on page 31 shows basic TIF NP Release use cases.

Figure 11: ISUP Message Flows for TIF NP Release

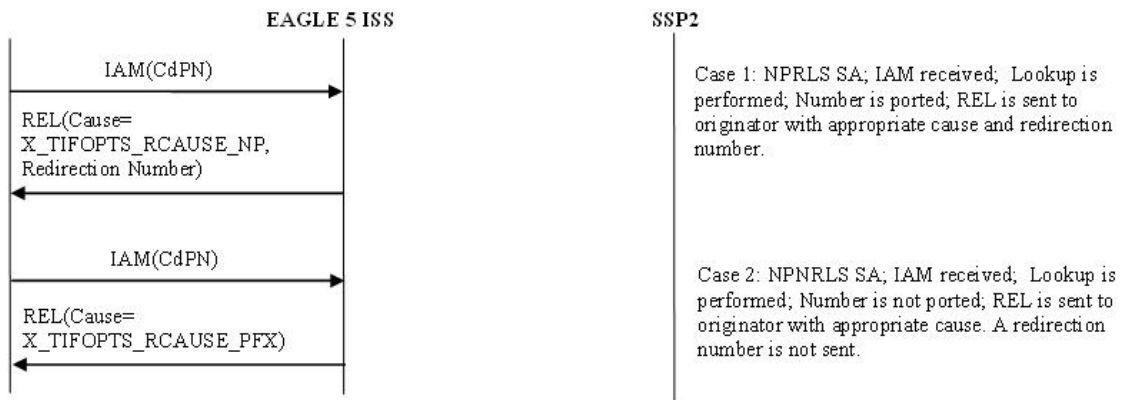


Figure 12: ISUP Message Flows for TIF NP Release, with Optional NM bits on page 32 shows TIF NP Release use cases, with use of NM bits.

Figure 12: ISUP Message Flows for TIF NP Release, with Optional NM bits

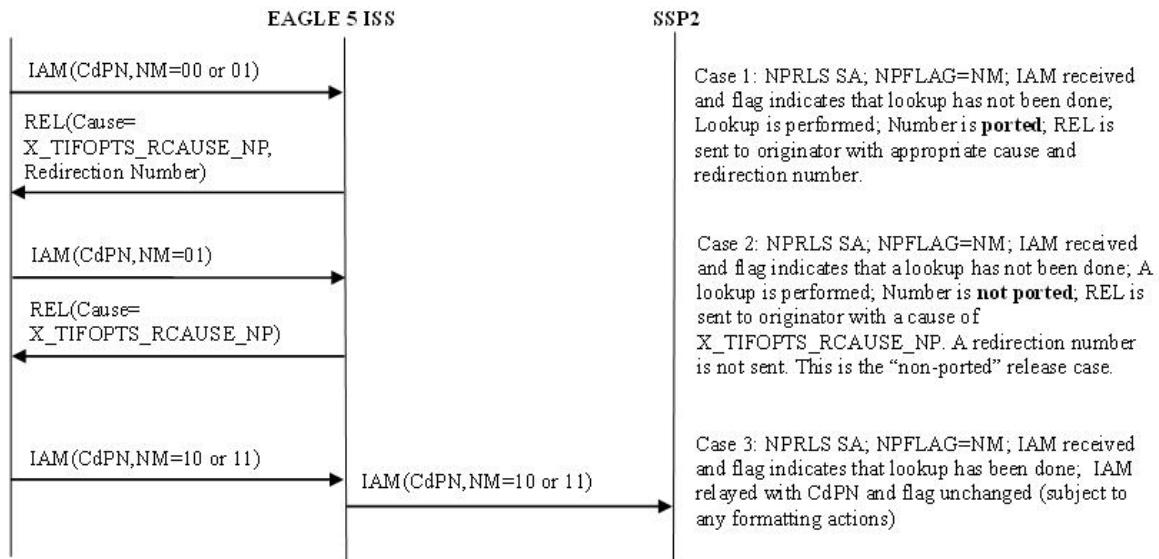
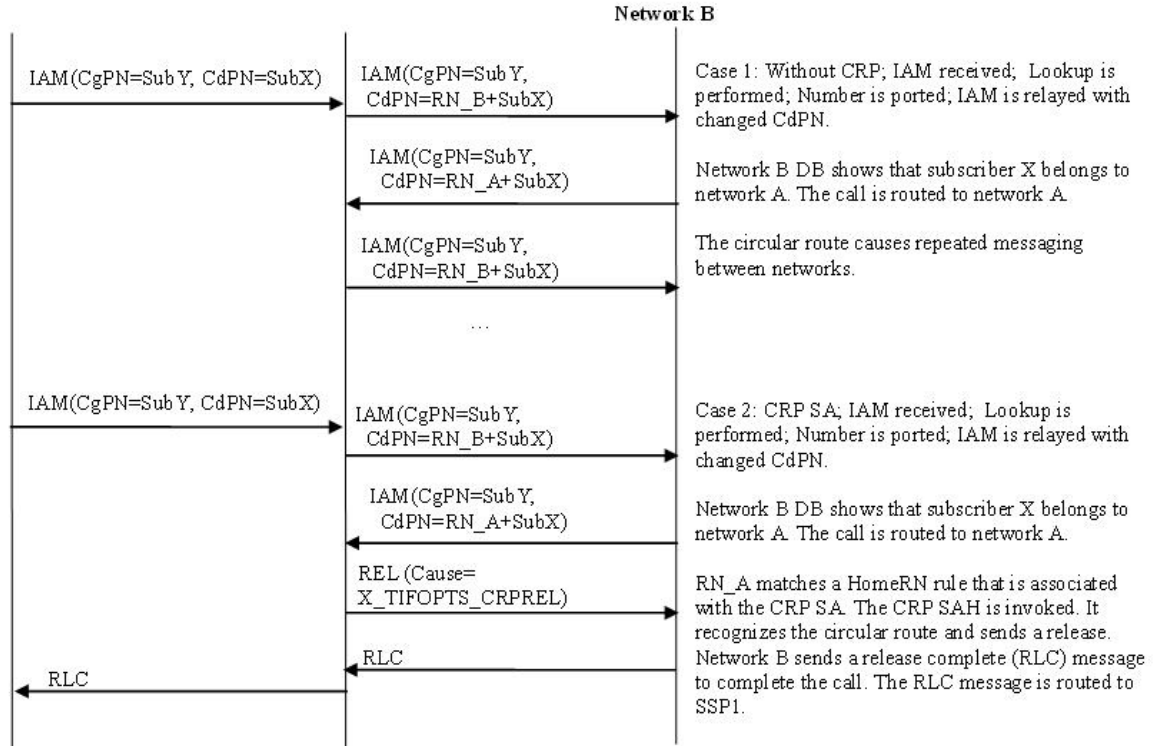


Figure 13: ISUP Message Flows for TIF CRP on page 32 shows Circular Route Prevention use cases. In these cases, subscriber X is ported from network A to network B. Network A's NP database has the correct entry indicating that subscriber X is ported, but network B has incorrect routing information, indicating that subscriber B still belongs to network A. Subscriber Y belongs to network A. In the use case, subscriber Y calls subscriber X.

Figure 13: ISUP Message Flows for TIF CRP





### TIF NP Configuration Options

Table 15: TIF Configuration Options on page 55 indicates the TIF configuration options that can be used specifically by TIF NP. TIF NP can also use other options that are available to any TIF feature.

### TIF NP Protocol Handling

TIF NP protocol handling provides the following functions:

- TIF NP-specific pre-NPP processing
- TIF NP Service Action Handlers
- Post NPP-processing

### TIF Pre-NPP Processing for TIF NP

TIF decodes the incoming MSU and passes the following information to NPP:

- Conditioned CgPN
- Number of Country Code digits in CgPN
- Incoming NM bits

## TIF NP Service Action Handlers

TIF NP provides Service Action Handlers for the NPP Service Actions that are specific to TIF NP. TIF and NPP perform the following functions for the TIF NP feature:

- RTDB lookup
- Interpretation of results from RTDB lookups
- NPP processing of Service Actions that are used for TIF NP

[Table 7: Summary of TIF NP Service Actions](#) on page 34 provides a summary of the Service Actions used for TIF NP.

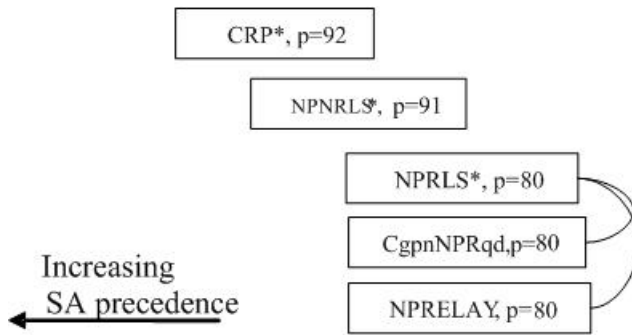
**Table 7: Summary of TIF NP Service Actions**

Service Action	Description	Function	Precedence
CRP	Circular Route Prevention	Performs an RTDB lookup on the CdPN and attempts to detect a circular route.	92
NPNRLS	Number Portability Release on No Match	Performs an RTDB lookup on the CdPN and indicates release behavior on an unsuccessful lookup.	91
NPRELAY	Number Portability Relay	Performs an RTDB lookup on the CdPN and indicates relay behavior.	80
NPRLS	Number Portability Release on Match	Performs an RTDB lookup on the CdPN and indicates release behavior on a successful lookup.	80
CgPNNPRqd	Calling Number Lookup	Performs an RTDB lookup on the CgPN.	80

## Relationships Between TIF NP Service Actions

[Figure 14: NP Service Action Precedence](#) on page 34 shows the relationships between NP Service Actions. The figure shows the precedence values (p) and shows which Service Actions are mutually exclusive in terms of Action Set configuration. In the diagram, Service Actions that are connected by lines are mutually exclusive. Service Actions that can be terminating actions are marked with asterisks.

**Figure 14: NP Service Action Precedence**



The mutual exclusion relationships can be explained as follows:

- NPDELAY and NPRLS – For the successful NP lookup case, must choose between Relay or Release
- CgpnNPRqd and NPRLS – CgpnNPRqd implies Relay behavior.

The precedence relationships can be explained as follows:

- CRP – CRP should be first since it is a special case and a terminating action.
- NPNRLS – NPNRLS is a special condition and a terminating action.
- NPRLS – Normal Release case; can be same precedence as normal Relay cases since they are mutually exclusive so can't appear in the same action set CgpnNPRqd.
- NPRELAY – normal relay case

The following principles apply to precedence relationships:

- Special NP Release cases are given higher precedence.
- Handlers that need to override conditions set by other handlers must be given lower precedence

The mutual exclusion relationships are enforced during EAGLE 5 ISS configuration for TIF NP.

### RTDB Lookup

A single invocation of NPP can result in multiple invocations of various Service Action Handlers associated with TIF NP and other TIF features. Because nearly all TIF Service Action Handlers perform RTDB lookups, TIF provides a common mechanism to ensure that only a single CdPN or CgPN lookup is done and that the resulting data are shared by all Service Action Handlers.

The CdPN lookup is performed on the conditioned CdPN digit string. The conditioned string is typically in International format.

The CgPN lookup is performed on the conditioned CgPN. The conditioned CgPN is typically in International format.

### Interpreting Results of an RTDB Lookup

*Table 8: Portability Types Relevant to NP Lookups* on page 36 lists portability types that are relevant to NP lookups.

**Table 8: Portability Types Relevant to NP Lookups**

Value	Description
0	Not known to be ported (available for backward compatibility; 36 should be used instead of 0)
1	Out-of-network; my subscriber ported out
2	Out-of-network; foreign subscriber ported in, then ported out
5	In-network; number migrated from IS41 to GSM
36	Not known to be ported
0Xff	No status; Indicates "none" in the database

[Table 9: Possible Lookup Results](#) on page 36 summarizes the meanings of the normal lookup return codes:

**Table 9: Possible Lookup Results**

Return Code	Meaning
ENTITY FOUND	The DN was found and at least one of the specified entities is present.
ENTITY NOT FOUND	The DN was found, but none of the specified entities are present
DN NOT FOUND	The DN was not found.

The following general rules determine portability status:

- A subscriber is considered in-network if the entity type is SP
- A subscriber is considered ported out if the entity type is RN. One exception to this rule is the case of subscribers migrated from GSM to IS41. These subscribers are considered in-network even though the entity type is RN.

The RN, SP, VMSID, and GRN (Generic Routing Number) entity types are supported.

In certain networks, a network an entity type other than RN and SP can affect portability status. For example, an entity type of GRN could imply ported number. This can be indicated by setting the NPTYPE or NPTYPECGPN configuration option to ANY or ALL.

In a CdPN or CgPN lookup, the individual DN table is searched first. If a successful match is not found in the individual DN table, then the DN range table is searched. [Table 10: RTDB Success Criteria for NPTYPE](#) on page 37 shows the overall match result based on NPTYPE and data from the RTDB.

**Note:** RNSP and RNSPDN are identical, because DN is not a supported network entity at this time.

**Note:** The IGM feature on, NE=RN, and PT=0 is considered entity type SP for individual or range status.

Table 10: RTDB Success Criteria for NPTYPE

NPTYPE	Individual Status	Range Status	Result
SP	Found, NE=SP	N/A	Individual.SP
SP	Found, NE≠SP	Found, NE=SP	Range.SP
SP	Found, NE≠SP	Found, NE≠SP	None
SP	Found, NE≠SP	Not found	None
SP	Not found	Found, NE=SP	Range.SP
SP	Not found	Found, NE≠SP	None
SP	Not found	Not found	None
RN	Found, NE=RN	N/A	Individual.RN
RN	Found, NE≠RN	Found, NE=RN	Range.RN
RN	Found, NE≠RN	Found, NE≠RN	None
RN	Found, NE≠RN	Not found	None
RN	Not found	Found, NE=RN	Range.RN
RN	Not found	Found, NE≠RN	None
RN	Not found	Not found	None
RNSP / RNSPDN	Found, NE=SP	N/A	Individual.SP
RNSP / RNSPDN	Found, NE=RN	N/A	Individual.RN
RNSP / RNSPDN	Found, NE≠RN or SP	Found, NE=SP	Range.SP
RNSP / RNSPDN	Found, NE≠RN or SP	Found, NE=RN	Range.RN
RNSP / RNSPDN	Found, NE≠RN or SP	Found, NE≠RN or SP	None
RNSP / RNSPDN	Found, NE≠RN or SP	Not found	None
RNSP / RNSPDN	Not found	Found, NE=SP	Range.SP
RNSP / RNSPDN	Not found	Found, NE=RN	Range.RN
RNSP / RNSPDN	Not found	Found, NE≠RN or SP	None
RNSP / RNSPDN	Not found	Not found	None
Any/All	Found, NE=SP	N/A	Individual.SP
Any/All	Found, NE=RN	N/A	Individual.RN
Any/All	Found, NE≠ RN/SP	Found, NE=SP	Range.SP

NPTYPE	Individual Status	Range Status	Result
Any/All	Found, NE≠ RN/SP	Found, NE=RN	Range.RN
Any/All	Found, NE≠ RN/SP	Found, NE≠ RN/SP	None
Any/All	Found, NE≠ RN/SP	Not found	None
Any/All	Not found	Found, NE=SP	Range.SP
Any/All	Not found	Found, NE=RN	Range.RN
Any/All	Not found	Found, NE≠ RN/SP	None
Any	Not found	Not found	None
All	Not found	Not found	None

### Use of NM Bits

Use of NM bits is optional and is controlled by the TIF NPFLAG configuration option.

