Tekelec EAGLE® 5 Integrated Signaling System

Feature Manual - IS41 GSM Migration

910-5733-001 Revision A

June 2009

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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

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Chapter 1

Migration Introduction

Topics:

This chapter provides a brief description of the IS41GSM Migration (IGM) feature of the EAGLE 5 Integrated Signaling System. The chapter also includes the scope, audience, and organization of the manual; how to find related publications; and how to contact Tekelec for assistance.

Overview

This manual provides a description, along with commands, maintenance, measurements, and configuration details associated with the Migration (IGM) feature of the EAGLE 5 ISS (Integrated Signaling System).

The IGM feature provides the mobile wireless service provider a way to migrate subscribers from IS-41 to GSM and GSM to IS-41. Once the subscriber is marked as migrated, the GSM handset is fully functional, and the migrated subscriber has the option whether to continue to receive calls on the IS-41 or GSM handset.

The Migration feature is based on the EAGLE 5 ISS platform. It is deployed in a node that is also performing the STP function.

Number lengths vary between countries and may even vary within a country. As a result, the IGM database structure supports numbers of varying length in a flexible way without necessitating software modifications. A maximum number length of 15 digits for ported numbers is supported.

Migration is an optional feature on the EAGLE 5 ISS, and can be enabled and turned on, but not off, via a feature access key. Note that Migration requires the Global Title Translation (GTT) feature and that Migration and North American LNP (Local Number Portability) are mutually exclusive on an EAGLE 5 ISS node.

Scope and Audience

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

Manual Organization

This document is organized into the following chapters:

- *Migration Introduction* on page 1 contains general information about the IGM documentation, the organization of this manual, and how to request technical assistance.
- *Feature Description* on page 9 provides a functional description of the IGM feature, including network perspectives, assumptions and limitations, a database overview, Service Module card provisioning and reloading, IGM user interface, and an audit overview.
- *EAGLE 5 ISS Migration Commands* on page 45 describes the commands that support the IGM feature, sample reports, and explanations of appropriate command usage.
- *Migration Feature Activation* on page 65 describes how to activate the IGM feature.
- *Maintenance and Measurements* on page 101 describes maintenance and measurements, including EPAP status and alarms, hardware verification messages, IGM system status reports and commands, code and application data loading, and alarms.

Documentation Admonishments

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

Table 1: Admonishments

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

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

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:

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- **USA and Canada**

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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.

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*). 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.

Locate Product Documentation on the Customer Support Site

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

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

Chapter 2

Feature Description

Topics:

This chapter describes the IS41 GSM Migration (IGM) feature.

Introduction

The IS41 GSM Migration (IGM) feature supports call termination for customers to migrate from IS-41 to GSM and GSM to IS-41 wireless technology. This is referred to as Portability Type = 5 (PT = 5). This feature provides the mobile wireless service provider a way to migrate subscribers from IS-41 to GSM and GSM to IS-41. Once the subscriber is marked as migrated, the GSM handset is fully functional, and the migrated subscriber has the option whether to continue to receive calls on the IS-41 or GSM handset.

The IGM is based on the EAGLE 5 ISS platform. It is deployed in a node that is also performing the STP function.

IGM provides the ability for subscribers to change service providers while retaining their Mobile Dialed Number (MDN). IGM uses EPAP provisioning database (also used by G-Port, INP, EIR, G-Flex, and the A-Port features) to maintain subscriber portability/migration information. Subscriber information in the EPAP provisioning database is keyed by Mobile MDNs for ANSI-41 subscribers and Mobile Station International ISDN Number (MSISDNs) for GSM subscribers.

Note: IGM treats only those DN entries assigned with SP/PT= 5, No NE/PT=5, or assigned with RN/PT= 0 as migrated subscribers. Any other types of NE/PT assignments are not considered as migrated or ported subscribers.

Two types of subscriber entries, migrated and non-migrated subscribers are supported. For migrated subscribers, the subscriber entries are entered with No NE/PT=5, SP/PT=5, and RN/PT=0. All other entries are non-migrated subscribers. Migration also supports DN block entries.

The ETSI standards are defined so that GSM carriers can choose to implement either Signaling Relay Function (SRF)-based (using MAP protocol) MNP or IN-based (using INAP protocol) MNP. Migration supports only the SRF-based solution for MNP. (INAP-based MNP processing is similar to wireline networks; this function is supported by the INP feature.)

Message Interception

SRF-based MNP processing involves the “intercepting” of existing MAP messages to check for ported numbers. For call-related messages, IGM acts as a “NP HLR” in the case where the number has been exported, by responding to the switch with a SRI, SRI-SM, LOCREQ, and SMSREQ ack messages. For non-migrated calls, IGM performs message relay.

Routing Options

The ETSI standards for SRF-based MNP define two routing options, direct routing and indirect routing. IGM supports both options:

- With direct routing, the network where the call is originated is responsible for determining whether the called party has ported and routing the call to the new subscription network.
- With indirect routing, this is the responsibility of the network that originally owned the number.

Number Lengths

Number lengths vary between countries and may even vary within a country. As a result, the Migration Database structure supports numbers of varying length in a flexible way without

necessitating software modifications. A maximum number length of 15 digits for ported numbers is supported.

Supported Messages

IGM utilizes the EPAP database to derive the portability status of a subscriber. This feature supports LOCREQ messages as well as SMSREQ messages (if the option is selected) for number portability handling. LOCREQ messages generate a LOCREQ response if the mobile dialed number (MDN) is migrated and relays the LOCREQ if the MDN is not ported (non-ported or ported in are handled the same way). SMSREQ messages generate a SMSREQ NAK if access is denied and relays the SMSREQ if SMSREQ BYPASS is set to false. SRI generates an ACK if the MSISDN is migrated, and relays the message if the dialed number is not migrated. SRI-SM generates an ACK if the dialed number is migrated, and relays the message if it is not.

MTP Msgs for SCCP Apps

If the MTP Msgs for SCCP Apps feature is turned on, all MTP-routed UDT and non-segmented XUDT SCCP messages are routed to Service Module cards. The Service Module card then performs SCCP decode/verification on MTP-routed messages. If the MTP-routed messages have CDPA GTI = 0, and the IGM feature is turned on, then the message is sent for IGM processing. If the MTP-routed messages have CDPA GTI ≠ 0, then SRVSEL lookup is performed using the SCCP CDPA information. If the result of the lookup is MNP service, the MTP routed messages are sent for MNP handling. MNP begins IGM general TCAP/MAP verification if the message is ANSI TCAP and IGM feature is turned on.

MNP Circular Route Prevention

The MNP Circular Route Prevention (MNP CRP) feature is an extension of the IGM feature which helps in cases of circular routing caused by incorrect information in one or more of the network number portability databases. For example, a subscriber may have ported from network A to network B. Network A has the correct routing information, indicating the subscriber now belongs to network B. However, network B may have incorrect routing information, indicating that the subscriber still belongs to network A. In this case, network A routes the call to network B, based on its portability data, but network B routes the call back to network A, based on its incorrect data. This results in a circular route. The MNP CRP feature provides the logic to prevent this scenario. This feature is enabled and turned-on using Feature Access Key (FAK) commands.

DigitAction Expansion

The DigitAction Expansion feature provides more flexibility to formulate the SCCP Called Party Address (SCCP) Global Title Address (GTA) field of the MAP messages relayed by IGM.

DigitAction Expansion is provisioned via the PDBI Enter Network Entity or Update Network Entity commands. DigitAction Expansion can also be modified via the Add an NE and Update an NE GUI screens.

MNP SCCP Service Re-Route

The MNP SCCP Service Re-Route feature is used when the IGM subscriber database is incoherent with MPS data and the GTT data is valid. The MNP SCCP Service Re-Route feature provides the capability to re-route the traffic from the EAGLE 5 ISS to other IGM subscriber database nodes and inform the originating nodes to re-route the IGM service related traffic to other IGM service nodes.

The MNP SCCP Service Re-Route feature is designed to handle and control re-routing of IGM traffic from an affected node to alternate nodes within an operators network. This feature is an optional feature and doesn't affect the normal IGM function. This feature also provides the option to mark IGM OFFLINE to perform a controlled re-routing during this state.

IS412GSM Migration Changes

For systems that are upgraded to the IGM feature, the upgrade process sets an SCCP option to on if the G-Port feature is turned on and the IS412GSM prefix is defined. If the G-Port feature is turned on and the IS412GSM prefix is not defined, the upgrade process sets the SCCP option to off. The default setting for new systems is off (disabled).

The EAGLE 5 ISS populates a new GSM2IS41 prefix following the same mechanism that is used for the existing IS412GSM prefix. The EAGLE 5 ISS returns a GSM2IS41 prefix in the SRI_ACK message if a received SRI message is destined for a non-migrated IS41 or GSM migrated IS41 subscriber (a data entry is found with RN and PT=0).

MPS/EPAP Platform

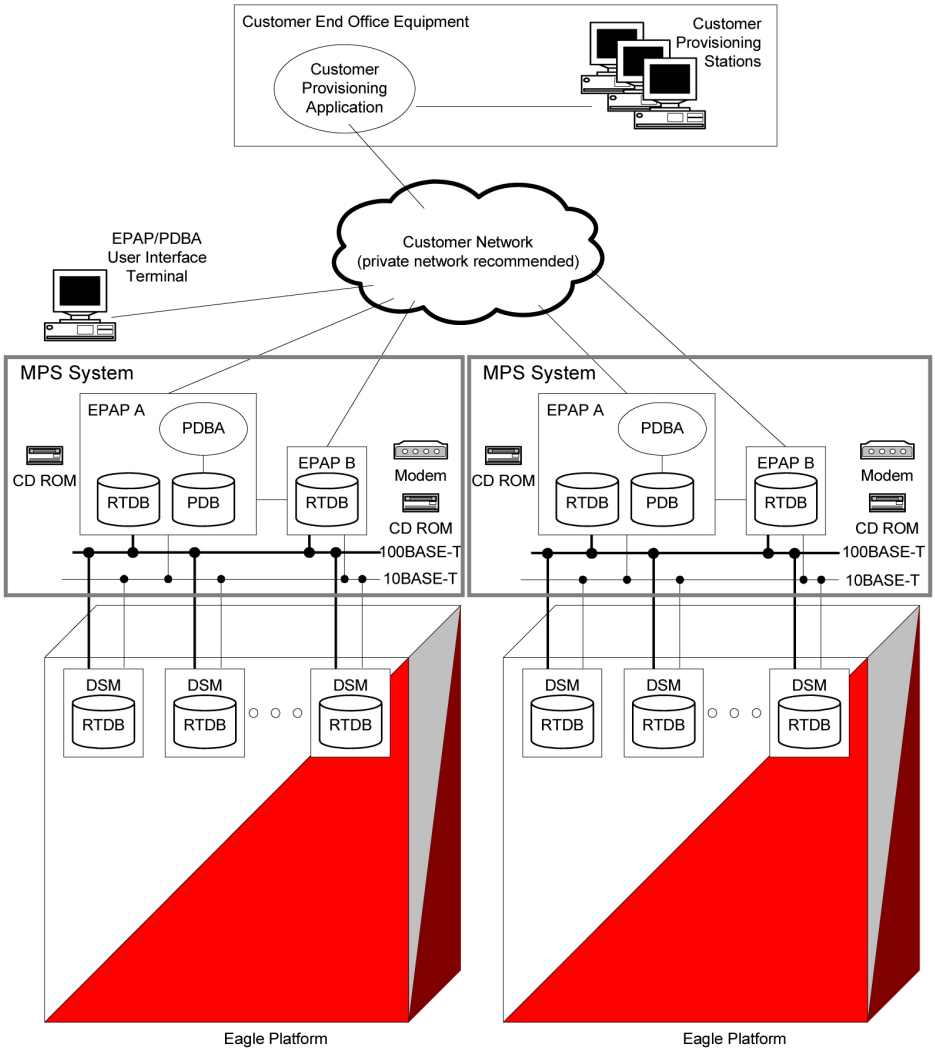
Tekelec provides the MPS (Multi-Purpose Server) platform as a subsystem of the EAGLE 5 ISS. The MPS provides support for the AINPQ, A-Port, EIR , G-Flex, G-Port, IGM, and INP features.

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. *Figure 1: MPS/EPAP Platform Architecture* on page 12 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 Service Module card databases.

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

Figure 1: MPS/EPAP Platform Architecture



Design Overview and System Layout

Figure 1: MPS/EPAP Platform Architecture on page 12 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 database 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.

The major modules on the EPAP are:

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

The Service Module card provisioning module is responsible for updating subscriber databases on the EAGLE 5 ISS Service Module cards using the Reliable Multicast Transport Protocol (RMTP) multicast. The maintenance module is responsible for the proper functioning of the EPAP platform. The PDB module is responsible for preparing and maintaining the Real Time Database, which is the "golden copy" of the subscriber database. The PDB module can run on one of the EPAPs of either 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 database 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-Service Module card provisioning task sends database information out on the provisioning link. The Service Module cards act as the receivers and are reprovisioned.

EPAP/PDBA Overview

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

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

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

The EPAP platform performs the following:

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

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

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

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

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

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

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

Each EPAP server maintains a copy of the Real Time Database (RTDB) in order to provision the EAGLE 5 ISS Service Module cards. The EPAP server must comply with the hardware requirements in the *MPS Hardware Manual*. *Figure 1: MPS/EPAP Platform Architecture* on page 12 illustrates the EPAP architecture contained in the MPS subsystem.

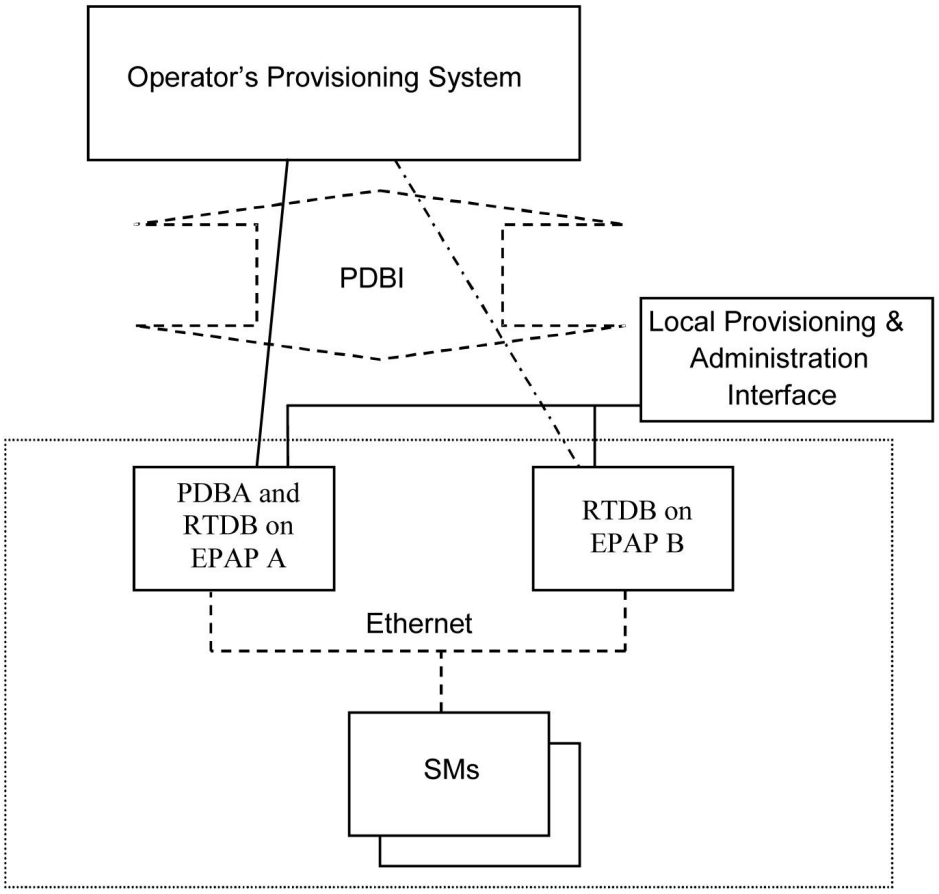
Each EPAP has a dedicated optical media drive. One EPAP per EAGLE 5 ISS platform has a modem capable of supporting remote diagnostics, configuration, and maintenance. These remote operations are performed through EPAP login sessions and are accessible across the customer network as well as through a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

Subscriber Data Provisioning

Figure 2: Subscriber Data Provisioning Architecture (High Level) on page 16 shows the current high-level view of the subscriber data provisioning architecture. Only those parts of the EAGLE 5 ISS platform that are relevant to subscriber data provisioning are shown. This section defines requirements for the Provisioning Database Interface (PDBI) between the EPAP and the operator's provisioning system (OPS). Provisioning clients connect to the EPAPs via the PDBI. This interface contains commands that allow all of the provisioning and retrieving of subscription data. The

PDBI is used for real-time provisioning of subscriber and network entity data only. Refer to the *Provisioning Database Interface Manual* for more details.

Figure 2: Subscriber Data Provisioning Architecture (High Level)



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

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

Distributed Administrative Architecture

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

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

An EPAP consists of a combined Provisioning (MySQL) and Real Time Database (RTDB). The Provisioning Database (PDB) responds to requests for updates by the active and standby RTDBs on both mated EAGLE 5 ISSs. The active EPAP RTDB is responsible for initiating multi-cast updates of changed database records to the Service Module cards after the data has been committed to the

EPAP disks. Furthermore, the PDB may accept and commit more database updates while the RTDBs are completing their previous updates.

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

The EPAP architecture contains a local provisioning terminal and a modem for remote access, as well as other functions. A backup device can be used to back up or restore the provisioning database. The local provisioning terminal is used to manually repair the standby EPAP RTDB or to turn the subscriber database audit on or off. For additional information, refer to the *Tekelec T1000 Application Server Hardware Manual* and *EPAP Administration Manual*.

EPAP (EAGLE Provisioning Application Processor)

As shown in *Figure 1: MPS/EPAP Platform Architecture* on page 12, a single MPS system contains two EPAP (EAGLE Provisioning Application Processor) servers. At any given time, only one actively communicates with the Service Module cards. The other EPAP server is in standby mode. In addition, two MPS systems can be deployed in a mated-pair configuration.

The primary purpose of the EPAP systems is to maintain the RTDB and PDB and to download copies of the RTDB to the Service Module cards on the EAGLE 5 ISS.

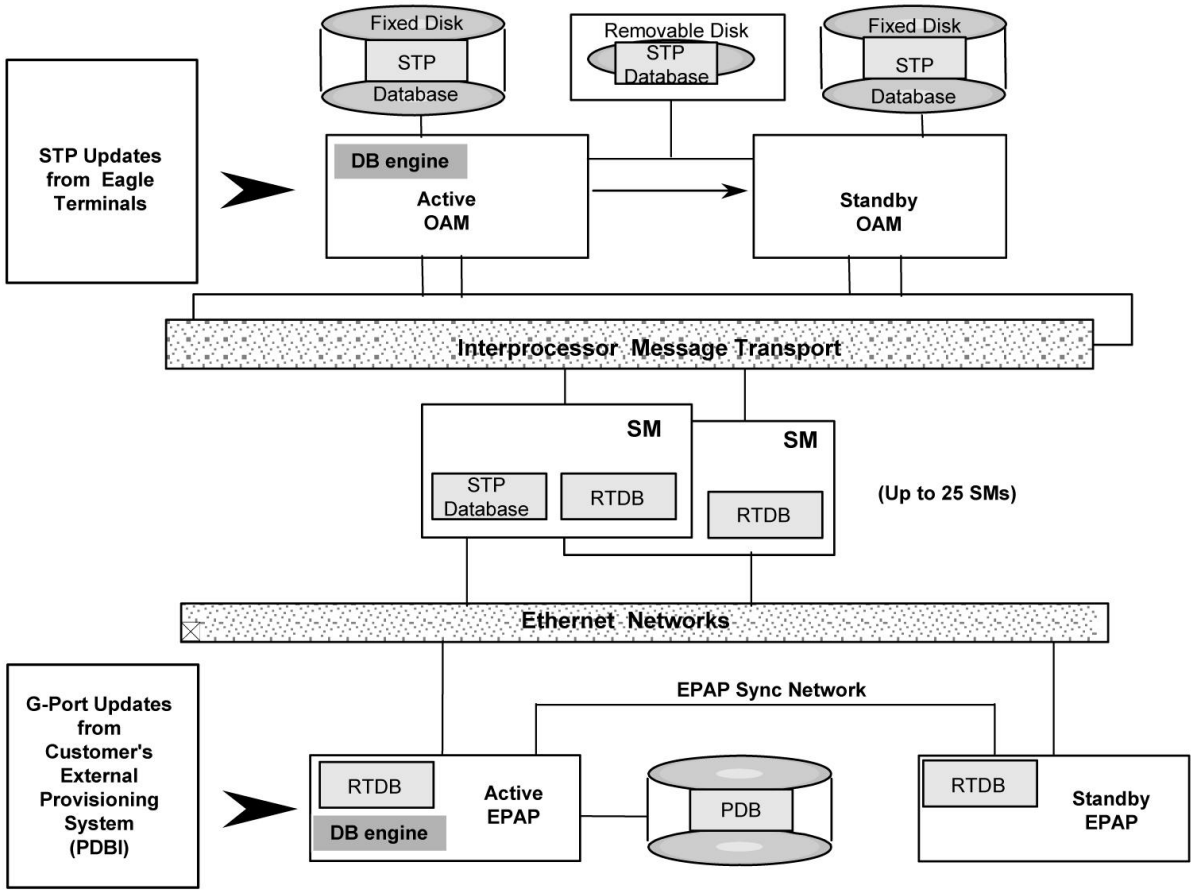
The PDB on the active EPAP receives subscription data from the customer network through the PDBI, the external source of provisioning information. The PDBA continually updates the active EPAP's PDB. The PDB uses MySQL database software. Once an update is applied to the active PDB, it is sent to the RTDBs on the active and standby EPAPs.

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

In a mated-pair configuration, there are two mated MPS Systems, as shown in *Figure 1: MPS/EPAP Platform Architecture* on page 12. The PDB on the active EPAP automatically updates the PDB on the mate platform. The PDB on the mate platform then updates its EPAP RTDBs, which in turn update the RTDBs on the associated Service Module cards.

Provisioning of the EAGLE 5 ISS's Service Module cards is performed through two interfaces, using two different sets of commands. Provisioning is accomplished by the STP updates from EAGLE 5 ISS terminals and by updates from the customer's external provisioning system. This system of dual provisioning is illustrated in *Figure 3: Database Administrative Architecture* on page 17.

Figure 3: Database Administrative Architecture



Service Module Cards

From 1 to 25 Service Module cards can be provisioned with one or more EPAP-related features enabled. EPAP-related features require that all Service Module cards contain 4 GB of memory. *Figure 3: Database Administrative Architecture* on page 17 illustrates each Service Module card having two Ethernet links, the main Service Module network on the 100BASE-T link and the backup Service Module network on the 10BASE-T link. The Service Module cards run the VSCCP software application.

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

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

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

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

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

Overview of EPAP to Service Module Card Communications

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

- UDP - sending Service Module card status messages

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

- IP - reporting EPAP maintenance data

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

- IP Multicast - downloading GSM database

  Because of the large size of the database and the need to download it quickly on up to 25 Service Module cards, EPAP-related features use a technique known as IP multicasting. This technique is based on Reliable Multicast Transport Protocol-II (RMTP-II), a product of Globalcast Communications. IP multicasting downloads the RTDB and database updates to all of the Service Module cards simultaneously.

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

Service Module Card Provisioning and Reload

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

- EPAP A, Link A (on the main DSM network, 100BASE-T)

- EPAP A, Link B (on the backup DSM network, 10BASE-T)
- EPAP B, Link A (on the main DSM network, 100BASE-T)
- EPAP B, Link B (on the backup DSM network, 10BASE-T)

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

The Service Module cards do the following:

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

Service Module Card Reload Model

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

EPAP Continuous Reload

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

Service Module Card Database Levels and Reloading

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

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

- **Stage 1 loading**: The database is being copied record for record from the golden RTDB in the EPAP to the Service Module card RTDB. The database is incoherent during stage 1 loading.
- **Incremental update**: The database is receiving all of the updates missed during stage 1 loading or some other reason (e.g., network outage, processor limitation, lost communication, etc.). The database is coherent, but back-level during incremental update.
- **Current**: The database is receiving current updates from the Service Module card provisioning task.

- **Coherent:** The database is at a whole database level, that is, not currently updating records belonging to a database level.

EPAP Status and Error Reporting via Maintenance Blocks

The EPAPs forward all status and error messages to the Service Module cards in maintenance blocks. Maintenance blocks are asynchronously sent whenever the EPAP has something to report. The maintenance blocks eventually update EPAP Device Control Blocks (DCBs) located on the EAGLE 5 ISS. The DCBs provide the status information that is received when a `rept-stat-mps` command is issued.

Network Connections

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

- *Customer Provisioning Network* on page 21
- *EPAP Sync Network* on page 22
- *DSM Networks* on page 23
- *Dial-Up PPP Network* on page 24

The following discussion is an overview of these private networks. It expands on the networks in the architecture diagram shown in *Figure 4: Customer Provisioning Network* on page 21. (For details about configuring these networks, refer to the EPAP *Administration Manual*.)

