Tekelec EAGLE® 5
Integrated Signaling System

Release 1.0

Feature Manual - ECAP

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TEKELEC

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Table of Contents

List of Figures

List of Tables

1

Introduction

Overview

The Eagle Collection Application Processor (ECAP) is a dedicated standalone platform for the collection of EAGLE® 5 ISS traffic statistics data. The ECAP platform is a frame mounted system that includes two or more ECAP servers, a power distribution breaker panel, and two Ethernet switches. The ECAP server is a T1100 Application Server (AS) running the Integrated Q.752 MTP / SCCP Accounting Feed application. The Eagle Collector Application Process collects raw MSUs from the EAGLE 5 ISS and generates data files that contain structured counts supporting *ITU-T Recommendation Q.752, Section 7*. These counts are sent to another system for accounting activities.

The Integrated Accounting Feed application provides basic MTP and SCCP accounting and measurements capability on the EAGLE 5 ISS platform in accordance with *ITU-T Recommendation Q.752, Section 7*. The concepts discussed in *ITU-T Recommendation Q.752, Section 7* are known as "cascade remuneration" and "cascade remuneration verification", and are based on the principle that the originator of a message pays the network operator who owns the next node in the message's path for accepting the messages and subsequent processing. This operator then pays the network operator who owns the next node in the message's path, and so on until the message finally reaches its final destination, which could be in yet another network.

The ECAP platform is an adjunct system to the Tekelec portfolio of products that work in conjunction with the EAGLE 5 ISS and other system(s) so that the raw MSU data can be converted into accounting records in accordance with *Section 7*. The ECAP generates periodic traffic data files which are transferred to a configured Aggregator, allowing detailed usage reports to be compiled across all monitored links in the system. This system takes the STPLAN feed from EAGLE 5 ISS and collects specific information from each MSU. In general, the information consists of OPC, DPC, SI, SCCP CdPA, SCCP CgPA, and MAP Opcode. These values are organized and written to files and "pushed" to an external system for final analysis.

NOTE: For the purpose of this document, a ‘data file’ is defined as a compiled file of peg counts and other measurements in XML format.

A single ECAP server can process up to 5000 MSUs per second, providing precise measurements of MSUs and octets transmitted. See Table 2-1, *MSU to Server Mapping* on page 2-3 for adding multiple ECAPs to an EAGLE 5 ISS system to increase capacity.

The ECAP provides a user interface for configuration and application control and generates log files for monitoring and maintenance purposes.

Scope and Audience

This manual is intended for anyone responsible for installing, maintaining, and using the Integrated Accounting Feed application 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 manual is organized into the following chapters:

- Chapter 1, *Introduction*, contains general overview of the ECAP system, general information about the organization of this manual, the audience, references to other Tekelec documentation you might need, information on customer assistance, documentation packaging, delivery, and updates, and a list of acronyms and abbreviations used in the document.
- Chapter 2, *Feature Description*, provides a functional description of the Integrated Accounting Feed application and ECAP system, including overviews of the architecture and connectivity, hardware requirements, and considerations.
- Chapter 3, *ECAP Configuration*, describes how to configure the components that comprise the Integrated Accounting Feed application.
- Chapter 4, *Maintenance*, describes maintenance tasks for the Integrated Accounting Feed application, including alarms, disaster recovery, log files, and health check procedures.
- Appendix A, *MSU to XML Field Mapping*, describes how MSU parameters that come into the ECAP server relate to the peg count fields in the ECAP data file.

Related Documentation

The ***Feature Manual - ECAP*** is part of the EAGLE 5 ISS documentation set and may refer to one or more of the following manuals:

- The *Commands Manual* contains procedures for logging into or out of the EAGLE 5 ISS, a general description of the terminals, printers, the disk drive used on the system, and a description of all the commands used in the system.
- The *Commands Pocket Guide* is an abridged version of the *Commands Manual*. It contains all commands and parameters, and it shows the command-parameter syntax.
- The *Commands Quick Reference Guide* contains an alphabetical listing of the commands and parameters. The guide is sized to fit a shirt-pocket.

- The *Commands Error Recovery Manual* contains the procedures to resolve error message conditions generated by the commands in the *Commands Manual*. These error messages are presented in numerical order.
- The *Database Administration Manual – Features* contains procedural information required to configure the EAGLE 5 ISS to implement these features:
  - X.25 Gateway
  - STP LAN
  - Database Transport Access
  - GSM MAP Screening
  - EAGLE 5 Integrated Monitoring Support.
- The *Database Administration Manual - Gateway Screening* contains a description of the Gateway Screening (GWS) feature and the procedures necessary to configure the EAGLE 5 ISS to implement this feature.
- The *Database Administration Manual – Global Title Translation* contains procedural information required to configure an EAGLE 5 ISS to implement these features:
  - Global Title Translation
  - Enhanced Global Title Translation
  - Variable Length Global Title Translation
  - Global Title Translation Modification
  - Intermediate GTT Load Sharing
  - ANSI-ITU-China SCCP Conversion
  - Flexible GTT Load Sharing
  - Origin-Based SCCP Routing
  - Hex Digit Support for GTT
  - Weighted GTT Load Sharing
  - Transaction-Based GTT Load Sharing.
- The *Database Administration Manual - IP^7 Secure Gateway* contains procedural information required to configure the EAGLE 5 ISS to implement the SS7-IP Gateway.
- The *Database Administration Manual – SEAS* contains the EAGLE 5 ISS configuration procedures that can be performed from the Signaling Engineering and Administration Center (SEAC) or a Signaling Network Control Center (SNCC). Each procedure includes a brief description of the

procedure, a flowchart showing the steps required, a list of any EAGLE 5 ISS commands that may be required for the procedure but that are not supported by SEAS, and a reference to optional procedure-related information, which can be found in one of these manuals:

— *Database Administration Manual – Gateway Screening*

— *Database Administration Manual – Global Title Translation*

— *Database Administration Manual – SS7.*

- The *Database Administration Manual – SS7* contains procedural information required to configure an EAGLE 5 ISS to implement the SS7 protocol.
- The *Database Administration Manual – System Management* contains procedural information required to manage the EAGLE 5 ISS database and GPLs, and to configure basic system requirements such as user names and passwords, system-wide security requirements, and terminal configurations.
- The *Dimensioning Guide for EPAP Advanced DB Features* is used to provide EPAP planning and dimensioning information. This manual is used by Tekelec personnel and EAGLE 5 ISS customers to aid in the sale, planning, implementation, deployment, and upgrade of EAGLE 5 ISS systems equipped with one of the EAGLE 5 ISS EPAP Advanced Database (EADB) Features.
- The *ELAP Administration Manual* defines the user interface to the EAGLE 5 ISS LNP Application Processor on the MPS/ELAP platform. The manual defines the methods for accessing the user interface, menus, screens available to the user and describes their impact. It provides the syntax and semantics of user input and defines the output the user receives, including information and error messages, alarms, and status.
- The *EPAP Administration Manual* describes how to administer the EAGLE 5 ISS Provisioning Application Processor on the MPS/EPAP platform. The manual defines the methods for accessing the user interface, menus, and screens available to the user and describes their impact. It provides the syntax and semantics of user input and defines the output the user receives, including messages, alarms, and status.
- The *Feature Manual - A-Port* provides an overview of a feature providing the capability for IS41 mobile subscribers to change service provider while retaining their original Mobile Directory Number (MDN). This manual gives the instructions and information on how to install, use, and maintain the A-Port feature on the Multi-Purpose Server (MPS) platform of the EAGLE 5 ISS.

- The *Feature Manual - ECAP* provides instructions and information on how to install, use, and maintain the Integrated Accounting Feature Application feature on the Eagle Collector Application Processor (ECAP). This feature collects raw MSU data from the EAGLE 5 ISS, categorizes the data into groups, and feeds those groups to another system for accounting activities. Additional features will be added to this manual at a later date.
- The *Feature Manual - EIR* provides instructions and information on how to install, use, and maintain the EIR feature on the Multi-Purpose Server (MPS) platform of the EAGLE 5 ISS. The feature provides network operators with the capability to prevent stolen or disallowed GSM mobile handsets from accessing the network.
- The *Feature Manual - G-Flex C7 Relay* provides an overview of a feature supporting the efficient management of Home Location Registers in various networks. This manual gives the instructions and information on how to install, use, and maintain the G-Flex feature on the Multi-Purpose Server (MPS) platform of the EAGLE 5 ISS.
- The *Feature Manual - G-Port* provides an overview of a feature providing the capability for mobile subscribers to change the GSM subscription network within a portability cluster while retaining their original MSISDNs. This manual gives the instructions and information on how to install, use, and maintain the G-Port feature on the Multi-Purpose Server (MPS) platform of the EAGLE 5 ISS.
- The *Feature Manual - INP/AINPQ* provides the user with information and instructions on how to implement, utilize, and maintain either the INAP-based Number Portability (INP) feature or the ANSI-41 INP Query (AINPQ) feature or both features on the Multi-Purpose Server (MPS) platform of the EAGLE 5 ISS.
- The *Feature Manual - Migration* provides an overview of a feature providing the capability for IS41 subscribers to migrate to a GSM network and GSM mobile subscribers to migrate to an IS41 network. This manual gives the instructions and information on how to install, use, and maintain the Migration feature on the Multi-Purpose Server (MPS) platform of the EAGLE 5 ISS.
- The *FTP-Based Table Retrieve Application (FTRA) User Guide* describes how to set up and use a PC to serve as the offline application for the EAGLE 5 ISS FTP Retrieve and Replace feature.
- The *Hardware Manual* **-** EAGLE 5 ISS provides an overview of each system and its subsystems, details of standard and optional hardware components in each system, and basic site engineering. These include the EAGLE 5 ISS, OEM-based products such as the ASi 4000 Service Control Point (SCP), and the Netra-based Multi-Purpose Server (MPS).