TIF determines the value of the NM Bits in the incoming message. All CdPN-based Service Action Handlers (NPRELAY, NPRLS, NPNRLS and CRP) inspect the incoming NM bits value.

**Note:** The NPFLAG configuration option and the NM bits apply only to CdPN, not to CgPN. Therefore, the CgPNNPRqd Service Action Handler does not look at the NM bits. The NM bits apply only for ITU ISUP messages when NPFLAG=NM.

**Table 11: NM Bits Values**

NM Bits Value	Meaning
00	DPC is out-of-network, or no RTDB lookup performed
01	DPC is in-network, RTDB lookup was not performed
10	DPC is in-network, unsuccessful RTDB lookup
11	DPC is in-network, successful RTDB lookup

If the NPFLAG configuration option is set to NM and the incoming NM bit value is 10 or 11, then the Service Action Handlers return immediately.

If the NPFLAG configuration option is set to NM and the incoming NM bit value is 00, the NP-specific post-NPP processing Result Handler searches for the Destination Point Code in the Common Screening List (CSL) table. TIF uses the lookup result to determine if the NM bits need to be updated in the outgoing IAM message.

- If the Destination Point Code is found in the CSL table, then the outgoing message NM bits are set to 00 ("without indication").
- If the Destination Point Code is not found in the CSL table, and the incoming NM bits are not equal to the outgoing NM bits, then the NM bits are set to 10 ("not ported") or 11 ("ported") in the outgoing IAM message.

If the NPFLAG configuration option is set to NM and the incoming NM bits are set to 01 ("query not performed"), the NPRLS Service Action Handler generates a Release message if the DN is not found in the RTDB. The REL message contains the Release Cause (the value of the TIF RCAUSENP option) and does not contain a Redirection Number.

### RN, SP, and DFLTRN Handling

The RN and SP values are set depending on the entity type retrieved from the RTDB and the values of the NPTYPE and DFLTRN configuration options. The NPTYPE option is used as part of the matching criteria to determine when the RTDB search is considered a success.

If a match is found and the Entity Type is RN, then RN digits are inserted into the outbound field.

If a match is found and the Entity Type is SP, then SP digits are inserted into the outbound field or the DFLTRN option digit string can be used instead of actual SP digits.

The DFLTRN configuration option allows a single digit string to be inserted instead of the actual SP digits to identify 'in-network subscribers'. There may be different SPs in the RTDB for use by G-Port or other EAGLE 5 ISS features, but a single digit string is needed for TIF. The DFLTRN string is considered 'routing digits'. When a DFLTRN string is provisioned, the RN Formatting Action is used to encode: 'routing digits' (RN or DFLTRN) in the outbound digits.

The RN Formatting Action inserts the 'routing digits' into the outbound digits (either be the actual RN or the DFLTRN string).

The SP Formatting Action inserts the SP digits into the outbound digits.

**Note:** If the IGM Feature is turned on, Entity Type is RN, and portability type (PT) is zero, then the Entity Type is treated as SP (in-network subscriber).

[Table 12: Rules for Determining Outbound RN and SP](#) on page 39 summarizes the rules for determining the outbound RN and SP.

**Table 12: Rules for Determining Outbound RN and SP**

Case	NPTYPE	RTDB Entity Type	DFLTRN	RN	SP
1	RN, RNSP, RNSPDN, ANY, ALL	RN	N/A	Entity data digits from the RTDB	No data
2	SP	RN	N/A	No data	No data
3	RN	SP	N/A	No data	No data
4	SP, RNSP, RNSPDN, ANY, ALL	SP	Null	No data	Entity data digits from the RTDB
5	SP, RNSP, RNSPDN, ANY, ALL	SP	Not Null	DFLTRN	Entity data digits from the RTDB
6	SP, RN, RNSP, RNSPDN, ANY, ALL	Not RN, Not SP	N/A	No data	No data

## NPRELAY Service Action Handler

The NPRELAY Service Action Handler performs an RTDB lookup on the conditioned CdPN digit string and indicates Relay behavior.

The NPRELAY and NPRLS Service Actions are mutually exclusive in an Action Set.

### Configuration Options Used

The NPATYPE configuration option indicates the conditions that are used for a successful RTDB match.

The NPFLAG configuration option indicates that the NM bits should be processed.

The value of the DFLTRN option, if provisioned, is used to populate the RN on a successful match on SP.

### Action Performed

This Service Action Handler uses the incoming NM bits to determine if a lookup has already been performed.

If the NPFLAG option is set to NM and the NM bits indicate that a lookup has already been performed, then the Service Action Handler returns immediately.

If a lookup has not already been performed, the NPRELAY Service Action Handler performs an RTDB lookup on the CdPN digit string. RN and SP can be found as a successful match. RN and SP entities are processed as described in [RN, SP, and DFLTRN Handling](#) on page 39.

Interpretation of lookup results is described in [Interpreting Results of an RTDB Lookup](#) on page 35.

Depending on the Formatting Action configuration for the selected rule, the updated RN or SP can be used during CdPN formatting by NPP.

The NPP Formatting Action processing will be skipped on an unsuccessful lookup. One way to force formatting of the outgoing CdPN, even after an unsuccessful lookup, is to configure the CDIAL Service Action.

On a successful lookup, where DN and entity data was found, the CdPN message parameter is changed to the ported number and the message is relayed to the recipient network.

On a successful lookup, where DN was found but entity data was not found (NPATYPE=ALL), the CdPN is unchanged and the message is relayed to the original destination.

The decoded NM result is used to determine if the NM bits need to be set in the outgoing IAM message.

### Terminating Action?

This is not a terminating action.

## NPRLS Service Action Handler

The NPRLS Service Action Handler performs a lookup on the conditioned CdPN digit string and indicates Release behavior on a successful lookup.

The NPRELAY and NPRLS Service Actions are mutually exclusive in an Action Set.



### Configuration Options Used

The NPTYPE configuration option indicates the conditions used for a successful match.

The RNRQD configuration option indicates if a Redirection Number should be included in the Release message.

The RCAUSENP configuration option indicates the Release Cause to be included in the Release message.

The value of DFLTRN, if provisioned, is used to populate the RN on a successful match on SP.

The NPFLAG configuration option indicates if the NM bits should be processed, and if a Release message should be generated if a DN is-not-found.

### Action Performed

This Service Action Handler uses the incoming NM bits to determine whether a lookup has already been performed.

If the NPFLAG configuration option is set to NM and the NM bits indicate that a lookup has already been performed, then the Service Action Handler returns immediately.

If the NM bits indicate that a lookup has not already been performed, the Service Action Handler performs an RTDB lookup on the conditioned CdPN digit string. RN or SP can be found as successful match. The RN and SP values are processed as described in [RN, SP, and DFLTRN Handling](#) on page 39.

Interpretation of lookup results is described in [Interpreting Results of an RTDB Lookup](#) on page 35.

On a match, the RNRQD option indicates whether or not a Redirection Number is included in the Release message, and the RCAUSENP option indicates the Release Cause to be included in the Release message.

On a successful lookup, where DN and entity data was found, a Release message is sent. If the Redirection Number configuration option (RNRQD) is set to YES, then the ported number is included in the ISUP Release message.

On a successful lookup, where DN was found but entity data was not found (NPTYPE=ALL), a Release message is sent. If the Redirection Number configuration option (RNRQD) is set to YES, then the original CdPN is included in the ISUP Release message.

Depending on the Formatting Action configuration for the selected rule, the updated RN or SP can be used during CdPN formatting by NPP.

The Formatting Action processing will be skipped on an unsuccessful lookup. The original message is relayed using the original CdPN (unless NPFLAG=NM and a Release message is to be generated).

### Terminating Action?

This is a terminating action in either of the following two conditions:

- The NPFLAG is set to NM, lookup is not successful, and the NM bits indicate “query not performed” (binary value 01).
- The lookup is successful.

## NPNRLS Service Action Handler

The NPNRLS Service Action Handler performs a lookup on the conditioned CdPN digit string and indicates Release behavior on an unsuccessful lookup.

### Configuration Options Used

The NPTYPE configuration option indicates the conditions used for a successful match.

The NPFLAG configuration option indicates if the NM bits should be processed.

The RCAUSEPX configuration option indicates the Reason Cause Value to be included in a Release message.

### Action Performed

This Service Action Handler uses the incoming NM bit decode result to determine if a lookup has already been performed.

If the NPFLAG configuration option is set to NM and the NM bits indicate that a lookup has already been performed, then the Service Action Handler returns immediately.

If the NM bits indicate that a lookup has not already been performed, the RTDB lookup is performed and does not return a match.

In this no-match case, a Release message will be sent with a Reason Cause specified in the RCAUSEPFX option. The Redirection Number is not included in the Release message.

This Service Action Handler provides no inputs to Formatting Actions.

The post-NPP processing sends a Release message with a Reason Cause that is configured in the RCAUSEPFX option. The Redirection Number is not included in the Release message.

### Terminating Action?

In the no-match case, this is a terminating action.

## CgPNNPRqd Service Action Handler

The CgPNNPRqd Service Action Handler performs an RTDB lookup on the conditioned CgPN digit string.

The CgPNNPRqd and NPRLS Service Actions are mutually exclusive in an Action Set.

### Configuration Options Used

The NPTYPECGPN option indicates the conditions used for a successful match.

The IAMCGPN option value (DN, RN, RNDN) indicates the format of outgoing CgPN string. For the IAMCGPN configuration option, RN implies either RN or SP.

The value of the DFLTRN option, if set, is used to populate the RN on a successful match on SP.

### Action Performed

On a lookup where entity data was found, the CgPN is changed according to the IAMCGPN configuration option. TIF will use the updated CgPN string to set the CgPN in the outgoing message.

On a lookup where an entry was found, but entity data was not found (NPTYPE=ALL), the CgPN is unchanged. The outgoing CgPN string is empty.

The length of the provisioned STPOPTS Default Country Code (DEFCC) parameter value provides the number of Country Code (CC) digits that are at the front of the conditioned CgPN.

On a successful lookup, where the outgoing format includes the DN (IAMCGPN=DN or RNDN) and the Country Code (CC) was added to the conditioned CgPN, the CC will be removed from the conditioned CgPN before copying the DN to the outgoing CgPN digit sting.

For example,

- On entry to the Service Action Handler:

The conditioned CgPN is CCC1234567.

The number of CC digits is 3.

The IAMCGPN option values is RNDN.

- The lookup is successful.

The value of RN is AAA.

The resulting outgoing CgPN digit string is AAA1234567.

If a match is found and the Entity Type is RN, then RN digits are inserted into the outgoing field.

If a match is found and the Entity Type is SP, then SP digits are inserted into the outgoing field or the DFLTRN option digit string can be used instead of actual SP digits.

**Note:** If the IGM feature is turned on, Entity Type is RN, and PT=0, then the Entity Type is treated as SP (in-network subscriber).

#### Terminating Action?

This is not a terminating action.

### TIF Post-NPP Processing for TIF NP

TIF post-NPP processing performs all actions required for NP Release and most actions required for NP Relay. The only extra NP-specific logic in TIF post-NPP processing is a Result Handler that performs the following functions:

- If the NPFLAG option value is NM, perform a search for the Destination Point Code on the Common Screening List (CSL) table). If the DPC is found, then the NM bits will be set to 00 (meaning “without indication”).
- If the NPFLAG option is NM, and the Destination Point Code was not found in the CSL table, and if the incoming NM bits are not equal to the outgoing NM bits, then write the outgoing NM bits to the outgoing ISUP IAM message (see [NPRELAY Service Action Handler](#) on page 40 for details).

### TIF SCS Forwarding Feature

The TIF SCS Forwarding feature provides the ability to forward messages to the SCS for additional processing after TIF processing is complete.

The only modifications made to the message by TIF are:

- Re-encode a modified CdPN
- Forward message to SCS, using DTA

The TIF SCS Forwarding feature provides the Service Action Handler for the FWDSCS Service Action that is provided by TIF to NPP. Before an NPP Rule can be provisioned with the FWDSCS Service Action in the Action Set, the TIF SCS Forwarding feature must be enabled in the system.

The feature does not require EPAP and RTDB lookup, but can operate with EPAP or ELAP subsystems.

#### **FWDSCS Service Action Handler**

The FWDSCS Service Action indicates that any relayed IAM and SAM messages require processing by the Database Transport Access (DTA; also called Redirect), a feature that encapsulates an MSU in an SCCP header and forwards it to a destination (the DTA DPC, usually an SCS). Refer to the *Database Administration Manual - Features* for more information about DTA, including message size limits for encapsulation.

DTA might not be able to forward a message for the following reasons:

- The message is too large for DTA to process.
- The DTA DPC is prohibited or congested (through TFC, local link congestion is not considered).
- The DTA node is disabled.

If DTA encapsulation is requested but cannot be performed, the message is relayed without additional modification.

## **TIF Simple Number Substitution Feature**

The TIF Simple Number Substitution (TIF SNS) feature allows the Calling Party number in the ISUP IAM message to be substituted with a single Calling Party number that is provisioned in a TIF configuration option. The RTDB is not used in this case.

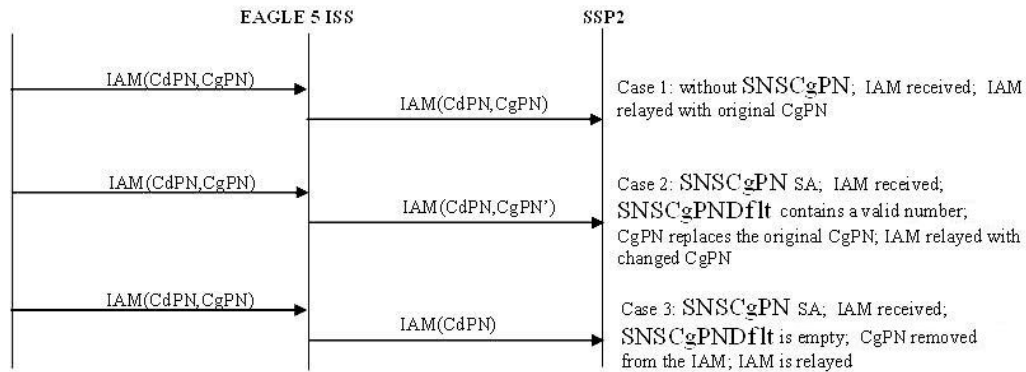
The TIF SNS feature uses services provided by the Triggerless ISUP Framework (TIF), and provides the following functions:

- Feature-specific pre-NPP processing
- Service Action specification (including Service Action names and precedence)
- Service Action Handlers
- Feature-specific post-NPP processing

### **TIF SNS Message Flows**

*Figure 15: ISUP Message Flows for TIF SNS* on page 44 shows TIF SNS use cases.