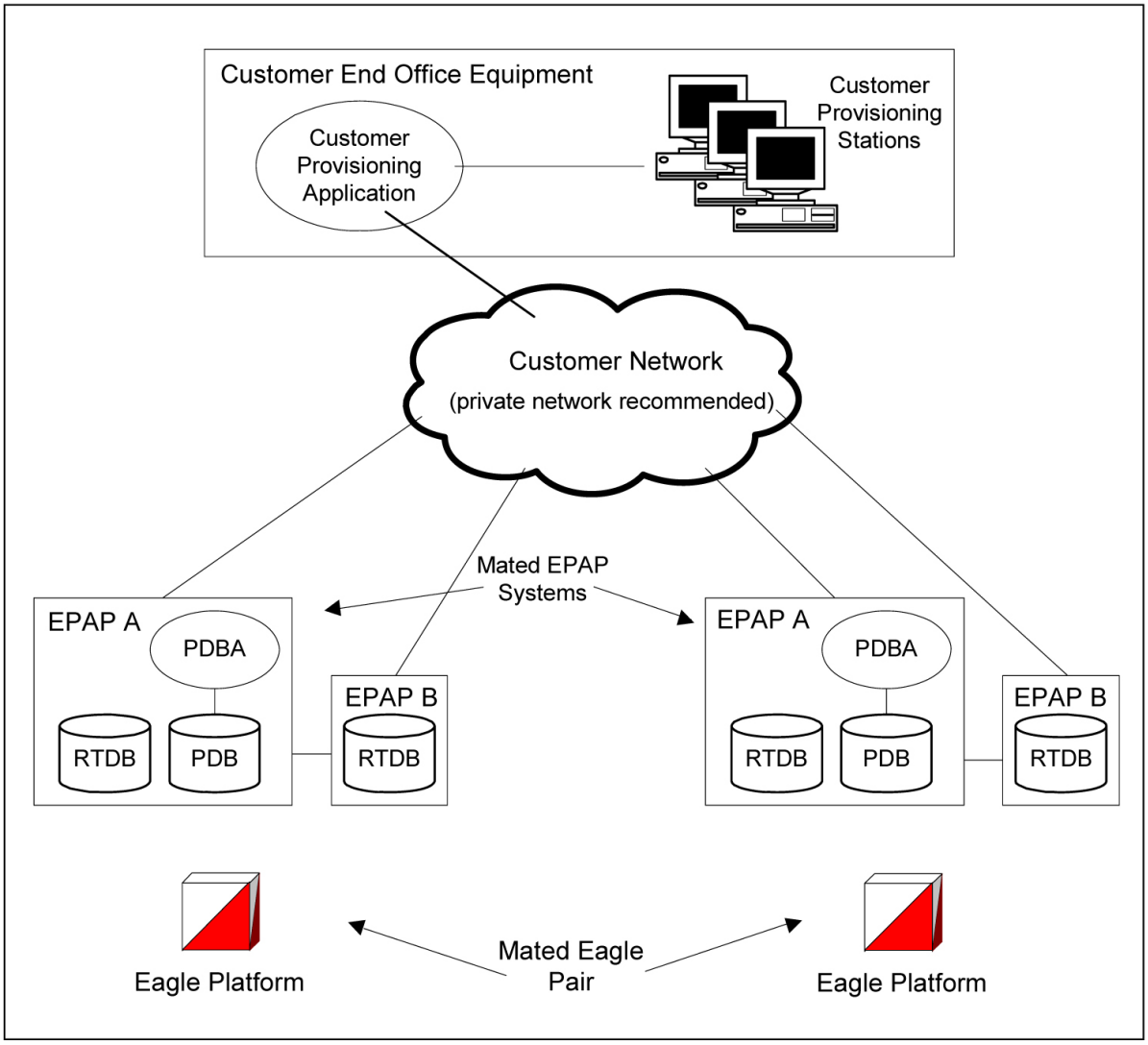
Customer Provisioning Network

The customer network carries the following traffic:

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

A typical customer network is shown in *Figure 4: Customer Provisioning Network* on page 21.

Figure 4: Customer Provisioning Network

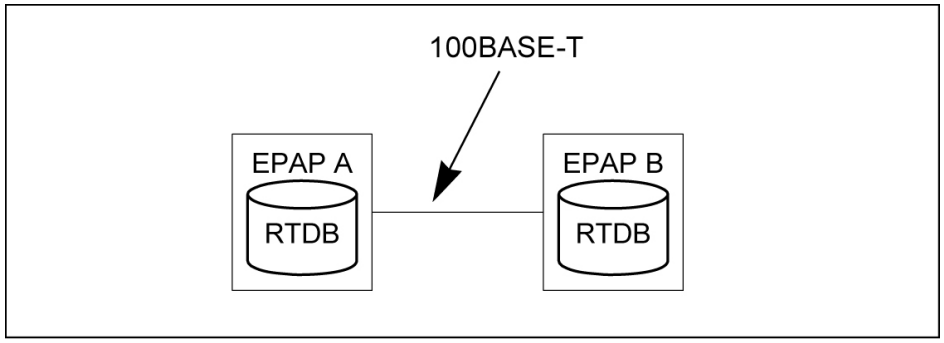


Although a dedicated network is recommended, it is possible that unrelated customer traffic can use the network as well. The determination, either to have a dedicated network or to allow other customer traffic, should be based on available external Ethernet bandwidth and network performance considerations.

EPAP Sync Network

The EPAP sync network carries RTDB and maintenance application traffic between active and standby EPAP servers on an MPS system. It synchronizes the contents of the RTDBs of both EPAP A and B. The EPAP Sync network is a single Ethernet connection between EPAP A and EPAP B running at 100BASE-T, as shown in *Figure 5: EPAP Sync Network* on page 22.

Figure 5: EPAP Sync Network

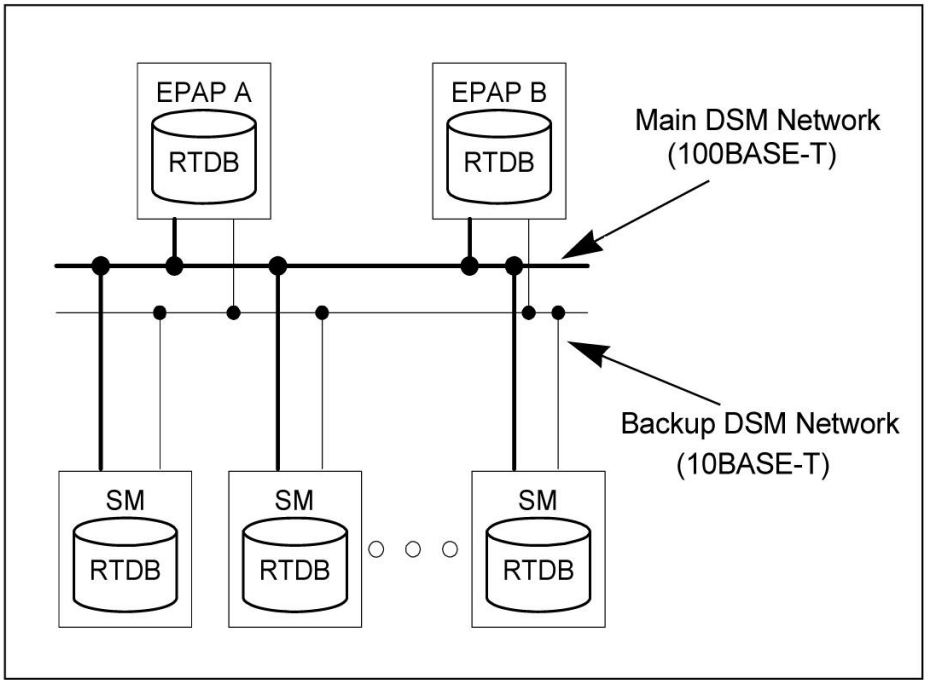


DSM Networks

The DSM networks are shown in *Figure 6: DSM Networks* on page 23. They carry provisioning data from the active EPAP RTDB to the Service Module cards. They also carry reload and maintenance traffic to the Service Module cards.

The DSM networks consist of two Ethernet networks: the main DSM network running at 100BASE-T, and the backup DSM network running at 10BASE-T. Both Ethernet networks connect EPAP A and EPAP B with every Service Module card on a single EAGLE 5 ISS platform.

Figure 6: DSM Networks



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

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

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

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

The fourth octet of the address is specified as follows:

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

Table 2: EPAP IP Addresses in the DSM Network on page 24 summarizes the contents of each octet.

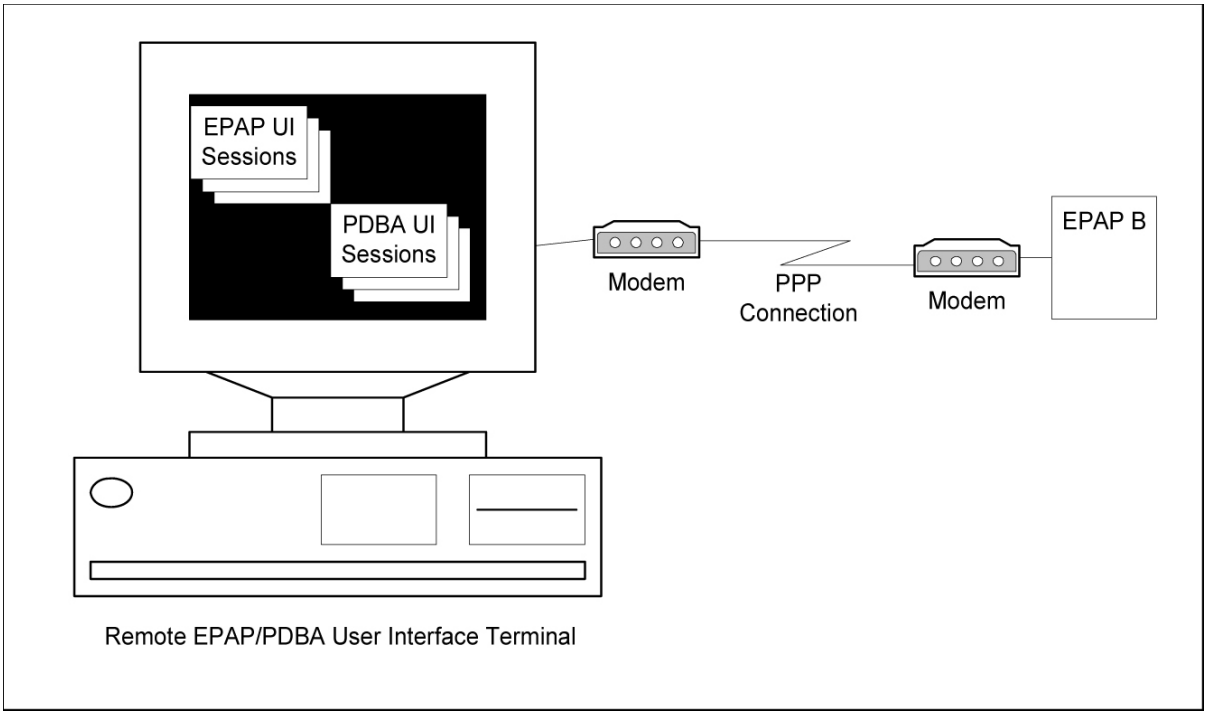
Table 2: EPAP IP Addresses in the DSM Network

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

Dial-Up PPP Network

The dial-up PPP network allows multiple user-interface sessions to be established with the EPAP. The network connects a remote EPAP/PDBA user interface terminal with the EPAP in the EAGLE 5 ISS’s MPS subsystem. The dial-up PPP network is illustrated in *Figure 7: Dial-Up PPP Network* on page 24.

Figure 7: Dial-Up PPP Network



IGM Protocol

IGM provides the following main functions:

Message Discrimination

Because IGM provides translation of migrated and non-migrated numbers, it provides a method to identify which messages need migration handling versus GTT. This task of identification is provided via a service selector table where the user defines the service for a combination of selectors.

Operation Code Discrimination

IGM handles ANSI Loc_Req, SMSREQ, GSM SRI, and SRI_SM differently than other ANSI/GSM operation codes. The Portability type field is only considered for these operation codes. Message relay is performed for all other operation codes based on IGM Translation data.

Number Conditioning

The RTDB stores International MSISDN only. IGM provides the capability to condition incoming numbers to be international MSISDN (Insert CC or/and NDC) for the database look up. IGM removes the GSM prefix from GSM SRI messages and then conditions the non-international numbers to international numbers, if needed, before performing any database lookup.

IS412GSM

IGM generates a Loc_Req Return Result Response, when the MDN in the Loc_Req is a "Migrated with one handset" subscriber. When formulating a Loc_Req response, IGM uses the IS412GSM prefix in GSMOPTS to build the Routing Digits. If the IS412GSM prefix is not provisioned, IGM issues UIM 1130 “LOCREQ rcvd - IS412GSM not provisioned” and falls through to GTT.

GSM2IS41

The GSM2IS41 prefix is used in the SRI-ack if the message received is SRI and DN lookup has RN and PT = 0 assigned. If MIGRPFX = MULTPLE then the RN from the RTDB is used as the prefix in the SRI ack message. If MIGRPFX = SINGLE and GSM2IS41 prefix is NONE, then the SRI ack message issues UIM 1341 "SRI rcvd GSM2is41 prefix not provisioned" and the message falls through to GTT.

Database Lookup

IGM performs the RTDB database lookup using the international MSISDN.

The individual number database is searched first:

- If the number is not found, the number range database is searched.
- If a match is not found in the individual and range-based database, the GTT is performed on the message.

In the event of the MSISDN numbers in the RTDB database being odd and CDPA GTI of the incoming message being ‘2’, and the last digit of the number is 'zero':

- IGM first performs database lookup one time using the even number.
- If no match is found, IGM again performs the database lookup, using the odd number (without last digit).

Since a DN may be the target of the A-Port, G-Port, or IGM message processing in a hybrid network (where an operator owns both GSM and IS41 network), message processing call disposition is based on what applications are in service. *Table 3: IGM Customer Message Processing* on page 27 through *Table 7: IGM, A-Port, and G-Port Customer Message Processing* on page 31 show call dispositions for the following configurations:

- IGM Only (*Table 3: IGM Customer Message Processing* on page 27)
- IS41 GSM Migration Only *Table 4: IS412GSM Migration Customer Message Processing* on page 28
- IGM and G-Port (*Table 5: IGM and G-Port Customer Message Processing* on page 29)
- IGM and A-Port (*Table 6: IGM and A-Port Message Processing* on page 30)
- A-Port, G-Port, and IGM (*Table 7: IGM, A-Port, and G-Port Customer Message Processing* on page 31

  The following notations apply to *Table 3: IGM Customer Message Processing* on page 27through *Table 7: IGM, A-Port, and G-Port Customer Message Processing* on page 31.

  PT = Portability Type for the DN

  Values:

  - **0** – not known to be ported

- **1** – own number ported out
- **2** – foreign number ported to foreign network
- **3** – prepaid 1 (used by PPSMS)
- **4** – prepaid 2 (used by PPSMS)
- **5** – migrated with one handset

RN = Routing Number

SP = Signaling Point

NE = Network Entity

SP* : This row refers to DN is assigned with SP, with or without PT. SP**: This row refers to DN is assigned with SP without PT. DN blocks are commonly assigned with SP and without PT.

Table 3: IGM Customer Message Processing

NE/PT	SRI	SRI_SM	Other GSM	LOCREQ	SMSREQ	Other IS41
RN and PT = 0	MIGRPFX= single: ACK (use GSM2IS41 prefix) MIGRPFX= multiple: ACK (RN from EPAP)	SRI_SM_ACK with Return Error Component	Relay	Relay	Relay	Relay
RN and PT ≠ 0	GTT	GTT	GTT	GTT	GTT	GTT
SP and PT = 5	Relay	Relay	Relay	ACK (IS412GSM prefix)	smsreq (SMS Access Denied Reason = 5) GTT (if smsreqbypass = true	Relay
SP and PT ≠ 5	Relay	Relay	Relay	Relay	Relay	Relay
No NE and PT = 0	ACK (no NE)	GTT	GTT	GTT	GTT	GTT

NE/PT	SRI	SRI_SM	Other GSM	LOCREQ	SMSREQ	Other IS41
No NE and PT=1, 2, or No PT	GTT	GTT	GTT	GTT	GTT	GTT
No NE and PT = 5	GTT	GTT	GTT	ACK (IS412GSM prefix)	smsreq (SMS Access Denied Reason = 5) GTT (if smsreqbypass = true	GTT
No DN entry found	GTT	GTT	GTT	GTT	GTT	GTT

Table 4: IS412GSM Migration Customer Message Processing

NE/PT	SRI	SRI_SM	Other GSM	LOCREQ	SMSREQ	Other IS41
RN and PT = 0	ACK (RN from EPAP)	SRI_SM_ACK with Return Error Component	Relay	Relay	Relay	Relay
RN and PT ≠ 0	ACK (RN from EPAP)	Relay	Relay	Relay	Relay	Relay
SP and PT = 5	Relay	Relay	Relay	ACK (IS412GSM prefix)	smsreq (SMS Access Denied Reason = 5)	Relay
SP and PT ≠ 5	Relay	Relay	Relay	Relay	Relay	Relay
No NE and PT= 0, 1, 2, or No PT	ACK (no NE)	GTT	GTT	GTT	GTT	GTT
No NE and PT = 5	GTT	GTT	GTT	ACK (IS412GSM prefix)	smsreq (SMS Access	GTT

NE/PT	SRI	SRI_SM	Other GSM	LOCREQ	SMSREQ	Other IS41
					Denied Reason = 5)	
No DN entry found	GTT	GTT	GTT	GTT	GTT	GTT

Table 5: IGM and G-Port Customer Message Processing

NE/PT	SRI	SRI_SM	Other GSM	LOCREQ	SMSREQ	Other IS41
RN and PT = 0	MIGRPFX= single: ACK (use GSM2IS41 prefix) MIGRPFX= multiple: ACK (RN from EPAP)	SRI_SM_ACK with Return Error Component	Relay	Relay	Relay	Relay
RN and PT ≠ 0	ACK (RN from EPAP)	Relay	Relay	GTT	GTT	GTT
SP and PT = 5	Relay	Relay	Relay	ACK (IS412GSM prefix)	smsreq (SMS Access Denied Reason = 5) Relay (if smsreqbypass = false)	Relay
SP and PT ≠ 5	Relay	Relay	Relay	Relay	Relay	Relay
No NE and PT = 5	GTT	GTT	GTT	ACK (IS412GSM prefix)	smsreq (SMS Access Denied Reason = 5) GTT (if smsreqbypass = true)	GTT

NE/PT	SRI	SRI_SM	Other GSM	LOCREQ	SMSREQ	Other IS41
No NE and PT= 0, 1, 2, or No PT	ACK (no NE)	GTT	GTT	GTT	GTT	GTT
No DN entry found	GTT	GTT	GTT	GTT	GTT	GTT

Table 6: IGM and A-Port Message Processing

NE/PT	SRI	SRI_SM	Other GSM	LOCREQ	SMSREQ	Other IS41
RN and PT = 0	MIGRPFX= single: ACK (use GSM2IS41 prefix) MIGRPFX= multiple: ACK (RN from EPAP)	SRI_SM_ACK with Return Error Component	Relay	Relay	Relay	Relay
RN and PT≠ 0	ACK (RN from EPAP)	GTT	GTT	ACK (RN from EPAP)	Relay	Relay
SP and PT= 5	Relay)	Relay	Relay	ACK (using IS412GSM prefix)	smsreq (SMS Access Denied Reason = 5)	Relay
SP and PT≠ 5	GTT	GTT	GTT	Relay	Relay	Relay
No NE and PT = 5	GTT	GTT	GTT	ACK (using IS412GSM prefix)	smsreq (SMS Access Denied Reason = 5) GTT (if smsreqbypass = true	GTT
No NE and PT= 0	ACK (no NE)	GTT	GTT	GTT	GTT	GTT

NE/PT	SRI	SRI_SM	Other GSM	LOCREQ	SMSREQ	Other IS41
No NE and PT= 1, 2, or No PT	GTT	GTT	GTT	ACK (no NE)	GTT	GTT
No DN entry found	GTT	GTT	GTT	GTT	GTT	GTT

Table 7: IGM, A-Port, and G-Port Customer Message Processing

NE/PT	SRI	SRI_SM	Other GSM	LOCREQ	SMSREQ	Other IS41
RN and PT = 0	MIGRPFX= single: ACK (use GSM2IS41 prefix) MIGRPFX= multiple: ACK (RN from EPAP)	SRI_SM_ACK with Return Error Component	Relay	Relay	Relay	Relay
RN and PT ≠ 0	ACK (RN from EPAP)	Relay	Relay	ACK (RN from EPAP)	Relay	Relay
SP and PT = 5	Relay	Relay	Relay	ACK (IS412GSM prefix)	smsreq (SMS Access Denied Reason = 5) GTT (if smsreqbypass = true)	Relay
SP and PT ≠ 5	Relay	Relay	Relay	Relay	Relay	Relay
No NE and PT = 0	ACK (no NE)	GTT	GTT	GTT	GTT	GTT

NE/PT	SRI	SRI_SM	Other GSM	LOCREQ	SMSREQ	Other IS41
No NE and PT=1, 2, or No PT	ACK (no NE)	GTT	GTT	ACK (no NE)	GTT	GTT
No NE and PT = 5	GTT	GTT	GTT	ACK (IS412GSM prefix)	smsreq (SMS Access Denied Reason = 5) GTT (if smsreqbypass = true)	GTT
No DN entry found	GTT	GTT	GTT	GTT	GTT	GTT

Database lookup results in the following:

1. Applying normal routing or
2. Relaying the message to the destination as noted in the database or
3. Returning an acknowledge message to the originating switch.

Message Relay

The rules for formatting the SCCP CdPA GTA field are based on the value specified in the DigitAction field. In the case where a received IS41 message is relayed, the EAGLE formulates the SCCP CdPA GTA field of the outgoing message according to DigitAction specified. If DigitAction = none, the EAGLE 5 ISS does not overwrite the SCCP CdPA GTA. For all other values, the EAGLE 5 ISS formats the SCCP CdPA GTA according to the value assigned to DigitAction. *Table 8: DigitAction Applications* on page 32 identifies the required DigitAction options as well as the samples of how the SCCP CdPA GTA of an outgoing message is formatted for each of the options. The illustration assumes the RN/SP ID is 1404 and default country code is 886.

Table 8: DigitAction Applications

DigitAction	Value in Incoming CdPA GTA	Value in Outgoing CdPA GTA	Meaning
none	886944000213	886944000213	No change to the Called Party GTA (default)
prefix	886944000213	1404886944000213	Prefix Called Party GTA with the entity id

DigitAction	Value in Incoming CdPA GTA	Value in Outgoing CdPA GTA	Meaning
replace	886944000213	1404	Replace Called Party GTA with the entity id
insert	886944000213	8861404944000213	Insert entity id after country code. (CC + Entity Id + NDC + SN)
delccprefix	886944000213	1404944000213	Delete country code and add prefix
delcc	886944000213	944000213	Delete country code
spare1	886944000213	treated as none	No change to the Called Party GTA (default)
spare2	886944000213	treated as none	No change to the Called Party GTA (default)

Returning Acknowledgement

The following encoding rules are followed when a LOCREQ ack is returned:

1. When a ACK/Response is returned, the EAGLE 5 ISS follows the LOCREQ encoding rules along with the following enhancements for added flexibility:
2. Allow users to specify which TCAP locreq parameter (a.k.a., the TCAP Outgoing Called Party parameter) shall encode the RN (and/or DN) information
3. Allow users to specify the DigitType value to encode the TCAP Outgoing Called Party parameter
4. Allow users to specify the value to encode the Nature of Number field of the TCAP Outgoing Called Party parameter
5. Allow users to specify the value to encode the Numbering Plan field of the TCAP Outgoing Called Party parameter
6. Allow users to specify the digit encoding format of the locreq TCAP Outgoing Called Party parameter
7. Allow users to specify the MSCID values to be encoded in the locreq message
8. Allow users to specify the ESN values to be encoded in the locreq message
9. Allow users to specify how the digits of the locreq MIN parameter shall be encoded.

The following encoding rules are followed when a SRI ack is returned:

1. When a SRI ack is returned, the EAGLE 5 ISS follows the SRI ack encoding rules along with the following enhancements for added flexibility
2. Allow users to specify which SRI parameter (the TCAP MSRN parameter) encodes the RN (and/or DN) information

3. Allow users to specify the value to encode the Nature of Address field of the TCAP MSRN parameter
4. Allow users to specify the value to encode the Numbering Plan field of the TCAP MSRN parameter.

MNP SCCP Service Re-Route Capability

This feature is designed to handle and control re-routing of MNP traffic from an affected node to alternate nodes within an operators network. This feature is an optional feature and does not affect the normal MNP functionality. This feature consists of the following main functions:

- *Service State* on page 34
- *MNP Re-Routing* on page 34
- *MNP Capability Point Codes* on page 34

Service State

Service state is part of the MNP SCCP Service Re-Route Capability. Service state is used to indicate the current state of MNP, either ONLINE or OFFLINE . Service state also gives the user the option to mark MNP as OFFLINE or ONLINE based on the current behavior. If a MNP problem is identified, MNP can be marked OFFLINE to initiate the re-routing procedure. When the Service Module cards need to be reloaded, MNP can be marked OFFLINE until enough cards are in-service and then bring MNP ONLINE in a controlled fashion. This feature also provides the option to mark MNP OFFLINE to perform a controlled re-routing during this state.

MNP Re-Routing

MNP Re-Routing is an optional feature and is enabled by defining a list of alternate PCs or by defining the GTT option. MNP re-routing is activated by marking MNP OFFLINE . When MNP is OFFLINE and alternate PCs are provisioned, any messages destined for MNP are re-routed to the available alternate PCs that are defined for MNP. If alternate PCs are not provisioned or none are available, then the GTT option is used. If the GTT option is set to YES, then messages destined for MNP will fall through to GTT as part of the re-routing procedure.

Re-Routing is applied to all MNP messages (based on SRVSEL). There is no distinction of DPC of the messages. The DPC of the message can be either True, Secondary, or Capability Point code.

MNP Capability Point Codes

Capability Point Codes (CPC) are also supported for MNP. The use of MNP capability point code aids the adjacent nodes in knowing about MNP outages. When MNP is brought down though administrative commands, all traffic destined to this MNP node will generate a Transfer Prohibited (TFP) message to the adjacent node about the MNP CPC. The TFP response to the adjacent node causes the traffic originating nodes to stop sending MNP traffic to this node. All MNP traffic coming into this node is sent to the alternate MNP nodes. Adjacent nodes will initiate route-set-test procedures after receipt of the TFP response.

If the messages are destined to the EAGLE 5 ISS true point code, then TFP messages are not generated when the MNP service is OFFLINE . The originator would not be aware of the outage.

Once MNP is back in service on the EAGLE 5 ISS, a Transfer Allowed (TFA) message is sent to the traffic adjacent nodes in response to route-set-test message. The traffic originating nodes will then start sending MNP traffic to the original MNP node.

MNP Capability point codes can be provisioned when the MNP feature is ON. There can be more than one Capability Point Code assigned to MNP CPCType.

When the MNP feature is turned ON and the MNP service state is set to OFFLINE , the user can change the service to ONLINE at any point. Once the feature is turned ONLINE , MNP will start processing messages if at least one Service Module card is IS-NR.

The MNP service can be set to OFFLINE at any point. This causes the EAGLE 5 ISS to stop processing MNP traffic and re-routing is performed.

The MNP service state is persistent. Booting the OAM or all the Service Module cards will not change the service state. Commands must be used to change the service state.

MNP supports up to 7 alternate PCs per domain. All 6 domains (ANSI, ITU-I, ITUN14, ITUN14 spare, ITU-I spare and ITUN24) are supported. An entire set of alternate PCs are considered as a re-route set. A GTT option is supported for MNP re-route. When the MNP service is OFFLINE , MNP messages fall though to GTT based on the GTT option. This option is set to YES by default.

MNP SCCP Service Re-Route Capability Summary

If the MNP service is not normal (because the RTDB is not in sync with MPS or if cards are misrouting MNP messages) then the MNP service state should be changed to OFFLINE .