- The *Hardware Manual - Tekelec 1000 Application Server* provides general specifications and a description of the Tekelec 1000 Application Server (T1000 AS). This manual also includes site preparation, environmental and other requirements, procedures to physically install the T1000 AS, and troubleshooting and repair of Field Replaceable Units (FRUs).
- The *Hardware Manual - Tekelec 1100 Application Server* provides general specifications and a description of the Tekelec 1100 Application Server (T1100 AS). This manual also includes site preparation, environmental and other requirements, procedures to physically install the T1100 AS, and troubleshooting and repair of Field Replaceable Units (FRUs).
- The *Installation Manual* - EAGLE 5 ISS contains cabling requirements, schematics, and procedures for installing the EAGLE 5 ISS along with LEDs, connectors, cables, and power cords to peripherals. Refer to this manual to install components or the complete systems.
- The *LNP Database Synchronization Manual - LSMS with* EAGLE 5 ISS describes how to keep the LNP databases at the LSMS and at the network element (the EAGLE 5 ISS is a network element) synchronized through the use of resynchronization, audits and reconciles, and bulk loads. This manual is contained in both the LSMS documentation set and in the EAGLE 5 ISS documentation set.
- The *LNP Feature Activation Guide* contains procedural information required to configure the EAGLE 5 ISS for the LNP feature and to implement these parts of the LNP feature on the EAGLE 5 ISS:
  - LNP services
  - LNP options
  - LNP subsystem application
  - Automatic call gapping
  - Triggerless LNP feature
  - Increasing the LRN and NPANXX Quantities on the EAGLE 5 ISS
  - Activating and Deactivating the LNP Short Message Service (SMS) feature.
- The *Maintenance Manual* contains procedural information required for maintaining the EAGLE 5 ISS and the card removal and replacement procedures. The *Maintenance Manual* provides preventive and corrective maintenance procedures used in maintaining the different systems.
- The *Maintenance Pocket Guide* is an abridged version of the Maintenance Manual and contains all the corrective maintenance procedures used in maintaining the EAGLE 5 ISS.

- The *Maintenance Emergency Recovery Pocket Guide* is an abridged version of the Maintenance Manual and contains the corrective maintenance procedures for critical and major alarms generated on the EAGLE 5 ISS.
- The *MPS Platform Software and Maintenance Manual* - EAGLE 5 ISS *with Tekelec 1000 Application Server* describes the platform software for the Multi-Purpose Server (MPS) based on the Tekelec 1000 Application Server (T1000 AS) and describes how to perform preventive and corrective maintenance for the T1000 AS-based MPS. This manual should be used with the EPAP-based applications (EIR, G-Port, G-Flex, A-Port, Migration, AINPQ, and INP).
- The *MPS Platform Software and Maintenance Manual* - EAGLE 5 ISS *with Tekelec 1100 Application Server* describes the platform software for the Multi-Purpose Server (MPS) based on the Tekelec 1100 Application Server (T1100 AS) and describes how to perform preventive and corrective maintenance for the T1100 AS-based MPS. This manual should be used with the ELAP-based application (LNP).
- The *Provisioning Database Interface Manual* defines the programming interface that populates the Provisioning Database (PDB) for the EAGLE 5 ISS features supported on the MPS/EPAP platform. The manual defines the provisioning messages, usage rules, and informational and error messages of the interface. The customer uses the PDBI interface information to write his own client application to communicate with the MPS/EPAP platform.
- The *Previously Released Features Manual* summarizes the features of previous EAGLE, EAGLE 5 ISS, and IP^7 Secure Gateway releases, and it identifies the release number of their introduction.
- The *Release Documentation* contains the following documents for a specific release of the system:
  - *Feature Notice* - Describes the features contained in the specified release. The Feature Notice also provides the hardware baseline for the specified release, describes the customer documentation set, provides information about customer training, and explains how to access the Customer Support website.
  - *Release Notice* - Describes the changes made to the system during the lifecycle of a release. The Release Notice includes Generic Program Loads (GPLs), a list of PRs resolved in a build, and all known PRs.

    NOTE: The *Release Notice* is maintained solely on Tekelec's Customer Support site to provide you with instant access to the most up-to-date release information.
  - *Systems Overview* - Provides high-level information on SS7, the IP^7 Secure Gateway, system architecture, LNP, and EOAP.

— *Master Glossary* - Contains an alphabetical listing of terms, acronyms, and abbreviations relevant to the system.

— *Master Index* - Lists all index entries used throughout the documentation set.

- The *SEAS Commands Error Messages Manual* lists the error messages generated by the EAGLE 5 ISS that are specific to the Signaling Engineering and Administration System (SEAS). It includes the SEAS commands that trigger the error messages, the equivalent system error messages and commands, and the explanatory text.
- The *SS7-over-IP Networks Using SIGTRAN* manual examines the reasons for transitioning to an SS7-over-IP network, the considerations that go into planning and dimensioning, and helpful information for implementing the network using EAGLE 5 ISS.
- The *System Manual – EOAP* describes the Embedded Operations Support System Application Processor (EOAP) and provides the user with procedures on how to implement the EOAP, replace EOAP-related hardware, device testing, and basic troubleshooting information.

Documentation Packaging, Delivery, and Updates

Customer documentation is provided with each system in accordance with the contract agreements. It is updated whenever significant changes that affect system operation or configuration are made. Updates may be issued as an addendum, or a reissue of the affected documentation.

The document part number appears on the title page along with the current revision of the document, the date of publication, and the software release that the document covers. The bottom of each page contains the document part number and date of publication.

Two types of releases are major software releases and maintenance releases. Maintenance releases are issued as addenda with a title page and change bars. On the changed pages, the date and document part number are changed. On any unchanged pages that accompany the changed pages, the date and document part number is unchanged.

When the software release has a minimum effect on documentation, we provide an addendum. The addendum provides an instruction page, a new title page, a change history page, and replacement chapters with the date of publication, the document part number, and change bars.

If a new release has a major impact on documentation, such as a new feature, the entire documentation set is reissued with a new part number and a new release number.

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. This manual has three admonishments, listed in descending order of priority as shown in Table 1-1, *Admonishment icons.*

Table 1-1. Admonishment icons

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

Customer Care Center

The Customer Care Center offers a point of contact through which customers can receive support for problems that may be encountered during the use of Tekelec's products. The Customer Care Center is staffed with highly trained engineers to provide solutions to your technical questions and issues seven days a week, twenty-four hours a day. A variety of service programs are available through the Customer Care Center to maximize the performance of Tekelec products that meet and exceed customer's needs.

To receive technical assistance, call the Customer Care Center at one of the following locations:

- Tekelec, UK

  Phone +44 1784 467 804
  Fax +44 1784 477 120
  E-mail **ecsc@tekelec.com**

- Tekelec, USA

  Phone (within the continental US) 888-367-8552 (888-FOR-TKLC)
  (outside the continental US) +1 919-460-2150
  Fax 919-460-0877
  E-mail **support@tekelec.com**

Problem Classification

Once a Customer Service Request (CSR) is issued, the Customer Care Center, along with the customer, determines the classification of the trouble.

Problems are reported using problem criteria, as defined in the following sections and “TL-9000 Quality System Metrics (Book Two, Release 3.0)” .

Problem – Critical

Critical problems severely affect service, capacity / traffic, billing, and maintenance capabilities and requires immediate corrective action, regardless of time of day or day of the week, as viewed by a customer upon discussion with the supplier. For example:

- A loss of service that is comparable to the total loss of effective functional capacity of an entire switching or transport system.
- A reduction in capacity or traffic handling capacity such that expected loads cannot be handled.
- A loss of ability to provide safety or emergency capability (for example, 911 calls).

Problem – Major

Major problems cause conditions that seriously affect system operations, or maintenance and administration, and require immediate attention as viewed by the customer upon discussion with the supplier. Because of a lesser immediate or impending effect on system performance, the urgency is less than in a critical situation. A list of possible examples follows:

- Reduction in any capacity / traffic measurement function
- Any loss of functional visibility and / or diagnostic capability
- Short outage equivalent to system or subsystem outages with accumulated duration of greater than two minutes in any 24-hour period or that continue to repeat during longer periods
- Repeated degradation of DS1 or higher rate spans or connections
- Prevention of access for routine administrative activity
- Degradation of access for maintenance or recovery operations
- Degradation of the system’s ability to provide any required critical or major trouble notification
- Any significant increase in product-related customer trouble reports
- Billing error rates that exceed specifications
- Corruption of system or billing databases

Problem – Minor

Other problems that a customer does not view as critical or major are considered minor. Minor problems do not significantly impair the functioning of the system and do not significantly affect service to customers. These problems are tolerable during system use.

Engineering complaints are classified as minor unless otherwise negotiated between the customer and supplier.

Response

If a critical problem exists, emergency response is offered by calling the Customer Care Center 24 hours a day, 7 days a week.

If the problem is not critical, information regarding the serial number of the system, Common Language Location Identifier (CLLI), and initial problem symptoms and messages is recorded and a primary Customer Care Center specialist is assigned to work the Customer Service Request (CSR) and provide a solution to the problem. The CSR is closed when the problem has been resolved.

Hardware Repair and Return

Any system components being returned for repair or replacement must be processed through the Tekelec Return Material Authorization (RMA) procedures. A hardware repair is defined as an item returned to Tekelec due to a failure, with the returned item being repaired and returned to the customer. It is essential that serial numbers are recorded correctly. RMAs cannot be created without a valid serial number. All repair and quality information is tracked by serial number.