**Figure 15: ISUP Message Flows for TIF SNS**



### TIF SNS Configuration Option

The SNNSCgPNDefault configuration option is used by TIF SNS. The provisioned option value indicates the number to be used to replace the CgPN during simple number substitution. A value of **none** indicates that the CgPN will be removed from the outgoing message.

The TIF SNS feature can use other TIF configuration options that are available to any TIF feature. See [TIF Configuration Options](#) on page 13.

### TIF SNS Protocol Handling

TIF SNS protocol handling consists of the following functions:

- SNS-specific pre-NPP Processing
  - TIF sends the conditioned CgPN to NPP.
- SNNSCgPN Service Action Handler
- SNS-specific post NPP-Processing

### TIF SNS Service Action Handler

The SNNSCgPN Service Action Handler indicates how to update the outgoing CgPN based on the value of the SNNSCgPNDefault configuration option.

#### Configuration Options Used

The SNNSCgPNDefault option indicates the number used to replace the CgPN, or a value of NONE if the CgPN should be removed.

#### Actions Performed

If the SNNSCgPNDefault option value is the number used to replace the CgPN, the SNNSCgPN Service Action Handler indicates that the CgPN is to be replaced.

If the SNNSCgPNDefault option value is NONE, then the SNNSCgPN Service Action Handler indicates that the CgPN should be removed from the message.

This Service Action Handler provides no input to NPP Formatting Actions.

**Note:** Formatting of the outgoing CgPN string is not based on the value of the IAMCGPN configuration option.

### **NPP Post-Processing**

TIF post-NPP processing performs all actions required for SNS-related updates to the outgoing message:

- If the value of the SNSCgPNDefault option is NONE, then TIF removes the CgPN.
- If the value of the SNSCgPNDefault option is not NONE, then TIF replaces the CgPN with the SNSCgPNDefault value in the outgoing message. The CgPN NAI is not changed.

## **TIF Additional Subscriber Data Feature**

The TIF Additional Subscriber Data (TIF ASD) feature allows for the insertion of Additional Subscriber Data (ASD) from the incoming CgPN and CdPN digit strings into the CdPN of an outgoing IAM or Redirection Number.

TIF ASD provides Service Action Handlers for the ASDLKUP and CgPNASDRqd Service Actions in NPP.

The NPP ASD Formatting Action is used to process the ASD that is retrieved by TIF ASD Service Actions.

### **Basic TIF ASD Use Case**

The incoming IAM message contains CdPN=1238882223333 and CgPN=1239995556666.

The following Filter and Action Set components are used for the example:

- Filter Prefix (FPFX) = 123
- Filter Digit Length (FDL) = 13
- Conditioning Actions = CC3 + AC3 + DN7
- Service Action = CgPNASDRqd
- Formatting Actions = CC + ASD + AC + DN

NPP extracts the following information from the incoming CdPN:

- Country Code (CC) = 123
- Area Code (AC) = 888
- Dialed Number (DN) = 223333

The CgPNASDRqd Service Action Handler performs an RTDB lookup for the DN in the CgPN. The CgPN entry is found and contains ASD = a5d.

NPP Formatting Action execution uses the extracted information and the ASD to construct the outgoing digit string as CC + ASD + AC + DN = 123a5d8882223333.

TIF uses the constructed CdPN digit string in the outgoing IAM message. The CgPN is not changed. The outgoing message is relayed.

### TIF ASD Message Flows

Figure 16: ISUP IAM Message Flows for TIF ASD on page 47 shows TIF ASD use cases.

Figure 16: ISUP IAM Message Flows for TIF ASD

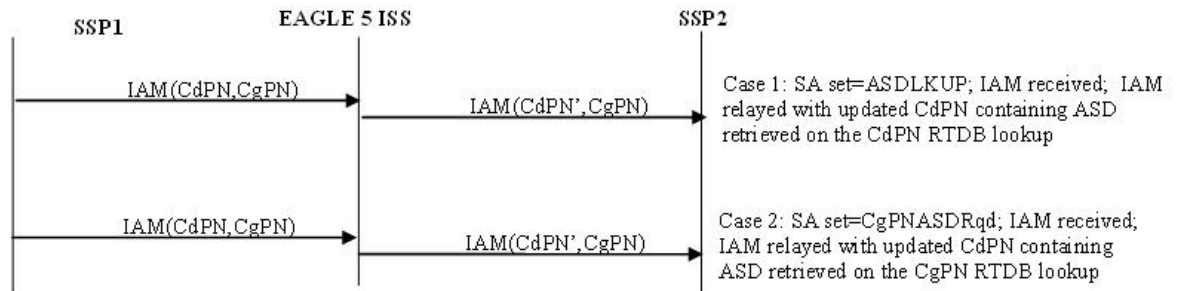
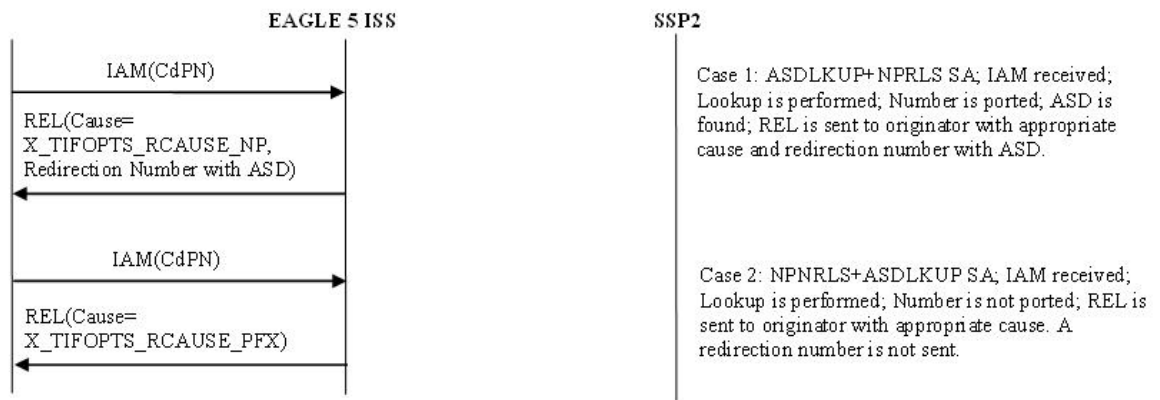


Figure 17: ISUP REL Message Flow for TIF ASD on page 47 shows TIF ASD use cases with the NPRLS and NPNRLS Service Actions.

Figure 17: ISUP REL Message Flow for TIF ASD



### TIF ASD Service Action Handlers

TIF ASD provides Service Action Handlers for the NPP Service Actions shown in :

Table 13: NPP Service Actions used by TIF ASD

Service Action	Description
ASDLKUP	Performs an individual or range RTDB lookup on the CdPN to find an entry containing an ASD digit string.
CgPNASDRqd	Performs an individual or range RTDB lookup on the CgPN to find an entry containing an ASD digit string.

The ASDLKUP Service Action or CgPNASDRqd Service Action can coexist in the same Service Action group with any other Service Actions used by TIF. The ASDLKUP Service Action and the CgPNASDRqd Service Action are mutually exclusive in the same Action Set.

#### **ASDLKUP Service Action Handler**

The ASDLKUP Service Action Handler uses the ASDLKUP Service Action to perform an individual or range RTDB lookup on the conditioned CdPN, to find an entry containing an ASD digit string.

Depending on the Formatting Action configuration for the selected NPP Rule, the ASD digit string can be used during CdPN formatting by NPP.

TIF uses the formatted CdPN in the outgoing IAM or REL message.

If the TIF ASD feature is turned off in the system, the ASDLKUP Service Action Handler returns immediately.

#### **CgPNASDRqd Service Action Handler**

The CgPNASDRqd Service Action Handler uses the CgPNASDRqd Service Action to perform an individual or range RTDB lookup on the conditioned CgPN, to find an entry containing an ASD digit string.

Depending on the Formatting Action configuration for the selected NPP Rule, the ASD digit string can be used during CdPN formatting by NPP.

TIF uses the formatted CdPN in the outgoing IAM or REL message.

If the TIF ASD feature is turned off in the system, the CgPNASDRqd Service Action Handler returns immediately.

## **TIF Generic Routing Number Feature**

The TIF Generic Routing Number (TIF GRN) feature allows for the insertion of a Generic Routing Number (GRN) digit string into the CdPN of an outgoing IAM or Redirection Number

TIF GRN provides Service Action Handlers for the GRNLKUP and CgPNGRNRqd Service Actions in NPP.

The NPP GRN Formatting Action is used to process the GRN that is retrieved by TIF GRN Service Actions.

### **TIF GRN Message Flows**

*Figure 18: ISUP Message Flows for TIF GRN* on page 48 shows TIF GRN use cases.

**Figure 18: ISUP Message Flows for TIF GRN**



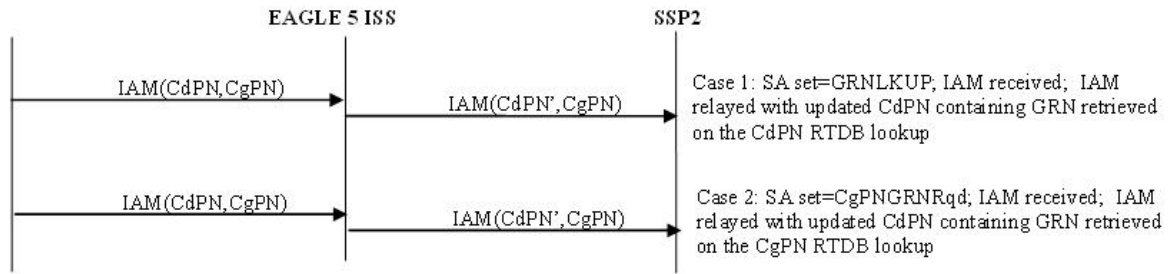
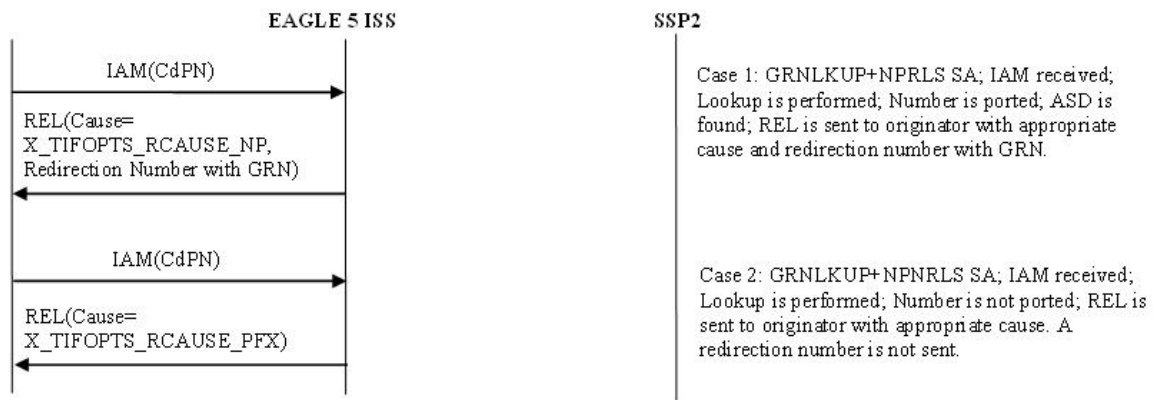


Figure 19: ISUP REL Message Flow for TIF GRN on page 49 shows TIF GRN use cases with NPRLS and NPNRLS.

Figure 19: ISUP REL Message Flow for TIF GRN



### TIF GRN Service Action Handlers

TIF GRN provides Service Action Handlers for the NPP Service Actions shown in :

Table 14: NPP Service Actions used by TIF GRN

Service Action	Description
GRNLKUP	Performs an individual or range RTDB lookup on the CdPN to find an entry containing a GRN digit string.
CgPNGRNRqd	Performs an individual or range RTDB lookup on the CgPN to find an entry containing a GRN digit string.

The GRNLKUP Service Action or CgPNGRNRqd Service Action can coexist in the same Service Action group with any other Service Actions used by TIF. The GRNLKUP Service Action and the CgPNGRNRqd Service Action are mutually exclusive in the same Action Set.

**GRNLKUP Service Action Handler**

The GRNLKUP Service Action Handler uses the GRNLKUP Service Action to perform an individual or range RTDB lookup on the conditioned CdPN, to find an entry containing a GRN digit string.

Depending on the Formatting Action configuration for the selected NPP Rule, the GRN digit string can be used during CdPN formatting by NPP.

TIF uses the formatted CdPN in the outgoing IAM or REL message.

If the TIF GRN feature is turned off in the system, the GRNLKUP Service Action Handler returns immediately.

**CgPNGRNRqd Service Action Handler**

The CgPNGRNRqd Service Action Handler uses the CgPNGRNRqd Service Action to perform an individual or range RTDB lookup on the conditioned CgPN, to find an entry containing an GRN digit string.

Depending on the Formatting Action configuration for the selected NPP Rule, the GRN digit string can be used during CdPN formatting by NPP.

TIF uses the formatted CdPN in the outgoing IAM or REL message.

If the TIF GRN feature is turned off in the system, the CgPNGRNRqd Service Action Handler returns immediately.

# Chapter

# 4

## EAGLE 5 ISS TIF Commands

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### Topics:

- [EAGLE 5 ISS Commands for TIF Features Page 52](#)
- [Maintenance Commands Page 58](#)
- [Debug Commands Page 65](#)

This chapter contains brief descriptions of the EAGLE 5 ISS commands that are used for the configuration, maintenance, debug, and test for the Triggerless ISUP Framework (TIF) and the features that use TIF.

## EAGLE 5 ISS Commands for TIF Features

This chapter describes the EAGLE 5 ISS commands that are used for the configuration and maintenance for the following features:

- TIF Number Portability
- TIF SCS Forwarding
- TIF Simple Number Substitution
- TIF Additional Subscriber Data
- TIF Generic Routing Number

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

- System Serial Number commands: `ent/rtrv-serial-num`
- Card commands: `ent/dlt/rtrv/alw/inh/init/rept-stat-card`
- Feature control commands: `enable/chg/rtrv-ctrl-feat`, `chg/rtrv-feat`
- Gateway Screening and linkset commands: `chg/rtrv-gws-actset`, `ent/chg/dlt/rtrv-scr-sio`, `ent/chg/dlt/rtrv-scrset`, `ent/chg/dlt/rtrv-ls`
- Common Screening List commands: `ent/chg/dlt/rtrv-csl`
- TIF Options commands: `chg/rtrv-tifopts`
- NPP commands: `ent/chg/dlt/rtrv-npp-as`, `ent/chg/dlt/rtrv-npp-srs`, `chg/rtrv-npp-serv`
- Retrieve, Report Status, and Maintenance commands: `chg-th-alm`, `ent-trace`, `init-network`, `init-sys`, `rept-stat-alm`, `rept-stat-db`, `rept-stat-mps`, `rept-stat-sccp`, `rept-stat-sys`, `rept-stat-trbl`
- TIF Test Tool commands: `chg/rtrv-isup-msg`, `tst-msg`

## EAGLE 5 ISS Card Commands

The `ent/dlt/rtrv/alw/inh-card` commands are used to add, remove, display information about, allow operation of, and stop operation of cards in the system.