Before changing MNP service to OFFLINE , it should be decided what kind of re-routing will be used during the outage. The EAGLE 5 ISS supports re-routing data to alternate point codes or falling through to GTT as two possible options. Re-routing to alternate point code has priority over falling though to GTT. Examples of the two options follow:

Option 1

Define alternate point codes to re-route MNP traffic. This is the recommended option. Up to 7 alternate MNP nodes can be provisioned to re-route all the incoming MNP traffic. Once provisioned, the MNP service can be changed to OFFLINE . This example has any incoming being MNP traffic being load-shared to point codes based on the relative cost.

```
chg-sccp-serv:serv=mnp:pci1=1-1-1:rc1=10:pci2=2-2-2:rc2=10:pci3=3-3-3:rc3=10:pci4=4-4-4:rc4=10
chg-sccp-serv:serv=mnp:pci1=1-1-1:rc1=10:pci2=2-2-2:rc2=10:pci3=3-3-3:rc3=10:pci4=4-4-4:rc4=10
chg-sccp-serv:serv=mnp:pci1=5-5-5:rc1=10:pci2=6-6-6:rc2=10:pci3=7-7-7:rc3=10:pci4=8-8-8:rc4=10
chg-sccp-serv:serv=mnp:state=offline
```

Option 2

With this option default GTT translations are provisioned for MNP service. Then the chg-sccp-serv command is used to provision GTT=YES. All MNP messages will fall through to GTT. An example command follows:

`chg-sccp-serv:serv=mnp:gtt=yes` (it is yes by default)

Once the MNP re-routing data is provisioned, MNP service can be changed to OFFLINE . At this point all MNP traffic will be re-routed. The use can take necessary steps to correct the MNP service on the node. Until all the cards or enough cards are in active state with valid MNP subscriber database, MNP service should not be changed to ONLINE .

Table 9: MNP SCCP Service Re-Route Capability Summary on page 36 shows the actions taken when the MNP service is offline, a message arrives at the affected node requiring MNP service, and the Service Module cards are available.

Table 9: MNP SCCP Service Re-Route Capability Summary

Result of service selector	DPC	Alternate point code defined and available	GTT to be performed as fall through	Message Handling	Network Management
MNP	MNP Capability PC	Yes	N/A	Re-Route to alternate point code based on relative cost	TFP concerning CPC
MNP	MNP Capability PC	No*	Yes	Fall through to GTT and perform GTT	TFP concerning CPC
MNP	MNP Capability PC	No*	No	Generate UDTS (return cause = network failure)	TFP concerning CPC
MNP	MNP Capability PC	Not Defined	Yes	Fall through to GTT and perform GTT	TFP concerning CPC
MNP	MNP Capability PC	Not Defined	No	Generate UDTS (return cause = no xlation for this addr)	TFP concerning CPC
Not MNP	MNP Capability PC	N/A	N/A	Perform appropriate Service/GTT	None
MNP	True or Secondary PC or non-MNP CPC	Yes	N/A	Re-Route to alternate point code based on relative cost	None
MNP	True or Secondary PC or non-MNP CPC	No*	No	Generate UDTS (return cause = network failure)	None
MNP	True or Secondary PC or non-MNP CPC	No*	Yes	Fall through to GTT and perform GTT	None
MNP	True or Secondary PC or non-MNP CPC	Not Defined	Yes	Fall through to GTT and perform GTT	None

Result of service selector	DPC	Alternate point code defined and available	GTT to be performed as fall through	Message Handling	Network Management
MNP	True or Secondary PC or non-MNP CPC	Not Defined	No	Generate UDTS (return cause = no xlation for this addr)	None
Not MNP	True or Secondary PC or non-MNP CPC	N/A	N/A	Perform appropriate Service/GTT	None
*Alternate point codes are defined and unavailable (prohibited or congested).					

MTP Routed SCCP Traffic for IGM

IGM supports MTP routed SCCP messages (Figure 2-8). LOCREQ messages are supported. This feature cannot be turned on unless at least one of the following is turned on:

- A-Port
- IGM
- G-Flex

Use of MTP Msgs for SCCP Apps feature adversely affects the SCCP capacity, as all of these messages are counted under SCCP capacity.

After this feature is turned on, all SCCP messages are routed to the Service Module cards. The Service Module card then performs SCCP decode/verification. If the MTP routed messages have CDPA GTI = 0 and IGM is turned on, then the message is sent for IGM processing. If MNP service is OFFLINE, then MTP routing is performed on the messages.

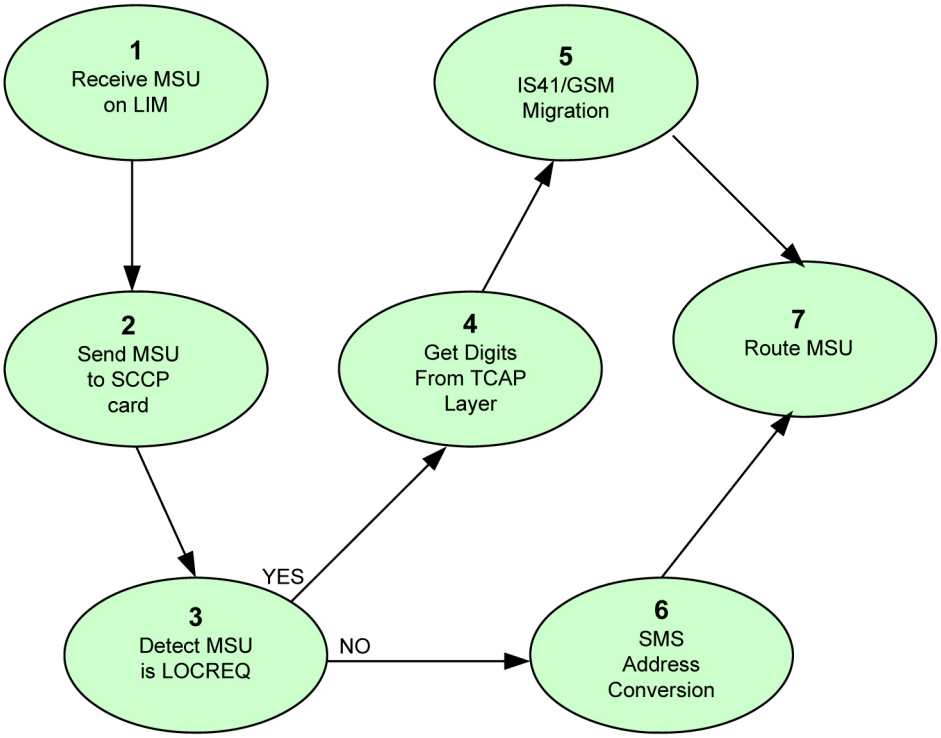
If the MTP routed messages have CDPA GTI ≠ 0, then SRVSEL lookup is performed using the SCCP CDPA information. If the result of the lookup is MNP service, the message is sent to MNP handling. If a service selector is not defined or does not match, or if the service is OFFLINE, then MTP routing is performed on the messages. The MNP SCCP Service re-route is not performed on MTP routed messages.

MNP checks to see if the TCAP portion of the message is ITU or ANSI. If the message has ITU TCAP then normal routing (or G-Flex if provisioned) is performed on the message. If the message has ANSI TCAP then, IGM general TCAP/MAP verification is performed if A-Port or IGM is turned on.

SMS Address conversion is not affected by the MTP Msgs for SCCP Apps feature; SMS conversion handles only Registration Notification and SMS Notification messages.

A feature access key (FAK) for part number 893017401 is required to enable the MTP Msgs for SCCP Apps feature.

Figure 8: Message Control Flow



Detailed message control flow routing information follows:

1. The MSU is received by the EAGLE 5 ISS
2. The MSU is sent to the SCCP Function.
3. The Service Module card examines the MSU and determines if it is a LOCREQ message.
4. For LOCREQ, the TCAP Digit Parameter contains the digits to apply to Migration. This is a mandatory parameter. The digits are in encoded.
5. IS41/GSM Migration is applied to the digits to determine if the subscriber is migrated. If so, a LOCREQ Return Result is generated to the OPC. If not, the LOCREQ is routed.
6. If the message is not a LOCREQ, ITUN-ANSI SMS Address Conversion is applied. SMS Address conversion feature does not have any impact because on this feature because SMS conversion handles only Registration Notification and SMS Notification messages.
7. The MSU is routed. MTP and SCCP conversion are performed if crossing a network boundary.

Detailed message processing for MTP Routed messages are included in the following tables.

- *Table 10: MTP Routed Handling Example 1* on page 39: Message processing for MTP routed messages when IGM is on, A-Port, G-Port, and G-Flex are OFF. SERV=MNP or GTI=0.
- *Table 11: MTP Routed Handling Example 2* on page 39: Message processing for MTP routed messages when IGM, A-Port, G-Port are ON. SERV=MNP or GTI=0.
- *Table 12: MTP Routed Handling Example 3* on page 40: Message processing for MTP routed messages when G-Flex and IGM (or A-Port, G-Port) are ON. SERV=MNP.

Table 10: MTP Routed Handling Example 1

NE/PT	SRI	SRI_SM	Other GSM	LOCREQ	SMSREQ	Other IS41
RN and PT = 0	MTP routing	MTP routing	MTP routing	Relay	MTP routing	MTP routing
RN and PT ≠ 0	MTP routing	MTP routing	MTP routing	MTP routing	MTP routing	MTP routing
SP and PT = 5	MTP routing	MTP routing	MTP routing	ACK (IS412GSM prefix)	MTP routing	MTP routing
SP and PT ≠ 5	MTP routing	MTP routing	MTP routing	Relay	MTP routing	MTP routing
No NE and PT = 0	MTP routing	MTP routing	MTP routing	MTP routing	MTP routing	MTP routing
No NE and PT=1, 2, or No PT	MTP routing	MTP routing	MTP routing	MTP routing	MTP routing	MTP routing
No NE and PT = 5	MTP routing	MTP routing	MTP routing	ACK (IS412GSM prefix)	MTP routing	MTP routing
No DN entry found	MTP routing	MTP routing	MTP routing	MTP routing	MTP routing	MTP routing

Table 11: MTP Routed Handling Example 2

NE/PT	SRI	SRI_SM	Other GSM	LOCREQ	SMSREQ	Other IS41
RN and PT = 0	MTP routing	MTP routing	MTP routing	Relay	MTP routing	MTP routing
RN and PT ≠ 0	MTP routing	MTP routing	MTP routing	ACK (RN from EPAP)	MTP routing	MTP routing

NE/PT	SRI	SRI_SM	Other GSM	LOCREQ	SMSREQ	Other IS41
SP and PT = 5	MTP routing	MTP routing	MTP routing	ACK (IS412GSM prefix)	MTP routing	MTP routing
SP and PT ≠ 5	MTP routing	MTP routing	MTP routing	Relay	MTP routing	MTP routing
No NE and PT = 0	MTP routing	MTP routing	MTP routing	MTP routing	MTP routing	MTP routing
No NE and PT=1, 2, or No PT	MTP routing	MTP routing	MTP routing	ACK (no NE)	MTP routing	MTP routing
No NE and PT = 5	MTP routing	MTP routing	MTP routing	ACK (IS412GSM prefix)	MTP routing	MTP routing
No DN entry found	MTP routing	MTP routing	MTP routing	MTP routing	MTP routing	MTP routing

Table 12: MTP Routed Handling Example 3

NE/PT	SRI	SRI_SM	Other GSM	LOCREQ	SMSREQ	Other IS41
RN and PT = 0	Relay	Relay	Relay	Relay	Relay	Relay
RN and PT ≠ 0	Relay	Relay	Relay	ACK (no NE)	Relay	Relay
SP and PT = 5	Relay	Relay	Relay	ACK (IS412GSM prefix)	Relay	Relay
SP and PT ≠ 5	Relay	Relay	Relay	Relay	Relay	Relay
No NE and PT = 0	MTP routing	MTP routing	MTP routing	MTP routing	MTP routing	MTP routing

NE/PT	SRI	SRI_SM	Other GSM	LOCREQ	SMSREQ	Other IS41
No NE and PT=1, 2, or No PT	MTP routing	MTP routing	MTP routing	ACK (no NE)	MTP routing	MTP routing
No NE and PT = 5	MTP routing	MTP routing	MTP routing	ACK (IS412GSM prefix)	MTP routing	MTP routing
No DN entry found	MTP routing	MTP routing	MTP routing	MTP routing	MTP routing	MTP routing

General Numbering Requirements

Incoming called party numbers, from the SCCP portion, destined for IGM processing are conditioned to fit the GDB requirements where possible. The following factors are used to condition the SCCP numbers.

- Based on provisioning: If the GTT selectors available in the incoming message match an entry in the IGM selector table, then the service numbering plan from the selector table entry uses that number's numbering plan. Further conditioning is applied based on this new numbering plan.
- Based on configurable options: If the GTT selectors available in the incoming message match an entry in the IGM selector table, then the service nature of address from the selector table entry uses that number's nature of address. Further conditioning is applied based on this new nature of address.
- If the nature of address is Subscriber, the default CC + default NC (network code for E.164) are prepended to the number. The default codes to be used by the EAGLE 5 ISS must be previously provisioned by the EAGLE 5 ISS operator. If not, a UIM is issued, and the message falls through to GTT.

Numbers with fewer than five digits after the above conditioning are not used for IGM. In this case, a UIM is issued, and the message falls through to GTT.

Numbers with more than fifteen digits after the above conditioning are not used for IGM. In this case, a UIM is issued, and the message falls through to GTT.

Maintenance

Validation of Hardware Configuration

Service Module card loading verifies the validity of the hardware configuration for the Service Module cards. Hardware verification includes the following.

- **Service Module Card Main Board Verification**

  An AMD-K6 or better main board is required to support the VSCCP application on the Service Module card. EAGLE 5 ISS maintenance stores the validity status of the main board configuration of the Service Module card.

  Note: The system does not allow the feature to be turned on if the hardware configuration is invalid.

- During initialization, the VSCCP application determines the main board type. The SCCP maintenance block is the mechanism used to relay the main board information to OAM. This requires that the application software be loaded to the Service Module card and then the main board information received in the SCCP maintenance block must be verified. If the main board is determined to be invalid for the application, loading of the Service Module card is automatically inhibited.
- **Service Module Card Applique Memory Verification**

  The VSCCP application performs two types of memory validation to determine whether or not a Service Module card has sufficient memory to run the feature:

  CAUTION: The feature cannot be enabled if any of the Service Module cards have less than 4 GB of memory installed. 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.

- ***Local Memory Validation*** . When the feature is enabled and the Service Module card is initializing, VSCCP checks whether the Service Module card has at least 4GB of memory installed.
- *Real-Time Memory Validation (during card initialization)*. After communications between the Service Module card and EPAP have been established, and the Service Module card has joined the RMTP Tree, the EPAP starts downloading the RTDB to the Service Module card. After the Service Module card has downloaded the RTDB, it continues to receive database updates as necessary. The EPAP includes the size of the current RTDB in all records sent to the Service Module card. The Service Module card compares the size required to the amount of memory installed, and issues a minor alarm once the database exceeds 80% of the Service Module card memory. If the database completely fills the Service Module card memory, a major alarm is issued, the Service Module card leaves the RMTP tree, and the status of the Service Module card changes to IS-ANR/Restricted. The Service Module card continues to carry traffic.
- **Actions Taken When Hardware Determined to be Invalid**

  When the hardware configuration for a Service Module card is determined to be invalid for the application, SCM automatically inhibits loading for that specific Service Module card. A major alarm is generated indicating that card loading for that Service Module card has failed and has been automatically inhibited (that is, prevented from reloading again). Refer to *IGM Related Alarms* on page 109 for the specific alarm that is generated. When card loading has been inhibited, the primary state of the card is set to `oos-mt-dsbld` and the secondary state of the card is set to `MEA` (Mismatch of Equipment and Attributes).

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

  - The Service Module card will not download the EAGLE 5 ISS databases

- The Service Module card will not download the RTDB from the EPAP.
- The Service Module card will not accept RTDB updates (that is, add, change, delete) from the EPAP, nor will it accept STP database updates.

To activate loading of a Service Module card that has been automatically inhibited, enter the `alw-card` command (`alw-card:loc=xxxx`).

- **Unstable Loading Mode**

  At some point, having a number of invalid Service Module cards results in some of the LIMs (Link Interface Module) being denied SCCP services. The threshold is monitored; if the number of valid Service Module cards is insufficient to provide service to at least 80% of the IS-NR LIMs, the system is said to be in an unstable loading mode. For additional reasons an EAGLE 5 ISS might be in an unstable loading mode, refer to *Loading Mode Support Status Reporting* on page 104.

Maintenance Commands

The following commands are used for IGM maintenance.

- The debug command `ent-trace` traps IGM MSUs (Message Signaling Unit) based on the point code of the switch that generated the MSU (SSP), a particular DN and entity ID. For MSISDN and entity ID, the comparison is based on the search key built from the CdPA GTAI (Global Title Address Information) after any conditioning. The existing GT SCCP trigger also applies to IGM messages.
- The command `rept-stat-sccp` reports current MNP statistics. A MSU is considered to be a IGM MSU after SRVSEL. This command reports IGM statistics on the basis of a specific Service Module card or on a IGM system basis.

For more information, refer to *Maintenance and Measurements* on page 101.

IGM *Loading Mode Support*

Loading mode support is not applicable for RTDB updates because Service Module cards use incremental loading from the EPAP. STP Administrative updates are allowed while a Service Module card is loading and the system is above the 80% card stability threshold. If it is below the 80% threshold, loading mode support allows STP administrative updates to be rejected while cards finish loading and cross the 80% or better threshold.

For IGM, loading mode support is applicable for database updates originating from the EAGLE 5 ISS GPSM-II (General Purpose Service Module II cards) destined for the Service Module cards.

Audit Requirements

The IGM audit does not change EAGLE 5 ISS compliance to STP audit requirements. IGM subscriber database tables residing on the EAGLE 5 ISS TDM fixed disks are audited by the existing STP audit, which verifies tables on the EAGLE 5 ISS active and standby TDMs. Additional audit mechanisms for IGM tables residing on the EPAP platform that are downloaded to the Service Module cards are:

- On each Service Module card and on the standby EPAP, a background audit calculates checksums for each RTDB table record and compares the calculated checksum against the checksum value stored in each record. If the checksum values are not the same, then a *database corrupt* alarm is issued.

- A process that runs periodically on the active EPAP (approximately every five seconds or less) sends the latest RTDB database level to all the Service Module cards and the standby EPAP. If the database levels do not match, the standby EPAP or Service Module card issues a *diff level* alarm.

For more information on the audit mechanisms, refer to the *EPAP Administration Manual.*

Chapter 3

EAGLE 5 ISS Migration Commands

Topics:

This chapter provides brief descriptions of the EAGLE 5 ISS commands that are used for the configuration, control, maintenance, and measurements of the IS41 GSM Migration (IGM) feature.

EAGLE 5 ISS Commands for Migration

This chapter contains the commands for maintenance, measurements, and administration of the IS41 GSM Migration (IGM) feature. These EAGLE 5 ISS commands provide for the provisioning, operations, and maintenance activities of the EAGLE 5 ISS Service Module cards and associated network connections. Commands are listed in *Table 13: Commands for EAGLE 5 ISS IS41 GSM Migration* on page 46.

The command examples in this chapter illustrate the requirements and provide suggestions for example names and output. Detailed descriptions of the commands are available in *Commands Manual*, including parameter names, valid parameter values, and output examples for the commands.

Table 13: Commands for EAGLE 5 ISS IS41 GSM Migration

EAGLE 5 ISS Commands for Migration Feature			
act-gpl	chg-srvsel	inh-card	rtrv-ctrl-feat
alw-card	copy-gpl	rept-ftp-meas	rtrv-card
chg-ctrl-feat	dlt-map	rept-meas	rtrv-gpl
chg-db	dlt-card	rept-stat-alm	rtrv-gsmopts
chg-gpl	dlt-sccp-serv	rept-stat-db	rtrv-is41opts
chg-gsmopts	dlt-srvsel	rept-stat-gpl	rtrv-measopts
chg-is41opts	enable-ctrl-feat	rept-stat-meas	rtrv-sccp-serv
chg-measopts	ent-card	rept-stat-mps	rtrv-sid
chg-map	ent-map	rept-stat-sccp	rtrv-srvsel
chg-sccp-serv	ent-srvsel	rept-stat-sys	unhb-alm
chg-sid	inh-alm	rept-stat-trbl	

EAGLE 5 ISS GSM System Options Commands

The GSM system options (`gsmopts`) commands change and display Migration-specific GSM system options in the EAGLE 5 ISS database. The `chg-gsmopts` and `rtrv-gsmopts` commands are described below. Refer to *Commands Manual* for details of these commands.

- **chg-gsmopts: Change GSM System Options Command** – The `chg-gsmopts` command changes Migration-specific options in the database. This command updates the GSMOPTS table. The default parameter values are overwritten when specified.

Table 14: `chg-gsmopts` Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
defmapvr	Optional	1-3	Default MAP version
gsm2is41	Optional	1-15 digits, none	GSM to IS-41 migration prefix
is412gsm	Optional	1-15 digits, none	IS-41 to GSM migration prefix
migrpfx	Optional	single, multiple	Migration prefix
msisdntrunc	Optional	1 digit (0-5)	MS ISDN Truncation digits
msrndig	Optional	rn, rndn, ccrndn	RN used "as is" or with MSISDN
msrnnai	Optional	1-7	NAIV for the MSRN
msrnnp	Optional	0-15	Numbering plan for the MSRN
multcc	Optional	1 to 3 digits (0-9, a-f, or A-F)	Multiple Country Code
nmultcc	Optional	1 to 3 digits (0-9, a-f, A-F, or none)	New Multiple Country Code
serverpfx	Optional	1-4 digits, none	Server SRI prefix
srfaddr	Optional	1-15 digits	Entity address of MNP_SRF node
srfnai	Optional	0-127	NAIV of the MNP_SRF

Parameter	Optional/ Mandatory	Range	Description
srfnp	Optional	0-15	Numbering plan value of the MNP_SRF Network Code
sridn	Optional	tcap, sccp	Send Routing Information Dialed Number location
sridnnotfound	Optional	gtt, srinack	When G-Port encounters an RTDB query result that indicates that the given DN is not known, SRIDNNOTFOUND parameter value determines further processing.

- **rtrv-gsmopts: Retrieve System Options Command** – The `rtrv-gsmopts` command displays the GSM option indicators maintained in the GSMOPTS table.

EAGLE 5 ISS IS41 Options Commands

The IS41 options (is41opts) commands are used to change and report on the values of one or more of the STP node level processing option indicators maintained in the IS41option tables. All values are assigned initially to system defaults at STP installation. The values can be updated using the `chg-is41opts` command. The `chg-is41opts` and `rtrv-is41opts` commands are described below. Refer to *Commands Manual* for details of these commands.

- **chg-is41opts: Change IS41 Options** – The `chg-is41opts` command changes IS41-specific options in the database. This command updates the IS41OPTS table. The default parameter values are overwritten when specified.

Table 15: `chg-is41opts` Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
esnmfg	Optional	0-255	TCAP LOCREQ ESN Manufacturer code. This parameter specifies the value to be encoded in the TCAP LOCREQ ESN parameter in the manufacturer code section.
esnsn	Optional	0-16777215	TCAP LOCREQ ESN Serial Number. This parameter specifies the value to be encoded in the TCAP LOCREQ ESN parameter in the serial number section.

Parameter	Optional/ Mandatory	Range	Description
iec	Optional	digit string 1-5 digits, none	International escape code
locreqdn	Optional	tcap, sccp	Use this parameter to define whether the Called Party will be obtained from the SCCP layer or the TCAP layer of a received LOCREQ for database lookup
locreqrmhrn	Optional	yes, no	Locreq RM HRN. Used to specify if HomeRN is to be removed from the TCAP Outgoing Called party for a relayed LOCREQ message.
mscmktid	Optional	0-65535	Locreq MSCID market id. Used to specify the value to be encoded in locreq MSCID parameter for Market ID.
mscswitch	Optional	0-255	Locreq mscid market id switch part is used to specify the value to be encoded in locreq MSCID parameter, market id switch part
mtplocreqnai	Optional	ccrndn, frmsg, intl, natl, rnidn, rnndn, rnsdn, sub, locreqlen	Message Translation Part LOCREQ nature of address indicator. Used to define how Called Party obtained from the TCAP layer of a received MTP-routed LOCREQ message is interpreted.
nec	Optional	digit string 1-5 digits, none	National escape code
rspcdpari	Optional	frmsg, gt, ssn	Response Called Party Routing Indicator. Use this parameter to specify the value of the Routing Indicator bit to encode the SCCP CdPA GTA of a returned locreq message.
rspcgpanai	Optional	0-127, none	Response calling party Nature of Address Indicator (NAI). Used to specify a new NAI value to override the NAI value specified in the SCCP CdPA of a received LOCREQ/SMSREQ if the message is to be relayed after database lookup.
rspcgpanp	Optional	0-15, none	Response calling party numbering plan. Used to specify a new Numbering Plan value

Parameter	Optional/ Mandatory	Range	Description
			to override the Numbering Plan value specified in the SCCP CdPA of a received LOCREQ/SMSREQ if the message is to be relayed after database lookup.
rspcgpapcp	Optional	frmsg, on, off	Response Calling Party Point Code Present. Used to specify the value of the Point Code Present bit to encode the SCCP CgPA GTA of a returned locreq message
rspcgpari	Optional	frmsg, gt, ssn	Response Calling Party Routing Indicator. Used to specify the value of the Routing Indicator bit to encode the SCCP CgPA GTA of a returned locreq message.
rspcgpatt	Optional	0-255, none	Response calling party translation type. Used to specify a new TT value to override the TT value specified in the SCCP CdPA of a received LOCREQ/SMSREQ if the message is to be relayed after database lookup.
rspdig	Optional	ccrndn, hrnrndn, rn, rndn	Use this parameter to specify the digit encoding format of the locreq TCAP Outgoing Called Party parameter on a per EAGLE 5 ISS node basis.
rspdigtype	Optional	0-255	Response digit type. Used to specify DigitType value to encode the TCAP Outgoing Called Party parameter.
rspmin	Optional	homern, nothomern, tendelhomern, tenhomern, tenzero	Response locreq min parameter encoding. Used to specify how the digits of the locreq MIN parameter are to be encoded.
rspnon	Optional	0-255, none	MSRN nature of number. Used to specify the Nature of Number value of the TCAP Outgoing Called Party parameter.
rspnp	Optional	0-15, none	MSRN numbering plan. Used to specify the Numbering Plan values of the TCAP Outgoing Called Party parameter.

Parameter	Optional/ Mandatory	Range	Description
rspparm	Optional	ddigit, rtdigit, tlist	Response parameter. Used to specify which TCAP locreq parameter (TCAP Outgoing Called Party) will encode the RN and/or DN information.
smsreqbypass	Optional	yes, no	Use this parameter to specify whether a received SMSREQ that passes the MNP Service Selector (serv=mnp parameter is specified) will be subject to Migration message processing. **Note:** The MT-Based IS41 SMS NP feature described in the *A-Port Feature Manual* does not consider the value of this parameter. If smsreqbypass has a value of yes,the IGM feature will not be applied but the message will be considered for MT-Based IS41 SMS NP processing.
tcapsnai	Optional	ccrndn, frmsg, intl, natl, rnidn, rnndn, rnsdn, sub	Use this parameter to specify how Called Party, obtained from the TCAP layer of a received LOCREQ message shall be interpreted, either based on the Nature of Number encoded in the TCAP Digits[Dialed] parameter, or based on the selection specified by the mtplocreqnai parameter.