Acronyms

AS	Application Server
CdPA	Called Party Address
CgPA	Calling Party Address
DPC	Destination Point Code
DTD	Document Type Definition
ECAP	Eagle Collector Application Processor
FTP	File Transfer Protocol
FTR	File Transfer Region
IP	Internet Protocol
IPSM	Internet Protocol Services Module

IS-41	International Standard 41, same as ANSI-41
ISUP	ISDN User Part
ITU	International Telecommunications Union
MAP	Mobile Application Part
MIB	Management Information Base
MSU	Message Signaling Unit
MTP	Message Transfer Part
NMS	Network Management System
NTP	Network Time Protocol
OAM	Operation, Administration, and Maintenance
OPC	Origination Point Code
SCCP	Signalling Connection Control Part
SCMG	SCCP Management
SCP	Service Control Point
SLAN	STPLAN
SI	Service Indicator
SSEDCM	Single Slot Enhanced Database Communication Module
SSH	Secure Shell
SNMP	Simple Network Management Protocol
SP	Switching Point
STPLAN	Signalling Transfer Point Local Area Network
VSCCP	VxWorks Signaling Connection Control Part
VXWSLAN	VXWorks SLAN Card
XML	Extensible Markup Language
XML DTD	Extensible Markup Language Document Type Definition

2

Feature Description

Introduction

The Integrated Accounting Feed application runs on the Eagle Collector Application Processor (ECAP) and provides a broad compliance to the requirements for basic MTP and SCCP accounting and measurements functionality as described in *ITU-T Recommendation Q.752, Section 7* and *Tables 15 and 16*.

The Integrated Accounting Feed application performs collection of EAGLE® 5 ISS traffic statistics data. ECAP is one or more T1100-based servers that run in an integrated fashion with EAGLE 5 ISS that receives MSUs from the EAGLE 5 ISS and feeds them to an accounting system.

A single ECAP server can process up to 5000 MSUs per second, providing precise measurements of MSUs and octets transmitted. Multiple ECAP servers can be connected to an EAGLE 5 ISS server for increased processing bandwidth.

The ECAP server periodically generates data files which are transferred to an accounting system, consisting of a server configured as an Aggregator. This application allows detailed usage files to be compiled across all monitored links in the system. See “Architectural Overview” on page 2-5 for more information.

NOTE: The Aggregator may consist of a single server or an IP cluster that uses a virtual IP address.

The application provides a user interface for configuration and application control and generates log files for monitoring and maintenance purposes.

Hardware Requirements

Hardware requirements for the ECAP platform are as follows (refer to Figure 2-1 on page 2-4):

- T1100 AS Frame

NOTE: Release 1.0 supports a single ECAP Frame.

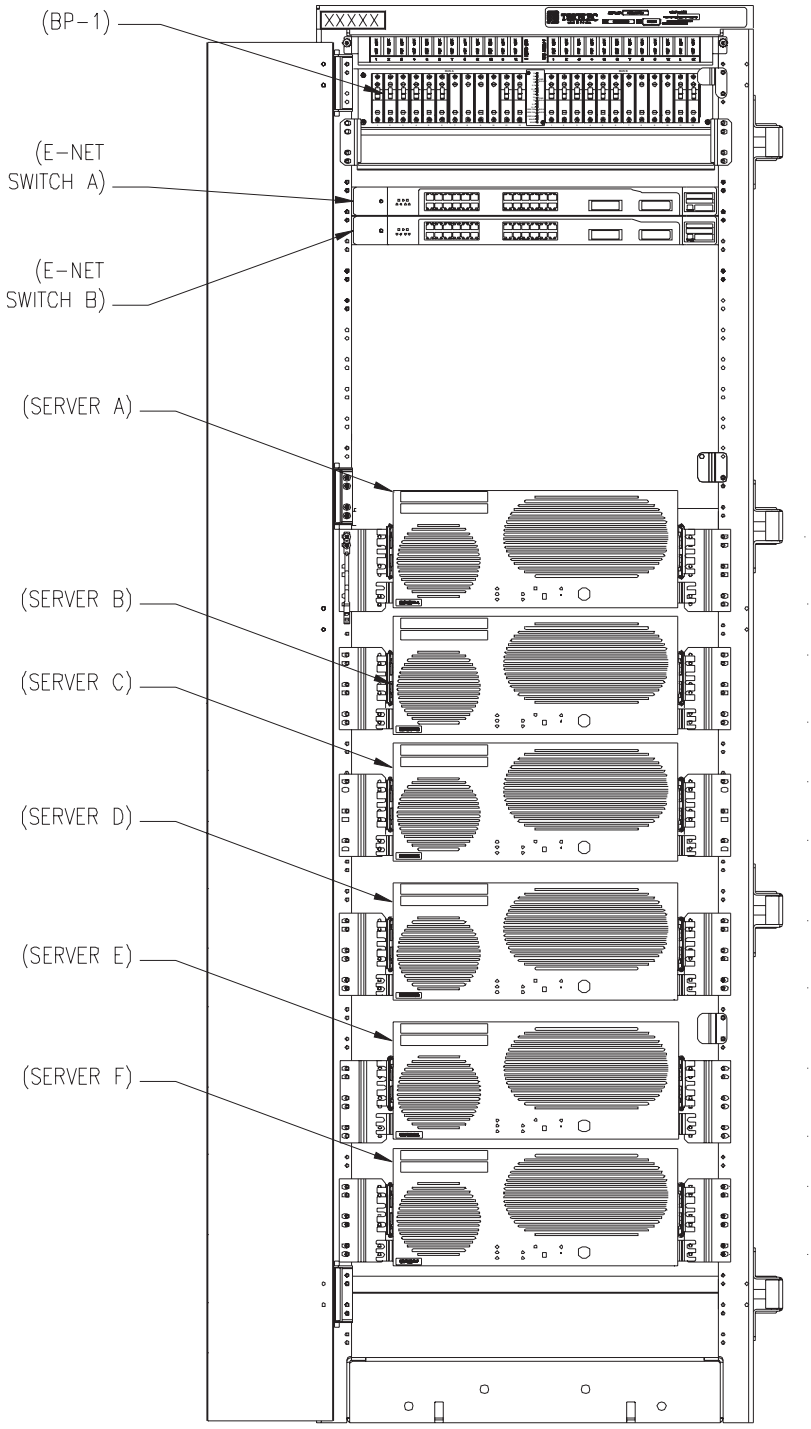
- Power Distribution breaker panel
- Two Ethernet Switch units
- A T1100 server, running the Integrated Q.752 MTP/SCCP Accounting Feed feature.
- The maximum number of ECAP Servers is six.
- The number of ECAP Servers per frame is two to six.
- The EAGLE 5 ISS system used with the ECAP must be equipped with SSEDCM card types running the VXWSLAN application. The VXWSLAN application cards must be provisioned with 100 Mbps links in order to achieve 5000 MSUs/sec.

The ECAP Servers are configured in an n+1 configuration based on the maximum expected traffic rate as shown in Table 2-1.

Table 2-1. MSU to Server Mapping

MSU per Second	Servers
<= 5000	2
5001 to 10000	3
10001 to 15000	4
15001 to 20000	5
20001 to 25000	6

Figure 2-1. ECAP T1100 Frame



Architectural Overview

Figure 2-2 provides a high-level architectural view of the Integrated Accounting Feed application as it runs on the ECAP system. The EAGLE 5 ISS (100) connects to the Collector (101) via a direct connected Ethernet cable. The data feed from the EAGLE 5 ISS to the Collector is the STPLAN (104). The Collector runs on the T1100 series of Tekelec Servers. The set of Collector hardware and software (the Integrated Accounting Feed application) is considered the ECAP.

The Collectors are connected to the Aggregator (102) via a WAN Ethernet connection (105). The Aggregator (102) collects data from all Collectors and performs any processing decided by the customer (103).

Figure 2-2. Integrated Accounting Feed Architectural Overview

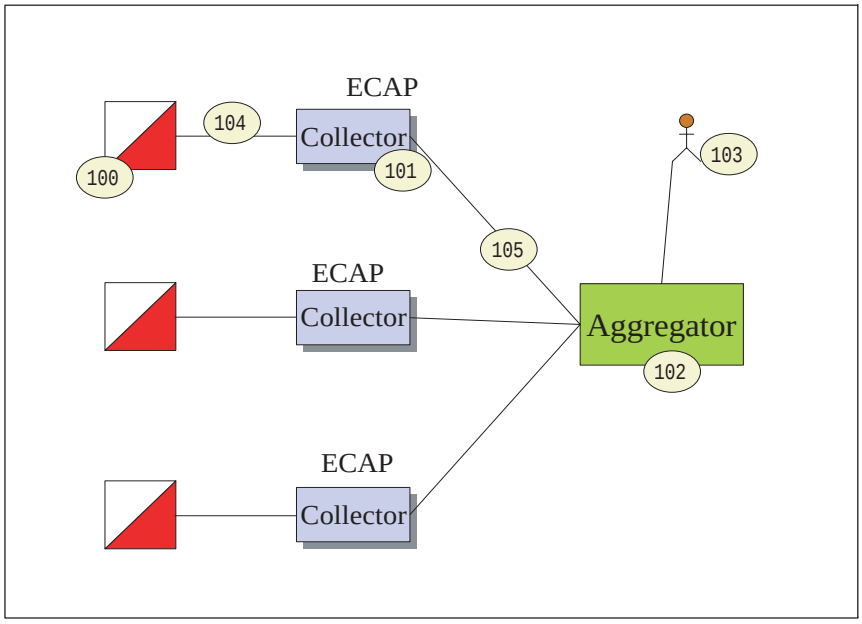


Table 2-2 defines the terms used in the above figure.