The `ent-card` command is used to add cards to the database.

For Service Module cards (DSM cards and E5-SM4G cards) the command specifies the card location, the card type (**dsm**), and the application that runs on the card (**vsccp**).

TSM cards or DSM cards can be used for Gateway Screening.

- The command specifies the card location, the card type (**tsm**), and the application that runs on the card (**gls**)
- the command specifies the card location, the card type (**dsm**), and the application that runs on the card (**gls**)

The `dlt-card` command is used to remove provisioned cards from the database, before they are physically removed from the card location in the shelf. The TIF features use only Service Module cards running the **vsccp** application. Any TSM cards that are running the **sccp** application must be removed from the system before any TIF feature can be enabled

The `rtrv-card` command is used to display information about the cards that are provisioned in the database. When the command is entered with no parameters, all cards that are provisioned in the database are listed. The command can be entered with the `loc` parameter to display information about a specific card.

The `alw-card` command is used to cause a card to begin operation in the system. The card status is changed from Out-of-Service-Maintenance-Disabled (OOS-MT-DSBLD) to In-Service-Normal (IS-NR) if the GPL loading is successful. When the command is entered with the `loc` parameter, the approved version of the GPL is loaded on the specified card.

The `inh-card` command is used to cause a card to stop operation in the system. When the card status has changed from In-Service Normal (IS-NR) to Out-of-Service Maintenance-Disabled (OOS-MT-DSBLD), the card can be physically removed from the shelf. The `force` parameter must be used to inhibit the last card that is supporting an SCCP subsystem or MPS-to-DSM network connection.

The `rept-stat-card` command is used to report the operating status of all cards or of a specific card in the system.

## EAGLE 5 ISS Serial Number Commands

Before any controlled features can be enabled, the database must contain a valid and locked serial number for the EAGLE 5 ISS. The system is shipped with a serial number in the database, but the serial number is not locked. The serial number can be changed, if necessary, and locked after the system is on-site.

The `ent/rtrv-serial-num` commands are used to enter, lock, and display the status of the system serial number. The serial number must be entered once in the `ent-serial-num` command without the `lock` parameter, and entered again with the `lock=yes` parameter. The serial number cannot be changed after it is locked.

## EAGLE 5 ISS Feature Control Commands

The `chg/rtrv-feat` commands are used to turn on and display the on/off status of features, such as the GTT feature, that are controlled with feature bits. After a feature that is controlled with a feature bit is turned on, the feature cannot be turned off.

The `enable/chg/rtrv-ctrl-feat` commands are used to enable, turn on, and display the status of features that are controlled by feature access keys. The feature access key is based on the feature part number and the serial number of the system that uses the feature, making the feature access key site-specific. When a feature is enabled by entering the `enable-ctrl-feat` command with the feature part number and feature access key, the feature is recognized by the system. Other actions might be required to make the feature fully operational, such as turning the feature on, installing hardware, and provisioning information in database tables.

Some features can be enabled with a temporary part number and feature access key for a limited trial of the feature. When the trial period expires, the feature must be enabled with a permanent part number and feature access key to continue use of the feature.

The following feature controls are used for the TIF features:

- The GTT feature and the Gateway Screening feature (GWS) must be turned on, using the `chg-feat` command, before one or more TIF features can be enabled in the system.
- Each TIF feature must be enabled, using the `enable-ctrl-feat` command with its feature part number and a feature access key.

- TIF Number Portability - part number 893018901
  - TIF SCS Forwarding - part number 893022201
  - TIF Simple Number Substitution - part number 893024001
  - TIF Additional Subscriber Data - part number 893024501
  - TIF Generic Routing Number - part number 893025501
- After the feature is enabled, the feature must be turned on, using the `chg-ctrl-feat` command to set the feature status to on.
  - The following TIF features are Permanently On features. The features cannot be turned off after they are turned on.

Feature Name	Partnum	Status	Quantity
TIF Number Portability	893018901	on	----
TIF SCS Forwarding	893022201	on	----
TIF Simple Number Subst.	893024001	on	----

- The following TIF features are On/Off features. After the features have been enabled, they can be turned on and off using the `chg-ctrl-feat` command.

Feature Name	Partnum	Status	Quantity
TIF ASD	893024501	off	----
TIF GRN	893025501	off	----

- After each feature is enabled or turned off, the feature entry in the `rtrv-ctrl-feat` command output shows the Status as off. After the feature is turned on, the feature entry in the command output shows the Status as on.
- The TIF features cannot be enabled using a temporary part number and feature access key.

## EAGLE 5 ISS Gateway Screening and Linkset Commands

The `chg/rtrv-gws-actset`, `ent/chg/dlt/rtrv-scr-<xxx>`, and `ent/chg/dlt/rtrv-scrset` commands are used to define, change, and display the gateway screening stop action sets in the system database. Stop action sets are used to define the actions performed on the Message Sending Units (MSUs) that pass the gateway screening process.

TIF adds the TIF, TIF2, and TIF3 stop actions for gateway screening; each of these stop actions must be the last stop action in its Action Set. Each TIF stop action encapsulates incoming messages as SCCP data and forwards them to Service Module cards for processing. Each TIF stop action is association with a corresponding NPP service.

The `ent/chg/dlt/rtrv-ls` commands are used to turn on the gateway screening options (`gwsa`, `gwsn`, and `gwsd`) for linksets. The options determine whether gateway screening is on or off for the linkset, and how MSUs are handled when gateway screening is on for the linkset. The options need to be on for the TIF features.

## EAGLE 5 ISS TIF Options Commands

The `chg/rtrv-tifopts` commands define and display TIF configuration options that are provisioned in the TIFOPTS table. The TIF options are used for the following functions:

- Specify the conditioning that is needed before CdPN or CgPN lookup.
- Specify the conditions that indicate a successful RTDB lookup.
- Specify the cause for a Release message.
- Indicate when to split the IAM message into an IAM message and a SAM message.
- Specify the digits to substitute for the Calling Party Number in Simple Number Substitution.

- Specify the format and contents of fields in the outgoing message (CgPN digits, NM bits, delimiter digits, Area Code, Release Cause, Default RN).

The `chg-tifopts` command uses the following parameters to provision the data in the TIFOPTS table:

**Table 15: TIF Configuration Options**

Parameter	Range	Description	Used by TIF Feature
iamcgpn	dn, rn, rndn	Indicates the format of the outgoing CgPN digits, if they were modified by a feature	Any TIF feature
npflag	nm, none	Specifies whether the NM bits are modified in the IAM message to show that RTDB lookup has been performed. (The NM bits exist only in incoming and outgoing IAM messages.)	TIF Number Portability
rcausenp	0-127	Specifies the value to be used for the Release Cause field in a REL message sent in the number-not-ported case.	TIF Number Portability
rcausepfx	0-127	Specifies the value to be used for the Release Cause field in a REL message sent in the number-not-ported case.	TIF Number Portability
nptype	rnspsdn, any, sp, rn, sprn, all	NP entity type. Specifies the entity type of the DN that is used to indicate that a successful RTDB lookup occurred.	TIF Number Portability
nptypecgpn	rnspsdn, any, sp, rn, sprn, all	NP entity type of the CgPN. Specifies the entity type of the DN that is used to indicate that a successful RTDB lookup occurred.	TIF Number Portability

Parameter	Range	Description	Used by TIF Feature
dlma	1-16 hexadecimal digits, none	Digits used for Delimiter A (DLMA) in NPP Formatting Action  <b>Note:</b> If a TIF service has DLMA-DLMC values provisioned in NPP Formatting Actions and in the TIFOPTS table, the values from the TIFOPTS table will be used in NPP processing.	Any TIF feature
dlmb	1-16 hexadecimal digits, none	Digits used for Delimiter B (DLMB) in NPP Formatting Action  <b>Note:</b> If a TIF service has DLMA-DLMC values provisioned in NPP Formatting Actions and in the TIFOPTS table, the values from the TIFOPTS table will be used in NPP processing.	Any TIF feature
dlmc	1-16 hexadecimal digits, none	Digits used for Delimiter C (DLMC) in NPP Formatting Action  <b>Note:</b> If a TIF service has DLMA-DLMC values provisioned in NPP Formatting Actions and in the TIFOPTS table, the values from the TIFOPTS table will be used in NPP processing.	Any TIF feature



Parameter	Range	Description	Used by TIF Feature
aclen	0-8	Length of area code (used for CgPN handling)	Any TIF feature
splitiam	15-31, none	Determines when to split the IAM into IAM + 1 SAM	Any TIF feature
condcgpn	addcc, none	Indicates the preconditioning required when a CgPN lookup is needed.	Any TIF feature
dfiltrn	1-15 hexadecimal digits	Digits to substitute for an SP. Used for CdPN and CgPN	Any TIF feature
crprel	0-255	Provides the ISUP Release Cause for message that are determined to be Circular Routed	TIF Number Portability
rrrqd	yes, no	Indicates if the Redirection Number parameter shall be included in the Release message when Release handling is indicated	TIF Number Portability
snsccpndflt	1-32 hexadecimal digits, none	Digits to used in Calling Number Simple Number Substitution	TIF Simple Number Substitution
matchseq	dn, nptype	Determines the RTDB lookup mechanism. <b>Note:</b> Used only during upgrade, for backward compatibility.	Any TIF feature requiring RTDB lookup

### EAGLE 5 ISS Common Screening List Commands

The `ent-csl/chg-csl/dlt-csl/rtrv-csl` commands are used to define, change, and display screening requirements of various EAGLE 5 ISS features.

The TIF Number Portability feature can use the NP Flag Reset (NPFLGRST) common screening list to allow a destination point code (DPC) to be defined in the CSL table.

If the TIF NPFLAG=NM configuration option is used, the presence or absence of the DPC in the CSL table indicates how the NM bits are to be set in the outgoing IAM message. See [Use of NM Bits](#) on page 38.

- If the NPFLAG=NM option is used and the destination point code was found in the CSL table, the outgoing NM bits are set to 00 ("without indication").
- If the NPFLAG=NM option is used, a destination point code was not found in the CSL table, and the incoming NM bits are not equal to the outgoing NM bits, the NM bits in the outgoing IAM message are modified according to RTDB lookup results (10 for "ported" and 11 for "not ported").

## EAGLE 5 ISS NPP Commands

The `ent/chg/dlt/rtrv-npp-as` commands are used to enter, change, delete, and display NPP Action Sets that contain various Service Actions, Conditioning Actions, and Formatting Actions.

The `ent/chg/dlt/rtrv-npp-srs` commands are used to create, change, delete, and display NPP Service Rule Sets for calling services.

The `chg/rtrv-npp-serv` commands are used to change and display the On/Off status for NPP Services, Delimiter values to use in formatting the outgoing digit string, and the FNAI Class mapping values for the outgoing NAI, and display the Service Action precedence values. An NPP Service is any EAGLE 5 ISS feature or function that uses NPP to process digit strings.

Refer to the *Numbering Plan Processor (NPP) Overview* manual for descriptions of the NPP components: Service Actions, Conditioning Actions, Formatting Actions, Action Sets, Rules, and Service Rule Sets. See the TIF and TIF feature descriptions in this manual for the NPP components used by TIF and each feature.

## TIF Test Tool Commands

The TIF Test Tool is used to send a test message to a specified TIF service to verify the call flow behavior when the message information is injected into the call path without affecting live traffic. Refer to [TIF Test Tool](#) on page 86 for a description of the TIF Test Tool.

`chg/rtrv-isup-msg` commands are used with the TIF Test Tool to enter, change, and display ISUP test messages in the TESTMSG table.

The `tst-msg` command invokes the test for the specified ISUP test message from the TESTMSG table, and displays the results.

Refer to the *Commands Manual* for a complete description of the TIF Test Tool commands.

## Maintenance Commands

This section describes the following commands that can be used for maintenance when an EPAP-based feature is on.

- [rept-stat-sys](#) on page 59
- [rept-stat-sccp](#) on page 60
- [rept-stat-mps](#) on page 61
- [rept-stat-trbl](#) on page 62

- [rept-stat-alm](#) on page 63
- [rept-stat-db](#) on page 63
- [rtro-tbl-capacity](#) on page 64
- [inh-card/alm-card](#) on page 64
- [inh-alm/unhb-alm](#) on page 64
- [rtro-data-rtdb](#) on page 64

Detailed command descriptions in the *Commands Manual* include parameters, valid values, and output examples.