- **rtrv-is41opts: Retrieve System Options** – The `rtrv-is41opts` command displays the IS41 option indicators maintained in the IS41OPTS table.

EAGLE 5 ISS Migration Service Selector Commands

The Migration service selector (srvsel) commands are used to provision, remove, change, and report the applicable service selectors required to change a service entry for DSM services. These commands provide flexibility when provisioning the type of messages that require Migration processing. Four variants are described in the following sections: `ent-srvsel`, `chg-srvsel`, `dlt-srvsel`, and `rtrv-srvsel`. Refer to *Commands Manual* for details of these service selector commands.

- **ent-srvsel: Enter Service Selectors** – The `ent-srvsel` command specifies that the applicable Migration service selectors indicating Migration processing is required. The Migration feature must be enabled before entering this command.

Table 16: `ent-srvsel` Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
gti, gtia, gtii, gtin, gtin24	Mandatory	2, 4	Global Title Indicator
serv	Mandatory	eir, gflex, gport, inpq, inpmr, smsmr, idps, idpr, mnp, vflex, atinp	DSM service
ssn	Mandatory	0-255, *	Subsystem number
tt	Mandatory	0-255	Translation Type
nai	Optional	1sub, rsvd, natl, intl	Nature Of Address Indicator
naiv	Optional	0-127	NAI Value
np	Optional	e164, generic, x121, f69, e210, e212, e214, private	Numbering Plan
npv	Optional	10-15	Numbering Plan Value
snai	Optional	1sub, natl, intl, rnidn, rnndn, rnsdn, ccrndn	Service Nature of Address Indicator
snp	Optional	1e164, e212, e214	Service Numbering Plan

- **chg-srvsel: Change Service Selector** – The `chg-srvsel` command specifies the applicable Migration selectors required to change an existing Migration selector entry.

Table 17: `chg-srvsel` Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
gti, gtia, gtii, gtin, gtin24	Mandatory	2, 4	Global Title Indicator
ssn	Mandatory	0-255, *	Subsystem number
tt	Mandatory	0-255	Translation Type

Parameter	Optional/ Mandatory	Range	Description
nai	Optional	sub, rsvd, natl, intl	Nature Of Address Indicator
naiv	Optional	0-127	NAI Value
np	Optional	e164, generic, x121, f69, e210, e212, e214, private	Numbering Plan
npv	Optional	0-15	Numbering Plan Value
nserv	Mandatory	eir, gflex, gport, inpq, inpmr, smsmr, idpr, idps, mnp, vflex, atinp	New DSM service
nsnai	Optional	sub, natl, intl, rnidn, rnndn, rnsdn, ccrndn, none	New Service Nature of Address Indicator
nsnp	Optional	e164, e212, e214, none	New Service Numbering Plan

- **dlt-srvsel: Delete Migration Service Selector** – The `dlt-srvsel` command deletes a Migration service selector.

Table 18: dlt-srvsel Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
gti, gtia, gtii, gtin, gtin24	Mandatory	2, 4	Global Title Indicator
ssn	Mandatory	0-255, *	Subsystem number
tt	Mandatory	0-255	Translation Type
nai	Optional	sub, rsvd, natl, intl	Nature Of Address Indicator
naiv	Optional	0-127	NAI Value
np	Optional	e164, generic, x121, f69, e210, e212, e214, private	Numbering Plan
npv	Optional	0-15	Numbering Plan Value

- **rtrv-srvsel: Retrieve Migration Service Selector** – The `rtrv-srvsel` command displays a list of administered Migration service selector combinations. Output is sorted first by service, then by global title domain (ANSI first, followed by ITU), GTI, translation type, numbering plan, and by the nature of address indicator. The output can be filtered by specifying any optional parameter.

  Table 19: rtrv-srvsel Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
gti, gtia, gtii, gtin, gtin24	Optional	2, 4	Global Title Indicator
nai	Optional	sub, rsvd, natl, intl	Nature Of Address Indicator
naiv	Optional	0-127	NAI Value
np	Optional	e164, generic, x121, f69, e210, e212, e214, private	Numbering Plan
npv	Optional	0-15	Numbering Plan Value
serv	Optional	eir, gflex, gport, inpq, inpmr, smsmr, idpr, idps, mnp, vflex, atinp	DSM service
snai	Optional	sub, natl, intl, rnidn, rnndn, rnsdn, ccrndn	Service Nature of Address Indicator
snp	Optional	e164, e212, e214	Service Numbering Plan
ssn	Mandatory	0-255, *	Subsystem number
tt	Optional	0-255	Translation Type

EAGLE 5 ISS Feature Key Control Commands

These commands are used to enable, update, view, and control the Migration feature. A Feature Access Key is used to turn on the Migration feature. This feature must be purchased in order to have access to the Feature Access Key, which must be used when enabling these features.

No temporary key is associated with this feature. After the feature is turned on, it cannot be turned off. Two steps are performed to turn on the Migration feature. The first step is to enable the feature. The second step is to set the status to on.

Additional verifications are performed to ensure the correct hardware is present in the system. These checks include verifying that the GTT bit is on and that there are no SCCP GLP cards provisioned. Refer to the *Commands Manual* for details of this command.

The part number 893017301 is used to enable Migration feature on the EAGLE 5 ISS.

- **enable-ctrl-feat: Enable Control Feature Command** – The `enable-ctrl-feat` command is used for the permanent enabling of the Migration feature. An example of the command using the Migration part number is:

  `enable-ctrl-feat:partnum=893017301:fak=<Feature Access Key>`
- **chg-ctrl-feat: Change Control Feature Command** – The `chg-ctrl-feat` command is used to activate the Migration feature. This command requires the Migration feature to be enabled as a prerequisite.

  `chg-ctrl-feat:partnum=893017301:status=on`
- **rtrv-ctrl-feat: Retrieve Control Feature Command** – The `rtrv-ctrl-feat` command is used display the status of the features (on/off) and to show the trial period remaining if temporarily enabled. An example output is :

```
The following features have been permanently enabled:
    Feature Name              Partnum    Status  Quantity
    IPGWx Signaling TPS       893012805  on          2000
    ISUP Normalization        893000201  on          ----
    Command Class Management  893005801  on          ----
    Prepaid SMS Intercept Ph1 893006701  on          ----
    Intermed GTT Load Sharing 893006901  on          ----
    MNP Circ Route Prevent    893007001  on          ----
    XGTT Table Expansion      893006101  on        400000
    XMAP Table Expansion      893007710  on          3000
    Large System # Links      893005910  on          2000
    Routesets                 893006401  on          6000
    EAGLE5 Product            893007101  off         ----
    EAGLE Product             893007201  off         ----
    IP7 Product               893007301  off         ----
    Network Security Enhance  893009101  off         ----
    HC-MIM SLK Capacity       893011801  on            64
    MNP                       893016601  on          ----
    EAGLE OA&M IP Security    893400001  off         ----
    SCCP Conversion           893012001  on          ----
   The following features have been temporarily enabled:
   Feature Name              Partnum   Status Quantity   Trial Period Left
   G-Port Circ Route Prevent 893007001 On        ----  20 days 8 hrs 57 mins
   The following features have expired temporary keys:
   Feature Name              Part Num
   OnOffFeatV                893492401
;
```

EAGLE 5 ISS MNP SCCP Service Commands

The `sccp-serv` commands allow for services to be taken online and offline, and for the service processing loads to be shifted to other designated nodes. These commands also support the

assignment of PCs to PC groups used for MNP re-route assignment. The following sections describe three variations: `chg-sccp-serv`, `dlt-sccp-serv`, and `rtrv-sccp-serv`.

Entries using the `chg-sccp-serv` command are provisioned in the SCCP-SERV table, and are shown by the `rtrv-sccp-serv` command output. This reduces the maximum number of entries that the MRN table can contain by the number of entries shown in the `rtrv-sccp-serv` command output. For more information on provisioning MRN tables, refer to *Database Administration Manual - Global Title Translations*.

Refer to *Commands Manual* for details on the EAGLE 5 ISS MNP SCCP service command.

- **chg-sccp-serv: Change MNPSCCP Service** – The `chg-sccp-serv` command is used to add point codes to an existing service group, or to change the Relative Cost (RC) of existing point codes in a group. SCCP Service groups are organized by service (G-Flex, G-Port, MNP) and point code network type (ANSI, ITU-I, Spare ITU-I, ITU-N, Spare ITU-N, or ITUN-24). Up to seven PCs may be in a network type grouping for service re-route load sharing. This command allows for additions/modifications of up to 4 PCs at once. The point code parameters support the Spare Point Code subtype prefix *s-* for ITU-I and ITU-N point codes.

  Table 20: chg-sccp-serv Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
serv	Mandatory	gport, gflex, mnp	Service
state	Optional	offline, online	Status
gtt	Optional	no, yes	Global Title Translation
pc1, pca1, pci1, pcn1, pcn241	Optional	Refer to *Commands Manual*	Post GTT-translated PC
rc1	Optional	00-99	Relative Cost
pc2, pca2, pci2, pcn2, pcn242	Optional	Refer to *Commands Manual*	Post GTT-translated PC
rc2	Optional	00-99	Relative Cost
pc3, pca3, pci3, pcn3, pcn243	Optional	Refer to *Commands Manual*	Post GTT-translated PC
rc3	Optional	00-99	Relative Cost
pc4, pca4, pci4, pcn4, pcn244	Optional	Refer to *Commands Manual*	Post GTT-translated PC

Parameter	Optional/ Mandatory	Range	Description
rc4	Optional	00-99	Relative Cost

- **dlt-sccp-serv: Delete MNP SCCP Service** – The `dlt-sccp-serv` command is used remove entries from the SCCP Service table. A single command may remove either a PC from a group, or remove the entire group.

  Table 21: dlt-sccp-serv Parameters - Class = DATABASE

Parameter	Optional/ Mandatory	Range	Description
serv	Mandatory	gport, gflex, mnp	Service
pc1, pca1, pci1, pcn1, pcn241	Optional	Refer to *Commands Manual*	Post GTT-translated PC
pc2, pca2, pci2, pcn2, pcn242	Optional	Refer to *Commands Manual*	Post GTT-translated PC
pc3, pca3, pci3, pcn3, pcn243	Optional	Refer to *Commands Manual*	Post GTT-translated PC
pc4, pca4, pci4, pcn4, pcn244	Optional	Refer to *Commands Manual*	Post GTT-translated PC
all	Optional	No, Yes	*Yes* will delete the entire group

- **rtrv-sccp-serv: Retrieve MNP SCCP Service** – The `rtrv-sccp-serv` command is used to display the SCCP Service application relationship information maintained by the EAGLE 5 ISS. Point codes are grouped by service.

Maintenance and Measurements User Interface Commands

This section provides a description of the user interface for maintenance and measurements for the Migration feature. The commands allow provisioning, operations, and maintenance activities for Service Module cards.

The command examples shown illustrate the requirements and provide suggestions for suitable names and output. The commands are described in detail in *Commands Manual*, where the parameter names, valid values, and output for the commands are provided.

Commands described include:

rept-stat-sys

This command is used to determine the location of problems in the MNP subsystem. The display shows the number of items that are In Service-Normal (IS-NR) and how many are in another state (IS-ANR, OOS-MT, OOS-MT-DSBLD). Refer to *Commands Manual* for details of this command.

rept-stat-sccp

The output for the `rept-stat-sccp` command displays the Service Module cards running the VSCCP application and the GTT, G-Flex, INP, EIR, and MNP services executing on those cards. This command also displays any cards that are denied SCCP service. When turned on, the A-Port and IGM features share statistic status with the G-Port feature. If only the G-Port feature is on, the display title is GPORT. If the A-Port or IGM feature is on, with or without the G-Port feature, the display title for the statistic status changes from GPORT to MNP.

The loc parameter displays detailed view of the status of SCCP services provided by a specific Service Module card. Fields are omitted if an associated feature is not turned on.

The mode parameter targets the general SCCP traffic performance for Service Module cards. The report supplies message rates for group ticket voucher (TVG) performance.

Refer to *Commands Manual* for details of this command.

The following sample output shows the output of the `rept-stat-sccp` command with the G-Flex, G-Port, INP, and Migration features on. The EIR feature is not enabled, and the *ansigflex* system option is disabled:

```
tekelecstp 000623 13:34:22 EST  EAGLE5 36.0.0
    SCCP SUBSYSTEM REPORT IS-NR          Active
         SCCP ALARM STATUS = No Alarms
    INPQ SUBSYSTEM REPORT IS-ANR         Restricted  -----
         ASSUMING MATE'S LOAD
         INPQ: SSN STATUS = Allowed     MATE SSN STATUS  = Prohibited
         INPQ ALARM STATUS = No Alarms
```

```
    GFLEX SERVICE REPORT IS-ANR         Active
         GFLEX ALARM STATUS = No Alarms
    MNP SERVICE REPORT   IS-ANR         Active
         MNP ALARM STATUS   = No Alarms
    SCCP Cards Configured=4  Cards IS-NR=2
    System TPS Alarm Threshold = 100% Total Capacity
    System Peak SCCP Load = 3000 TPS
    System Total SCCP Capacity = 5000 TPS
    CARD   VERSION      PST          SST         AST       MSU USAGE  CPU USAGE

    --------------------------
    1212   101-001-000  IS-NR        Active      ALMINH       45%         30%
    1301 P 101-001-000  IS-NR        Active      ------       35%         40%
    1305   -----------  OOS-MT       Isolated    ------        0%          0%
    2112   -----------  OOS-MT-DSBLD Manual      ------        0%          0%
    --------------------------
    SCCP Service Average MSU Capacity = 40%       Average CPU Capacity = 35%
    AVERAGE CPU USAGE PER SERVICE:
      GTT   = 15%  GFLEX =  5%  MNP = 10%
      INPMR =  2%  INPQ  =  3%
    TOTAL SERVICE STATISTICS:
                                    FAIL     REROUTE\      FORWARD
      SERVICE    SUCCESS    ERRORS   RATIO     WARNINGS        TO GTT     TOTAL

      GTT:          1995         5      0%            -             -     2000

      GFLEX:         500         1      0%            4            10      515
      MNP:           800         0      0%            2             3      805
      INPMR:          50         5      0%            0            15       70
      INPQ:          499         1      0%            -             -      500
    Command Completed.
```

rept-stat-mps

This command is used to display the overall status of the application running on the Multi-Purpose Server (MPS).

If the G-Port, G-Flex, A-Port, or IGM feature is turned on, the status of the GSM and EPAP are displayed.

Refer to *Commands Manual* for details of this command.

The following sample output follows:

```
Integrat40 00-06-24 10:37:22 EST  Rel 36.0.0-49.10.0
                    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       EIR STAT
    1106 P IS-NR        Active    ACT
    1201   IS-ANR       Active    SWDL
    1205   OOS-MT-DSBLD Manual    -------
    1302   OOS-MT       Isolated  -------
    1310   IS-ANR       Standby   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.
;
```

rept-stat-trbl

This command displays a summary of the device trouble notifications. The severity of each alarm is indicated in the output report. Refer to *Commands Manual* for details of this command.

A sample output follows:

```
eagle10207 02-08-23 10:09:59 EST  Rel 35.0.0-49.10.0

    SEQN UAM  AL DEVICE    ELEMENT       TROUBLE TEXT
    0001.0013 ** CARD 1201 GLS           Card is isolated from the system
    0002.0013 ** CARD 1211 SS7ANSI       Card is isolated from the system
    0013.0013 ** CARD 1103 GLS           Card is isolated from the system
    0015.0013 ** CARD 1105 VSCCP         Card is isolated from the system
    0018.0013 ** CARD 1115 OAM           Card is isolated from the system
    0019.0236 ** SLK 1211,B   ls1134     REPT-LKF: not aligned
    0020.0236 ** SLK 1311,A   ls1134567  REPT-LKF: not aligned
    0021.0236 ** SLK 1312,A   ls113456   REPT-LKF: not aligned
    0022.0236 ** SLK 1313,A   ls11345    REPT-LKF: not aligned
    0023.0236 ** SLK 1314,A   ls113467   REPT-LKF: not aligned
    0024.0236 ** SLK 1315,A   ls11234567 REPT-LKF: not aligned
    0025.0236 ** SLK 1316,A   ls11345678 REPT-LKF: not aligned
    0026.0318 ** LSN ls11234567          REPT-LKSTO: link set prohibited
    0027.0318 ** LSN ls11345678          REPT-LKSTO: link set prohibited
    0028.0318 ** LSN ls1134567           REPT-LKSTO: link set prohibited
    0029.0318 ** LSN ls113456            REPT-LKSTO: link set prohibited
    0030.0318 ** LSN ls11345             REPT-LKSTO: link set prohibited
    0035.0318 ** LSN ls113467            REPT-LKSTO: link set prohibited
    0032.0318 ** LSN ls1134              REPT-LKSTO: link set prohibited
    0033.0336 ** SCCP SYSTEM             LIM(s) have been denied SCCP service
    0034.0349 *C SEAS SYSTEM             SEAS unavailable
    0035.0356 *C LSMS SYSTEM             LSMS unavailable
    0036.0455 *C EIR SYSTEM              EIR Subsystem is not available
```

```
    0019.0236 *C T1PORT 1301,1          REPT-T1F:FAC-T1   LOS failure
    Command Completed.
```

rept-stat-alm

This command includes the alarm totals of the MNP subsystem and Service Module card/EPAP IP links. Refer to *Commands Manual* for details of this command. This is an example of the command output.

```
rept-stat-alm
Command Accepted - Processing
    eagle10605 99-06-24 23:59:39 EAGLE 35.0.0
    rept-stat-alm
    Command entered at terminal #10.
;
    eagle10605 99-06-24 23:59:39 EAGLE 35.0.0
    ALARM  TRANSFER= RMC
    ALARM  MODE      CRIT= AUDIBLE     MAJR= AUDIBLE     MINR= AUDIBLE
    ALARM  FRAME 1     CRIT=   9         MAJR=  12         MINR=   2
    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 GPF   CRIT=   1         MAJR=   2         MINR=   1
    PERM. INH. ALARMS  CRIT=   0         MAJR=   0         MINR=   0
    TEMP. INH. ALARMS  CRIT=   0         MAJR=   0         MINR=   0
    ACTIVE ALARMS      CRIT=  10         MAJR=  14         MINR=   3
    TOTAL ALARMS       CRIT=  10         MAJR=  14         MINR=   3
    Command Completed.
;
```

chg-db

The `chg-db` command copies the EAGLE 5 ISS TDM resident MNP database tables during database backup, restore, and repair.

rept-stat-db

This command displays the status information for the EAGLE 5 ISS databases. This includes the level information for each DSM network 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 birthdates and levels. It is enhanced to show the status of the PDB and RTDB databases if the Migration feature is activated. For details about this command, refer to the *Commands Manual*.

inh-card / alw-card

The `inh-card` command is used to change the 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 DCM/LIM/Service Module/GPSM-II/MIM card or physically remove it from the shelf.

The `alw-card` command is used to change the card from OOS-MT-DSBLD to IS-NR if the loading is successful.

Refer to *Commands Manual* for details of these commands.

ent-card / rtrv-card / dlt-card

The `ent-card` command is used to add a card to the database. The card type and application specifies the function assigned to the card. This command verifies that if the Migration feature is turned on, that the gpl that is being provisioned is a VSCCP gpl, and if it is, an error is displayed and the `ent-card` command is rejected.

The `rtrv-card` command is used to display the information about a card. This command displays the card type, the application the card is running, the linkset name, the signaling link code, and the ports.

The `dlt-card` command is used to remove a card entry from the system database.

Refer to *Commands Manual* for details on using these commands.

ent-map / chg-map / dlt-map

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

These commands are updated to allow both ITU-N and ITU-I true point codes to be defined for the same SSN. Refer to *Commands Manual* for details of these commands.

chg-sid

This command is used to change and report on the self-identification of the EAGLE 5 ISS. The self-identification identifies the EAGLE 5 ISS to other signaling points in the network. The `mnp` CPC type is used for Migration. Refer to *Commands Manual* for details of this command.

chg-gpl / act-gpl / rtrv-gpl / rept-stat-gpl / copy-gpl

The command-handling and scroll area output for these commands include the VSCCP GPL. Refer to *Commands Manual* for details of these commands.

Here are samples of the reports produced by these commands.

```
chg-gpl:appl=vsccp:ver=101-3-0
    Command entered at terminal #3.
;
    tekelecstp 99-10-24 06:54:39 EAGLE 35.0.0
    VSCCP upload to 1114 completed
    VSCCP upload to 1116 completed
;
act-gpl:appl=vsccp:ver=101-3-0
    Command entered at terminal #3.
;
    tekelecstp 99-10-24 06:54:39 EAGLE 35.0.0
    VSCCP activate on 1114 completed
    VSCCP activate on 1116 completed
;
rtrv-gpl:appl=vsccp
    Command entered at terminal #3.
;
    tekelecstp 99-10-04 07:01:08 EAGLE 35.0.0
    GPL Auditing  ON
    APPL  CARD  RELEASE      APPROVED         TRIAL        REMOVE TRIAL
    VSCCP 1114  101-001-000  101-003-000      101-001-000  101-003-000
    VSCCP 1116  101-001-000  101-003-000      101-003-000  -----------
;
```

```
rept-stat-gpl:appl=vsccp
    Command entered at terminal #3.
;
    tekelecstp 99-10-04 12:55:50 EAGLE 35.0.0
    APPL  CARD      RUNNING            APPROVED      TRIAL
    VSCCP 1205      101-003-000 ALM    101-003-000   101-003-000
    VSCCP 1211      101-001-000 ALM+   101-003-000   -----------
    Command Completed.
;
```

inh-alm / unhb-alm

These commands allow both Port A and Port B to be specified for the dev=dlk. This allows alarms to be inhibited on the DSM ports. Refer to *Commands Manual* for details of these commands.

rept-ftp-meas

This command provides on-demand measurements reporting capabilities. This command initiates generation and FTP transfer of a measurements report from the MCPM to the FTP server. The `enttype=np` supports Migration measurements. The combination of this enttype and a report type determines which on-demand Migration report is generated. Refer to *Commands Manual* for details of this command.

rept-meas

This command includes Migration measurements in the output sent to the EAGLE 5 ISS Terminal. Refer to *Commands Manual* for details of this command.

rept-stat-meas

Reports the status of the measurements subsystem including card location and state, Alarm level, and Subsystem State. Refer to *Commands Manual* for details of this command.

rtrv-measopts / chg-measopts

The `chg-measopts` command provides the user with the capability to enable and disable measurement options related to the Measurements Platform. Use this command for the following functions:

- Enable the Measurements Platform collection function
- Turn on or turn off the 15 Minute Measurements collection function
- Enable or disable the automatic generation and FTP transfer of scheduled measurements reports to the FTP server
- Turn on or off the CLLI-based file name option for measurements reports files

The `rtrv-measopts` command displays the current state of the Measurements Platform options.

Refer to *Commands Manual* for details of these commands.

Chapter 4

Migration Feature Activation

Topics:

This chapter describes the prerequisites, considerations, and steps to activate the IS41 GSM Migration (IGM) feature.

Introduction

CAUTION: For an in-service environment, contact the *Customer Care Center* on page 3 before continuing to activate the Migration feature. For an environment that is not in-service, continue with this procedure.

The Migration feature cannot be turned on if any of the Service Module cards have less than 4 GB of memory installed. 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.

This chapter identifies prerequisites for the Migration (IGM) feature activation procedure, an overview of the activation steps, and a matching number of detailed step descriptions to turn on the IGM feature. The IGM feature activation is performed at the EAGLE 5 ISS.

The IGM feature provides the mobile wireless service provider a way to migrate subscribers from IS-41 to GSM and GSM to IS-41. After the subscriber is marked as migrated, the GSM handset is fully functional and the migrated subscriber has the option whether to continue to receive calls on the IS-41 or GSM handset.

The IGM feature, and other related features, are optional and can be purchased from Tekelec. If you are not sure whether you have purchased a specific feature, contact your Tekelec Sales or Account Representative.

CAUTION:

After a feature has been turned on with the `enable-ctrl-feat` command, the feature cannot be turned off. Because features may overwrite other features or create changes in the database, confirm that you have a license and full technical support from Tekelec before turning on this or any feature. The IGM feature requires a Service Module card running the VSCCP application. . 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.

The following features are related to the IGM feature. Contact your Tekelec Sales or Account Representative for additional information.

- Global Title Translation (GTT)
- Enhanced Global Title Translation (EGTT)
- Variable-Length Global Title Translation (VGTT)
- Mobile Number Portability Circular Route Prevention (MNPCRP)

Prerequisites

The IGM feature activation assumes that at least one of the following features is provisioned.

- Global Title Translation (GTT),
- Enhanced Global Title Translation (EGTT)

- Variable-Length Global Title Translation (VGTT)

Refer to the Database Administration Manual - Global Title Translation for provisioning procedures.

The NT serial number (`ent-serial-num`) must be entered and locked before IGM can be enabled and turned-on.

The IGM feature activation assumes that the EPAP software is already configured; refer to *EPAP Administration Manual*, EPAP Software Configuration.

The IGM feature activation assumes that 4 GB Service Module cards to be installed.

- Note installed Service Module card locations, if any.
- Note available odd-even card slots for Service Module card installation.
- Determine Service Module card IP addresses and have them available during the activation procedure.

For in-service systems, schedule Service Module card replacement in maintenance window that allows the reboot of Service Module cards (`init-card:loc=<Service Module card location>`) one at a time.

CAUTION:

Initialize one Service Module card at a time. Verify the Service Module card is in the IS-NR state before initializing another Service Module card. This precaution keeps cards in service and prevents an interruption of SCCP services.

For in-service systems that already have the G-Port, G-Flex or INP feature enabled, perform only steps *Step 46* on page 70 through *Step 66* on page 71 to turn on the IGM feature. With the G-Port, G-Flex and/or INP feature enabled, the Service Module cards already contain the RTDB database.

For new systems, Service Module cards may be rebooted all at one time using the `init-card:appl=vsccp` command.

For new systems, GTT, EGTT, or VGTT features must be turned on prior to the reboot of all Service Module cards.

Feature Activation Overview

This section provides an overview of the IGM feature activation procedure. The procedure is described in detail in section *Feature Activation Procedure* on page 71

The feature activation consists of these sections:

- Configure system for HLR destinations in *Step 1* on page 68 through *Step 28* on page 69.
- Install Service Module cards in available slots and configure for VSCCP in *Step 29* on page 69 through *Step 44* on page 69.
- Turn on and configure the IGM feature in *Step 46* on page 70 through *Step 66* on page 71.

Step 1 on page 68 through *Step 28* on page 69 configure the system to be able to communicate with the system of the HLR database. The route to this database may already be configured. Perform these steps to verify that you have entered all HLR destinations for IGM and make configuration changes as needed.