Table 2-2. Integrated Accounting Feed Architecture Terms

Term	Definition
Collector	The Collector function runs on the ECAP servers. This function receives the STPLAN MSU feed and parses the MSUs in the feed into categories based on provisioning rules. The Collector provides the interface to the Aggregator function.
Aggregator	The Aggregator function accepts the data feed from all Collector functions within the customer's network and compiles user-defined accounting reports. The Aggregator function is installed on a system defined by the customer. This system should have the following characteristics: • Ability to accept an XML file • Ability to accept a 'push' • Ability to sustain an IP connection and support Virtual IP, including a virtual IP address. **NOTE: The ability to support Virtual IP is recommended but not a requirement.** • Ability to enable SecureShell

Interconnectivity

Figure 2-3 provides a high-level view of interconnectivity for the Integrated Accounting Feed application.

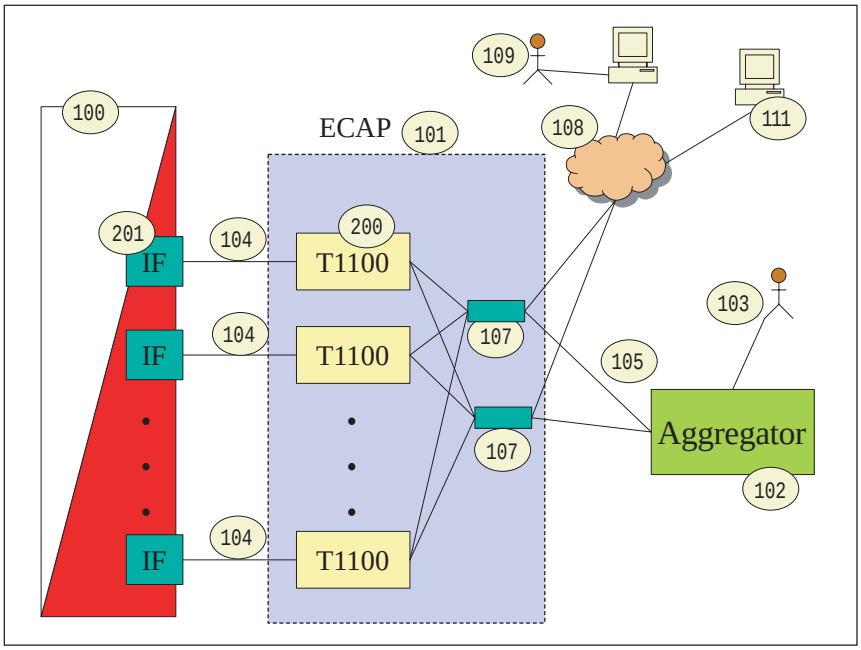
The number of ECAP Servers (200) and Interface Cards (201) is dependent on the number of MSU that need to be collected to provide the measurement data. The capacity of 5000 MSU per server is the benchmark. The T1100 servers and Interface Cards are configured on a one-for-one basis (1:1).

The Aggregator (102) must be capable of retrieving data files from at least 20 ECAP Servers.

An NMS (111) is used to capture SNMP traps generated by each server.

Maintenance Personnel (109) access the Collectors via the Customer Network (108) that is connected to the Dual Ethernet Switches (107).

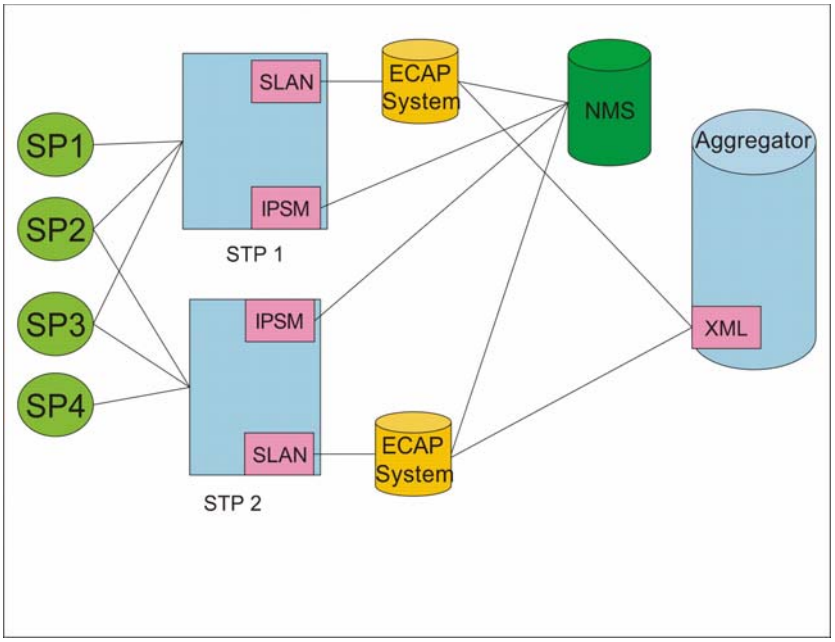
Figure 2-3. Interconnectivity Overview



See “Architectural Overview” on page 2-5 for a description of the other details in the above figure.

A diagram showing a detailed view of the EAGLE 5 ISS / ECAP / Aggregator connectivity is shown in Figure 2-4. This diagram includes the types of connection that flow between each component.

Figure 2-4. Aggregator / ECAP / EAGLE 5 ISS Connectivity Diagram



The connectivity elements are as follows:

- **EAGLE 5 ISS Connectivity**
  - SLAN to ECAP for Q.752 accounting information
  - IPSM to NMS for alarms monitoring
- **ECAP Connectivity**
  - Ethernet to EAGLE SLAN for Q.752 accounting information retrieval.
  - Ethernet to NMS for alarm transfer
  - Ethernet to Aggregator for XML data transfer
- **Aggregator Connectivity**
  - LAN to ECAP for Q.752 accounting information in XML data format. See Appendix A, “MSU to XML Field Mapping.” for more details.

Integrated Accounting Feed Considerations

Some considerations for optimal ECAP performance are listed below.

- The Integrated Accounting Feed application must be configured to use the ITU protocol via **ecapcfg**.

  NOTE: ANSI is provided as a possible protocol for the ECAP server (see "Configuring the Integrated Accounting Feed Application" on page 3-15). However, ITU is the only supported protocol for Release 1.0.

- The Integrated Accounting Feed application cannot aggregate data to the linkset level. Aggregation of peg counts must be done by the Aggregator.
- Because of the nature of the EAGLE 5 ISS and its SLAN subsystem, no other application requiring SLAN copied MSUs may operate simultaneously with the EAGLE 5 ISS that is being used to run the Integrated Accounting Feed application.
- If over 50% of the message traffic consists of MSUs that are greater than 200 bytes, then the ECAP server is not able to reach the 5000 MSUs/second process rate.

3

ECAP Configuration

Introduction

The Integrated Accounting Feed application requires configuration tasks to be performed on the Aggregator, NMS, ECAP network, Integrated Accounting Feed application, and EAGLE® 5 ISS. It is recommended that these tasks be performed in the following sequence:

- Configure the Aggregator (customer-specific)
- Configure the ECAP Network Interfaces
- Configure File Transfer from the ECAP server to the Aggregator
- Configure NTP to synchronize time between the ECAP server and the Aggregator
- Configure the NMS on the NMS system (customer specific) and configure the ECAP server to send SNMP traps to the NMS
- Configure the Integrated Feed Application
- Configure the EAGLE 5 ISS SLAN cards
- Configure Gateway Screening on EAGLE 5 ISS

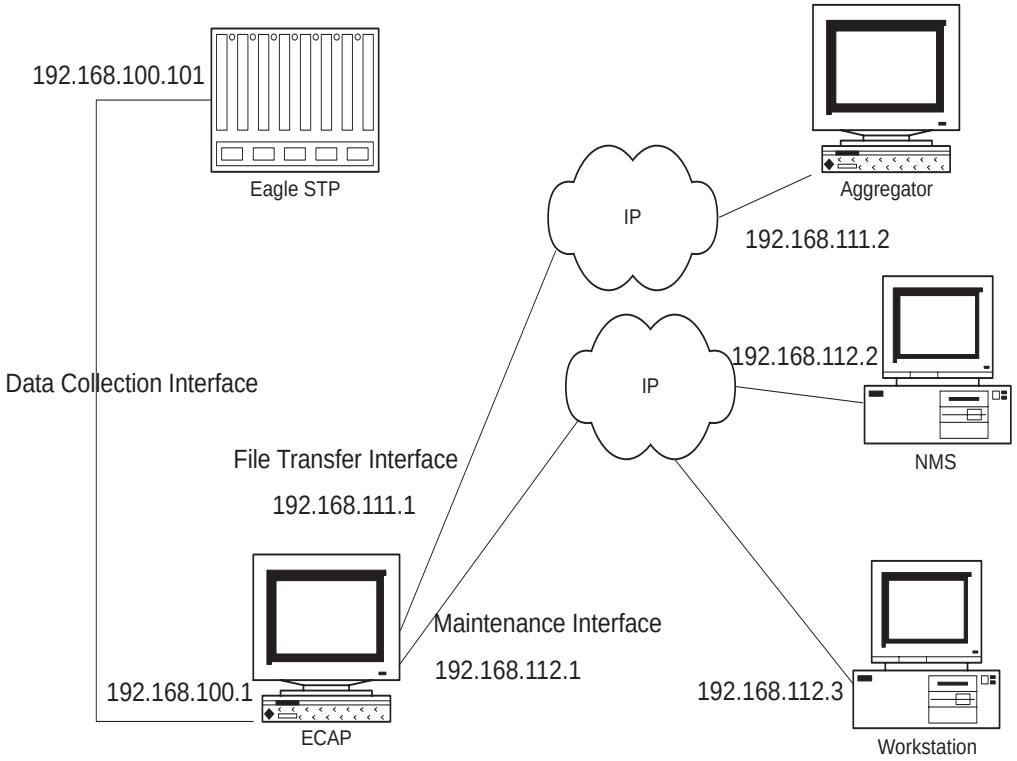
Configuring the Aggregator

The Aggregator must be configured to receive data files from the ECAP. These configuration tasks are mostly customer-specific. However, an RSA Public Key must be generated from the File Transfer Interface and added to the Aggregator. See “Configuring File Transfer” on page 3-7 for more information.