## rept-stat-sys

This command reports the status of system entities, including cards. The display shows the number of these items that are in service (IS-NR) and how many are in another state (IS-ANR, OOS-MT, OOS-MT-DSBLD). Refer to the *Commands Manual* for a complete description of this command.

```
eagle10605 08-05-25 02:32:46 EST EAGLE 39.2.0
  MAINTENANCE STATUS REPORT
  Maintenance Baseline established.
  Routing Baseline established.
  SCCP Baseline established.
  ALARMS:      CRIT=      9 MAJR=     10 MINR=  3 INH=  2
  OAM 1113      IS-NR      Active INH=  0
  OAM 1115      IS-NR      Standby INH=  0
  LIM      CARD IS-NR=  3 Other=  0 INH=  0
  X25      CARD IS-NR=  0 Other=  0 INH=  0
  SCCP     CARD IS-NR=  3 Other=  0 INH=  0
  GLS      CARD IS-NR=  0 Other=  0 INH=  0
  SLAN     CARD IS-NR=  0 Other=  0 INH=  0
  VXWSLAN  CARD IS-NR=  0 Other=  0 INH=  0
  EMDC     CARD IS-NR=  0 Other=  0 INH=  0
  SS7IPGW  CARD IS-NR=  0 Other=  0 INH=  0
  IPGWI    CARD IS-NR=  0 Other=  0 INH=  0
  IPLIM    CARD IS-NR=  0 Other=  0 INH=  0
  IPLIMI   CARD IS-NR=  0 Other=  0 INH=  0
  HMUX     CARD IS-NR=  0 Other=  0 INH=  0
  HIPR     IS-NR=  2 Other=  0 INH=  0
  IMT      IS-NR=  2 Other=  0
  SLK      IS-NR=  0 Other=  6 INH=  0
  DLK      IS-NR=  0 Other=  0 INH=  0
  LINK SET  IS-NR=  0 Other=  4 INH=  0
  NDC IP LK IS-NR=  4 Other=  0 INH=  0
  DSM IP LK IS-NR=  0 Other=  0 INH=  0
  MCPM     CARD IS-NR=  0 Other=  0 INH=  0
  EROUTE   CARD IS-NR=  0 Other=  0 INH=  0
  CLOCK    IS-NR=  2 Other=  0 INH=  0
  HS CLOCK IS-NR=  2 Other=  0 INH=  0
  MCPM IP LK IS-NR=  2 Other=  0 INH=  0
  APPLSOCK IS-NR=  0 Other=  0 INH=  0
  SCTP ASSOC IS-NR=  0 Other=  0 INH=  0
  APPL SERVER IS-NR=  0 Other=  0 INH=  0
  SS7 DPC   IS-NR=  0 Other=  6 INH=  0
  X25 DPC   IS-NR=  0 Other=  0 INH=  0
  CLUST DPC IS-NR=  0 Other=  1 INH=  0
  RTX      IS-NR=  2 Other=  1 INH=  0
  XLIST DPC IS-NR=  0 Other=  0
  DPC SS    Actv =  0 Other=  0
  SEAS SS   IS-NR=  0 Other=  2
  SEAS X25  IS-NR=  0 Other=  2 INH=  0
```

```

LSMS SS      IS-NR= 0  Other= 2
LSMS Conn   IS-NR= 0  Other= 2 INH= 0
TERMINAL    IS-NR= 2  Other= 14 INH= 0
MPS         IS-NR= 2  Other= 0
SECURITY SS IS-NR= 1  Other= 0
EIR SS      IS-NR= 1  Other= 0
RTD SS      IS-NR= 0  Other= 1
ATINP SS    IS-NR= 1  Other= 0

```

```
;
```

## rept-stat-sccp

This command reports subsystem operating status, CPU usage, and Service Module card status. When the loc parameter is specified, the command displays detailed card traffic statistics. Refer to the *Commands Manual* for a complete description of this command.

```

tklc1170501 08-08-18 10:16:24 EST EAGLE5 39.2.0
SCCP SUBSYSTEM REPORT IS-NR      Active      -----
  SCCP ALARM STATUS = No Alarms
GFLEX SERVICE REPORT IS-NR      Active      -----
  GFLEX ALARM STATUS = No Alarms
GPORT SERVICE REPORT IS-NR      Active      -----
  GPORT ALARM STATUS = No Alarms
ATINPQ SUBSYSTEM REPORT IS-NR    Active      -----
  ATINPQ: SSN STATUS = Allowed    MATE SSN STATUS = -----
  ATINPQ ALARM STATUS = No Alarms

SCCP Cards Configured=25      Cards IS-NR=25
System Daily Peak SCCP Load    15639 TPS 06-09-18 06:14:24
System Overall Peak SCCP Load   21062 TPS 06-09-15 14:24:38
System Total SCCP Capacity      21250 TPS (21250 max SCCP Capacity)
System SCCP Capacity Calc. Method (N)
System TPS Alarm Threshold      17000 TPS ( 80% System N SCCP Capacity)

CARD   VERSION   PST      SST      AST      MSU   CPU
                  USAGE   USAGE
-----
1217   126-030-000 IS-NR    Active   ----- 100%  45%
1317   126-030-000 IS-NR    Active   ----- 100%  51%
2217   126-030-000 IS-NR    Active   ----- 100%  42%
3201   126-030-000 IS-NR    Active   ----- 54%   25%
3203   126-030-000 IS-NR    Active   ----- 55%   25%
3205   126-030-000 IS-NR    Active   ----- 57%   27%
3207   126-030-000 IS-NR    Active   ----- 69%   29%
3211   126-030-000 IS-NR    Active   ----- 85%   35%
3213   126-030-000 IS-NR    Active   ----- 94%   37%
3215   126-030-000 IS-NR    Active   ----- 86%   35%
3217   126-030-000 IS-NR    Active   ----- 74%   31%
4217   126-030-000 IS-NR    Active   ----- 64%   28%
4317   126-030-000 IS-NR    Active   ----- 100%  41%
5117   126-030-000 IS-NR    Active   ----- 100%  40%
5317   126-030-000 IS-NR    Active   ----- 56%   25%
6101 P 126-030-000 IS-NR    Active   ----- 57%   32%
6103   126-030-000 IS-NR    Active   ----- 63%   27%
6105   126-030-000 IS-NR    Active   ----- 69%   37%
6107   126-030-000 IS-NR    Active   ----- 66%   29%
6111   126-030-000 IS-NR    Active   ----- 59%   27%
6113   126-030-000 IS-NR    Active   ----- 55%   34%
6115   126-030-000 IS-NR    Active   ----- 55%   26%
6117   126-030-000 IS-NR    Active   ----- 54%   26%
1105   126-030-000 IS-NR    Active   ----- 55%   26%
1107   126-030-000 IS-NR    Active   ----- 55%   26%

```

```

-----
SCCP Service Average MSU Capacity = 71%   Average CPU Capacity = 32%

AVERAGE CPU USAGE PER SERVICE:
  GTT = 1%  GFLEX = 4%  GPORT = 0%
  ATINPQ= 2%

TOTAL SERVICE STATISTICS:

  SERVICE      SUCCESS      ERRORS      FAIL
              RATIO      REROUTE\    FORWARD
              TO GTT      TOTAL
  GTT:          3510         15         0%         -         -         3525
  GFLEX:        100043        0         0%         0         0        100043
  GPORT:        312203        0         0%         15        1879        314097
  ATINPQ:       23157         0         0%         -         -         23157

Command Completed.
;
    
```

**rept-stat-mps**

This command 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 status and status for specific cards when a feature is on. Refer to the *Commands Manual* for a complete description of this command.

Overall status:

```

rlghncxa03w 08-09-07 11:27:34 EST  EAGLE 39.2.0
          VERSION      PST          SST          AST
EPAP A    027-015-000  IS-NR      Active      -----
CRITICAL PLATFORM  ALARM DATA = No Alarms
MAJOR    PLATFORM  ALARM DATA = No Alarms
MINOR    PLATFORM  ALARM DATA = No Alarms
CRITICAL APPLICATION ALARM DATA = No Alarms
MAJOR    APPLICATION ALARM DATA = No Alarms
MINOR    APPLICATION ALARM DATA = No Alarms
          ALARM STATUS = No Alarms

          VERSION      PST          SST          AST
EPAP B    027-015-000  OOS-MT      Fault      Standby
CRITICAL PLATFORM  ALARM DATA = No Alarms
MAJOR    PLATFORM  ALARM DATA = h'0123456789ABCDEF
MINOR    PLATFORM  ALARM DATA = h'0123456789ABCDEF
CRITICAL APPLICATION ALARM DATA = No Alarms
MAJOR    APPLICATION ALARM DATA = h'0123456789ABCDEF
MINOR    APPLICATION ALARM DATA = No Alarms
          ALARM STATUS = ** 0371 Major Platform Failure(s)

CARD  PST          SST          GSM STAT  VFLEX STAT
1106 P IS-NR      Active      ACT       ACT
1201 IS-ANR      Active      SWDL      SWDL
1205 OOS-MT-DSBLD Manual      -----
1302 OOS-MT      Isolated   -----
1310 IS-ANR      Standby    SWDL      SWDL

CARD 1106 ALARM STATUS = No Alarms
DSM PORT A: ALARM STATUS = No Alarms
    
```

```

DSM PORT B:      ALARM STATUS      = No Alarms
CARD 1201 ALARM STATUS = No Alarms
DSM PORT A:      ALARM STATUS      = ** 0084 IP Connection Unavailable
DSM PORT B:      ALARM STATUS      = ** 0084 IP Connection Unavailable
CARD 1205 ALARM STATUS = No Alarms
DSM PORT A:      ALARM STATUS      = ** 0084 IP Connection Unavailable
DSM PORT B:      ALARM STATUS      = ** 0084 IP Connection Unavailable
CARD 1302 ALARM STATUS = ** 0013 Card is isolated from the system
DSM PORT A:      ALARM STATUS      = ** 0084 IP Connection Unavailable
DSM PORT B:      ALARM STATUS      = ** 0084 IP Connection Unavailable
CARD 1310 ALARM STATUS = No Alarms
DSM PORT A:      ALARM STATUS      = ** 0084 IP Connection Unavailable
DSM PORT B:      ALARM STATUS      = ** 0084 IP Connection Unavailable
Command Completed.
;

```

Status for a specific card:

```

Integrat40 08-09-07 11:37:24 EST EAGLE5 39.2.0
CARD  VERSION      TYPE      PST      SST      AST
1205  -----      DSM      OOS-MT-DSBLD  Manual  -----
      DSM PORT A      OOS-MT      Unavail  -----
      ALARM STATUS    = ** 0084 IP Connection Unavailable
      DSM PORT B      OOS-MT      Unavail  -----
      ALARM STATUS    = ** 0084 IP Connection Unavailable
GSM STAT          = -----
ATINP STAT        = -----
CARD ALARM STATUS = No Alarms.
DSM MEMORY USAGE = 0%
Command Completed.
;

```

## rept-stat-trbl

This command output includes a summary of any trouble notifications for local subsystems, cards, and linksets. The severity of each alarm is indicated in the output report. Refer to the *Commands Manual* for a complete description of this command.

```

rlghncxa03w 07-02-03 09:50:17 EST EAGLE5 37.6.0
SEQN UAM AL DEVICE  ELEMENT  TROUBLE TEXT
0002.0143 * CARD 1113 EOAM      System release GPL(s) not approved
3661.0048 * TERMINAL 1         Terminal failed
3674.0155 * DLK 1107,A STPLAN  STPLAN connection unavailable
3677.0312 * DPC 001-115-001    DPC is restricted
3678.0002 * GPL SYSTEM BPCDM  Card is not running approved GPL
3683.0176 * SECULOG 1116     Stdby security log -- upload required
3684.0013 ** CARD 1305 SS7IPGW Card is isolated from the system
3688.0236 ** SLK 1203,A lslg2 REPT-LKF: not aligned
3692.0318 ** LSN e5e6        REPT-LKSTO: link set prohibited
3697.0539 ** ENET 1305,A    Ethernet Interface Down
3698.0539 ** ENET 1305,B    Ethernet Interface Down
3699.0539 ** ENET 1307,B    Ethernet Interface Down
3700.0536 * IP7 assoc1234567890 IP Connection Excess Retransmits
0915.0541 *C RTD SYSTEM      MSU cksum error threshold exceeded

0915.0541 *C RTD SYSTEM      MSU cksum error threshold exceeded
0916.0565 *C ATINPQ SYSTEM    ATINPQ Subsystem is not available

```

```
Command Completed.
;
```

### rept-stat-alm

This command output includes the alarm totals for local subsystems and DSM/EPAP IP links. Refer to the *Commands Manual* for a complete description of this command.

```
rlghncxa03w 08-05-27 15:00:53 EST EAGLE 39.2.0
ALARM TRANSFER= LMC
ALARM MODE CRIT= AUDIBLE MAJR= SILENT MINR= AUDIBLE
ALARM FRAME 1 CRIT= 7 MAJR= 0 MINR= 10
ALARM FRAME 2 CRIT= 0 MAJR= 0 MINR= 0
ALARM FRAME 3 CRIT= 0 MAJR= 0 MINR= 0
ALARM FRAME 4 CRIT= 0 MAJR= 0 MINR= 0
ALARM FRAME 5 CRIT= 0 MAJR= 0 MINR= 0
ALARM FRAME 6 CRIT= 0 MAJR= 0 MINR= 0
ALARM FRAME OAP CRIT= 0 MAJR= 0 MINR= 0
ALARM FRAME GPF CRIT= 0 MAJR= 0 MINR= 0
PERM. INH. ALARMS CRIT= 2 MAJR= 0 MINR= 0
TEMP. INH. ALARMS CRIT= 3 MAJR= 0 MINR= 0
TIMED. INH. ALARMS CRIT= 0 MAJR= 0 MINR= 0
ACTIVE ALARMS CRIT= 2 MAJR= 0 MINR= 10
TOTAL ALARMS CRIT= 7 MAJR= 0 MINR= 10

Command Completed.
;
```

### rept-stat-db

This command 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. For a complete description of this command, refer to the *Commands Manual*.

```
tekelecstp 08-08-29 08:55:54 NZST EAGLE 39.2.0
EPAP A ( ACTV )
C BIRTHDATE LEVEL EXCEPTION
-----
PDB Y 07-08-29 08:20:04 12345 -
RTDB Y 07-08-29 08:20:04 12345 -
RTDB-EAGLE Y 07-08-29 08:20:04 12345 -

EPAP B ( STDBY )
C BIRTHDATE LEVEL EXCEPTION
-----
PDB Y 07-08-29 08:20:04 12345 -
RTDB Y 07-08-29 08:20:04 12345 -
RTDB-EAGLE Y 07-08-29 08:20:04 12345 -

EAGLE RTDB REPORT
CARD/APPL LOC C BIRTHDATE LEVEL EXCEPTION IN-SRVC
-----
VSCCP 1201 Y 07-08-29 08:20:04 12345 - 10d 23h 21m
VSCCP 1203 Y 07-08-29 08:20:04 12345 - 10d 23h 21m
VSCCP 1105 Y 07-08-29 08:20:04 12345 - 5d 3h 1m
```

;

### rtrv-tbl-capacity

The `rtrv-tbl-capacity` command 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 them is enabled.

```
tklcl1090701 07-05-24 14:22:01 EST EAGLE 37.6.0

DSTN      table is (      5940 of      6000) 99% full
XLIST     table is (         0 of       500)  0% full
X25-DSTN  table is (         0 of     1024)  0% full
SPC       table is (         4 of       40) 10% full
LS        table is (       738 of     1024) 72% full
SLK       table is (       360 of     2000) 18% full
X25-SLK   table is (         0 of       256)  0% full
IP-LNK    table is (         6 of       512)  1% full
MAP       table is (       336 of     1024) 33% full
GTA       table is (    269999 of  269999) 100% full
SSNSELID  table is (         0 of     10000)  0% full
SCRSET    table is (        40 of       255) 16% full
RTEKEY    table is (         0 of      1000)  0% full
APPLSOCK  table is (         0 of     4000)  0% full
AS        table is (         0 of       250)  0% full
MRN       table is (       768 of     5988) 13% full
SCCPSRV   table is (        12 of        96) 13% full
VFLXRN    table is (         1 of    10000)  1% full
VFLXCD    table is (         1 of     4950)  1% full
VFLXVID   table is (         1 of      1000)  1% full

;
```

### inh-card/alw-card

The `inh-card` command is used to change the operating state of the card from In-Service Normal (IS-NR) to Out-of-Service Maintenance-Disabled (OOS-MT-DSBLD). A craftsperson then can test the card or physically remove it from the shelf.

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.

Refer to the *Commands Manual* for a complete description of these commands.

### inh-alm/unhb-alm

The `inh/unhb-alm` commands are used to allow and inhibit alarms on the Service Module card ports. The commands allow both Port A and Port B to be specified. Refer to the *Commands Manual* for a complete description of these commands.