1. Display and note current system settings for point codes (PCs) and capability point codes (CPCs), destination point codes (DPCs), routes, and linksets using *Step 2* on page 68 through *Step 7* on page 68.
2. Use `rtrv-sid` command to display current PCs and CPCs.
3. Use `rtrv-dstn` command to display current DPCs.
4. Use `rtrv-rte` command to display current route configurations.
5. Identify PCs and CPCs; determine new PC and CPC to be entered in *Step 9* on page 68 .
6. Use `rtrv-stpopts` command to display PC or CPC format if ITU-N network.
7. User`rtrv-map` command to display PCs of mated applications in database; remove system PC from table if necessary. Refer to procedure "Removing A Mated Application" in *Database Administration Manual - Global Title Translation*.

CAUTION:

Changing the point code of a system requires a system reboot using the `init-sys` command to fully implement the changes. The `init-sys` command causes a complete system reload and should be used only in an environment that is not in service. Using this command ensures the updated self identification information is loaded onto all cards, but service is interrupted.

8. Change PC, CPC, DPC, route, linkset, and LIM card configurations for the HLR database using *Step 9* on page 68 through *Step 28* on page 69.
9. Use `chg-sid` command to configure PC and CPC by network type.
10. Use `init-sys` command to initialize the system if changes were made in *Step 9* on page 68 to any `pca/pci/pcn` parameter.

CAUTION:

The`init-sys` command causes a complete system reload and should be used only in an environment that is not in service. Using this command ensures the updated self-identification information is loaded onto all cards, but service is interrupted.

When the `init-sys`command executes, the system does not retain the manually initiated state (for example, OOS-MT-DSBLD) for the signaling link, card, or terminal. After the command executes, the system attempts to bring all provisioned links, cards, and terminals on line, including those that were previously out of service. You will need to manually put each device back into its previous state after the system is back on line. Print or electronically capture the output of the `rept-stat-slk`, `rept-stat-card`, and`rept-stat-trm` commands for reference prior to issuing the `init-sys` command. To restore a device to its previous state, issue the appropriate inhibit/deactivate command listed in *Commands Manual* in the Related Commands section for each of the above rept-stat commands.

11. Use `rtrv-sid` command to display new PC and CPC.
12. Use `ent-dstn` command to enter DPC for HLR destinations.
13. Use `rtrv-dstn` command to display new HLR DPC.
14. Use `ent-ls` command to enter linkset and assign DPC for HLR destinations.
15. Use `rtrv-ls` command to display new linkset and assigned DPC for HLR destinations.

16. Use `ent-card` command to enter LIM cards into database.
17. Use `rtrv-card` command to display new LIM cards in database.
18. Use `ent-slk` command to assign signaling links to LIM cards.
19. Use `rtrv-slk` command to display new signaling links assigned to LIM cards.
20. Use `ent-rte` command to assign route to new DPC.
21. Use `rtrv-rte` command to display route assigned to new DPC.
22. Use `ent-map` command to enter mated application into database.
23. Use `rtrv-map` command to display new mated application in database.
24. Use `alw-card` command to allow LIM cards.
25. Use `rept-stat-card` command to display status of new LIM cards in database.
26. Use `act-slk` command to activate new signaling links for LIM cards.
27. Use `rept-stat-slk` command to display IS-NR status of signaling links.
28. Use `rtrv-card` command to confirm the new LIM cards and identify Service Module cards running VSCCP application.

CAUTION:

When adding Service Module cards in an in-service environment, take care precautions to not interrupt traffic.

29. Install and configure Service Module cards in available odd-even slots as needed using *Step 30* on page 69 through*Step 44* on page 69.
30. Install Service Module cards in available odd-even slots and verify the IMT bus LEDs are illuminated green.
31. Use `ent-card` command to enter Service Module cards as VSCCP cards into database.
32. Use `rtrv-card` command to display new Service Module cards running VSCCP in database.
33. Use `rtrv-ip-host` command to display current IP host information in database.
34. Use `ent-ip-host` command to add host name and IP address for each VSCCP link.
35. Use `rtrv-ip-host` command to display changed IP host information.
36. Use `chg-ip-card` command to set local domain and IP router address if necessary.
37. Use `rtrv-ip-card` command to display changed Service Module card information.
38. Use `rtrv-ip-lnk` command to display current link parameters associated with the Service Module card.
39. Use `chg-ip-lnk` command to set the IP address port and speed associated with the Service Module card.
40. Use `rtrv-ip-lnk` command to display changed link parameters.
41. Use `alw-card` command to boot Service Module cards.
42. Use `rept-stat-card` command to display IS-NR status of Service Module card.
43. Use pass command to test presence of EPAP hosts on network.
44. Repeat *Step 30* on page 69 through *Step 43* on page 69 to add all Service Module cards (N+1) to be installed in available slots.
45. Contact *Customer Care Center* on page 3 before continuing for assistance in completing the IGM activation procedure. Do not proceed without contacting *Customer Care Center* on page 3

46. Turn on IGM feature and configure the feature using *Step 47* on page 70 through *Step 66* on page 71.
47. Use `enable-ctrl-feat` command to enable the IGM feature.
48. Use `chg-ctrl-feat` command to turn on the IGM feature.

    Note:

    Step 51 on page 70 through *Step 61* on page 70 describe the commands that administer the IGM protocol flow to support:

    - IGM SRI ACK and LOCREQ (Ported-out MDNs)
    - IGM SRI ACK and LOCREQ (Foreign MDNs not known to be ported)
    - IGM Message Relay (Ported-in, non-ported MDNs)

49. Use `enable-ctrl-feat` command to enable the optional MTP MSGS for SCCP Apps feature, if required.
50. Use `chg-ctrl-feat` command to turn on the optional MTPMSGS for SCCP Apps feature, if required.
51. Use `chg-stpopts` command to enter default country code (CC) and default network destination code (NDC) if handling non-international numbers.
52. Use `rtrv-stpopts` command to verify changes of CC and NDC.
53. Use `chg-gsmopts` command to change GSM options.
54. Use `rtrv-gsmopts` command to verify changes to GSM options.
55. Use `chg-is41opts` command to change IS41 options.
56. Use `rtrv-is41opts` command to verify changes to IS41 options.
57. Use the `ent-homern` command to enter any Home RNs that are prefixed to DNs for incoming IGM MR messages.
58. Use `rtrv-homern` command to verify routing number prefixes.
59. Use the `rtrv-srvsel` command to display the administered service selector combinations.
60. Use `ent-srvsel` command to enter MNP service selectors.
61. Use `rtrv-srvsel` command to verify changes to MNP service selectors.

    CAUTION: In in-service environment , initialize one Service Module card at a time. Verify its return to IS-NR state before initializing another Service Module card. This precaution keeps cards in service and precludes an interruption of SCCP services.

62. Use `init-card:loc=<Service Module card>` command to load RTDB, OAM, GPL, and GTT data to Service Module card.
63. Use `rept-stat-card` command to display IS-NR status of Service Module card running VSCCP.
64. Repeat *Step 62* on page 70 and *Step 65* on page 70 to reboot each Service Module card.

    Note:

    After the IGM feature is turned on, always boot the Service Module cards with the `init-card:loc=`<Service Module card location> command.

65. Use `chg-sccp-serv:serv=mnp:state=online` to set the MNP service to online.

66. Confirm success of activation procedure with `rept-stat-sccp`, `rept-stat-mps`, and `rept-stat-db:display=all` commands.

    EPAP can now administer Migration entity objects and IGM subscribers. For the details about performing these actions, refer to the *EPAP Administration Manual*.

Feature Activation Procedure

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.

1. Before changing a true point code (PC) and adding a capability point code (CPC) for the IS41 GSM Migration (IGM) feature, display the current values of the self-identification configuration (shown in *Step 2* on page 71), the destination point codes (DPCs) (shown in *Step 3* on page 71), and the routes and linksets assigned to the DPCs (shown in *Step 4* on page 72).

   The IGM feature applies to ITU-I (international), ITU-N (national), and ITU-N ANSI networks.

2. Display the current self-identification of the system (PC and CPC) using the `rtrv-sid` command.

   Example of possible output:

```
tklc1081301 06-10-05 11:43:02 EST  EAGLE5 36.0.0

     PCA             PCI          PCN               CLLI        PCTYPE
     006-010-006     5-010-5      5-010-5-aa        tklc1081301   ANSI

      CPCA (MNP)
      006-012-000

      CPCI (MNP)
      5-012-0

      CPCN (MNP)
      5-012-0-aa        5-012-0-ms

      CPCN24 (MNP)
      006-012-000
;
```

   This example retrieved all capability point codes with `cpctype=mnp`.

3. Display the current destination point codes in the destination point code table (*dpci/dpcn/dpc/dpca*) using the `rtrv-dstn` command.

   Example of possible output:

```
  tklc1191001 06-05-11 08:02:13 EST  EAGLE5 36.0.0
     DPCA         CLLI        BEI ELEI   ALIASI          ALIASN/N24  DOMAIN

     008-030-008   stpa038a    no  ---  ----------      --------------   SS7

     006-010-006   stpc016a    no  ---  ----------      --------------   SS7
```

```
      042-052-012   tklca4212a2 no  ---    4-075-2         4-075-2-aa    SS7

      042-054-012   tklca4212a4 no  ---    4-077-2         4-077-2-aa    SS7

      042-056-012   tklca4212a6 no  ---    4-079-2         4-079-2-aa    SS7

      255-*-*       mobrncr001a --- --- ----------      --------------   SS7

      255-225-*     mobrncr002a no  no  ----------      --------------   SS7

      225-225-199   mobrrte001a no  ---    7-255-7         7-255-7-aa    SS7


      DPCI          CLLI        BEI ELEI   ALIASA          ALIASN/N24  DOMAIN

      7-030-7       stpa037i    no  --- --------------  --------------   SS7

     s-7-030-7      ----------- no  --- --------------  --------------   SS7

      5-010-5       stpc015i    no  --- --------------  --------------   SS7


      DPCN24        CLLI        BEI ELEI   ALIASA          ALIASI      DOMAIN

      008-030-008   stpa038c    no  --- --------------  ----------       SS7

      006-010-006   stpc016c    no  --- --------------  ----------       SS7

      006-090-006   stpd096c    no  --- --------------  ----------       SS7

      006-132-002   sc3a040i00  no  --- --------------  ----------       SS7


   DESTINATION ENTRIES ALLOCATED:   6000
       FULL DPC(s):                  664
       EXCEPTION DPC(s):            5272
       NETWORK DPC(s):                 1
       CLUSTER DPC(s):                 1
       TOTAL DPC(s):                5938
       CAPACITY (% FULL):             99%
   ALIASES ALLOCATED:               12000
       ALIASES USED:                1185
       CAPACITY (% FULL):             10%
   X-LIST ENTRIES ALLOCATED:         500
```

The example shows a truncated display of all provisioned destinations.

4. Display the current route configuration using the `rtrv-rte` command.

   Example of possible output:

```
rlghncxa03w 01-03-07 11:43:04 GMT  EAGLE 36.0.0
DPCA          ALIASI     ALIASN      CLLI    LSN         RC APCA
-----------   -------   -------     -----    --------   -- -----------
DPCI        ALIASN      ALIASA      CLLI     LSN         RC APCI
2-100-1     121111      --------    idp1     ls100001    10 1-234-5
                                             ls100002    10 1-234-6
                                             ls100003    20 1-234-7
                                             ls100004    30 1-234-1
                                             ls100005    40 1-234-2
                                             ls100006    50 1-234-3

DPCN        ALIASA      ALIASI      CLLI     LSN         RC APCN
21111       --------    0-001-1     ndp1     ls200001    10 11111
```

```
                                                  ls200002    10 11112
                                                  ls200003    20 11113
                                                  ls200004    30 11114
                                                  ls200005    40 11115
                                                  ls200006    50 11116
```

5. If the system point code (*pci/pcn*) or capability point code (*cpci/cpcn*) to be configured in this procedure is shown in *Step 2* on page 71, *Step 3* on page 71, or *Step 4* on page 72 , choose another point code to configure with this procedure (*Step 9* on page 74).
6. If configuring the system point code or capability point code (*pcn* or *cpcn*) of an ITU-N network, view the current value of the ITU-N point code format. Otherwise, continue with *Step 7* on page 73.

   Enter the `rtrv-stpopts` command and specify the ITU-N point code format *npcfmti* option. The *npcfmti* option identifies how the ITU-N point code is entered into the database and how it is displayed in any outputs. The value is shown in the *NPCFMTI* field.

   Example of possible output:

```
rlghncxa03w  01-03-17 16:02:05 GMT  EAGLE 36.0.0
STP OPTIONS
-----------------------
MTPT31CTL            1
MTPLTI             yes
MTPLTCTDPCQ          3
MTPLTST          10000
MTPXLQ             500
MTPXLET           0100
MTPXLOT            90%
MTPDPCQ           1750
TFATFRPR          1000
MTPRSI             yes
MTPRSIT           5000
MTPLPRST           yes
MTPT10ALT        30000
SLSCNV           perls
UIMRD              yes
CRITALMINH          no
DISPACTALMS         no
NPCFMTI        4-4-4-2
DEFCC                49
DEFNDC              177
DSMAUD               on
```

   To change the format of the ITU-N point code, refer to section *ITU National Point Code Formats* in *Database Administration Manual - SS7*. Then continue with*Step 7* on page 73.

7. Display the mated applications in the database using the `rtrv-map` command.

   Example of possible outputs:

```
PCN           SSN  RC  MPCN           MSSN MATERC SRM MRC GRP NAME
11111           5  10  12347             5    20

PCI           SSN  RC  MPCI           MSSN MATERC SRM MRC GRP NAME
2-100-1         5  20  3-200-1        250      99 --- --- abcdefgh
```

   If the system point code is shown in the `rtrv-map` command output (in the *PCA*, *PCI*, *PCN*, *MPCA*, *MPCI*, or *MPCN* fields), remove the system's point code from the mated application table. Refer to procedure *Removing a Mated Application* in *Database Administration Manual - Global Title Translation*.

If the system point code or capability point code is a destination point code of a route, select a point code that is not the destination point code of a route (see output of the `rtrv-rte` command in *Step 4* on page 72 `rtrv-dstn` command in *Step 3* on page 71).

8. Change PC, CPC, DPC, route, linkset, and LIM card configurations for the HLR database using *Step 9* on page 74 through *Step 29* on page 80.

CAUTION:

Changing a system point code requires a system reboot using the `init-sys` command to fully implement the changes. The `init-sys` command causes a complete system reload and should be used only in an environment that is not in service. Using this command ensures the updated self-identification information is loaded onto all cards but does interrupt service.

Note: The `init-sys` command must be entered twice within 30 seconds for the system to re-initialize. If the `init-sys` command is not executed twice within 30 seconds, the attempt to re-initialize the system is aborted.

9. Configure the system point code (*pci/pcn*) and capability point code (*cpci/cpcn*) by network type using the `chg-sid` command.

Command examples:

```
chg-sid:pci=1-100-2:cpci=1-102-1
```

```
chg-sid:pcn=11112:cpcn=11125
```

where:

pci/pcn

Point code used to uniquely identify the system

cpci/cpcn

Point code used by the SS7 protocol to identify a group of functionally related EAGLE 5 ISSs in the signaling network to which the EAGLE 5 ISS

After successful completion of this command, the system returns the following output:

```
rlghncxa03w 01-03-07 00:57:31 GMT EAGLE 36.0.0
CHG-SID: MASP A - COMPLTD
```

When any of the *pci/pcn* parameters have changed, the system needs to be reinitialized. The following caution message is displayed:

```
CAUTION: SYSTEM SITE ID HAS BEEN CHANGED, MANUAL RE-INITIALIZATION IS NEEDED
```

CAUTION:

The `init-sys` command causes a complete system reload and should be used only in an environment that is not in service. Using this command ensures the updated self identification information is loaded onto all cards, but does interrupt service.

When the `init-sys` command executes, the system does not retain the manually initiated state (for example, OOS-MT-DSBLD) for the signaling link, card, or terminal. After the command executes, the system attempts to bring all provisioned links, cards, and terminals on line, including those that were previously out of service. You will need to manually put each device back into its previous state

after the system is back on line. Print or electronically capture the output of the `rept-stat-slk`, `rept-stat-card`, and`rept-stat-trm` commands for reference prior to issuing the `init-sys` command. To restore a device to its previous state, issue the appropriate inhibit/deactivate command listed in the *Related Commands* section of *Command Manual* for each of the `rept-stat` commands.

10. Reinitialize the system by entering the `init-sys` command if changes were made in *Step 9* on page 74 to any *pca/pci/pcn* parameter.

When the `init-sys` command is first entered, this message is displayed.

```
rlghncxa03w 01-03-07 00:57:31 GMT EAGLE 36.0.0
CAUTION: This command causes a complete system reload, and
will result in traffic loss.
Re-enter command within 30 seconds to confirm.
```

When the `init-sys` command is re-entered within the 30-second time limit, this message is displayed:

```
rlghncxa03w 01-03-07 00:57:31 GMT EAGLE 36.0.0
Init System command issued at terminal #3
```

From the time that the `init-sys` command is accepted, wait approximately two minutes before you can perform *Step 11* on page 75 (logging into the system). If the terminal is in the VT-100/VT-320 mode, the terminal display will be refreshed with non-zero alarm counts. During this two-minute interval, an intermediate screen refresh occurs, which is caused by the MASP role change from active to standby and from standby to active. This screen refresh is typically a partial refresh and the alarm indicators are set to zero. If you are logged into the system in the KSR mode, the only response you will receive of being able to log into the system is the message 'UAM 0009, MASP became active'. UAM 0009 could be issued twice due to a possible transient MASP role change (switching from active to standby). Following the execution of the `init-sys` command, the MASP that was active before the `init-sys` command was entered will be the active MASP again when the system has finished reinitializing.

11. Verify the system self-identification changes using the `rtrv-sid` command.

Example of possible output:

```
durhncxa03w 01-03-07 00:57:31 GMT EAGLE 36.0.0
PCA              PCI              PCN           CLLI             PCTYPE
-------------    1-100-1          11111         rlghncxa03w      OTHER

CPCA
-------------
CPCI
1-101-1           1-101-2           1-101-3          1-101-4
1-102-1

CPCN
11121             11122             11123            11124
11125
```

12. Enter a destination point code for the HLR location in the Destination Point Code table by network type using the `ent-dstn` command.

Command examples:

`ent-dstn:dpci=2-100-2`

`ent-dstn:dpcn=21112`

where:

dpc/dpca/dpci/dpcn

Destination point code being added to the database

13. Verify the changes using the`rtrv-dstn` command and specifying the DPC that was entered in *Step 12* on page 75.

    Command examples:

    `rtrv-dstn:dpci=2-100-2`

    `rtrv-dstn:dpcn=21112`

    Example of possible output for DPCIs:

```
rtrv-dstn:dpci=2-100-2
RLGHNCXA03W 09-08-24 21:16:37 GMT EAGLE 41.0.0
DPCI        CLLI        BEI ELEI  ALIASA       ALIASN/N24  DMN
2-100-2     --------    no  ---   --------     ----------  SS7
```

    Example of possible output for DPCNs:

```
rtrv-dstn:dpcn=21112

RLGHNCXA03W 09-08-24 21:16:37 GMT EAGLE 41.0.0
DPCN        CLLI        BEI ELEI  ALIASA       ALIASI  DMN
21112       --------    no  ---   --------     ------  SS7
```

14. Enter a linkset with the `ent-ls` command, and assign the linkset to the destination point code by network type.

    Command examples:

    `ent-ls:lsn=ls400001:apci=2-200-2:lst=c`

    `ent-ls:lsn=ls500001:apcn=21122:lst=c`

    where:

    lsn

    Name of linkset

    apc/apca/apci/apcn

    Adjacent point code – the point code identifying the node that is next to the system

    lst

    Linkset type of the specified linkset

15. Verify the changes using the `rtrv-ls` command and specifying the linkset name.

    Command examples:

    `rtrv-ls:lsn=ls400001`

    `rtrv-ls:lsn=ls500001`

    For lsn400001, the system returns output similar to the following:

```
                                L3T  SLT              GWS GWS GWS
LSN          APCI (SS7)  SCRN  SET  SET BEI LST LNKS ACT MES DIS SLSCI NIS
ls400001     2-200-2     scr1  1    2   no  a   0    on   off  off  no    on
```

For lsn500001, the system returns output similar to the following:

```
                                L3T  SLT              GWS GWS GWS
LSN          APCI (SS7)  SCRN  SET  SET BEI LST LNKS ACT MES DIS SLSCI NIS
ls500001     21122       scr3  1    2   no  a   0    on   off  off  no    on
```

16. Add the LIM cards to the database using the`ent-card` command.

    Command examples:

    `ent-card:loc=1105:type=lime1:appl=ccs7itu`

    `ent-card:loc=1106:type=lime1:appl=ccs7itu`

    where:

    loc

    Card location or slot as stenciled on the shelf of the system

    type

    Hardware card type specified as LIME1

    appl

    Application for card specified as CCS7ITU

17. Verify the changes using the `rtrv-card` command with the card location specified.

    Command examples:

    `rtrv-card:loc=1105`

    `rtrv-card:loc=1106`

    Example of possible output for command example:

```
tekelecstp51 09-08-24 21:16:37 GMT EAGLE 41.0.0

CARD   TYPE      APPL      LSET NAME     LINK SLC LSET NAME     LINK SLC
1105   LIME1     CCS7ITU   ls400001      A    00  ------------  B    --
1106   LIME1     CCS7ITU   ls500001      A    00  ------------  B    --
```

18. Enter the E1 interface using the `ent-e1` command.

    Command examples:

    ent-e1:loc=1105:e1port=1

    ent-e1:loc=1106:e1port=1

    where:

    loc

    Card location or slot as stenciled on the shelf of the system

    e1port

    E1 card port number

19. Assign signaling links to the LIM cards using the `ent-slk` command.

    Command examples:

    `ent-slk:loc=1105:link=a:lsn=ls400001:slc=0:l2tset=1:e1port=1:ts=1`

    `ent-slk:loc=1106:link=a:lsn=ls500001:slc=0:l2tset=1:e1port=1:ts=1`

where

loc

Location of the LIM card to which the SS7 signaling is assigned

link

Signaling link on the LIM card

lsn

Unique name of linkset containing the signaling link

slc

Signaling link code - unique within the linkset

l2tset

Level 2 timer set

e1port

Port for E1 interface on E1 card to which the signaling link and timeslot are assigned

ts

E1 timeslot for the assigned signaling link

Signaling links are the only elements in the database directly supported by a hardware device. When a link is added to a linkset, the link remains in the *Out of Service Maintenance Disabled* (OOS-MT-DSBLD) state until it is activated in *Step 27* on page 80.

20. Verify the changes using the `rtrv-slk` command, specifying the card location and port of the signaling link entered in *Step 19* on page 77.

Command examples:

```
rtrv-slk:loc=1105:link=a
```

```
rtrv-slk:loc=1106:link=a
```

where:

loc

Card location or slot as stenciled on shelf of system

link

Signaling link on the LIM card

21. Add a route for the new DPC by network type using the `ent-rte` command.

Command examples:

```
ent-rte:dpci=2-100-2:lsn=ls400001:rc=10
```

```
ent-rte:dpcn=21112:lsn=ls500001:rc=10
```

where:

dpci/dpcn

Destination point code of the node to which the traffic is bound

lsn

Linkset name associated with this route

rc

Relative cost or priority of this route

22. Verify the changes using the `rtrv-rte` command and specifying the destination point code of the route.
23. Add a mated application by network type to the database using the `ent-map` command.

    Command examples:

    ```
    ent-map:pci=2-100-1:ssn=12:rc=20:mpci=3-200-1:mssn=50
    :materc=99:grp=grp03
    ```

    ```
    ent-map:pcn=11112:ssn=12:rc=10:mpcn=11114:mssn=250:materc=99 :grp=grp07
    ```

    where:

    pci/pcn

    Point code of the primary signaling point that is to receive the message

    ssn

    Subsystem number which is the subsystem address of the primary point code that is to receive the message

    rc

    Relative cost

    mpc/mpca/mpci/mpcn

    Point code of the backup signaling point that is to receive the message

    mssn

    Mate subsystem number which is the subsystem address of the backup point code that is to receive the message

    materc

    Mate relative cost

    grp

    Name of the concerned signaling point code group that contains the point codes that should be notified of the subsystem status. This parameter applies to both RPCs/SSNs.

24. Verify the changes using the `rtrv-map` command.

    Example of possible outputs:

    ```
    rlghncxa03w 01-03-07  11:43:04  GMT  EAGLE 36.0.0
    PCN            SSN  RC  MPCN          MSSN MATERC SRM MRC GRP NAME
    11111            5  20  12347         250      99 --- --- GRP07
    11112           12   0  12347         250      99 --- --- GRP07

    rlghncxa03w 01-03-07  11:43:04  GMT  EAGLE 36.0.0
    PCI            SSN  RC  MPCI          MSSN MATERC SRM MRC GRP NAME
    1-100-1          5   0  3-200-1       250      99 --- --- GRP03
    2-100-1         12  20  3-200-1        50      99 --- --- GRP03
    ```

25. Allow the LIM cards that were entered in *Step 16* on page 77 using the `alw-card` command.

    Command examples:

    ```
    alw-card:loc=1105
    ```

```
alw-card:loc=1106
```

This message is displayed:

```
RLGHNCXA03W  01-03-30 21:20:37 GMT EAGLE 36.0.0
Card has been allowed.
```

26. Verify the In-Service-Normal (IS-NR) status of the cards using the `rept-stat-card` command.
27. Activate the signaling links entered in *Step 19* on page 77 using the `act-slk` command.

    Command examples:

    ```
    act-slk:loc=1105:link=a
    act-slk:loc=1106:link=a
    ```

    The link changes its state from Out-of-Service Maintenance-Disabled (OOS-MT-DSBLD) to In-Service-Normal (IS-NR). The output confirms the activation.

    ```
    RLGHNCXA03W 01-03-07 11:11:28 GMT EAGLE 36.0.0
    Activate Link message sent to card
    ```

28. Verify the In-Service-Normal (IS-NR) states of the signaling link using the `rept-stat-slk` command.

    Command examples:

    ```
    rept-stat-slk:loc=1105
    rept-stat-slk:loc=1106
    ```

    Example of possible output:

    ```
    RLGHNCXA03W 01-03-30 21:16:37 GMT EAGLE 36.0.0
    SLK      LSN        CLLI       PST     SST     AST
    1105,A   ls400001  ----------  IS-NR   Avail   ----
    Command Completed.