Configuring ECAP Network Interfaces

Each ECAP server requires three operational network interfaces. All interfaces are standard 100Mbps IP connections. While each ECAP server connects to only one Aggregator, the Aggregator may receive measurements data from multiple ECAP servers associated with a single EAGLE 5 ISS. Figure 3-1 provides an example network configuration.

Figure 3-1. Network Configuration



The Data Collection Interface is the incoming MSU data network interface. This interface connects an ECAP server to the EAGLE 5 ISS SLAN card via a direct IP connection. Each ECAP server interfaces with one and only one SLAN card.

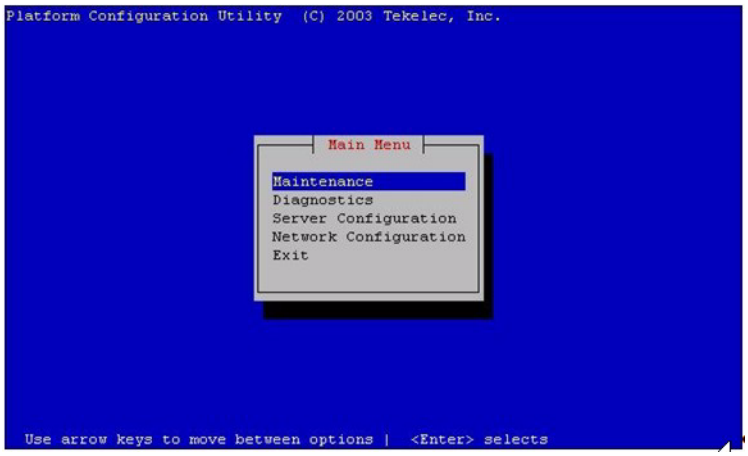
The File Transfer Interface is used to transfer data files from the ECAP server to the Aggregator. This is a secure interface.

The Maintenance Interface is an OAM interface that allows monitoring of alarms by a remote NMS. This interface supports secure remote login via SSH.

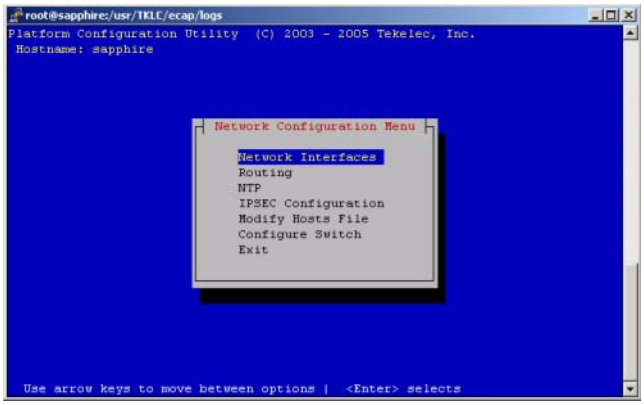
ECAP network configuration is managed by **`platcfg`**. Use the following procedure to configure the interfaces. See Table 3-1 for a list of recommended interface settings.

Procedure 3-1. Configuring Network Interfaces

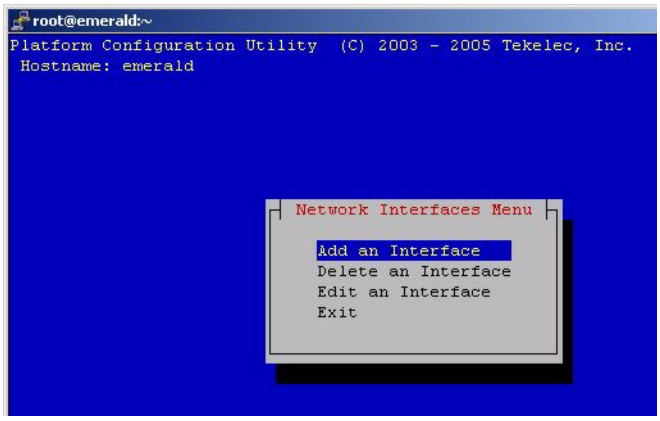
1. Log in to the ECAP server as the **`platcfg`** user.



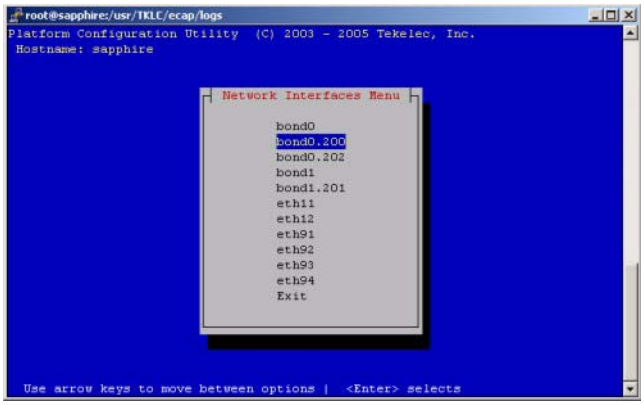
2. Select **Network Configuration** from the Platform Configuration Utility Main Menu and press **Enter**.



3. Select **Network Interfaces** from the Network Configuration Menu and press **Enter**.

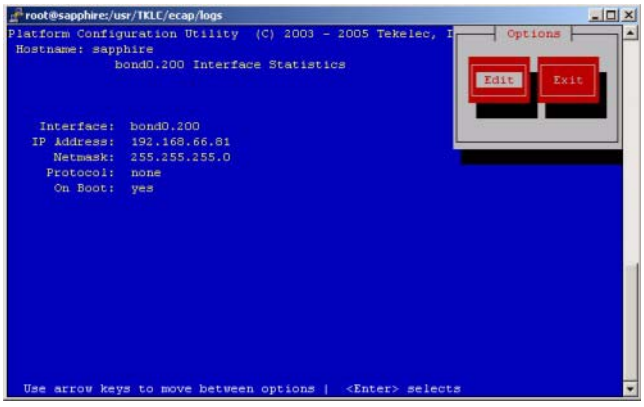


4. Select **Edit an Interface** from the Network Interfaces Menu and press **Enter**.



5. Select the device that corresponds to the interface you want to configure and press **Enter**.

   See Table 3-1 for a list of interfaces and their associated devices.



6. Select **Edit** to configure the interface, using the settings in Table 3-1.

7. Save and **Exit** the menu .

You have now completed this procedure.

Table 3-1. ECAP Network Parameters

Parameter	Data Collection Interface	File Transfer Interface	Maintenance Interface
Device	eth93	bond0.200 **NOTE: Device bond0.200 is a VLAN-tagged device of bond0.**	bond1.201 **NOTE: Device bond1.201 is a VLAN-tagged device of bond1.**
IP Address	Default at install: 1A: 192.168.100.1 1B: 192.168.100.2 1C: 192.168.100.3 1D: 192.168.100.4 1E: 192.168.100.5 1F: 192.168.100.6	locally administered	locally administered
Netmask	255.255.255.0	locally administered	locally administered
Boot Protocol	none	none	none
Start on Boot	yes	yes	yes

For bonded interfaces such as the File Transfer and Maintenance Interfaces, when taking down individual physical interfaces enslaved to the bond with the **`ifdown`** or **`ifconfig down`** commands (e.g. **`ifdown eth12`**), perform the following steps to bring the bonds back up correctly:

1. **`ifup`** or **`ifconfig up`** on the bonded interface (e.g. **`ifup bond0`**).
2. **`ifup`** or **`ifconfig up`** on the VLAN-tagged bonded interface (e.g. **`ifup bond0.200`**.)

The bonded interface should then be up and working correctly again.

Configuring File Transfer

In addition to the network configuration tasks listed above, the File Transfer Interface must be configured to automatically push data files from the ECAP server to the Aggregator. In normal operating conditions, the ECAP server pushes data files to the Aggregator every 30 minutes.

To configure the File Transfer Interface to perform this function, run the **ssh-keygen** command from each ECAP server to generate the ECAP server's RSA public key.

Output from **ssh-keygen** appears as follows:

CAUTION: Do NOT enter a passphrase when prompted.

```
# ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (your_local_home/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in id_rsa.
Your public key has been saved in id_rsa.pub.
The key fingerprint is:
17:5a:e7:77:ad:2c:0b:8e:f3:97:f8:20:53:79:69:55 ecapadm@ecap1
```

After generating the public key, place the contents of the `id_rsa.pub` key file on the Aggregator in the FTP user's home directory in order to gain FTP access to the Aggregator FTP directory. Use Procedure 3-2 on page 3-7 or Procedure 3-3 on page 3-8 depending on the OS of the Aggregator.

Procedure 3-2. Adding the RSA public key to a Linux/UNIX Aggregator

1. Copy the `id_rsa.pub` file to the ftp user's home directory on the Aggregator.

   [ecap1] # scp ~/.ssh/id_rsa.pub ftpuser@aggregator:/home/ftpuser/id_ecap1_rsa.pub
   ftpuser@aggregator's password:
   id_rsa.pub 00% 604 0.5KB/s --:-- ETA

2. **ssh** to the Aggregator to put the key file in the correct place.