### rtrv-data-rtdb

This command 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.

## 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.

The `ent-trace` command can be used to trace MSUs sent to Service Module cards that are running the VSCCP application. The EAGLE 5 ISS traps MSUs that meet the specified tracing criteria, which include DN, some point codes, Entity ID, and message verification and message processing errors.

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

For TIF, the `ent-trace` command can trace any MSU that is screened with the TIF, TIF2, or TIF3 Gateway Screening Stop Action. The trace output can be in standard format and in a brief format similar to the TIF Test Tool information (see [TIF Test Tool](#) on page 86). For full-format test output, the TIF Test Tool should be used.



# Chapter 5

## TIF Feature Configuration

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### Topics:

- [Introduction Page 68](#)
- [Provisioning Service Module Cards Page 68](#)
- [Provisioning GLS Cards Page 72](#)
- [Enabling TIF Features Page 75](#)
- [Provisioning Gateway Screening for TIF Page 78](#)
- [Provisioning the TIF Options Page 78](#)
- [Provisioning NPP for TIF Page 80](#)
- [Turning On TIF Features Page 80](#)
- [Turning On Gateway Screening for Linksets Page 81](#)
- [Turning Off TIF Features Page 82](#)
- [Activating the E5-SM4G Throughput Capacity Feature Page 83](#)
- [TIF Test Tool Page 86](#)

This chapter provides procedures for configuring the TIF features for use in the EAGLE 5 ISS.

## Introduction

This chapter describes the EAGLE 5 ISS configuration of the TIF features.

The EAGLE 5 ISS configuration of each TIF feature consists of the following tasks:

- Verify that the GTT feature is on and that the EAGLE 5 ISS contains only DSM cards or E5-SM4G cards, or both, running the VSCCP application, and no TSM cards running the SCCP application. See [Adding a Service Module Card](#) on page 68 and [Removing a TSM Card](#) on page 71.
- Verify that the Gateway Screening feature is on and that the EAGLE 5 ISS contains up to 8 TSM cards running the GLS application. See [Adding a GLS Card](#) on page 72.
- Enable each TIF feature. See [Enabling TIF Features](#) on page 75.
- Provision Gateway Screening stop actions for TIF. See [Provisioning Gateway Screening for TIF](#) on page 78.
- Provision TIF options. See [Provisioning the TIF Options](#) on page 78.
- Provision NPP Action Sets, Service Rule Sets, and Services. See [Provisioning NPP for TIF](#) on page 80 .
- Turn on each TIF Feature. See [Turning On TIF Features](#) on page 80.
- Turn on Gateway Screening in linksets. See [Turning On Gateway Screening for Linksets](#) on page 81.

## Provisioning Service Module Cards

EPAP-based features that perform RTDB lookup require “Service Module cards” running the VSCCP application.

Any of 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

TSM cards running the SCCP application cannot be used with the TIF feature. If any cards running the SCCP application are present in the system, they must be replaced by Service Module cards or removed. Contact your Customer Care Center before replacing any cards that are running the SCCP application.

This section contains procedures for adding Service Module cards to the system and removing TSM cards for SCCP from the system.

### Adding a Service Module Card

This procedure uses the `ent-card` command to add Service Module cards to the database, to support the Global Title Translation (GTT) feature, the Enhanced Global Title Translation (EGTT) feature, and EPAP-based features that require RTDB lookup.



**CAUTION:** Refer to the *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information on the dimensioning rules and the DSM database capacity requirements.

**CAUTION**

A Service Module card can be inserted only in an odd/even numbered pair of empty card slots of an EAGLE 5 ISS shelf. Slots 09 and 10 of each shelf contain an HMUX card or a HIPR card. A Service Module cannot be inserted in slots 09 and 10. Service Module cards can be inserted in the control shelf, but only in slots 01, 03, 05, 07, and 11. A Service Module card occupies two card slots, so the even-numbered card slot to the right of the odd-numbered slot where the Service Module card has been inserted must be empty. The Service Module card is connected to the network through the odd-numbered card slot connector.

**Table 16: Service Module Card Locations**

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

The shelf to which the card is to be added must already be provisioned in the database. This can be verified with 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 card cannot be added to the database if the specified card location already has a card assigned to it.

The system can contain a maximum of 25 Service Module cards for EPAP-based features.

**Note:** This manual contains brief descriptions of the commands that are used in these procedures to configure EPAP-based features. 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. Verify that the GTT feature is on. Enter the `rtrv-feat` command.

If the GTT feature is on, the `GTT = on` field appears in the command output.

**Note:** The `rtrv-feat` command output contains other fields that are not used by this procedure. To see all the fields displayed by the `rtrv-feat` command, refer to the `rtrv-feat` command description in the *Commands Manual*.

- If the GTT feature is on, shown by the entry `GTT = on` in the `rtrv-feat` command output, continue with [Step 2](#) on page 70.
- If the GTT feature is off, shown by the entry `GTT = off` in the `rtrv-feat` command output, use the procedures in the *Database Administration Manual - GTT* to turn on the GTT feature. Then continue with [Step 2](#) on page 70.

2. 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 or are not HMUX or HIPR card locations) could 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
;

```

3. If an E5-SM4G card is being added, verify that card locations 09 and 10 contain HIPR cards in the shelf where the E5-SM4G card will be installed.

Enter the `rept-stat-gpl:gpl=hipr` command to list the installed HIPR cards in the system.

- If the shelf contains HIPR cards, continue with [Step 4](#) on page 70.
- If the shelf does not contain HIPR cards, refer to the *Installation Manual - EAGLE 5 ISS* to install HIPR cards in the shelf. Continue with [Step 4](#) on page 70.

**Note:** Cards should be distributed throughout the system for proper power distribution. Refer to the *Installation Manual - EAGLE 5 ISS* for the shelf power distribution.

4. Verify that the Service Module card has been physically installed into the proper location.



**CAUTION**

**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 *Unsolicted Alarm and Information Messages* manual before proceeding with this procedure.

5. Add the Service Module card to the database, using the `ent-card` command.  
`ent-card:loc=1301:type=dsm:appl=vscpp`
6. Verify the temperature threshold settings for an E5-SM4G card by performing the “Changing the High-Capacity Card Temperature Alarm Thresholds” procedure in the *Database Administration Manual - SS7*.
7. Verify the changes by entering the `rtrv-card` command with the card location specified.

`rtrv-card:loc=1102`

```

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
;

```

8. 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.
```

9. Repeat this procedure for each Service Module card that needs to be added to the system.
10. If TSM cards need to be removed from the system, go to [Removing a TSM Card](#) on page 71.

## Removing a TSM Card

This procedure uses the `dlt-card` command to remove TSM cards from the database. A card cannot be removed if it does not exist in the database.



**CAUTION:** If the TSM card is the last card in service, removing this card from the database will cause global title translation traffic to be lost.

### CAUTION

The TSM card is shown in the database with the entries TSM in the TYPE field and SCCP in the APPL field of the `rtrv-card` command output.

The examples in this procedure are used to remove the TSM card in card location 1201.

1. Display the TSM cards in the system, by entering the `rtrv-card` command.

```
rlghncxa03w 08-03-15 16:34:56 EST EAGLE 39.2.0
CARD  TYPE      APPL      LSET NAME      LINK SLC LSET NAME      LINK SLC
1201  TSM          SCCP      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. Display the operating status of the TSM card to be removed, by entering the `rept-stat-card` command with the `loc` parameter for the card location of the TSM.

```
rept-stat-card:loc=1201
```

3. Remove the TSM card from service (inhibit the card), by entering the `inh-card` command and specifying the card location. If the TSM card to be inhibited is the only TSM card in service, the `force=yes` parameter must also be specified. The cards that are in service are shown by the entry IS-NR in the PST field in the output in step 2.

```
inh-card:loc=1201
```

```
rlghncxa03w 08-03-15 16:34:56 EST EAGLE 39.2.0
Card has been inhibited.
;
```

When the card is successfully inhibited, physically remove the card from the shelf.

4. Delete the TSM card from the database, by entering the `dlt-card` command.
- ```
dlt-card:loc=1201
```
5. Verify the changes, using the `rtrv-card` command that specifies the card that was removed.
- ```
rtrv-card:loc=1201
```

```
E2144 Cmd Rej: Location invalid for hardware configuration
```

6. Repeat this procedure for each TSM card that needs to be removed from the system.

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

```

## Provisioning GLS Cards

The TIF features require TSM cards running the GLS application (GLS cards) for use by the Gateway Screening feature.

This section contains procedures for adding GLS cards to the system and removing GLS cards from the system.

### Adding a GLS Card

This procedure is used to add a TSM card running the GLS application to the system to support the Gateway Screening feature.

The shelf to which the card is to be added must already be defined in the database. This can be verified with 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 card cannot be added to the database if the specified card location already has a card assigned to it.

Before the GLS card can be configured in the database, the Gateway Screening feature must be turned on with the `chg-feat` command (see *Provisioning Gateway Screening for TIF* on page 78). The `rtrv-feat` command can be entered to verify that the Gateway Screening feature is on.

**Note:** After the Gateway Screening feature is turned on with the `chg-feat` command, the feature cannot be turned off.

The EAGLE 5 ISS can contain a maximum of 8 TSM cards running the GLS GPL.

- Display the cards in the EAGLE 5 ISS, using the `rtrv-card` command.

If the APPL field of the `rtrv-card` command output shows cards assigned to the GLS GPL, skip steps 2, and 3, and go to step 4.

```

rlghncxa03w 06-10-25 09:58:31 GMT EAGLE5 36.0.0
CARD  TYPE      GPL      LSET NAME      LINK SLC  LSET NAME      LINK SLC
1102  TSM          GLS
1113  GPSM        EOAM
1114  TDM-A
1115  GPSM        EOAM
1116  TDM-B
1117  MDAL
1201  LIMDS0      SS7ANSI  sp2            A      0      sp1            B      0
1203  LIMDS0      SS7ANSI  sp3            A      0
1204  LIMDS0      SS7ANSI  sp3            A      1
1206  LIMDS0      SS7ANSI  nsp3           A      1      nsp4           B      1
1207  LIMV35      SS7GX25  nsp1           A      0

```



1208	LIMV35	SS7GX25	nsp1	A	1				
1216	ACMENET	STPLAN							
1308	LIMDS0	SS7ANSI	sp6	A	1	sp7	B	0	
1314	LIMDS0	SS7ANSI	sp7	A	1	sp5	B	1	
1317	ACMENET	STPLAN							

- Verify that the Gateway Screening feature is on, by entering the `rtrv-feat` command.

If the Gateway Screening feature is on, the `GWS = on` field appears in the command output.

**Note:** The `rtrv-feat` command output contains other fields that are not used by this procedure. If you wish to see all the fields displayed by the `rtrv-feat` command, see the `rtrv-feat` command description in the *Commands Manual*.

If the Gateway Screening feature is on, go to [Step 4](#) on page 73. If the Gateway Screening feature is not on, continue with [Step 3](#) on page 73.

**Note:** After the Gateway Screening feature is turned on with the `chg-feat` command, it cannot be turned off.

- If the Gateway Screening feature is not on, shown by the `GWS = off` entry in the `rtrv-feat` command output in [Step 2](#) on page 73, turn the Gateway Screening feature on using the `chg-feat:gws=on` command.
- Verify that the TSM card has been physically installed into the proper location.
- Add the TSM card to the database, using the `ent-card` command.  
`ent-card:loc=1212:type=tsm:appl=gl`

Cards should be distributed throughout the EAGLE 5 ISS for proper power distribution. Refer to the *Installation Manual - EAGLE 5 ISS* for the shelf power distribution.

- Verify the changes, using the `rtrv-card` command with the card location (`loc` parameter) specified.
- Put the card in service, using the `rst-card` command with the card location specified.
- Back up the new 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.
```

## Removing a GLS Card

This procedure is used to remove GLS cards (TSM cards used by Gateway Screening) from the database. A card cannot be removed if it does not exist in the database.



CAUTION

**CAUTION:** If the GLS card is the last GLS card in service, removing this card from the database will disable the Gateway Screening feature.

### Canceling the REPT-STAT-CARD Command

Because the `rept-stat-card` command used in this procedure can display information for a long period of time, the `rept-stat-card` command can be canceled to stop the output to the terminal. There are three ways that the `rept-stat-card` command can be canceled.

- Press the F9 function key on the keyboard at the terminal where the `rept-stat-card` command was entered.
- Enter the `canc-cmd` without the `trm` parameter at the terminal where the `rept-stat-card` command was entered.
- Enter the `canc-cmd:trm=<xx>` from another terminal other than the terminal where the `rept-stat-card` command was entered. `<xx>` specifies the terminal where the `rept-stat-card` command was entered. To enter the `canc-cmd:trm=<xx>` command, the terminal must allow Security Administration commands to be entered from it and the user must be allowed to enter Security Administration commands. The terminal permissions can be verified with the `rtrv-secu-trm` command. The user permissions can be verified with the `rtrv-user` or `rtrv-secu-user` commands.

For more information about the `canc-cmd` command, refer to the *Commands Manual*.

1. Display the cards in the database, using the `rtrv-card` command.

```
rlghncxa03w 06-10-25 09:58:31 GMT EAGLE5 36.0.0
CARD  TYPE      APPL      LSET NAME      LINK SLC  LSET NAME      LINK SLC
1102  TSM          GLS
1103  ACMENET     STPLAN
1104  ACMENET     STPLAN
1113  GPSM        EOAM
1114  TDM-A
1115  GPSM        EOAM
1116  TDM-B
1117  MDAL
1201  LIMDS0      SS7ANSI   lsn1           A    0    lsn2           B    1
1202  LIMV35      SS7GX25  lsn2           A    0
1203  LIMV35      SS7ANSI   lsn2           A    0    lsn1           B    1
1205  TSM          GLS
```

2. Display the cards that are in service, using the `rept-stat-card:stat=nr` command.  
`rept-stat-card:stat=nr`

A GLS card is identified by the entry GLS in the APPL fields in the command output.

```
rlghncxa03w 06-10-25 15:26:30 GMT EAGLE5 36.0.0
CARD  VERSION      TYPE  GPL  PST  SST  AST
1102  110-003-000  TSM   GLS  IS-NR  Active  ---
1103  110-002-000  ACMENET  STPLAN  IS-NR  Active  ---
1104  110-002-000  ACMENET  STPLAN  IS-NR  Active  ---
1109  109-003-000  HMUX   BPHMUX  IS-NR  Active  ---
1110  109-003-000  HMUX   BPHMUX  IS-NR  Active  ---
1201  110-003-000  LIMDS0  SS7ANSI  IS-NR  Active  ---
1202  110-002-000  LIMV35  SS7GX25  IS-NR  Active  ---
1203  110-003-000  LIMV35  SS7ANSI  IS-NR  Active  ---
1205  110-003-000  TSM     GLS     IS-NR  Active  ---
1209  109-003-000  HMUX   BPHMUX  IS-NR  Active  ---
1210  109-003-000  HMUX   BPHMUX  IS-NR  Active  ---
```

3. If the GLS card to be removed is identified by the entry GLS in the APPL fields in the output, remove the card from service. Enter the `rmv-card` command specifying the card location of the card to be inhibited.