    RLGHNCXA03W 01-03-30 21:16:37 GMT EAGLE 36.0.0
    SLK      LSN        CLLI       PST     SST     AST
    1106,A   ls500001   ---------- IS-NR   Avail   ----
    Command Completed
    ```

29. Display the new LIM cards in the database using the `rtrv-card` command.

    Example of possible output:

    ```
    tekelecstp51 09-08-24 21:16:37 GMT EAGLE 41.0.0
    CARD   TYPE      APPL      LSET NAME     LINK SLC LSET NAME     LINK SLC
    1105   LIME1     CCS7ITU   ls400001      A    00  ------------  B    --
    1106   LIME1     CCS7ITU   ls500001      A    00  ------------  B    --
    ```

30. Determine the locations in the output of *Step 29* on page 80 where dual-slot Service Module cards can be inserted. Install and configure Service Module cards as needed in available odd-even slots using *Step 31* on page 80 through *Step 45* on page 85.

    Note: When adding Service Module cards in an in-service environment, take precautions to not interrupt traffic.

    This example installs Service Module cards in slots 1107 and 1108. Substitute the correct card slot values for your installation in the appropriate steps.

31. Install the Service Module card in the identified slots.

The Service Module card requires two slots and must be installed in an odd slot with an adjacent empty even slot on its right side.

a) Open the ejector levers on the Service Module card.
b) Align the card edges with the top and bottom card guides and slowly slide the card into the chassis until the rear connectors of the card contact the mating connectors of the shelf backplane.
c) Push the left edge of the card faceplate using a constant pressure until the card connectors are securely inserted into the backplane connectors.

warning: Do not push on the card faceplate with extreme or abrupt force to insert the card connectors into the backplane connectors. Extreme or abrupt force on the card faceplate may damage the faceplate, connector pins, or connector housings.

d) Engage (push inward) the top and bottom ejector levers to lock the card in the slot and ensure a secure connection between the card and backplane connectors.
e) Verify that both IMT bus LEDs are illuminated green.
f) Install the cabling required to connect the Service Module card to the MPS. Refer to *Hardware and Installation - T1000* and *MPS Platform Software and Maintenance* for details

32. Add the Service Module card to the database and configure the card as Service Module card running the VSCCP application using the ent-card command.

Command example:

```
ent-card:appl=vsccp:loc=1107:type=dsm
```

where:

appl

Application for the card

loc

Card location or slot number for the card. For any Service Module card, this card location must be an odd number.

type

Type of card

33. Verify the addition of the Service Module card to the database using the `rtrv-card` command with the card location specified.

Command example:

```
rtrv-card:loc=1107
```

Example of possible output:

```
RLGHNCXA03W 09-08-24 09:12:36 GMT EAGLE 41.0.0
CARD   TYPE      APPL      LSET NAME     LINK SLC LSET NAME     LINK SLC
1107   DSM       VSCCP     ------------  A    --  ------------  B    --
```

34. Display current link parameters associated with the Service Module card in the database by entering the `rtrv-ip-lnk` command.

Example of possible output:

```
RLGHNCXA03W 09-08-24 21:14:37 GMT EAGLE 41.0.0
LOC PORT IPADDR   SUBMASK    DUPLEX  SPEED  MACTYPE  AUTO  MCAST
```

```
1107 A   -------  --------   HALF    10     DIX      NO    NO
1107 B   -------  --------   HALF    10     DIX      NO    NO
```

35. Enter the IP address and other parameter values associated with the Service Module card in the database using the `chg-ip-lnk` command.

    Command examples:

    `chg-ip-lnk:loc=1107:port=a:duplex=half:ipaddr=192.168.122.1:mactype=dix:speed=100:mcast=yes:submask=255.255.255.0`

    `chg-ip-lnk:loc=1107:port=b:duplex=half:ipaddr=192.168.123.1:mactype=dix:speed=10:mcast=yes:submask=255.255.255.0`

    where

    loc

    Card location or slot number of the Service Module card in the EAGLE 5 ISS

    port

    Ethernet interface Port ID - the physical interface of the Service Module card

    ipaddr

    IP address for the specified port. This is a TCP/IP address expressed in standard dot notation. IP addresses consist of the network number of the system and the unique host number.

    submask

    Subnet mask of the IP interface in the form of an IP address with a restricted range of values

    duplex

    Mode of operation of the interface

    speed

    Interface bandwidth in megabits per second. The speed is either 100 Mbps for main Service Module network or 10 Mbps for backup Service Module network.

    mactype

    Media Access Control Type of the interface. Specify *dix* for the Digital/Inter/Xerox *defacto* standard for Ethernet 2.

    mcast

    Multicast Control to enable or disable multicast support for the interface. This parameter value must be *yes* to establish the connection from the Service Module card to the MPS system.

36. Verify the IP address and other parameter values associated with the Service Module card in the database by entering the `rtrv-ip-lnk` command.

    Example of possible output:

```
RLGHNCXA03W 09-08-24 21:14:37 GMT EAGLE 41.0.0
LOC  PORT IPADDR        SUBMASK       DUPLEX SPEED MACTYPE AUTO MCAST
1107 A    192.168.122.1 255.255.255.0 HALF   100   DIX     NO   YES
1107 B    192.168.123.1 255.255.255.0 HALF   10    DIX     NO   YES
```

37. Display the current IP host information in the database by entering the `rtrv-ip-host` command.

Example of possible output:

```
RLGHNCXA03W 09-08-24 21:17:37 GMT EAGLE 41.0.0
IPADDR          HOST
192.1.1.32      KC_HLR2
192.1.1.50      DN_MSC1
192.1.1.52      DN_MSC2
```

38. Add the host name and IP address for each VSCCP link using the `ent-ip-host` command.

    Command examples:

    ```
    ent-ip-host:host=vsccp_1107_a:ipaddr=192.168.122.1
    ```

    ```
    ent-ip-host:host=vsccp_1107_b:ipaddr=192.168.123.1
    ```

    where:

    host

    Host name. Each VSCCP link must be specified separately.

    ipaddr

    IP network address for each EPAP. The first three octets of the IP address must be the same as MPS A and B ports, respectively. The fourth octet identifies the DSM card and must have a a unique octet identifier for the card's IP address; we recommend numbering the Service Module cards sequentially, using values 1 to 25. This example shows the assignment of the first Service Module card.

39. Verify the new IP host information in the database by entering the `rtrv-ip-host` command.

    Example of possible output:

    ```
    RLGHNCXA03W 01-03-30 21:19:37 GMT EAGLE 36.0.0

    IPADDR          HOST
    192.1.1.32      KC_HLR2
    192.1.1.50      DN_MSC1
    192.1.1.52      DN_MSC2
    192.168.122.1   VSCCP_1107_A
    192.168.123.1   VSCCP_1107_B
    ```

40. Enter local domain and IP router address for the Service Module card using the `chg-ip-card` command.

    Note:

    Most IGM customer private networks do not require setting up a default router for the Service Module card. However, if your network configuration does require a default router to connect the Service Module card communication to the EPAP, then only one default router is assignable to each Service Module card. Assign the default router address to each Service Module card as shown this step.

    Command example:

    ```
    chg-ip-card:loc=1107:domain=nc.tekelec.com :defrouter=192.168.122.250
    ```

    where:

    loc

    Card location or slot (odd number) of the Service Module card

    domain

    Domain name of domain server

defrouter

Default router IP address. This is a TCP/IP address expressed in standard *dot notation*. IP addresses consist of the network number of the system and the unique host number of the machine.

41. Verify the new TCP/IP parameters associated with the Service Module card in the database by entering the `rtrv-ip-card` command.

    Example of possible output:

```
RLGHNCXA03W 01-03-30 21:21:37 GMT EAGLE 36.0.0
   LOC  1107
     SRCHORDR  LOCAL
     DNSA      -----------
     DNSB      -----------
     DEFROUTER  192.168.122.250
     DOMAIN     NC.TEKELEC.COM
```

42. Boot the Service Module card that was added in *Step 32* on page 81 using the `alw-card` command.

    Command example:

    `alw-card:loc=1107`

43. Verify the In-Service-Normal (IS-NR) status of the Service Module card using the `rept-stat-card` command.

    Example of possible output:

```
RLGHNCXA03W 01-03-27 16:43:42 GMT  EAGLE 36.0.0
CARD  VERSION            TYPE    APPL      PST           SST       AST
1107  100-000-00003-000  DSM     VSCCP     IS-NR         Active    ---
```

44. Test the presence of the EPAP hosts on the network using the `pass` command with the *ping* parameter.

    This command is invoked with a destination (either a hostname or IP address).

    Command examples:

    `pass:loc=1107:cmd="ping 192.168.122.100"`

    `pass:loc=1107:cmd="ping 192.168.122.200"`

    `pass:loc=1107:cmd="ping 192.168.123.100"`

    `pass:loc=1107:cmd="ping 192.168.123.200"`

    After successful completion of each command, the system returns output similar to the following:

```
rlghncxa03w 00-06-27 08:30:44 GMT EAGLE 36.0.0
pass: loc=1107: cmd="ping 192.168.122.100"
Command entered at terminal #1.
;
rlghncxa03w 00-06-27 08:30:44 GMT EAGLE 36.0.0
PASS: Command sent to card
;
rlghncxa03w 00-06-27 08:30:44 GMT EAGLE 36.0.0
PING command in progress
;
rlghncxa03w 00-06-27 08:30:46 GMT EAGLE 36.0.0
PING 192.168.122.100: 56 data bytes
```

```
64 bytes from tekral.nc.tekelec.com (192.168.122.100):icmp_seq=0.time=5. ms
64 bytes from tekral.nc.tekelec.com (192.168.122.100):icmp_seq=1.time=0. ms
64 bytes from tekral.nc.tekelec.com (192.168.122.100):icmp_seq=2.time=0. ms
----192.168.100.3 PING Statistics----
3 packets transmitted, 3 packets received, 0% packet loss
round-trip (ms) min/avg/max = 0/1/5
PING command complete
```

If the `pass` commands with the *ping* parameter are not successful, verify the the correct connection of the hardware cabling and repeat the `pass` commands. again. If the commands fail again, contact *Customer Care Center* on page 3.

45. Repeat *Step 31* on page 80 through *Step 44* on page 84 to add all Service Module cards (N+1) to be installed in available slots.
46. Contact the *Customer Care Center* on page 3 for assistance in completing this IGM feature activation procedure. Do not proceed before consulting with the *Customer Care Center* on page 3. The IGM feature is enabled and turned on using *Step 47* on page 85 through *Step 65* on page 89.
47. Enter the `enable-ctrl-feat` command to enable the IGM feature.

    ```
    enable-ctrl-feat:partnum=893017301:fak=<Feature Access Key>
    ```

48. Enter the `chg-ctrl-feat` command to turn on the IGM feature.

    ```
    chg-ctrl-feat:partnum=893017301:status=ON
    ```

49. Enter the `enable-ctrl-feat` command to enable the MTP Msgs for SCCP Apps feature.

    ```
    enable-ctrl-feat:partnum=893017401:fak=<Feature Access Key>
    ```

50. Enter the `chg-ctrl-feat` command to turn on the MTP Msgs for SCCP Apps feature.

    ```
    chg-ctrl-feat:partnum=893017401:status=ON
    ```

51. Enter the default country code (CC) and default network destination code (NDC) to convert the nature of address indicator (NAI) of MDNs to the international format (`nai=intl`) with the `chg-stpopts` command.

    Command example:

    ```
    chg-stpopts:defcc=1:defndc=38:dsmaud=on:npcfmti=2-9-2-1
    ```

    where:

    defcc

    Default country code

    defndc

    Default network destination code

    dsmaud

    DSM audit running state (on or off)

    npcfmt1

    ITU National Point Code Format Identifier, which identifies how the ITU-N point code is entered into the database and how it is displayed in all EAGLE 5 ISS outputs. This code is a 14-bit integer.

52. Verify the new country code and network destination code using the `rtrv-stpopts` command.
53. Change the GSM system options in the database using the `chg-gsmopts` command.

Command example:

```
chg-gsmopts:srfnai=7:srfaddr=23448:srfnp=15:is412gsm=34:msrsndig=ccrndn:defmapvr=2
```

where:

srfnai

Nature of address indicator value of the MNP_SRF

srfaddr

Entity address of the MNP_SRF node

srfnp

Numbering plan value of the MNP_SRF

is412gsm

IS-41 to GSM migration prefix

msrndig

Routing number to be used as is or to be concatenated with the MSISDN

defmapvr

Default MAP version

54. Verify the changes and display all GSM system options from the database using the `rtrv-gsmopts` command.
55. Change the IS41 system options in the database using the `chg-is41opts` command.

    Command example:

    ```
    chg-is41opts:rspcgpanai=7:rspcgpanp=15:rspdig=ccrndn
    ```

    where:

    rspcgpanai

    New NAI value to override the NAI value specified in the SCCPCdPA of a received LOCREQ/SMSREQ if the message is to be relayed after database lookup

    rspcgpanp

    Numbering plan value of the MNP_SRF

    numbering plan value of the MNP_SRF

    Digit encoding format of the LOCREQTCAP Outgoing Called Party parameter on a per EAGLE 5 ISS node basis

56. Verify the changes and display all IS41 system options from the database using the `rtrv-is41opts` command.
57. Add routing number prefixes for the operating network using the `ent-homern` command.

    Use this command to enter any Home RNs that are prefixed to DNs for incoming INPMR messages. You may use this command to enter up to 100 routing number prefixes for the operating network into the HOMERN table.

    Command example:

    ```
    ent-homern:rn=34
    ```

    where:

    rn

Home routing number prefix. The range is 1 to 15 hex digits (0-F).

58. Verify the changes using the `rtrv-homern` command.

    This command retrieves a list of routing number prefixes that belong to the operating network.

    Example of possible output:

```
rlghncxa03w  01-03-28  00:29:31 GMT EAGLE 36.0.0.0
RN
----------------
216780909087654
76345098
c10234567
c222
cabade
abc
abc123

HOMERN table is (6 of 100) 6% full
```

59. View the list of service selector combinations uing the `rtrv-srvsel` command.

    This command retrieves a list of administered service selector combinations.

    Example of possible output:

```
rlghncxa03w 00-06-20 09:09:14 GMT EAGLE 36.0.0
GTII  TT   NP       NAI   NPV  NAIV  SSN  SNP   SNAI   SERV
4     1    e214     intl  ---  ---   3    ---   ---    mnp
```

60. Use the `ent-srvsel` command to enter the IGM service selectors by network type.

    This command assigns applicable service selectors required to specify the service entry for DSM services.

    Command example:

    `ent-srvsel:gtii=4:tt=1:snp=e164:snai=intl:serv:mnp:nai=intl :np=e164:ssn=9`

    where:

    gtii

    Global title translation indicator (ITU international)

    tt

    Translation type

    snp

    Service numbering plan (e164, e212, or e214)

    snai

    International Service Nature of Address Indicator

    serv

    DSM service

    nai

    Nature of address indicator

    np

Numbering plan

ssn

Subsystem number

61. Verify the changes using the `rtrv-srvsel` command.

This command retrieves a list of administered service selector combinations. Avoid lengthy output by filtering the list using various parameter combinations. The selector table can have over 1,000 entries.

Command examples:

```
rtrv-srvsel:gtii=2
```

```
rtrv-srvsel:gtii=4
```

After successful completion of this command, the system returns output similar to the following:

```
rlghncxa03w  01-03-28  00:29:30 GMT EAGLE 36.0.0
TII  TT   NP        NAI    NPV  NAIV  SNP  SNAI  SERV
2     0    e164      intl   ---  ---   e164 intl  gport
2     1    e164      intl   ---  ---   e164 intl  gport

rlghncxa03w  01-03-28  00:29:31 GMT EAGLE 36.0.0
GTII  TT   NP        NAI    NPV  NAIV  SNP  SNAI  SERV
4     0    e164      intl   ---  ---   e164 intl  gport
4     1    e164      intl   ---  ---   e164 intl  gport
```

62. Reload a Service Module card using the `init-card` command.

CAUTION:

When the environment is in-service, initialize one Service Module card at a time. Verify its return to IS-NR state before initializing another Service Module card. This precaution keeps cards in service and avoids an interruption of SCCP services.

GTT, EGTT, and VGTT traffic is routed based on the global titles in the OAM database while G-Flex, IGM, and INP traffic is routed based on the global title in the RTDB. Rebooting a Service Module card running the VSCCP application causes both the OAM and RTDB databases on the Service Module card to reload

Command example:

```
init-card:loc=1101
```

The system returns the following message:

```
rlghncxa03w  01-03-07 00:28:31 GMT EAGLE 36.0.0
Command entered at terminal #3.
Init Card command issued to card 1101
```

63. Verify the Service Module card returns to the IS-NR state with the `rept-stat-card` command.

Wait until In-Service-Normal state is restored before continuing.

Example of possible output:

```
RLGHNCXA03W 01-03-07 00:30:42 GMT  EAGLE 36.0.0
CARD  VERSION            TYPE    APPL      PST          SST       AST
1101 100-000-00003-000   DSM     VSCCP     IS-NR        Active    ---
```

64. After the `init-card` and the `rept-stat-card` commands show that service is successfully restored, repeat *Step 62* on page 88 and *Step 63* on page 88 for each Service Module card in the system.
65. Enter the `chg-sccp-serv` command to set the MNP service to the online state.

    Command example:

    ```
    chg-sccp-serv:serv=mnp:state=online
    ```

    where:

    serv

    Name of the service. MNP is Mobile Number Portability.

    state

    State of the service

66. Confirm that essential activation procedures are successful.

    - Use `rept-stat-sccp` to verify that all Service Module cards are loaded and are In-Service Normal (IS-NR) status.
    - Use `rept-stat-mps` to verify that all Service Module cards are connected to the EPAP and are operational.
    - Use `rept-stat-db:display=all` to verify database levels are identical for the EPAP PDB and RTDB, and the RTDBs on the Service Module cards.

    The IGM feature is now enabled, turned on, and operating in the system.

The 1100 TPS/Service Module Card for ITU NP Feature

This procedure is used to enable and turn on the 1100 TPS/Service Module card for ITU NP feature. This feature provides up to 26,400 transactions per second when the maximum number of Service Module cards are installed in the EAGLE 5 ISS and one or more EPAP-related features (such as G-Port, G-Flex, A-Port, INP, EIR, Migration) are enabled and turned on.

This feature can be enabled only for Service Module cards that are rated at 850 transactions per second (TPS).

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

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

The `enable-ctrl-feat` command enables the 1100 TPS/Service Module card for ITU NP feature by inputting the feature's access key and the feature's part number with these parameters:

:fak

The feature access key provided by Tekelec. The feature access key contains 13 alphanumeric characters and is not case sensitive.

:partnum

The Tekelec-issued part number of the 1100 TPS/Service Module card for ITU NP feature, 893018001.

After the 1100 TPS/Service Module card for ITU NP feature has been enabled, the feature must be turned on with the `chg-ctrl-feat` command. The `chg-ctrl-feat` command uses these parameters:

:partnum

The Tekelec-issued part number of the 1100 TPS/Service Module card for ITU NP feature, 893018001.

:status=on

Used to turn the 1100 TPS/Service Module card for ITU NP feature on.

Activating the 1100 TPS/DSM for ITU NP Feature

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

The 1100 TPS/DSM for ITU NP feature increases the processing capacity of SCCP traffic for an EAGLE 5 ISS processing EPAP-based traffic to 26,400 transactions per second. To provide this increase in SCCP processing capacity, the maximum of 25 Service Module cards must be provisioned and installed in the EAGLE 5 ISS, and one or more EPAP-related features enabled and turned on. This feature can be enabled only for Service Module cards that are rated at 850 transactions per second (TPS).

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

The 1100 TPS/DSM for ITU NP feature cannot be enabled if:

- The EAGLE 5 ISS does not contain any Service Module cards.
- The LNP feature is enabled.
- The ANSI G-Flex STP Option is enabled.
- The GTT feature is not turned on.

The feature access key for the 1100 TPS/DSM for ITU NP feature is provided by Tekelec. Contact your Tekelec Sales Representative or Account Representative before beginning the feature activation procedure if you do not have the feature access key for this feature. Based on the feature part number and the serial number of the EAGLE 5 ISS, the feature access key is site-specific. The feature access key contains thirteen alphanumeric characters and is not case sensitive. The 1100 TPS/DSM for ITU NP feature cannot be enabled with a temporary feature access key.

The `enable-ctrl-feat` command requires that the database contain a valid serial number for the EAGLE 5 ISS, and that this serial number is locked. Verify with the `rtrv-serial-num` command. The EAGLE 5 ISS 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 EAGLE 5 ISS is on-site with the `ent-serial-num` command.

Note: To enter and lock the serial number of the EAGLE 5 ISS, the `ent-serial-num` command must be entered twice. The first entry of the `ent-serial-num` command adds the correct serial number to the database with the `serial` parameter. The second entry of the `ent-serial-num` command with the `serial` and `lock=yes` parameters locks the serial number. Verify that the

serial number in the database is correct before locking the serial number. The serial number is on a label attached to the control shelf (shelf 1100).

Refer to *Commands Manual* for detailed descriptions of all commands used in this procedure.

1. Display the status of the 1100 TPS/DSM for ITU NP feature by entering the `rtrv-ctrl-feat` command.

   Example of a possible output:

```
rlghncxa03w 09-08-24 21:15:37 EST  EAGLE 40.1.0

The following features have been permanently enabled:
Feature Name              Partnum    Status  Quantity
HC-MIM SLK Capacity       893012707  on            64
Prepaid SMS Intercept Ph1 893006701  on          ----
1100 TPS/DSM for ITU NP   893018001  on          ----

The following features have been temporarily enabled:
Feature Name              Partnum    Status  Quantity     Trial Period Left
MNP Circ Route Prevent    893000140  On          ----  20 days 8 hrs 57 mins

The following features have expired temporary keys:
Feature Name            Part Num
OnOffFeatV
```

2. Based on the output in *Step 1* on page 91, perform one of the following:

   - If the `rtrv-ctrl-feat` output shows that the LNP feature is enabled, this procedure cannot be performed. The 1100 TPS/DSM for ITU NP feature cannot be enabled if the LNP feature is enabled.
   - If the 1100 TPS/DSM for ITU NP entry of the `rtrv-ctrl-feat` output shows that the 1100 TPS/DSM for ITU NP feature is enabled and the feature status is on, no further action is necessary.
   - If the feature is enabled and the feature status is off, go to *Step 13* on page 93.
   - If the 1100 TPS/DSM for ITU NP and LNP features are not enabled, continue to *Step 3* on page 91.

3. Determine whether the G-Flex feature is turned on by entering the `rtrv-ctrl-feat` .

   The status of the G-Flex feature is shown by the G-Flex entry in the `rtrv-ctrl-feat` output.

   - If the G-Flex feature is on, continue to *Step 4* on page 91.
   - If the G-Flex feature is off, go to *Step 5* on page 92.

4. Verify that the ANSI G-Flex option is not enabled or turned on by entering the `rtrv-stpopts` command.

   The 1100 TPS/DSM ITU NP feature cannot be enabled if the ANSI G-Flex option is turned on.

   The ANSI G-Flex option is shown by the ANSIGFLEX entry in the `rtrv-stpopts` output. If the ANSIGFLEX entry is displayed in the `rtrv-stpopts` output, both the G-Flex and the GTT features are turned on.

   - If the ANSIGFLEX value is *yes* in the `rtrv-stpopts` output , the ANSI G-Flex option is enabled and the remainder of this procedure cannot be performed.
   - If the ANSIGFLEX value is *no* in the `rtrv-stpopts` output, the ANSI G-Flex option is not enabled. Proceed to *Step 6* on page 92.

5. Determine whether the GTT feature is turned on by examining the output of the `rtrv-feat` command.

   The 1100 TPS/DSM ITU NP feature cannot be enabled unless the GTT feature is turned on. The GTT feature is shown by the GTT entry in the `rtrv-feat` output in *Step 3* on page 91.

   - If the GTT feature is turned on, continue to *Step 6* on page 92.
   - If the GTT feature is turned off, perform "Adding a Service Module" in *Database Administration Manual - Global Title Translation* to turn on the GTT feature and to add the required number of Service Module cards to the database. After "Adding a Service Module" has been performed, go to *Step 11* on page 93.

6. Verify the number of Service Module cards provisioned in the database using the `rtrv-card:appl=vsccp` command:

   Example of a possible output:

```
tklc1110501 07-04-12 17:28:02 EST  EAGLE5 37.0.0
CARD   VERSION      TYPE      GPL         PST            SST        AST
1111   128-015-000  DSM       SCCPHC      IS-NR          Active     -----
1101   128-015-000  DSM       VSCCP       IS-NR          Active     -----

Command Completed.
```

7. Based on the output shown in *Step 6* on page 92, perform one of the following:

   - If the required number of Service Module cards is provisioned in the database, continue to *Step 8* on page 92.
   - If the required number of Service Module cards is not provisioned in the database, perform "Adding a Service Module" in *Database Administration Manual - Global Title Translation* to add the required number of Service Module cards to the database. After "Adding a Service Module" has been performed, continue with *Step 8* on page 92.

8. Display the serial number in the database with the `rtrv-serial-num` command.

   Example of a possible output:

```
rlghncxa03w 09-08-24 21:15:37 EST  EAGLE 40.1.0

System serial number = nt00000123

System serial number is not locked
.
rlghncxa03w 09-08-24 21:15:37 EST  EAGLE 40.1.0
Command Completed
```

9. Compare the serial number located on a label affixed to the control shelf (shelf 1100) to the output shown in *Step 8* on page 92, then perform one of the following:

   - If the serial number is not correct and is locked, this feature cannot be enabled and the remainder of this procedure cannot be performed. Contact *Customer Care Center* on page 3 to change an incorrect and locked serial number.
   - If the serial number is not correct and is not locked, continue to *Step 10* on page 92.
   - If the serial number is correct but is not locked, go to *Step 12* on page 93.
   - If the serial number is correct and is locked, go to *Step 13* on page 93.

10. Enter the correct serial number into the database using the `ent-serial-num` command with the `serial` parameter.

Command example:

```
ent-serial-num:serial=<EAGLE 5 ISS serial number>
```

After the command has completed successfully, this message is displayed:

```
rlghncxa03w 09-08-24 21:15:37 EST  EAGLE 40.1.0
ENT-SERIAL-NUM:  MASP A - COMPLTD
```

11. Verify with the `rtrv-serial-num` command that the serial number entered in *Step 10* on page 92 was entered correctly. If the serial number was not entered correctly, repeat *Step 10* on page 92 and enter the correct serial number.

    Example of a possible output:

```
rlghncxa03w 09-08-24 21:15:37 EST  EAGLE 40.1.0
System serial number = nt00000123

System serial number is not locked.

rlghncxa03w 09-08-24 21:15:37 EST  EAGLE 40.1.0
Command Completed
```

12. Lock the serial number in the database by entering the `ent-serial-num` command with the correct serial number as shown in *Step 11* on page 93 and with the `lock=yes` parameter value.