   [ecap1] # ssh ftpuser@aggregator
   ftpuser@aggregator's password:

3. If the ftpuser does not have an `.ssh` directory under their home directory, it must be created and permissions set to 700. The contents of the ECAP's public key file must then be appended to the `authorized_keys` file in the `.ssh` directory, and the file's permissions set to 644.

   [aggregator] # mkdir -p ~/.ssh
   [aggregator] # chmod 700 .ssh
   [aggregator] # cat id_ecap1_rsa.pub >> .ssh/authorized_keys

[aggregator] # chmod 644 .ssh/authorized_keys
[aggregator] # exit

4. Test the steps performed above using the **ssh** command:

   [ecap1] # ssh ftpuser@aggregator

If the steps were performed correctly, you will be logged on to the Aggregator and will not be prompted for a password. The command line prompt will correspond to the display on the Aggregator.

The Integrated Accounting Feed application will be able to transfer data files to the Aggregator once the application has been configured via **ecapcfg** (see "Configuring the Integrated Accounting Feed Application" on page 3-15).

To configure the File Transfer Interface on the ECAP for an Aggregator that uses a virtual IP address (IP cluster node), the following additional steps must be performed at the ECAP.

a. Repeat the Procedure 3-2 on page 3-7 for each member of the cluster that shares the virtual IP address.

b. Test the File Transfer Interface as described in Step 4 for each member of the cluster. Do NOT use the virtual IP address of the cluster. Use the IP address of each member's physical network device.

c. Edit the `/var/TKLC/ecap/ecapadm/.ssh/known_hosts` file. This file will have server SSH keys defined, one per line, in the format `<ip address> ssh-rsa <ssh key>`. Find the IP addresses for each member of the IP node cluster, and replace the server's physical IP address with the cluster's virtual IP address.

d. Test the File Transfer Interface as described in Step 4 for each member of the cluster using the virtual IP address.

You have now completed this procedure.

Procedure 3-3. Adding the RSA Public Key to a Windows Aggregator

1. Copy the ECAP's `id_rsa.pub` file to the Aggregator, following the steps in the above procedure.

2. Append the appropriate authorized keys file used on the Aggregator, which is usually `authorized_keys` or `authorized_keys2`.

   NOTE: Refer to your SSH User's Manual for the appropriate way to do this.

You have now completed this procedure.

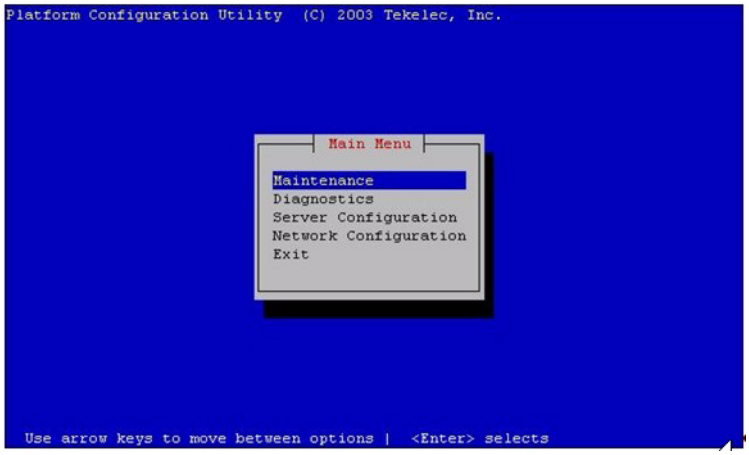
Configuring NTP

Synchronize each ECAP server's local time with the Aggregator via NTP. This allows the entire ECAP / Aggregator network to have synchronized time.

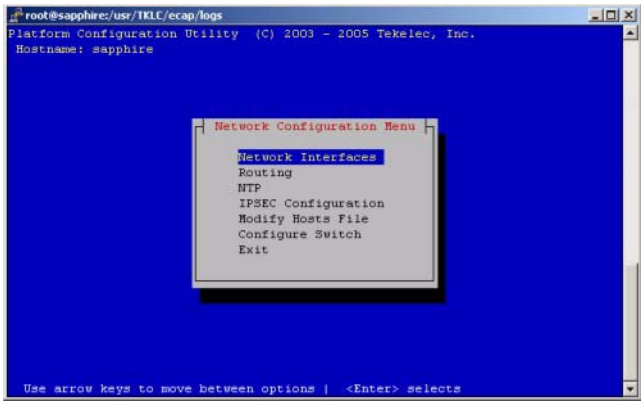
Use the following procedure to configure NTP using **`platcfg`**.

Procedure 3-4. Configuring NTP

1. Log in to the ECAP server as the **`platcfg`** user.



2. Select **Network Configuration** from the Platform Configuration Utility Main Menu and press **Enter**.



3. Select **NTP** from the Network Configuration Menu and press **Enter**.

4. Select **Edit.**

5. Edit the IP addresses as desired and click **Exit**.

   NOTE: NTP will be functional on the server when only one server is defined; however, providing more than one server will make the protocol more reliable.

6. Save and **Exit** the menu.

You have now completed this procedure.

Configuring NMS

ECAP servers generate SNMP traps to capture platform alarms. The MIBs required for platform traps are pre-existing, the snmpAgent used for platform alarms is activated during ECAP installation, and most of the hardware checks that would result in traps are defaulted to enabled. However, the Integrated Accounting Feed application also requires enabling the following:

- Breaker Panel / Power System traps
- Platform process traps if more or less than one instance of MeasServer, TimeServer, sentryd, or Logd are found
- Network ping traps if the Data Collection, File Transfer, or Maintenance Interfaces (see “Configuring ECAP Network Interfaces” on page 3-3) are down
- IP Bonding traps if the File Transfer or Maintenance Interfaces (see “Configuring ECAP Network Interfaces” on page 3-3) are down.

These traps are enabled by configuring the NMS IP address for the location where the traps will be destined.

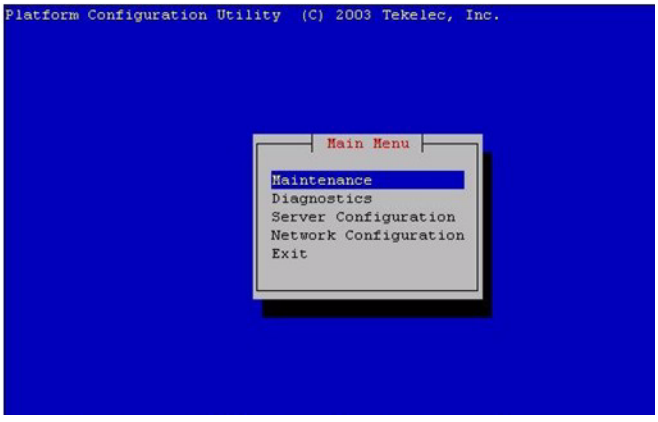
NMS configuration tasks involve configuring both the actual system used to monitor alarms and configuring the ECAP server to send alarms to the NMS.

Configuring the NMS used to monitor alarms involves customer-specific tasks. At a minimum, the Port Number and Community String must be configured. Refer to the documentation for your system for information on configuring these parameters.

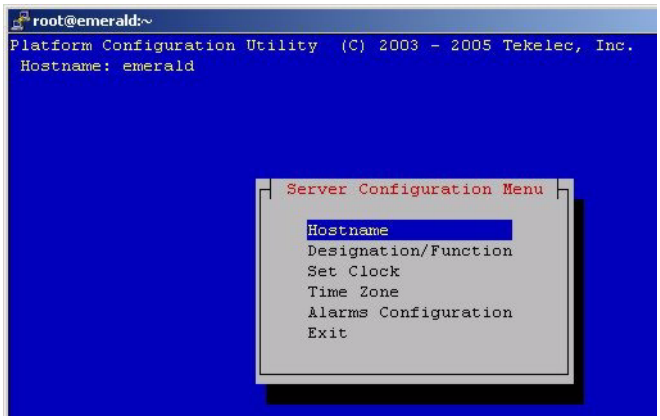
Use the following procedure to configure the ECAP server to send alarms to the NMS.

Procedure 3-5. Configuring the ECAP Server for NMS

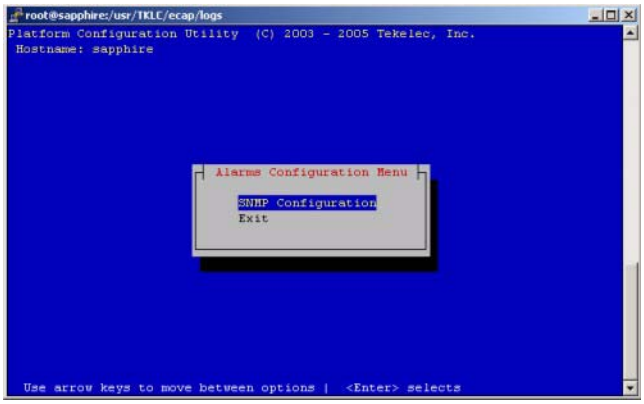
1. Log in to the ECAP server as the **`platcfg`** user .



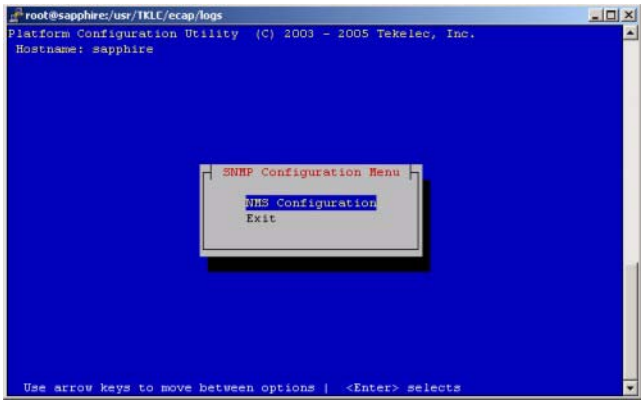
2. Select **Server Configuration** from the Platform Configuration Utility Main Menu and press **Enter**.