```
rmv-card:loc=1205
```

If the GLS card to be inhibited is the only GLS card in service, as shown in step 2, the `force=yes` parameter must also be specified.

```
rmv-card:loc=1205:force=yes
```

When this command has successfully completed, this message appears.

```
rlghncxa03w 06-10-25 15:27:30 GMT EAGLE5 36.0.0
Card has been inhibited.
```

4. Remove the card from the database. Enter the `dlt-card` command and specify the card location of the card to be removed.

```
dlt-card:loc=1205
```

5. Verify the changes, using the `rtrv-card` command with the card location of the card that was removed.

```
rtrv-card:loc=1205
```

When this command has successfully completed, this message appears.

```
E2144 Cmd Rej: Location invalid for hardware configuration
```

6. Back up the new 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 TIF Features

This procedure is used to enable TIF features in the EAGLE 5 ISS.

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

- TIF Number Portability - Part Number 893018901
- TIF SCS Forwarding - Part Number 893022201
- TIF Simple Number Substitution - Part Number 893024001
- TIF Additional Subscriber Data - Part Number 893024501
- TIF Generic Routing Number - Part Number 893025501

**Note:** Each feature 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 the feature and received the feature access key, contact your Tekelec Sales Representative or Account Representative.

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

**CAUTION**

**CAUTION:** The TIF Number Portability feature, the TIF Additional Subscriber Data feature, and the TIF Generic Routing Number feature cannot be enabled if the LNP feature is on. Enter the `rtrv-ctrl-feat` command to verify whether or not the LNP feature is on. If the LNP feature is on, shown with a quantity greater than zero for the LNP ported TNs field in the command output, this procedure cannot be performed for the features.

Before a TIF feature can be enabled, the following conditions must exist in the system:

- For TIF features that require RTDB lookup, Service Module cards running the VSCCP application must be configured in the system. If there are no Service Module cards present in the EAGLE 5 ISS, the cards must be added before the TIF feature can be enabled and turned on. See [Adding a Service Module Card](#) on page 68.

**CAUTION**

**CAUTION:** Refer to the *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information on the dimensioning rules and the DSM database capacity requirements.

Any TSM cards running the SCCP application must be deleted from the database and physically removed from the system. See [Removing a TSM Card](#) on page 71.

- The database must contain a valid and locked serial number for the EAGLE 5 ISS. The system is shipped with a serial number in the database, but the serial number is not locked. The serial number can be changed, if necessary, and locked after the system is on-site.
- The GTT feature must be turned on.
- The Gateway Screening feature must be turned on.

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

After a TIF feature has been enabled and database provisioning is complete, the TIF feature status must be set to on (the feature must be “turned on”) See [Turning On TIF Features](#) on page 80.

1. Verify that the GTT feature and the Gateway Screening (GWS) feature are on. Enter the `rtrv-feat` command. If the GTT feature is on, the GTT = on field appears in the command output. If the Gateway Screening feature is on, the GWS = on field appears in the command output.

**Note:** The `rtrv-feat` command output contains other fields that are not used by this procedure. To see all the fields displayed by the `rtrv-feat` command, refer to the `rtrv-feat` command description in the *Commands Manual*.

**Note:** The GTT feature and the GWS feature must be purchased before turning them on. If you are not sure whether you have purchased a feature, contact your Tekelec Sales Representative or Account Representative.

After the GTT feature or GWS feature has been turned on with the `chg-feat` command, it cannot be turned off.

- If the GTT and GWS features are on, shown by the entries GTT = on and GWS = on in the `rtrv-feat` command output in step 1, continue with [Step 2](#) on page 77.
- If the GTT feature is off, shown by the entry GTT = off in the `rtrv-feat` command output in step 1, use the procedures in the *Database Administration Manual - Global Title Translation* to turn on the GTT feature.

- If the Gateway Screening feature is off, shown by the entry `GWS = on` in the `rtrv-feat` command output in step 1, use the procedures in the *Database Administration Manual - Gateway Screening* to turn on the Gateway Screening feature.
2. 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 08-08-29 16:40:40 EST EAGLE5 39.2.0
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      ----
;
```

If the `rtrv-ctrl-feat` output shows a LNP ported TNs quantity entry, this procedure cannot be performed for the TIF Number Portability feature, the TIF ASD feature, and the TIF GRN feature.

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

3. Verify that the system serial number is correct and locked. Enter the `rtrv-serial-num` command to display the system serial number and the lock status.
  - If the serial number is correct and locked, continue with [Step 4](#) on page 77.
  - If the serial number shown in the output is not correct, enter the correct serial number into the database, using the `ent-serial-num` command without the lock parameter. Enter the `rtrv-serial-num` command again to verify that the correct serial number is entered.

```
ent-serial-num:serial=<system serial number>
```

```
rtrv-serial-num
```

- If the serial number is correct but is not locked, lock the serial number. Enter the `ent-serial-num` command, specifying the serial number shown in the `rtrv-serial-num` command output and the `lock=yes` parameter.

```
ent-serial-num:serial=<system serial number>:lock=yes
```

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

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

**Note:** The feature access key is provided by Tekelec. If you do not have the controlled feature part number or the feature access key for a TIF 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.

```
rlghncxa03w 08-08-29 16:40:40 EST EAGLE5 39.2.0
The following features have been permanently enabled:
Feature Name          Partnum    Status  Quantity
HC-MIM SLK Capacity   893012707  on      64
TIF Number Portability 893018901  off     ----
TIF SCS Forwarding     893022201  off     ----
```

```

TIF Simple Number Subst.  893024001  off          ----
;

rlghncxa03w 08-08-29 16:40:40 EST  EAGLE5 40.0.0
The following features have been permanently enabled:
Feature Name              Partnum    Status    Quantity
HC-MIM SLK Capacity      893012707  on         64
TIF Number Portability   893018901  off        ----
TIF SCS Forwarding      893022201  off        ----
TIF Simple Number Subst. 893024001  off        ----
TIF ASD                  893024501  off        ----
TIF GRN                  893025501  off        ----
E5-SM4G Throughput Cap  893019101  on         ----
;

```

5. 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 Gateway Screening for TIF

Refer to the *Database Administration Manual - Gateway Screening* and to x in this manual for descriptions of the TIF Stop Actions and procedures for configuring the GWS action sets and stop actions for TIF.

## Provisioning the TIF Options

This procedure is used to provision the configuration options for TIF and TIF features. At least one TIF feature must be enabled before TIF options can be provisioned.

1. Verify that each TIF feature is enabled for which options are being provisioned, by entering the `rtrv-ctrl-feat` command.

If a TIF feature is enabled but has not been turned on, the feature status in the entry is off.

```

rlghncxa03w 08-08-29 16:40:40 EST  EAGLE5 40.0.0
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         ----
TIF Number Portability   893018901  off        ----
TIF SCS Forwarding      893022201  off        ----
TIF Simple Number Subst. 893022101  off        ----
TIF ASD                  893024501  off        ----
TIF GRN                  893025501  off        ----
;

```

- If a TIF feature is not enabled (the entry does not appear in the output), go to [Enabling TIF Features](#) on page 75 to enable a TIF feature. Then continue with [Step 2](#) on page 79.
- If a TIF feature is enabled, continue with [Step 2](#) on page 79.

2. Display the current settings of the TIF options, using the `rtrv-tifopts` command.

```
tekelecstp 08-07-04 07:53:46 EST EAGLE 40.0.0

TIF OPTIONS
-----
IAMCGPN      = dn
NPFLAG      = none
RCAUSENP    = 0
RCAUSEPFX   = 0
NPTYPE      = sprn
NPTYPECGPN  = sprn
ACLEN       = 0
SPLITIAM    = none
CONDCGPN    = none
CRPREL      = 31
RNRQD       = yes
DFLTRN      = none
DLMA        = none
DLMB        = none
DLMC        = none
SNSCGPNDFLT = ANY
MATCHSEQ    = dn
;
```

3. Change the TIF options to the desired settings, by entering the `chg-tifopts` command with at least one of the option parameters specified.

Refer to [EAGLE 5 ISS TIF Options Commands](#) on page 54 in this manual and to the `chg-tifopts` 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-tifopts` command.

```
tekelecstp 08-05-04 07:53:46 EST 40.0.0

TIF OPTIONS
-----
IAMCGPN      = dn
NPFLAG      = nm
RCAUSENP    = 0
RCAUSEPFX   = 0
NPTYPE      = sprn
NPTYPECGPN  = sprn
ACLEN       = 3
SPLITIAM    = none
CONDCGPN    = none
CRPREL      = 15
RNRQD       = yes
DFLTRN      = none
DLMA        = none
DLMB        = none
DLMC        = none
SNSCGPNDFLT = ANY
MATCHSEQ    = dn
;
```

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.
```

## Provisioning NPP for TIF

Refer to the *Numbering Plan Processor (NPP) Overview* manual and the *Commands Manual*, and see the TIF and TIF feature descriptions in this manual for the required information and procedures to provision NPP components for TIF services.

NPP provisioning is performed in the following sequence for the components that are used for the specified TIF service.

1. Provision the FNAI mnemonic values required for filter matches on the NAI values for the service, using the `chg-npp-serv` command.
2. Provision the NPP Action Sets with the Conditioning Actions, Service Actions, Formatting Actions, and outgoing NAI value that are to be used by TIF and the enabled TIF features, using the `ent-npp-as` command.
3. Provision the Service Rule Sets (Rules that specify the filter values and Action Sets) that are to be used by TIF and the enabled TIF features. Enter the `ent-npp-srs` command.
4. Provision any delimiter values that are used in the outgoing digit string formatting. Enter the `chg-npp-serv` command.
5. Change the service Status to On to allow NPP processing for the specified service. Enter the `chg-npp-serv:svrn=<service name>:status=on` command.

## Turning On TIF Features

Before a TIF feature can be turned on, the feature must be enabled in the EAGLE 5 ISS.

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

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

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

- TIF Number Portability - Part Number 893018901
- TIF SCS Forwarding - Part Number 893022201
- TIF Simple Number Substitution - Part Number 893024001
- TIF Additional Subscriber Data - Part Number 893024501
- TIF Generic Routing Number - Part Number 893025501



After some TIF features are enabled and turned on, they cannot be turned off again. Other TIF features can be turned on and off after they are enabled.

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 08-08-29 16:40:40 EST EAGLE5 40.0.0
The following features have been permanently enabled:
Feature Name          Partnum    Status  Quantity
HC-MIM SLK Capacity   893012707 on       64
TIF Number Portability 893018901 off      ----
TIF SCS Forwarding    893022201 off      ----
TIF Simple Number Subst. 893024001 off      ----
TIF ASD               893024501 off      ----
TIF GRN               893025501 off      ----
E5-SM4G Throughput Cap 893019101 on       ----
;
```

If the entry for the TIF 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 TIF feature in the output is off, continue with [Step 2](#) on page 81.

2. Turn on the TIF 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 08-08-29 16:40:40 EST EAGLE5 40.0.0
The following features have been permanently enabled:
Feature Name          Partnum    Status  Quantity
HC-MIM SLK Capacity   893012707 on       64
TIF Number Portability 893018901 on       ----
TIF SCS Forwarding    893022201 on       ----
TIF Simple Number Subst. 893024001 on       ----
TIF ASD               893024501 on       ----
TIF GRN               893025501 on       ----
E5-SM4G Throughput Cap 893019101 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 On Gateway Screening for Linksets

Enter the `chg-ls` command with the `gwsa`, `gwsn`, and `gwsd` parameters to turn on Gateway Screening for each linkset that will be screened for TIF and the TIF features.

Refer to the procedures in *Database Administration Manual - Gateway Screening* for turning on Gateway Screening for a linkset.

## Turning Off TIF Features

Before a TIF feature can be turned on and off, the feature must be enabled in the EAGLE 5 ISS.

After some TIF features are enabled, they can be turned on and off in the EAGLE 5 ISS.

This procedure is used to turn off the TIF features that can be turned off in the EAGLE 5 ISS. Each TIF feature must be turned off using its feature part number.

- TIF Additional Subscriber Data - Part Number 893024501
- TIF Generic Routing Number - Part Number 893025501

**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 08-08-29 16:40:40 EST EAGLE5 40.0.0
The following features have been permanently enabled:
Feature Name          Partnum    Status    Quantity
HC-MIM SLK Capacity   893012707  on        64
TIF Number Portability 893018901  on        ----
TIF SCS Forwarding    893022201  on        ----
TIF Simple Number Subst. 893024001  on        ----
TIF ASD               893024501  on        ----
TIF GRN               893025501  on        ----
E5-SM4G Throughput Cap 893019101  on        ----
;
```

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

If the status of the TIF feature in the output is on, continue with [Step 2](#) on page 82.

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

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

```
rlghncxa03w 08-08-29 16:40:40 EST EAGLE5 40.0.0
The following features have been permanently enabled:
Feature Name          Partnum    Status    Quantity
HC-MIM SLK Capacity   893012707  on        64
TIF Number Portability 893018901  on        ----
TIF SCS Forwarding    893022201  on        ----
TIF Simple Number Subst. 893024001  on        ----
TIF ASD               893024501  off       ----
TIF GRN               893025501  off       ----
E5-SM4G Throughput Cap 893019101  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.
```

## Activating the E5-SM4G Throughput Capacity Feature

The E5-SM4G Throughput Capacity feature provides up to 75,000 transactions per second when the maximum number of E5-SM4G cards are installed in the EAGLE 5 ISS and one or more EPAP-related features (such as V-Flex) are enabled and turned on.

The E5-SM4G Throughput Capacity feature must be enabled using the E5-SM4G Throughput Capacity feature part number 893019101 and the 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 feature must be purchased before you can receive the feature access key to use to enable the E5-SM4G Throughput Capacity feature. If you are not sure if you have purchased the E5-SM4G Throughput Capacity feature and received the feature access key, contact your Tekelec Sales Representative or Account Representative.

After the 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.

Before the E5-SM4G Throughput Capacity feature can be enabled, the following conditions must exist in the system:

- The E5-SM4G Throughput Capacity feature requires 25 E5-SM4G cards running the VSCCP application to be configured in the system. This feature increases the processing capacity of SCCP traffic for an EAGLE 5 ISS processing EPAP-based traffic to 75,000 transactions per second. If there are no E5-SM4G cards present in the EAGLE 5 ISS, they must be added before the E5-SM4G Throughput Capacity feature can be enabled and turned on. See [Adding a Service Module Card](#) on page 68.



CAUTION

**CAUTION:** Refer to the *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information on the dimensioning rules and the DSM database capacity requirements.

- HIPR cards must be installed in card locations 09 and 10 in all shelves that contain E5-SM4G cards.
- Any TSM cards running the SCCP application must be deleted from the database and physically removed from the system. See [Removing a TSM Card](#) on page 71.
- The database must contain a valid and locked serial number for the EAGLE 5 ISS. The system is shipped with a serial number in the database, but the serial number is not locked. The serial number can be changed, if necessary, and locked after the system is on-site.
- The GTT feature must be turned on.

After the E5-SM4G Throughput Capacity feature has been enabled, the E5-SM4G Throughput Capacity feature status must be set to on (the feature must be “turned on”).

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