    Command example:

```
ent-serial-num:serial=<EAGLE 5 ISS serial number>:lock=yes
```

    After the command has completed successfully, this message is displayed:

```
rlghncxa03w 09-08-24 21:15:37 EST  EAGLE 40.1.0
ENT-SERIAL-NUM:  MASP A - COMPLTD
```

13. Enable the 1100 TPS/DSM for ITU NP feature with the feature access key using the `enable-ctrl-feat` command.

    Command example:

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

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

    After the command has completed successfully, this message is displayed:

```
rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
ENABLE-CTRL-FEAT: MASP B - COMPLTD
```

14. Perform on of the following:

    - To turn on the 1100 TPS/DSM for ITU NP feature, go to *Step 15* on page 93.
    - To not turn on the 1100 TPS/DSM for ITU NP feature, go to *Step 17* on page 94. The transaction rate will remain at 850 TPS per Service Module card.

15. To turn on the 1100 TPS/DSM for ITU NP feature, enter the `chg-ctrl-feat` command, specifying the 1100 TPS/DSM for ITU NP feature part number and the `status=on` parameter value.

    Command example:

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

This message is displayed:

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

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

16. Re-enter the `chg-ctrl-feat` command to turn on the feature.

    Command example:

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

    After the command has completed successfully, this message is displayed:

    ```
    rlghncxa03w 09-08-24 21:15:37 EST  EAGLE 40.1.0
    CHG-CTRL-FEAT:  MASP B - COMPLTD
    ```

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

    Command example:

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

    Example of a possible output:

    ```
    rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
    The following features have been permanently enabled:
    Feature Name              Partnum    Status  Quantity
    1100 TPS/DSM for ITU NP   893018001  on      ----

    The following features have been temporarily enabled:
    Feature Name              Partnum    Status  Quantity Trial Period Left
    Zero entries found.

    The following features have expired temporary keys:
    Feature Name              Part Num
    Zero entries found.
    ```

18. Back up the new database changes with the `chg-db` command:

    Command example:

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

    These messages are displayed. The active Maintenance and Administration Subsystem Processor (MASP) is displayed 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.
    ```

To turn off the 1100 TPS/DSM for ITU NP feature, enter the `chg-ctrl-feat` command, specifying the 1100 TPS/DSM feature part number and the `status=off` parameter value.

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

This message is displayed:

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

Confirm that you wish to turn off the 1100 TPS/DSM for ITU NP feature by re-entering the command within 30 seconds.

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

This message is displayed:

```
rlghncxa03w 09-08-24 21:15:37 EST EAGLE 40.1.0
CHG-CTRL-FEAT: MASP B - COMPLTD
```

Activating the E5-SM4G Throughput Capacity Feature

This procedure is used to enable and turn on the E5-SM4G Throughput Capacity feature. This feature provides up to 75,000 transactions per second when the maximum number of Service Module cards are installed in the EAGLE 5 ISS and one or more EPAP-related features (such as G-Port, A-Port, G-Flex) are enabled and turned on.

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

The `enable-ctrl-feat` command enables the E5-SM4G Throughput Capacity feature by inputting the feature's access key and the feature's part number with these parameters:

:fak

The feature access key provided by Tekelec. The feature access key contains 13 alphanumeric characters and is not case sensitive.

:partnum

The Tekelec-issued part number of the E5-SM4G Throughput Capacity feature, 893019101.

This feature cannot be enabled with a temporary feature access key.

The E5-SM4G Throughput Capacity feature cannot be enabled if:

- The LNP feature is enabled.
- The STPLAN feature is turned on.
- The GTT feature is not turned on.

The E5-SM4G Throughput Capacity feature cannot be enabled unless the EAGLE 5 ISS contains Service Module cards, and Service Module cards cannot be installed in the EAGLE 5 ISS unless HIPR cards are installed in all shelves containing Service Module cards. Enter the `rept-stat-gpl:gpl=hipr` command to verify if HIPR cards are installed in all shelves containing Service Module cards.

The status of the LNP feature is shown with the `rtrv-ctrl-feat` command output.

The status of the GTT is shown in the `rtrv-feat` command output.

The `enable-ctrl-feat` command requires that the database contain a valid serial number for the EAGLE 5 ISS, and that this serial number is locked. This can be verified with the `rtrv-serial-num` command. The EAGLE 5 ISS 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 once the EAGLE 5 ISS is on-site, with the `ent-serial-num` command. The `ent-serial-num` command uses these parameters.

:serial

The serial number assigned to the EAGLE 5 ISS. The serial number is not case sensitive.

:lock

Specifies whether or not the serial number is locked. This parameter has only one value, yes, which locks the serial number. Once the serial number is locked, it cannot be changed.

Note:

To enter and lock the serial number of the EAGLE 5 ISS, the `ent-serial-num` command must be entered twice. The first entry of the `ent-serial-num` command adds the correct serial number to the database with the `serial` parameter. The second entry of the `ent-serial-num` with the `serial` and `lock=yes` parameters locks the serial number. Verify that the serial number in the database is correct before locking the serial number. The serial number is on a label affixed to the control shelf (shelf 1100).

Once the E5-SM4G Throughput Capacity feature has been enabled, the feature must be turned on with the `chg-ctrl-feat` command. The `chg-ctrl-feat` command uses these parameters:

:partnum

The Tekelec-issued part number of the E5-SM4G Throughput Capacity feature, 893019101

:status=on

used to turn the E5-SM4G Throughput Capacity feature on.

This feature increases the processing capacity of SCCP traffic for an EAGLE 5 ISS processing EPAP-based traffic to 75,000 transactions per second. To achieve this increase in SCCP processing capacity, a maximum of 25 Service Module cards must be provisioned and installed in the EAGLE 5 ISS.

1. Display the status of the E5-SM4G Throughput Capacity feature by entering the `rtrv-ctrl-feat` command.

   `Possible output of this command follows:`

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
The following features have been permanently enabled:

Feature Name              Partnum    Status  Quantity
IPGWx Signaling TPS       893012814   on      20000
ISUP Normalization        893000201   on      ----
Command Class Management  893005801   on      ----
Intermed GTT Load Sharing 893006901   off     ----
XGTT Table Expansion      893006101   off     ----
XMAP Table Expansion      893007710   on      3000
Large System # Links      893005910   on      2000
Routesets                 893006401   on      6000
HC-MIM SLK Capacity       893012707   on      64

The following features have been temporarily enabled:

Feature Name              Partnum    Status  Quantity     Trial Period Left
Zero entries found.
```

```
The following features have expired temporary keys:

Feature Name              Partnum
Zero entries found.
MNP Circ Route Prevent    893007001 On        ----  20 days 8 hrs 57 mins
```

If the `rtrv-ctrl-feat` output shows that the E5-SM4G Throughput Capacity feature is enabled, shown by the entry E5-SM4G Throughput Cap, and its status is on, no further action is necessary.

If the `rtrv-ctrl-feat` output shows that the LNP feature is enabled, this procedure cannot be performed. The E5-SM4G Throughput Capacity feature cannot be enabled if the LNP feature is enabled.

If the feature is enabled, and its status is off, go to *Step 9* on page 99 (skip *Step 2* on page 97 through *Step 8* on page 99).

If the E5-SM4G Throughput Capacity and LNP features are not enabled, go to *Step 2* on page 97.

2. Enter the `rtrv-feat` command to verify the status of the STPLAN feature.

   To enable the E5-SM4G Throughput Capacity feature, the STPLAN feature cannot be turned on.

   The STPLAN feature is shown by the entry LAN in the `rtrv-feat` output.

   If the STPLAN feature is turned on, this procedure cannot be performed.

   If the STPLAN feature is turned off, go to *Step 3* on page 97

3. Verify that the GTT feature is turned on.

   To enable the E5-SM4G Throughput Capacity feature, the GTT feature must be turned on. The GTT feature is shown by the entry GTT in the rtrv-feat output executed in *Step 2* on page 97. If the GTT feature is turned on, go to *Step 4* on page 97. If the GTT feature is turned off, perform "Adding a Service Module" in the *Database Administration Manual* - Global Title Translation in order to:

   - Turn the GTT feature
   - add the required number of Service Module cards to the database

   After "Adding a Service Module" has been performed, go to *Step 5* on page 98 (skip *Step 4* on page 97).

4. Verify the number of Service Module cards that are provisioned in the database using the `rept-stat-gpl:gpl=sccphc` command.

   This is an example of the possible output:

```
rlghncxa03w 07-05-01 11:40:26 GMT EAGLE5 37.0.0
GPL     CARD   RUNNING       APPROVED      TRIAL
SCCPHC  1201   126-002-000   126-002-000   126-003-000
SCCPHC  1203   126-002-000   126-002-000   126-003-000
SCCPHC  1207   126-002-000   126-002-000   126-003-000
SCCPHC  1213   126-002-000   126-002-000   126-003-000
SCCPHC  1215   126-002-000   126-002-000   126-003-000
SCCPHC  1305   126-002-000   126-002-000   126-003-000
SCCPHC  1313   126-002-000   126-002-000   126-003-000
SCCPHC  2103   126-002-000   126-002-000   126-003-000
Command Completed
```

If the required number of Service Module cards are provisioned in the database, go to *Step 5* on page 98.

If the required number of Service Module cards are not provisioned in the database, perform "Adding a Service Module" in the *Database Administration Manual* - Global Title Translation to add the required number of Service Module cards to the database. After the required number of Service Module cards are provisioned in the database, go to *Step 5* on page 98.

5. Verify whether HIPR cards are installed on all the EAGLE 5 ISS shelves containing Service Module card using the `rept-stat-gpl:gpl=hipr` command.

```
the rept-stat-gpl:gpl=hipr command.
rlghncxa03w 07-05-01 11:40:26 GMT EAGLE5 37.0.0
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
HIPR    2109   126-002-000   126-002-000   126-003-000
HIPR    2110   126-002-000   126-002-000   126-003-000
Command Completed
```

If HIPR cards are installed in all shelves containing Service Module cards , go to *Step 6* on page 98.

If HIPR cards are not installed on all shelves containing E5-SM4G cards, refer to the *Installation Manual - EAGLE 5 ISS* and install the HIPR cards on each of the shelves. Once the HIPR cards have been installed, go to *Step 6* on page 98.

6. Display the serial number in the database with the `rtrv-serial-num` command.

   An example of output from this command follows:

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
System serial number = nt00001231

System serial number is not locked.

rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
Command Completed
```

   If the serial number is correct and locked, go to *Step 10* on page 99 (skip *Step 7* on page 98, *Step 8* on page 99, and *Step 9* on page 99). If the serial number is correct but not locked, go to *Step 9* on page 99 (skip *Step 7* on page 98 and *Step 8* on page 99). If the serial number is not correct, but is locked, this feature cannot be enabled and the remainder of this procedure cannot be performed. Contact the *Customer Care Center* on page 3 to get an incorrect and locked serial number changed. The serial number can be found on a label affixed to the control shelf (shelf 1100).

7. Enter the correct serial number into the database using the `ent-serial-num` command with the serial parameter .

   For this example, enter this command:

```
ent-serial-num:serial=<EAGLE 5 ISS's correct serial number>
```

   When this command has successfully completed, the following message appears.

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
ENT-SERIAL-NUM:  MASP A - COMPLTD
```

8. Verify that the serial number entered into *Step 7* on page 98 was entered correctly using the `rtrv-serial-num` command.

   An example of output from this command follows:

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
System serial number = nt00001231

System serial number is not locked.

rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
Command Completed
```

   If the serial number was not entered correctly, repeat *Step 7* on page 98 and *Step 8* on page 99 and re-enter the correct serial number.

9. Lock the serial number in the database by entering the `ent-serial-num` command with the serial number shown in *Step 6* on page 98, if the serial number shown in *Step 6* on page 98 is correct, or with the serial number shown in *Step 8* on page 99, if the serial number was changed in *Step 7* on page 98, and with the `lock=yes` parameter.

   For this example, enter this command:

   `ent-serial-num:serial=<EAGLE 5 ISS's serial number>:lock=yes`

   When this command has successfully completed, the following message appears:

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
ENT-SERIAL-NUM:  MASP A - COMPLTD
```

10. Enable the E5-SM4G Throughput Capacity feature with the permanent key by entering the `enable-ctrl-feat` command.

    For this example, enter the following command:

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

    Note: The feature access key for the E5-SM4G Throughput Capacity feature is provided by Tekelec. Contact your Tekelec Sales Representative or Account Representative if you do not have the feature access key for this feature. This feature cannot be enabled with a temporary feature access key.

    When the `enable-crtl-feat` command has successfully completed, this message appears:

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
ENABLE-CTRL-FEAT: MASP B - COMPLTD
```

    Note: If you do not wish to turn the E5-SM4G Throughput Capacity feature on, go to *Step 12* on page 100 (and skip *Step 11* on page 99) .

11. Turn the E5-SM4G Throughput Capacity feature using the `chg-ctrl-feat` command, specifying the E5-SM4G Throughput Capacity feature part number used in *Step 10* on page 99 and the `status=on` parameter.

    For example, enter the following command:

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

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

    When this command has successfully completed, the following message appears:

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
CHG-CTRL-FEAT: MASP B - COMPLTD
```

12. Verify the changes by entering the rtrv-ctrl-feat command with the E5-SM4G Throughput Capacity feature part number specified in *Step 10* on page 99 or *Step 11* on page 99.

    For example, enter the following command:

    `rtrv-ctrl-feat:partnum=893019101`

    An example of output from this command follows:

```
rlghncxa03w 07-05-28 21:15:37 GMT EAGLE5 37.0.0
The following features have been permanently enabled:

Feature Name              Partnum   Status Quantity
E5-SM4G Throughput Cap    893019101   on      ----

The following features have been temporarily enabled:

Feature Name              Partnum    Status  Quantity     Trial Period Left
Zero entries found.
G-Port Circ Route Prevent 893007001 On        ----  20 days 8 hrs 57 mins