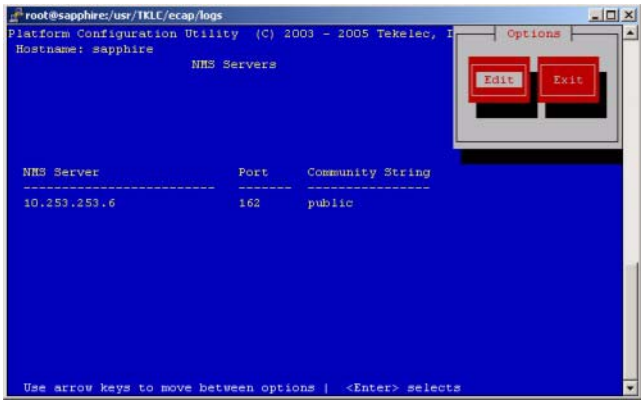
3. Select **Alarms Configuration** from the Server Configuration Menu and press **Enter**.



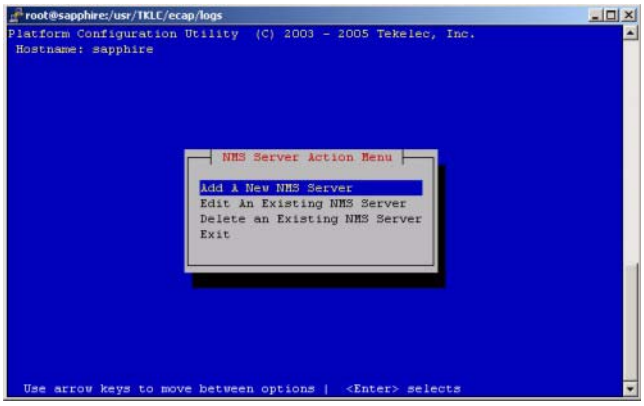
4. Select **SNMP Configuration** from the Alarms Configuration Menu and press **Enter**.



5. Select **NMS Configuration** from the Server Configuration Menu and press **Enter**.



6. Select **Edit**.



7. Select a task from the NMS Server Action menu. You can add, edit, or delete an NMS Server.

NOTE: The SNMP Community String and Port Number values must match the values configured on the NMS.

8. Save and **Exit** the menu.

You have now completed this procedure.

Configuring the Integrated Accounting Feed Application

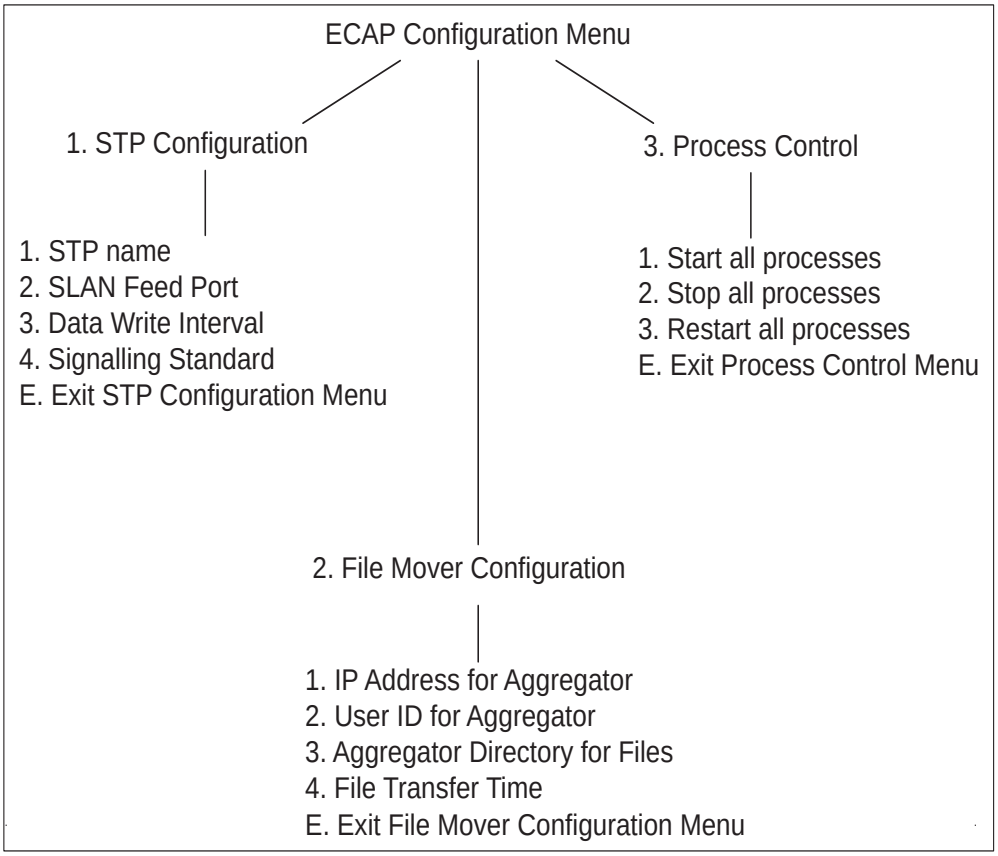
The Integrated Accounting Feed application automatically creates the **ecapadm** and **ecapuser** accounts. The **ecapadm** user can control or configure the Integrated Accounting Feed application and run the **savelogs** command (see "Savelogs" on page 4-13). The **ecapadm** user is part of the ecap group.

The **ecapuser** account is a limited account that can NOT control or configure the Integrated Accounting Feed application. However, this user may run **savelogs**. The **ecapuser** user is part of the ecap group.

The Integrated Accounting Feed application is configured via the **ecapcfg** command. Entering this command opens the Integration Accounting Feed Configuration Menu.

The Configuration Menu provides options that describe the EAGLE 5 ISS and Aggregator configuration values. A graphical representation of the menu layout is provided in Figure 3-2.

Figure 3-2. Integrated Accounting Feed Configuration Menu



The menu options and their functions are provided in Table 3-2.

Table 3-2. Configuration Menu Options

Menu Option	Description	Range of Values
STP Configuration	Displays a set of options that enable the operational parameters associated with the EAGLE 5 ISS MSU feed to be set or changed.	[1..4, E]
STP name	Sets the STP name that is used in the filename of the data file transferred to the Aggregator. Typically, the STP name reflects the STP CLLI from which the ECAP is receiving MSUs.	The value has a 12-character limit.
SLAN Feed Port	Sets the port number that the application monitors for the EAGLE 5 ISS MSU feed. The value entered must match the "ipport" parameter in the **ent-ip-node** EAGLE 5 ISS configuration command (see "Configuring SLAN Cards" on page 3-18).	[1024..5000]
Data Write Interval	Sets the interval, in minutes, at which the Integrated Accounting Feed application generates the data file. This file is stored on the ECAP server and periodically transferred to the Aggregator.	[1, 5]
Signalling Standard	Sets the protocol by which the ECAP server interprets the MSUs from the EAGLE 5 ISS.	[ANSI, ITU] **NOTE: ITU is the only supported protocol for Release 1.0.**
File Mover Configuration	Displays a set of options that enable the parameters associated with the Aggregator configuration to be set or changed.	[1..3, E]
IP Address for Aggregator	Sets the IP address for the Aggregator. The locator must be specified as an IP address.	The value must be a decimal-separated 4-octet value, with each octet in the 0-255 range.
User ID for Aggregator	Sets the user name that is used to log in to the Aggregator when transferring data files	No restrictions

Table 3-2. Configuration Menu Options (Continued)

Menu Option	Description	Range of Values
Aggregator Directory for Files	Sets the path to the directory in which the data files will be stored on the Aggregator	No restrictions.
File Transfer Time	Sets the number of minutes after the half hour to send data files to the Aggregator (1 - xx:01 and xx:31, 2 - xx:02 and xx:32, etc.)	[1...5]
Process Control	Displays a set of options that enable the application processes to be started and stopped.	[1..3, E]
Start all processes	If action is confirmed, this option starts all application processes that are not currently running.	[Y, y, N, n]
Stop all processes	If action is confirmed, this option stops all running application processes.	[Y, y, N, n]
Restart all processes	If action is confirmed, this option stops all running application processes, and then restarts all processes.	[Y, y, N, n]

Configuring SLAN Cards

The EAGLE 5 ISS SLAN card must be configured to interface with an ECAP server via the Data Collection Interface.

Use the **ent-dlk** and **ent-ip-node** commands to establish the links for the SLAN cards. See Table 3-3 for a list of these commands and their parameters as they apply to the Integrated Application Feed application. Refer to the *Commands Manual* for a complete discussion of how to use these commands to configure SLAN cards for the EAGLE 5 ISS.