```
rlghncxa03w 08-08-29 16:40:40 EST EAGLE5 39.2.0
The following features have been permanently enabled:
Feature Name          Partnum      Status  Quantity
HC-MIM SLK Capacity  893012707   on      64
ATINP                 893022101   on      ----
E5-SM4G Throughput Cap 893019101   on      ----
;
```

- If the `rtrv-ctrl-feat` output shows that the E5-SM4G Throughput Capacity feature is enabled and its status is on, no further action is necessary.
  - If the E5-SM4G Throughput Capacity feature is enabled, and its status is off, go to step [Step 8](#) on page 85.
2. Verify that the GTT feature is on. Enter the `rtrv-feat` command. If the GTT feature is on, the GTT = on field appears in the command output.
    - If the GTT feature is on, shown by the entry GTT = on in the `rtrv-feat` command output, go to [Step 4](#) on page 84.
    - If the GTT feature is off, shown by the entry GTT = off in the `rtrv-feat` command output, continue with [Step 3](#) on page 84.

**Note:** The GTT feature must be purchased before turning it on. If you are not sure whether you have purchased the GTT feature, contact your Tekelec Sales Representative or Account Representative.

After the Global Title Translation (GTT) feature has been turned on with the `chg-feat` command, it cannot be turned off.

3. Turn the GTT feature on, by entering the following command.  
`chg-feat:gtt=on`

Refer to the *Database Administration Manual - Global Title Translation* for more information about turning on and using the GTT feature.

4. Verify the number of E5-SM4G cards that are provisioned in the database using the `rept-stat-gpl:gpl=sccphc` command.
  - If the required number of E5-SM4G cards (25) are provisioned in the database, continue with [Step 5](#) on page 84.
  - If the required number of E5-SM4G cards are not provisioned in the database, go to [Adding a Service Module Card](#) on page 68 to add the required number of E5-SM4G cards to the database. Then continue with [Step 5](#) on page 84.
5. Verify that HIPR cards are installed on all the EAGLE 5 ISS shelves that contain E5-SM4G cards. Enter the `rept-stat-gpl:gpl=hipr` command.

```
tekelecstp 06-12-06 13:24:56 EST EAGLE 37.0.0
GPL Auditing ON

GPL      CARD      RUNNING          APPROVED          TRIAL
HIPR     1109     126-002-000     126-002-000     126-003-000
HIPR     1110     126-002-000     126-002-000     126-003-000
HIPR     1209     126-002-000     126-002-000     126-003-000
HIPR     1210     126-002-000     126-002-000     126-003-000
```

```

HIPR      1309      126-002-000      126-002-000      126-003-000
HIPR      1310      126-002-000      126-002-000      126-003-000
Command Completed.
;

```

- If HIPR cards are installed in the correct shelves, continue with [Step 6](#) on page 85.
  - If HIPR cards are not installed on all the correct shelves, refer to the procedures in the *Installation Manual - EAGLE 5 ISS* to install the HIPR cards. Once the HIPR cards have been installed, continue with [Step 6](#) on page 85.
6. Verify that the system serial number is correct and locked. Enter the `rtrv-serial-num` command to display the system serial number and the lock status.

- If the serial number is correct and locked, continue with [Step 7](#) on page 85.
- If the serial number shown in the output is not correct, enter the correct serial number into the database, using the `ent-serial-num` command without the `lock` parameter. Enter the `rtrv-serial-num` command again to verify that the correct serial number is entered.

```
ent-serial-num:serial=<system serial number>
```

```
rtrv-serial-num
```

- If the serial number is correct but is not locked, lock the serial number. Enter the `ent-serial-num` command, specifying the serial number shown in the `rtrv-serial-num` command output and the `lock=yes` parameter.

```
ent-serial-num:serial=<system serial number>:lock=yes
```

7. Enable the E5-SM4G Throughput Capacity feature by entering the `enable-ctrl-feat` command.

```
enable-ctrl-feat:partnum=893019101:fak=<E5-SM4G Throughput Capacity
feature access key>
```

The value for the feature access key is provided by Tekelec. If you do not have the feature access key for the E5-SM4G Throughput Capacity feature, contact your Tekelec Sales Representative or Account Representative.

**Note:** If you do not want to turn the E5-SM4G Throughput Capacity feature on at this time, go to [Step 9](#) on page 85.

8. Turn the E5-SM4G Throughput Capacity feature on with the `chg-ctrl-feat` command, specifying the E5-SM4G Throughput Capacity feature part number 893019101 and the `status=on` parameter.

```
chg-ctrl-feat:partnum=893019101:status=on
```

After this feature is turned on, it cannot be turned off.

9. Verify the changes by entering the `rtrv-ctrl-feat` command with the E5-SM4G Throughput Capacity feature part number 893019101.

```
rtrv-ctrl-feat:partnum=893019101
```

```

rlghncxa03w 08-08-29 16:40:40 EST  EAGLE5 39.2.0
The following features have been permanently enabled:
Feature Name          Partnum      Status  Quantity
E5-SM4G Throughput Cap 893019101  on      ----
;

```

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

These 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.
```

## TIF Test Tool

The TIF Test Tool can be used to send provisioned ISUP messages to a TIF service to test the call flow for a TIF feature. The test message is used to modify the internal data structure of the service and to study the call flow behaviour when the message is injected into the call path. The test message is never sent out to the network.

The Test Tool provides the following capabilities:

- Define up to 10 ISUP test messages in the TESTMSG table.
- Invoke TIF and NPP to process the a test message.
- Generate a report of the actions taken and the results of the test.

The Test Tool can be invoked as follows:

- After initial provisioning of TIF and NPP, before Gateway Screening is turned on for the linksets, to verify the provisioning
- During TIF feature operation, to quickly debug an issue
- After turning off Gateway Screening for a linkset, to debug an issue or test provisioning changes

The following information can be configured for each test message:

**Table 17: TIF Test Tool Parameters**

Category	Parameter	Range	Default
Called Party Digits	CDPNDGTS	0-32 hexadecimal digits	1234567890
Called Party NAI	CDPNNAI	0-127	0
Calling Party Digits	CGPNDGTS	0-32 hexadecimal digits	1234567890
Calling Party NAI	CGPNNAI	0-127	0
Calling Party Category	CGPNCAT	0-255	0
Active	ACTIVE	No, Yes	No
NM Bits	NMBITS	0-3	0

The `chg-isup-msg` command is used to configure the parameter values for each ISUP test message. The command must specify the message number (one of up to 10 messages) for the message that is being configured.

The `rtrv-isup-msg` command displays the configured messages in the ISUP Message table. Configured information for all messages or for one specified message number can be displayed.

The `tst-msg` command invokes the test. The command must specify the `prot=isup` parameter, the message number for the test, the TIF service (TIF, TIF2, or TIF3), and the mode for displaying the results (full, brief, debug). The most complete and accurate test result information is provided when debug mode is used.

**Note:** The specified message must be set to `Active=Yes` before the test is invoked for the message.

Refer to the *Commands Manual* for descriptions of the commands, parameter values, and output examples.





# Chapter 6

## Maintenance

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### Topics:

- [Hardware Requirements Page 90](#)
- [EPAP Status and Alarms Page 90](#)
- [EPAP System Status Reports Page 92](#)
- [Code and Application Data Loading Page 93](#)

This chapter describes the maintenance information that is available from the EAGLE 5 ISS for the TIF features. The information includes status, alarms (UAMs), and information messages (UIMs).

## Hardware Requirements

TIF features require Service Module cards (DSM cards or E5-SM4G cards) running the VSCCP application. The EAGLE 5 ISS can be equipped with from 1 to 25 Service Module cards to support TIF and EPAP-based features.



### CAUTION:

Having a mix of Service Module cards running the VSCCP application and TSM cards running the SCCP application is not permitted when EPAP-based features are enabled. All TSM cards that are running the SCCP application must be removed from the system before EPAP-based features can be enabled.

TIF features require up to 8 TSM cards running the GLS application for use by the Gateway Screening feature.

## EPAP Status and Alarms

Because EPAP has no direct means of accepting user input or displaying output messages on EAGLE 5 ISS terminals, maintenance, measurements, and status information are routed through a Service Module card. EPAP sends two types of messages to the Service Module card: *EPAP Maintenance Blocks* on page 90 and *DSM Status Requests* on page 91. Each message type is discussed in the following sections.

### 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-mps` and `rept-stat-sccp` commands.

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

- Status of EPAP 'A' - actual states are active, standby, and down (inoperative). Maintenance blocks include a field for this information so that it can be 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 for this information so that it 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 craftsman 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.

## Alarms

Refer to the *Unsolicited Alarms and Information Messages* manual for descriptions and corrective procedures for EAGLE 5 ISS related alarms (UAMs). Refer to the *MPS Platform Software and*

*Maintenance Manual - EAGLE 5 ISS with T1000 AS* for descriptions and corrective procedures for MPS-related alarms.

## TIF UIMs

Refer to the *Unsolicited Alarms and Information Messages* manual for descriptions of EAGLE 5 ISS UIMs.

UIM 1407 is issued when a message that is not ISUP is received by a TIF, TIF2, or TIF3 Stop Action.

UIM 1408 is issued when a TIF modified message is too large to route.

**Table 18: TIF UIMs**

UIM #	Message Text	UIM Format	Output Group
1407	Unexpected SI in TIF Stop Action	I6 (MTP Data Dump)	GWS
1408	TIF: Modified MSU too large to route	I15 (RPT_SCCP_INV_MSG)	APSS

The UIMs listed in [Table 19: Existing ISUP Decode Errors](#) on page 92 are used to handle ISUP decode and encode errors.

**Table 19: Existing ISUP Decode Errors**

Protocol Type	Error Description	UIM #	UIM Text
ISUP	IAM Decode Error (such as length or, missing parameter; the message is routed without modification)	1369	ISUP IAM decode failed
ISUP	IAM Called Party Decode Error, such as missing Called Party digits. The message is routed without modification.	1370	ISUP IAM Cld Pty decode failed
ISUP	Problem encoding IAM or SAM, Unknown DPC in REL	1371	ISUP encode failed

## EPAP System Status Reports

This section describes the following EPAP status reporting:

- System status
- EPAP-based feature status
- DSM memory capacity status
- Loading mode support status

### System Status Reporting

The `rept-stat-sys` command and the `rept-stat-sccp` command supports the Service Module cards running the VSCCP application. EPAP-based feature statistics are reported in the `rept-stat-sccp` command. Refer to the *Commands Manual* for descriptions of the commands and their output.

### MPS Status Reporting

The `rept-stat-mps` command reports the status of the MPS system, particularly the provisioning system. See [Maintenance Commands](#) on page 58 for more details.

### DSM Memory Capacity Status Reporting

As mentioned in the [DSM Status Reporting to the EPAP](#) on page 91, the Service Module card sends a message to the EPAP containing the amount of memory on the Service Module board. The EPAP determines whether the DSM has enough memory to store the RTDB and sends an ack or nak back to the Service Module card indicating whether or not the Service Module card has an adequate amount of memory. Refer to the *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information on the dimensioning rules and the DSM database capacity requirements.

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

### Loading Mode Support Status Reporting

The OAM application determines whether or not 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 [EPAP Application Data Loading](#) on page 93 for more details.

## 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 STP portion of the database has completed loading and is waiting for the RTDB to download.

### DSM Code Loading

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

## EPAP Application Data Loading

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

The VSCCP GPL application data loader registers all tables for loading, independent of EPAP-based feature provisioning and main board and 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 EPAP-based features.

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

### **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.

### **VSCCP Capacity**

An insufficient number of Service Module cards that are in an IS-NR or OOS-MT-DSBLD state 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 LIM cards 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 LIM cards. This is called “insufficient SCCP service.” When this occurs, some of the LIM cards 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**

Current system implementation interrupts and stops 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 in an IS-NR or OOS-MT-DSBLD state.
- The number of IS-NR and OOS-MT-DSBLD Service Module cards 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-DSBLD, IS-ANR).

### **Actions Taken When the System is 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.
- The `rept-stat-sys` command reports unstable loading mode.

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

- No EAGLE 5 ISS database updates allowed.

When in an unstable loading mode, the EAGLE 5 ISS does not accept database updates. When updates are rejected, the reason is given as: E3112 Cmd Rej: Loading Mode unstable due to SCCP service is deficient.

The `inh-card` and `alw-card` commands can be used to alter SCCP service levels to achieve the 80% threshold. This can be repeated for each card until the system is able to supply SCCP services to at least 80% of the IS-NR LIM cards. The remaining 20% LIM or supporting Service Module cards may remain out of service until the stream of database updates ceases. This stream of updates can be temporarily interrupted to allow the remaining 20% of the system to come in service.

Once an EAGLE 5 ISS database has been loaded, that database can be updated (as long as the system is not in an unstable loading mode). However, if an database update comes in during EAGLE 5 ISS database loading, the Service Module card stops the current loading, issues a class 01D7 obit, and reboots. The obit is shown in the following example.

**Figure 20: Obit Message for Abort of Card Loading**

```

tekelecstp 97-04-08 12:29:04 EAGLE 35.0.0
-----
Card 1317  Module RADB_MGR.C  Line 337  Class 01d7
Card 1317  Module RADB_MGR.C  Line 337  Class 01d7
Register Dump :
    EFL=00000246   CS =0058           EIP=0000808d   SS =0060
    EAX=000a6ff3   ECX=000a0005   EDX=00000000   EBX=000a6fa0
    ESP=00108828   EBP=0010882c   ESI=001f1e10   EDI=00000000
    DS =0060       ES =0060       FS =0060       GS =0060

Stack Dump :
[SP+1E]=001f   [SP+16]=0000   [SP+0E]=000a   [SP+06]=0010
[SP+1C]=1e10   [SP+14]=0004   [SP+0C]=6fa0   [SP+04]=8850
[SP+1A]=0010   [SP+12]=001f   [SP+0A]=0004   [SP+02]=0001
[SP+18]=886c   [SP+10]=4928   [SP+08]=7ec3   [SP+00]=504b

User Data Dump :

14 02 fa ed 01 01 1d 01 5a 01 00           .....Z..

Report Date:97-04-08  Time:12:29:04

```

### Using the force Option

Use the force option to execute commands that would put the system in unstable loading mode. If executing the `ent-card` command or `inh-card` command would cause the system to enter an unstable loading mode, use the force option in the command.





# Glossary

## D

DCB Device Control Block

## E

EPAP EAGLE Provisioning Application Processor

## M

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

## P

PDB Provisioning Database



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