The following features have expired temporary keys:
Feature Name              Partnum
Zero entries found.
```

13. Backup the new changes using the `chg-db:action=backup:dest=fixed` command.

    The following messages appear, with the active Maintenance and Administration Subsystem Processor (MASP) appearing first, as shown.

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

Chapter 5

Maintenance and Measurements

Topics:

This chapter describes the maintenance and measurements information available from the EAGLE 5 ISS for theIS41 GSM Migration (IGM) feature. The information includes status, alarms (UAMs), information messages (UIMs), and reports from the Measurements Platform.

Hardware Requirements

The EAGLE 5 ISS may be equipped with from 1 to 25 Service Module cards to support IGM. The IGM feature requires Service Module cards to run the VSCCP application. Refer to *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information on the dimensioning rules and the DSM database capacity requirements.

The IGM feature also requires a T1000-based Multi-Purpose Server (MPS) system.

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 102 and *DSM Status Requests* on page 103. 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 craftsperson requests that the database be reloaded.
- The Service Module card starts receiving database downloads or database updates. When a Service Module card starts downloading the RTDB or accepting database updates, it sends a DSM Status Message informing the EPAP of the first record received. This helps the EPAP keep track of downloads in progress.

DSM Status Messages Fields

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

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

  Refer to the *Dimensioning Guide for EPAP Advanced DB Features Technical Reference* for important information on the dimensioning rules and the Service Module card database capacity requirements.
- **Load Mode Status**. This indicator indicates whether or not 80% of the IS-NR (In-Service Normal) LIMs have access to SCCP services.

IGM System Status Reports

Status reporting described here includes the following:

- System status
- IGM status
- Service Module card memory capacity status

- Loading mode support status

System Status Reporting

The `rept-stat-sys` command supports the Service Module cards running the VSCCP application.

The `rept-stat-sccp` command supports the Service Module cards running the VSCCP application and reports IGM statistics.

IGM Status Reporting

The `rept-stat-mps` command supports IGM system reporting. rept-stat-mps concentrates on reporting the status of the provisioning system. See "Maintenance and Measurements User Interface Commands", for more details. IGM statistics are placed in the `rept-stat-sccp` command.

Service Module card Memory Capacity Status Reporting

As described in the *DSM Status Messages Fields* on page 103, the Service Module card sends a message to the EPAP containing the amount of memory on the Service Module card. The EPAP determines whether the Service Module card 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 Service Module card database capacity requirements**.**

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

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 since it knows the state of all LIM, SCCP, 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. Refer to *Loading Mode Support* on page 105, 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.

Service Module Code Loading

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

EPAP Application Data Loading

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

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

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

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

Non IGM Data Initialization

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

EPAP-Service Module Card Loading Interface

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

Loading Mode Support

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

80% Threshold of Support

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

Service Module Card Capacity

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

Insufficient SCCP Service

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

Conditions That Create an Unstable Loading Mode

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

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

Effects of System in an Unstable Loading Mode

- No affect on RTDB downloads or updates.

  Unstable loading mode has no impact on RTDB downloads or the stream of RTDB updates.
- `rept-stat-sys` reports unstable loading mode.

  When the loading mode is unstable, the `rept-stat-sys` command response reports the existence of the unstable loading mode and the specific trigger that caused it.
- No STP database updates allowed.

  Once an STP database has been loaded, that database can be updated (as long as the system is not in an unstable loading mode). However, if an STP update arrives during STP database loading, the Service Module card aborts the current loading, issues a class 01D7 obit, and reboots. *Figure 9: Obit Message for Abort of Card Loading* on page 106 shows an example.

  Figure 9: 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

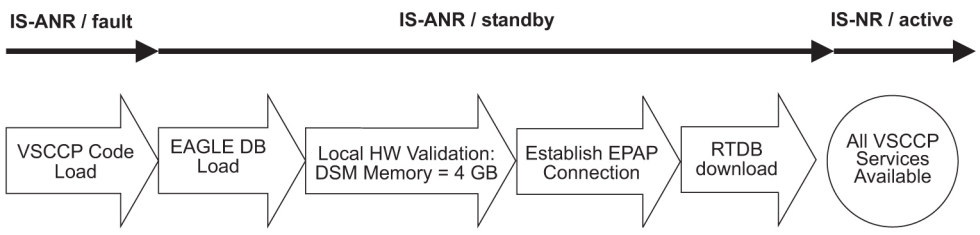
Use the force option to force the execution of commands that would put the system in unstable loading mode. If executing the `ent-card` or `inh-card` commands would cause the system to enter an unstable loading mode, use the force option on the command.

State Transitions during Start-Up

Figure 10: IGM Enabled, Normal Operating Sequence on page 107 through *Figure 15: IGM Activation Unsuccessful due to Insufficient Database* on page 109 show the transitions that a Service Module card goes through as it boots, loads code and data, and runs various VSCCP services. These figures do not illustrate every possible situation, but they include the most common scenarios involving the IGM feature.

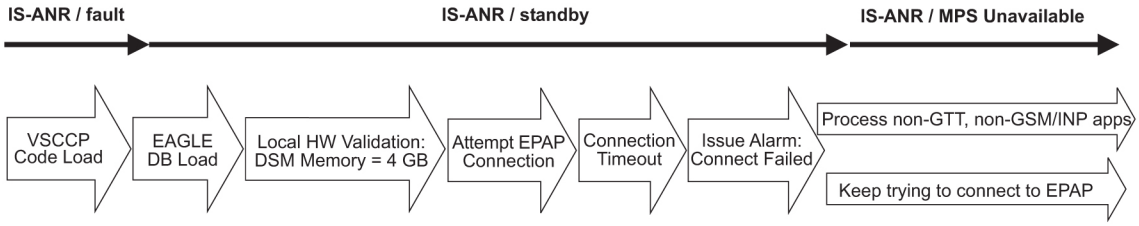
In *Figure 10: IGM Enabled, Normal Operating Sequence* on page 107, the IGM feature is enabled, and the Service Module card memory is 4 GB and is connected to the EPAP. A normal Service Module card operating sequence occurs, providing IGM service.

Figure 10: IGM Enabled, Normal Operating Sequence



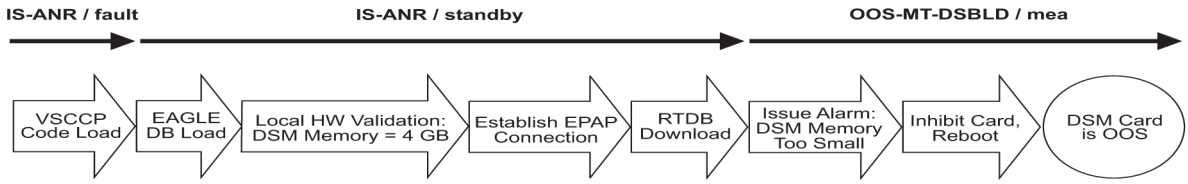
In *Figure 11: IGM Enabled, but Service Module Card Not Connected to EPAP* on page 108, the IGM feature is enabled, the Service Module card memory is 4 GB, but the Service Module card is unable to connect EPAP; the IGM cannot begin operation.

Figure 11: IGM Enabled, but Service Module Card Not Connected to EPAP



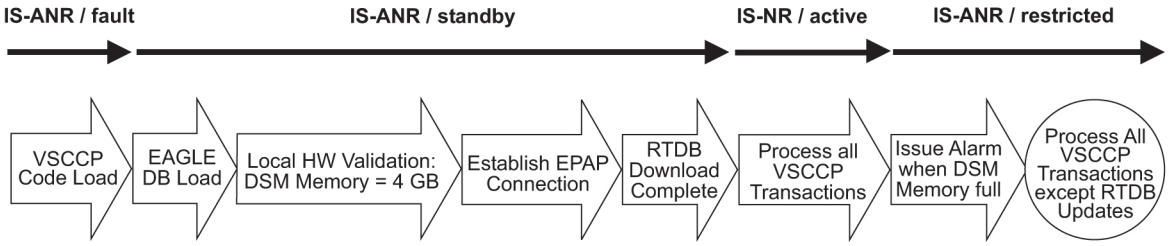
In *Figure 12: IGM Enabled, but Service Module Card Memory Insufficient for Database* on page 108, the IGM feature is enabled, the DSM card has the required 4 GB memory and is connected to the EPAP, but the DSM card is too small for the required database; IGM cannot begin operation. Refer to the *Dimensioning Guide for* EPAP *Advanced* DB *Features Technical Reference* for important information on the dimensioning rules and the DSM database capacity requirements**.**

Figure 12: IGM Enabled, but Service Module Card Memory Insufficient for Database



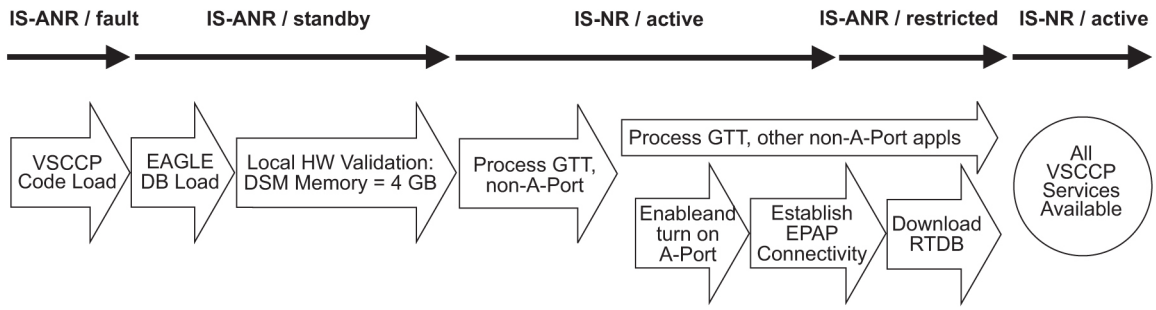
In *Figure 13: IGM Enabled, but Database Exceeds Service Module Card Memory* on page 108 , the IGM feature is enabled, the Service Module card is connected to the EPAP, but the RTDB grows eventually to exceed the capacity of the Service Module card memory, despite its memory size of 4GB (an alarm is issued when the Service Module card memory becomes full from the RTDB update). The IGM cannot begin operation. 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**.**

Figure 13: IGM Enabled, but Database Exceeds Service Module Card Memory



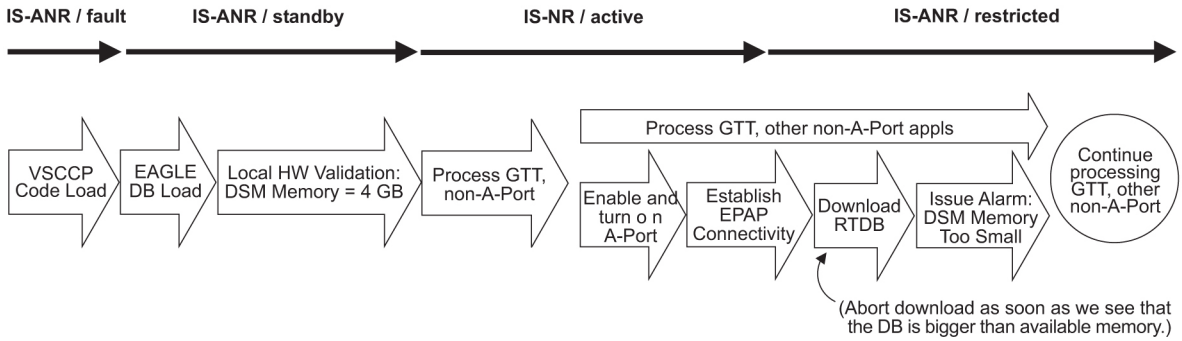
In *Figure 14: IGM Not Enabled at First, but then Activated on Sercice Module Card* on page 108, the IGM feature is not initially enabled; the Service Module card memory is 4 GB but no EPAP connection; the Service Module card is running other applications when the IGM feature is enabled and turned on; the Service Module card has sufficient memory to provide IGM service.

Figure 14: IGM Not Enabled at First, but then Activated on Sercice Module Card



In *Figure 15: IGM Activation Unsuccessful due to Insufficient Database* on page 109, the IGM feature is not initially enabled; the Service Mdule card memory is 4 GB but no EPAP connection, and is running other applications when the IGM feature is turned on. However, the Service Module card memory is insufficient for the needed database, and the cannot provide IGM operation. 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**.**

Figure 15: IGM Activation Unsuccessful due to Insufficient Database



IGM Related Alarms

All IGM related UAMs are output to the Maintenance Output Group. *Unsolicited Alarm and Information Messages* contains a complete description of all UAMs. *Table 22: IGM Related UAMs* on page 109 contains a listing of UAMs used to support the IGM feature.

Refer to *Unsolicited Alarm and Information Messages* for more information and corrective procedures for the EAGLE 5 ISS related alarms. Refer to *MPS Platform Software and Maintenance Manual* for information and corrective procedures for the MPS related alarms.

Table 22: IGM Related UAMs

UAM	Severity	Message Text	MPS or EAGLE 5 ISS
0013	Major	Card is isolated from system	EAGLE 5 ISS
0084	Major	IP Connection Unavailable	EAGLE 5 ISS

UAM	Severity	Message Text	MPS or EAGLE 5 ISS
0085	None	IP Connection Available	EAGLE 5 ISS
0099	Major	Incompatible HW for provisioned slot	EAGLE 5 ISS
0250	None	MPS available	MPS
0261	Critical	MPS unavailable	MPS
0328	None	SCCP is available	EAGLE 5 ISS
0329	None	SCCP capacity normal, card(s) abnormal	EAGLE 5 ISS
0330	Major	SCCP TPS Threshold exceeded	EAGLE 5 ISS
0331	Critical	SCCP is not available	EAGLE 5 ISS
0335	None	SCCP is removed	EAGLE 5 ISS
0336	Major	LIMs have been denied SCCP service	EAGLE 5 ISS
0370	Critical	Critical Platform Failures	MPS
0371	Critical	Critical Application Failures	MPS
0372	Major	Major Platform Failures	MPS
0373	Major	Major Application Failures	MPS
0374	Minor	Minor Platform Failures	MPS
0375	Minor	Minor Application Failures	MPS
0422	Major	Insufficient extended memory	EAGLE 5 ISS
0423	None	Card reload attempted	EAGLE 5 ISS
0441	Major	Incorrect MBD - CPU	EAGLE 5 ISS
0442	Critical	RTDB database capacity is 95% full	EAGLE 5 ISS
0443	Major	RTDB database is corrupted	EAGLE 5 ISS

UAM	Severity	Message Text	MPS or EAGLE 5 ISS
0444	Minor	RTDB database is inconsistent	EAGLE 5 ISS
0445	None	RTDB database has been corrected	EAGLE 5 ISS
0446	Major	RTDB database capacity is 80% full	EAGLE 5 ISS
0447	None	RTDB database capacity alarm cleared	EAGLE 5 ISS
0448	Minor	RTDB database is incoherent	EAGLE 5 ISS
0449	Major	RTDB resynchronization in progress	EAGLE 5 ISS
0451	Major	RTDB reload is required	EAGLE 5 ISS
0526	None	Service is available	EAGLE 5 ISS
0527	Minor	Service abnormal	EAGLE 5 ISS
0528	Critical	Service is not available	EAGLE 5 ISS
0529	Critical	Service is disabled	EAGLE 5 ISS
0530	None	Service is removed	EAGLE 5 ISS

IGM UIMs

Unsolicited Alarm and Information Messages contains a complete description of all UIM text and formats. *Table 23: IGM Related UIMs* on page 112 contains a listing of UAMs used to support the IGM feature.

Table 23: IGM Related UIMs

UIM	Text	Description	Action	Output Group (UI Output Direction)
1035	SCCP rsp did not route - invalid GTI	The SCCP response did not route due to an invalid GTI	Use a valid GTI in the CGPA part of the query	gtt
1036	SCCP rsp did not route - invalid TT	The SCCP response did not route due to an invalid TT	Provision the CGPA TT in the GTT TT table	gtt
1037	SCCP rsp did not route - bad Xlation	The SCCP response did not route due to a bad translation	Provision the CGPA GTA address in the GTT database	gtt
1038	SCCP rsp did not route - SSP not True PC	The SCCP response did not route due to SSP is not true point code	Use the true point code in the CGPA point code or OPC of the query	gtt
1039	SCCP rsp did not route - bad Selectors	The SCCP response did not route due to invalid selectors	Provision the CGPA GTI, TT, NP, and NAI in the EGTT selector table	gtt
1130	LOCREQ rcvd - IS412GSM not provisioned	The IS-41 to GSM Migration prefix (specified by the IS412GSM parameter) is not provisioned on this system.	The IS412GSM prefix must be specified in the GSMOPTS table.	gtt
1131	Invalid digits in IS41 MAP Digits parms	The EAGLE 5 ISS encountered an error in decoding the digits parameter in the LocationRequest message.	Correct the digits parameter	gtt
1169	SCCP rcvd inv TCAP portion	This indicates that SCCP discarded a message because the TCAP provided in the called party address is invalid in the EAGLE 5 ISS.	No action is necessary.	application subsystem

UIM	Text	Description	Action	Output Group (UI Output Direction)
1227	SCCP did not route - DPC not in MAP tbl	This message indicates that SCCP did not route a message because the destination point code was not in the mated application (MAP) table. The message was discarded.	If the DPC indicated in the message should not be routed to, no further action is necessary.	gtt
1230	SCCP did not route - SS not in MAP tbl	This message indicates that SCCP did not route a message because the destination subsystem was not in the Mated Application (MAP) table. The message was discarded.	No action is necessary.	gtt
1242	Conv to intl num - Dflt CC not found	Conversion to international number failed because default CC was not found	Define the default CC with `chg-stpopts :defcc=xxx`	application subsystem
1243	Conv to intl num - Dflt NC not found	Conversion to international number failed because default NC was not found	Define the default NDC with `chg-stpopts :defndc=xxxxx`	application subsystem
1246	Invalid length of conditioned digits	Invalid length of condition-ed digits (length of conditioned international number is less than 5 or greater than 15)	Use an international number with length in the acceptable range	application subsystem
1256	MNP Circular Route Detected	This message indicates the network has incorrect number portability data for a subscriber.	Verify and update number portability data.	application subsystem
1294	Invalid digits in MAP MSISDN parameter	No digits found in MAP MSISDN parameter	Specify valid digits in the MSISDN	application subsystem

UIM	Text	Description	Action	Output Group (UI Output Direction)
1295	Translation PC is Eagle's	PC translation is invalid because it is one of EAGLE 5 ISS's PCs	Change the point code	application subsystem
1297	Invalid length of prefix/suffix digits	Attempted digit action of prefixing entity ID is invalid because combined length of entity ID and GT digits was greater than 21 digits	Change the attempted digit action or decrease the length of the entity ID and/or GT digits	application subsystem
1341	SRI rcvd - GSM2IS41 not provisioned	MIGRPFX=SINGLE and GSM2IS41 prefix is NONE. The GSM to IS-41 Migration prefix is not provisioned on this system.	The GSM2IS41 prefix must be specified in the GSMOPTS table.	gtt

IGM Related Measurements

Refer to the *Measurements* manual for for detailed measurement usage information.

OAM Based Measurements

IGM measurements are available via the File Transfer Area (FTA) feature and not directly via EAGLE 5 ISS terminals. The File Transfer Area feature supports the transfer of file data between an EAGLE 5 ISS and a remote computer. The File Transfer Area feature provides the capability to download files from the EAGLE 5 ISS using a data communications link. The data communications link is accessed through a dial-up modem using one of the EAGLE 5 ISS RS-232 I/O ports. The link is illustrated in *Figure 7: Dial-Up PPP Network* on page 24.

See *Commands Manual* for details about using FTA commands, which are:

- Activate File Transfer: `act-file-trns`
- Copy to or from Transfer Area: `copy-fta`
- Delete Entry from File Transfer Area: `dlt-fta`
- Display File Transfer Area: `disp-fta-dir`

Measurements Platform

The Measurements Platform (MP) is required for an EAGLE 5 ISS with more than 700 links. It provides a dedicated processor for collecting and reporting EAGLE 5 ISS, LNP, INP, G-FLEX, EIR,

Migration, A-Port, and G-PORT measurements data. The interface to the customer's network supports the FTP transfer of Measurements reports to an FTP server. Following collection, scheduled reports are automatically generated and transferred to the customer FTP server via the FTP interface.

Note:

Existing FTP file server reports are overwritten by subsequent requests that produce the identical file name.

Reports can be scheduled or printed on-demand. Scheduled and on-demand reports are accessible by the following administrative commands:

- `chg-measopts` - Used to enable or disable the automatic generation and FTP transfer of scheduled measurement reports to the FTP server.
- `rept-stat-meas` - Reports the status of the measurements subsystem including card location and state, Alarm level, and Subsystem State.
- `rept-ftp-meas` - Manually initiates generation and FTP transfer of a measurements report from the MCPM to the FTP server.
- `rtrv-measopts` - Generates a user interface display showing the enabled/disabled status of all FTP scheduled reports.

Table 24: Pegs for Per System MNP Measurements on page 115 describes the Pegs per System measurement peg counts of MNP MSUs (Message Signaling Units) are supported for the IGM feature.

Table 24: Pegs for Per System MNP Measurements

Event Name	Description	Type	Unit
APSMSRCV	Number of SMS Request messages received **Note:** • If the MT-Based IS41 SMS NP feature is not turned on and the is41opts:smsreqbypass option is set to yes, this count will not be updated. • If neither the MT-Based IS41 SMS NP feature nor the IGM feature is turned on, this count will not be updated	System	Peg count

Event Name	Description	Type	Unit
APSMSREL	Number of SMS Request messages relayed **Note:** • If the MT-Based IS41 SMS NP feature is not turned on and the is41opts:smsreqbypass option is set to yes, this count will not be updated. • If neither the MT-Based IS41 SMS NP feature nor the IGM feature is turned on, this count will not be updated	System	Peg count
APSMRQREP	Number of SMSREQ messages received that result in SMSREQ ACK or SMSREQ NACK responses **Note:** This count will include any SMSREQ NACKs generated by the IGM feature.	System	Peg count
APSMRQERR	Number of SMSREQ messages received that resulted in error. **Note:** This count is only applicable when the incoming message is SMSREQ . The peg count is incremented only when the MT-Based IS-41 SMS NP feature is turned on. If the IGM feature is also turned on and the IGM feature handles the message	System	Peg count

Event Name	Description	Type	Unit
	resulting in an error, this peg count is incremented.		
GPSRRCV	Number of call-related SRI messages received	System	Peg count
GPSRGTT	Number of call-related SRI messages that fell through to GTT	System	Peg count
GPSREP	Number of call-related SRI messages that received A-Port service	System	Peg count
GPSRERR	Number of call-related messages that cause errors and SRI Negative ACK	System	Peg count
IS41LRERR	Number of IS-41 Location Request - Error response messages sent.	System	Peg count
IS41LRMRCV	Number of IS-41 Location Request messages received.	System	Peg count
IS41LRRTRN	Number of IS-41 Location Request - Return Result messages sent	System	Peg count

Table 25: Pegs for Per SSP MNP Measurements on page 118 describes the per SSP measurement peg counts of MNP MSUs are supported for the feature.

Table 25: Pegs for Per SSP MNP Measurements

Event Name	Description	Type	Unit
APLRACK	Number of call related LOCREQ messages acknowledged.	Point Code	Peg count
APLRRLY	Number of call related LOCREQ messages relayed	Point Code	Peg count
APNOCL	Number of non-call non-LOCREQ related messages relayed	Point Code	Peg count
APNOCLGT	Number of non-call non-LOCREQ related messages that fell through to GTT	Point Code	Peg count
GPSRACK	Number of call-related SRI responses	Point Code	Peg count
GPSRRLY	Number of call-related SRI messages relayed	Point Code	Peg count

Table 26: Pegs for Per System and Per SSP MNP Measurements on page 118 describes both the Per System and Per SSP MNP measurement peg counts of MNP MSUs are supported for the IGM feature.

Table 26: Pegs for Per System and Per SSP MNP Measurements

Event Name	Description	Type	Unit
GPNOCL	Number of non-call-related messages relayed by G-Port	System, Point Code	Peg count
GPNOCLGT	Number of non-call-related messages that fell through to GTT	System, Point Code	Peg count

Measurement Reports

Measurements are available with these report commands. Refer to the *Commands Manual* for detailed usage information.

The commands are specified as follows, where **xxx** is a three-letter abbreviation for a day of the week (MON, TUE, WED, THU, FRI, SAT, or SUN) and yy is an hour of the day:

- OAM Daily `rept-meas:type=mtcd:enttype=np`
- OAM hourly: `rept-meas:type=mtch:enttype=np`
- MP daily: `rept-ftp-meas:type=mtcd:enttype=np`
- MP hourly: `rept-ftp-meas:type=mtch:enttype=np`

Glossary

A

ACK	Data Acknowledgement
ADL	Application Data Loader
AINPQ	ANSI-41 INP Query
ANSI	American National Standards Institute An organization that administers and coordinates the U.S. voluntary standardization and conformity assessment system. ANSI develops and publishes standards. ANSI is a non-commercial, non-government organization which is funded by more than 1000 corporations, professional bodies, and enterprises.
A-Port	ANSI-41 Mobile Number Portability
AS	Application Server A logical entity serving a specific Routing Key. An example of an Application Server is a virtual switch element handling all call processing for a unique range of PSTN trunks, identified by an SS7 DPC/OPC/CIC_range. Another example is a virtual database element, handling all HLR transactions for a particular SS7 DPC/OPC/SCCP_SSN combination. The AS contains a set of one or more unique Application Server Processes, of which one or

A

more normally is actively processing traffic.

C

CC — Country Code

CdPA — Called Party Address

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

CgPA — Calling Party Address

The point code and subsystem number that originated the MSU. This point code and subsystem number are contained in the calling party address portion of the signaling information field of the MSU. Gateway screening uses this information to determine if MSUs that contain this point code and subsystem number area allowed in the network where the EAGLE 5 ISS is located.

Circular Route Prevention — See CRP.

CLLI — Common Language Location Identifier

The CLLI uniquely identifies the STP in terms of its physical location. It is usually comprised of a combination of identifiers for the STP's city (or locality), state (or

C

province), building, and traffic unit identity. The format of the CLLI is:

The first four characters identify the city, town, or locality.

The first character of the CLLI must be an alphabetical character.

The fifth and sixth characters identify state or province.

The seventh and eighth characters identify the building.

The last three characters identify the traffic unit.

CPC — Capability Point Code

A capability point code used by the SS7 protocol to identify a group of functionally related STPs in the signaling network.

CPU — Central Processing Unit

CRP — Circular Route Prevention

A G-Port MNP feature that detects instances of circular routing caused by incorrect information in one or more of the network number portability databases. If a circular route has been detected, a message will be generated by the EAGLE 5 ISS and returned to the originator.

D

Database — All data that can be administered by the user, including cards, destination point codes, gateway screening tables, global title translation tables, links, LNP services, LNP service providers, location routing numbers, routes, shelves, subsystem applications, and 10 digit telephone numbers.

D

DB	Database Daughter Board Documentation Bulletin
DCB	Device Control Block
DN	Directory number A DN can refer to any mobile or wireline subscriber number, and can include MSISDN, MDN, MIN, or the wireline Dialed Number.
DPC	Destination Point Code DPC refers to the scheme in SS7 signaling to identify the receiving signaling point. In the SS7 network, the point codes are numeric addresses which uniquely identify each signaling point. This point code can be adjacent to the EAGLE 5 ISS, but does not have to be.
DSM	Database Service Module. The DSM provides large capacity SCCP/database functionality. The DSM is an application card that supports network specific functions such as EAGLE Provisioning Application Processor (EPAP), Global System for Mobile Communications (GSM), EAGLE Local Number Portability (ELAP), and interface to Local Service Management System (LSMS).

E

EGTT	Enhanced Global Title Translation A feature that is designed for the signaling connection control part (SCCP) of the SS7 protocol. The EAGLE 5 ISS uses this feature to

E

	determine to which service database to send the query message when a Message Signaling Unit (MSU) enters the system.
EIR	Equipment Identity Register A network entity used in GSM networks, as defined in the 3GPP Specifications for mobile networks. The entity stores lists of International Mobile Equipment Identity (IMEI) numbers, which correspond to physical handsets (not subscribers). Use of the EIR can prevent the use of stolen handsets because the network operator can enter the IMEI of these handsets into a 'blacklist' and prevent them from being registered on the network, thus making them useless.
Enhanced Global Title Translation	See EGTT.
EPAP	EAGLE Provisioning Application Processor
ESN	Electronic Serial Number
ETSI	European Technical Standards Institute

F

FAK	Feature Access Key The feature access key allows the user to enable a controlled feature in the system by entering either a permanent feature access key or a temporary feature access key. The feature access key is supplied by Tekelec.

F

FTA	File Transfer Area A special area that exists on each OAM hard disk, used as a staging area to copy files to and from the EAGLE 5 ISS using the Kermit file-transfer protocol.
FTP	File Transfer Protocol A client-server protocol that allows a user on one computer to transfer files to and from another computer over a TCP/IP network.

G

GB	Gigabyte — 1,073,741,824 bytes
G-Flex	GSM Flexible numbering A feature that allows the operator to flexibly assign individual subscribers across multiple HLRs and route signaling messages, based on subscriber numbering, accordingly.
GPL	Generic Program Load Software that allows the various features in the system to work. GPLs and applications are not the same software.
G-Port	GSM Mobile Number Portability A feature that provides mobile subscribers the ability to change the GSM subscription network within a portability cluster, while retaining their original MSISDN(s).
GSM	Global System for Mobile Communications

G

GT	Global Title Routing Indicator
GTA	Global Title Address
GTI	Global Title Indicator
GTT	Global Title Translation A feature of the signaling connection control part (SCCP) of the SS7 protocol that the EAGLE 5 ISS uses to determine which service database to send the query message when an MSU enters the EAGLE 5 ISS and more information is needed to route the MSU. These service databases also verify calling card numbers and credit card numbers. The service databases are identified in the SS7 network by a point code and a subsystem number.
GUI	Graphical User Interface The term given to that set of items and facilities which provide the user with a graphic means for manipulating screen data rather than being limited to character based commands.

H

HLR	Home Location Register
HOMERN	Home Network Routing Number Prefix
HRN	Home Routing Number
HW	Hardware

I

ID	Identity, identifier
IGM	IS41 GSM Migration
IMT	Inter-Module-Transport The communication software that operates the inter-module-transport bus on all cards except the LIMATM, DCM, DSM, and HMUX.
IN	Intelligent Network A network design that provides an open platform for developing, providing and managing services.
INAP	Intelligent Network Application Protocol
INP	INAP-based Number Portability Tekelec's INP can be deployed as a stand-alone or an integrated signal transfer point/number portability solution. With Tekelec's stand-alone NP server, no network reconfiguration is required to implement number portability. The NP server delivers a much greater signaling capability than the conventional SCP-based approach. Intelligent Network (IN) Portability
IP	Internet Protocol IP specifies the format of packets, also called datagrams, and the addressing scheme. The network layer for the TCP/IP protocol suite widely used on Ethernet networks,

I

	defined in STD 5, RFC 791. IP is a connectionless, best-effort packet switching protocol. It provides packet routing, fragmentation and re-assembly through the data link layer.
IS-41	Interim Standard 41, same as and interchangeable with ANSI-41. A standard for identifying and authenticating users, and routing calls on mobile phone networks. The standard also defines how users are identified and calls are routed when roaming across different networks.
IS41 GSM Migration	A feature that adds GSM IS-41 migration functions to the existing IS-41 to GSM feature. This enhancement provides flexibility in the encoding and decoding of parameters of LOCREQ messages and responses to number migration from one mobile protocol to another.
IS-ANR	In Service - Abnormal The entity is in service but only able to perform a limited subset of its normal service functions.
ISDN	Integrated Services Digital Network
IS-NR	In Service - Normal
ISDN	Integrated Services Digital Network Integrates a number of services to form a transmission network. For example, the ISDN network

I

	integrates, telephony, facsimile, teletext, Datex-J, video telephony and data transfer services, providing users with various digital service over a single interface: voice, text, images, and other data.
ISS	Integrated Signaling System
ITU	International Telecommunications Union

K

KSR	Keyboard Send/Receive Mode

L

LIM	Link Interface Module Provides access to remote SS7, IP and other network elements, such as a Signaling Control Point (SCP) through a variety of signaling interfaces (DS0, MPL, E1/T1 MIM, LIM-ATM, E1-ATM, IPLIMx, IPGWx). The LIMs consist of a main assembly and possibly, an interface appliqué board. These appliqués provide level one and some level two functionality on SS7 signaling links.
Link	Signaling Link
LNP	Local Number Portability
LOCREQ	Location Request Message A TDMA/CDMA MSC query to an HLR for retrieving subscription/location information about a subscriber to terminate a voice call.

M

MAP	Mobile Application Part
MASP	Maintenance and Administration Subsystem Processor The Maintenance and Administration Subsystem Processor (MASP) function is a logical pairing of the GPSM-II card and the TDM card. The GPSM-II card is connected to the TDM card by means of an Extended Bus Interface (EBI) local bus. The MDAL card contains the removable cartridge drive and alarm logic. There is only one MDAL card in the Maintenance and Administration Subsystem (MAS) and it is shared between the two MASPs.
Mated Application	The point codes and subsystem numbers of the service databases that messages are routed to for global title translation.
MCPM	Measurement Collection and Polling Module The Measurement Collection and Polling Module (MCPM) provides comma delimited core STP measurement data to a remote server for processing. The MCPM is an EDSM with 2 GB of memory running the MCP application.
MDN	Mobile Dialed Number Mobile Directory Number
MIN	Mobile Identification Number
MNP	Mobile Number Portability

M

MP	Measurement Platform Message Processor The role of the Message Processor is to provide the application messaging protocol interfaces and processing. However, these servers also have OAM&P components. All Message Processors replicate from their System OAM's database and generate faults to a Fault Management System.
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.
MR	Message Relay
MRN	Message Reference Number An unsolicited numbered message (alarm or information) that is displayed in response to an alarm condition detected by the system or in response to an event that has occurred in the system. Mated Relay Node A mated relay node (MRN) group is provisioned in the database to identify the nodes that the traffic is load shared with, and the type of routing, either dominant, load sharing, or combined dominant/load sharing.
MS	Mobile Station

M

MSISDN — Mobile Station International Subscriber Directory Number

The MSISDN is thenetwork specific subscriber number of a mobile communications subscriber. This is normally the phone number that is used to reach the subscriber.

MSRN — Mobile Station Roaming Number

MSU — Message Signaling Unit

The SS7 message that is sent between signaling points in the SS7 network with the necessary information to get the message to its destination and allow the signaling points in the network to set up either a voice or data connection between themselves. The message contains the following information:

- The forward and backward sequence numbers assigned to the message which indicate the position of the message in the traffic stream in relation to the other messages.
- The length indicator which indicates the number of bytes the message contains.
- The type of message and the priority of the message in the signaling information octet of the message.
- The routing information for the message, shown in the routing label of the message, with the identification of the node that sent message (originating point code), the identification of the node receiving the message (destination point code), and the signaling link selector which the EAGLE 5 ISS uses to

M

	pick which link set and signaling link to use to route the message.
MTP	The levels 1, 2, and 3 of the SS7 protocol that control all the functions necessary to route an SS7 MSU through the network.
MTP Msgs for SCCP Apps	A feature that supports MTP-routed SCCP messages for the ANSI-41 Mobile Number Portability feature and the IS41 GSM Migration feature. The feature supports both LOCREQ and SMSREQ messages.

N

NAI	Nature of Address Indicator Standard method of identifying users who request access to a network.
NAIV	NAI Value
NAK	Negative Acknowledgment
NC	Network Cluster Network Code
NDC	Network destination code
NE	Network Element An independent and identifiable piece of equipment closely associated with at least one processor, and within a single location.

N

NP	Number Plan

O

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

P

PC	Point Code The identifier of a signaling point or service control point in a network. The format of the point code can be one of the following types: • ANSI point codes in the format network indicator-network cluster-network cluster member (**ni-nc-ncm**). • Non-ANSI domestic point codes in the format network indicator-network cluster-network cluster member (**ni-nc-ncm**). • Cluster point codes in the format network

P

	indicator-network cluster-* or network indicator-*-*. • ITU international point codes in the format **zone-area-id**. • ITU national point codes in the format of a 5-digit number (**nnnnn**), or 2, 3, or 4 numbers (members) separated by dashes (**m1-m2-m3-m4**) as defined by the Flexible Point Code system option. A group code is required (**m1-m2-m3-m4-gc**) when the ITUDUPPC feature is turned on. • 24-bit ITU national point codes in the format main signaling area-subsignaling area-service point (**msa-ssa-sp**). The EAGLE 5 ISS LNP uses only the ANSI point codes and Non-ANSI domestic point codes.
PDB	Provisioning Database
PDBA	Provisioning Database Application There are two Provisioning Database Applications (PDBAs), one in EPAP A on each EAGLE 5 ISS. They follow an Active/Standby model. These processes are responsible for updating and maintaining the Provisioning Database (PDB).
PDBI	Provisioning Database Interface The interface consists of the definition of provisioning messages only. The customer must write a client application that uses the PDBI request/response messages to communicate with the PDBA.

P

PPP	Point-to-Point Protocol
PPSMS	Prepaid Short Message Service Prepaid Short Message Service Intercept
PT	Portability Type

R

RC	Relative Cost
RFC	Request for Comment RFCs are standards-track documents, which are official specifications of the Internet protocol suite defined by the Internet Engineering Task Force (IETF) and its steering group the IESG.
RMTP	Reliable Multicast Transport Protocol
RN	Routing Number
Route	A path to another signaling point.
RS	Requirement Specification
RTDB	Real Time Database

S

SAT	Supervisory Audio Tone
SCCP	Signaling Connection Control Part

S

SCM	System Configuration Manager System Configuration Matrix.
Service Nature of Address Indicator	See SNAI.
SM	Short Message
SMS	Short Message Service
SMSREQ	SMS Request Message
SP	Service Provider Signaling Point
Spare Point Code	The EAGLE ITU International/National Spare Point Code feature allows a network operator to use the same Point Codes across two networks (either ITU-I or ITU-N). The feature also enables National and National Spare traffic to be routed over the same linkset. The EAGLE uses the MSU Network Indicator (NI) to differentiate the same point code of one network from the other. In accordance with the SS7 standard, unique Network Indicator values are defined for Point Code types ITU-I, ITU-N, ITU-I Spare, and ITU-N Spare.
SRF	Signaling Relay Function The SRF determines the HLR of the destination mobile station. If the mobile station is not ported, the original HLR is queried. If the mobile station is ported, the recipient HLR is queried.

S

SRI	Send_Route_Information Message
SS	Subsystem
SS7	Signaling System #7
SSP	Subsystem Prohibited network management message. Subsystem Prohibited SCCP (SCMG) management message. (CER)
STP	Signal Transfer Point STPs are ultra-reliable, high speed packet switches at the heart of SS7 networks, which terminate all link types except F-links. STPs are nearly always deployed in mated pairs for reliability reasons. Their primary functions are to provide access to SS7 networks and to provide routing of signaling messages within and among signaling networks.

T

TCAP	Transaction Capabilities Application Part
TCP	Transfer Control Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
TDM	Terminal Disk Module Time Division Multiplexing
TFA	TransFer Allowed (Msg)

T

TFP	TransFer Prohibited (Msg) A procedure included in the signaling route management (functionality) used to inform a signaling point of the unavailability of a signaling route.
TPS	Transactions Per Second
TT	Translation Type. Resides in the Called Party Address (CdPA) field of the MSU and determines which service database is to receive query messages. The translation type indicates which Global Title Translation table determines the routing to a particular service database.
TVG	Group Ticket Voucher

U

UAM	Unsolicited Alarm Message.
UDP	User Datagram Protocol
UIM	Unsolicited Information Message

V

VGTT	Variable Length GTT A feature that provides the ability to provision global title entries of varying lengths to a single translation type or GTT set. Users are able to assign global title entries of up to 10 different lengths to a single translation type or GTT set.

V

VSCCP	VxWorks Signaling Connection Control Part The application used by the Service Module card to support the G-Flex, G-Port, INP, AINPQ, EIR, A-Port, IGM, V-Flex, and LNP features. If the G-Flex, G-Port, INP, AINPQ, EIR, A-Port, IGM, V-Flex, or LNP feature is not turned on, and a Service Module card is present, the VSCCP GPL processes normal GTT traffic.

X

XUDT	Extended User Data

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