Table 3-3. SLAN Card Parameters

Command	Parameters	Description
ent-dlk	:loc=XXXX	Location of the SLAN card
	:ipaddr=x.x.x.x **NOTE: The IP addresses given to the right are the default addresses for the ECAP servers and the recommended addresses for the SLAN cards. These locations can be changed; however, the SLAN cards must be located within the same subnet as the associated ECAP server.**	Locally allocated static IP address of the SLAN card. The guideline for allocating the particular IP address is as follows: ECAP IP 192.168.100.1 (Server 1A) to SLAN IP 192.168.100.101 ECAP IP 192.168.100.2 (Server 1B) to SLAN IP 192.168.100.102 ECAP IP 192.168.100.3 (Server 1C) to SLAN IP192.168.100.103 ECAP IP 192.168.100.4 (Server 1D) to SLAN IP 192.168.100.104 ECAP IP 192.168.100.5 (Server 1E) to SLAN IP 192.168.100.105 ECAP IP 192.168.100.6 (Server 1F) to SLAN IP 192.168.100.106
	:speed=100	Sets the port speed to 100Mbps
ent-ip-node	:loc=XXXX	Location of the SLAN card
	:ipaddr=x.x.x.x	IP address of the ECAP Data Collection Interface
	:ipappl=stplan	Sets the application that will be using the interface
	:cap=100	Maximum percentage of ethernet capacity allocated to this connection
	:ipport=[1024..5000]	Port through which EAGLE 5 ISS and ECAP communicate. The value entered must match the “SLAN feed port” parameter in the ECAP configuration as shown in Table 3-2.

Configuring Gateway Screening

Gateway Screening measures an MSU attempting to enter the EAGLE 5 ISS against predefined criteria in the EAGLE 5 ISS database to determine whether the MSU should be allowed to enter.

Refer to the *Database Administration Manual – Gateway Screening* for information on configuring Gateway Screening.

The stop action **copy** set must be configured for the Integrated Accounting Feed application. This set is used to copy the MSU for the STPLAN.

NOTE: The gateway screening stop action set can only have one copy stop action.

4

Maintenance

Alarms

The following alarms are associated with the Integrated Accounting Feed application:

- The ECAP server raises alarms and provides SNMP traps that are monitored via a customer NMS.
- Connectivity problems between the EAGLE® 5 ISS and ECAP server are raised as UAMs on the EAGLE 5 ISS.
- Conditions associated with the Integrated Accounting Feed application may impact operation and may have associated alarms.

These alarms and conditions are discussed in the following sections.

Platform Alarms

All standard alarming and monitoring services for the platform running the Integrated Accounting Feed application are provided. Additional alarming services include breaker panel alarms, ECAP process alarms, and alarms on the File Transfer and Maintenance Interfaces.

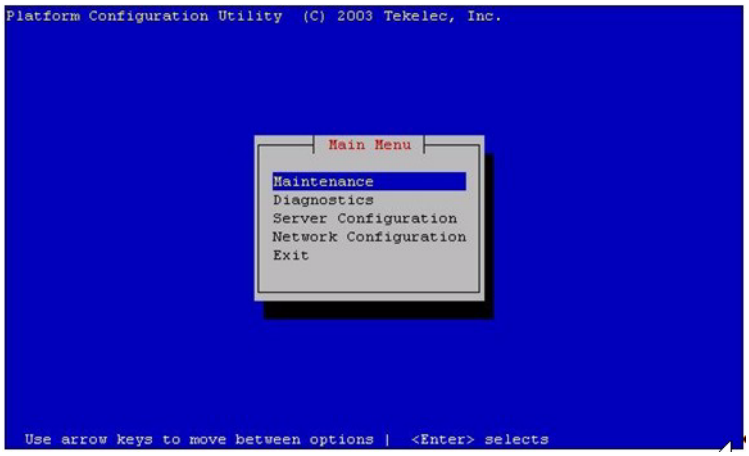
These alarms are monitored by an NMS which receives SNMP traps. In order for the NMS to monitor the SNMP traps, the Maintenance Interface must be configured per Procedure 3-1 on page 3-4, and the ECAP server must be configured to send alarms to the NMS per Procedure 3-5 on page 3-11. The customer is responsible for providing the network connectivity between the ECAP Maintenance Interface and the NMS as identified in Figure 3-1 on page 3-3.

Tables 4-1 through 4-3 list the Critical, Major, and Minor platform alarms for the Integrated Accounting Feed application.

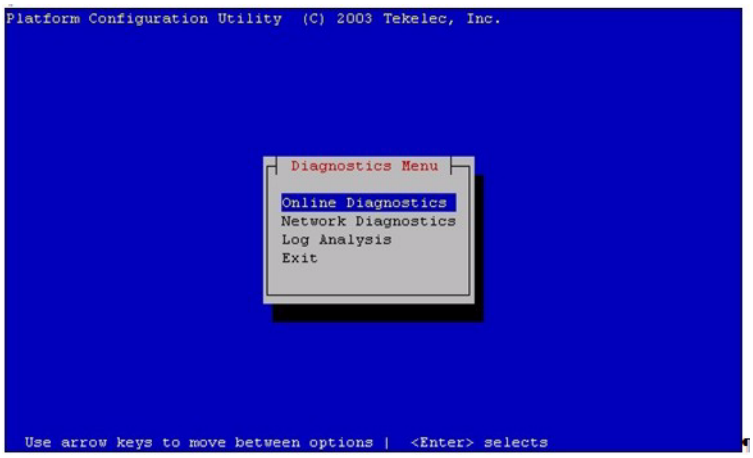
Use the following procedure to obtain additional information on the alarms raised.

Procedure 4-1. Viewing Information on Alarms

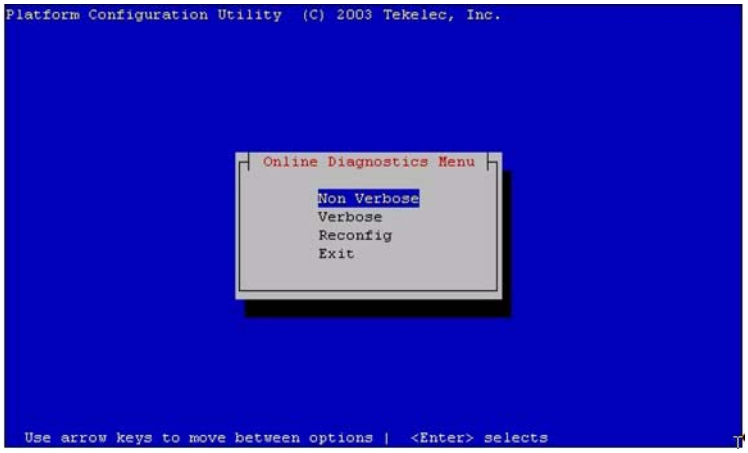
1. Log in to the ECAP server as the **platcfg** user.



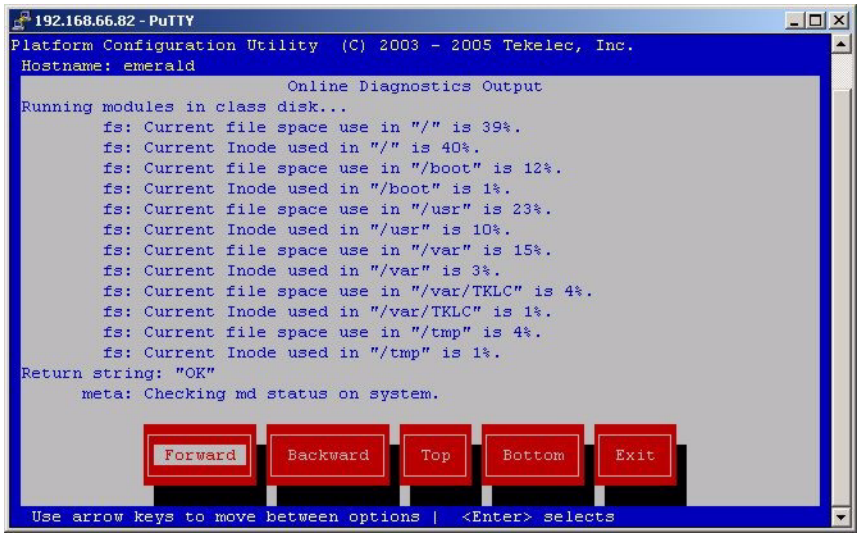
2. Select **Diagnostics** from the Platform Configuration Utility Main Menu and press **Enter**.



3. Select **Online Diagnostics** from the Network Diagnostics Menu and press **Enter**.



4. Select **Verbose** from the Online Diagnostics menu and press **Enter**.



5. An output report, containing debug information for each individual test performed on the server, is displayed.

6. Select **Exit** to return to the Online Diagnostics menu.

You have now completed this procedure.

Table 4-1. Critical Platform Alarms

Alarm Text	Range of Values	Alarm Data String Value
Breaker Panel Feed Unavailable	on or off	1000000000000001
Breaker Panel Breaker Failure	on or off	1000000000000002
Breaker Panel Monitoring Failure	on or off	1000000000000004
Power Feed Unavailable	on or off	1000000000000008
Power supply #1 Failure	on or off	1000000000000010
Power supply #2 Failure	on or off	1000000000000020
Power supply #3 Failure	on or off	1000000000000040

Table 4-2. Major Platform Alarms

Alarm Text	Range of Values	Alarm Data String Value
Server Fan Failure	on or off	3000000000000001
Server Internal Disk Error	on or off	3000000000000002
Server Platform Error	on or off	3000000000000008
Server File System Error	on or off	3000000000000010
Server Platform Process Error **NOTE: This alarm means that one of the processes is dead.**	on or off	3000000000000020
Server Ram Shortage Failure	on or off	3000000000000040
Server Swap Space Shortage Failure	on or off	3000000000000080
Server Disk Space Shortage Error	on or off	3000000000001000
Server Temperature Error	on or off	3000000000004000
Server Mainboard Voltage Error	on or off	3000000000008000
Server Power Feed Unavailable	on or off	3000000000010000
Server Disk Health Test Error	on or off	3000000000020000

Table 4-2. Major Platform Alarms (Continued)

Alarm Text	Range of Values	Alarm Data String Value
Server Disk Unavailable Error	on or off	3000000000040000
Device Interface Error **NOTE: This alarm means that the File Transfer Interface is down.**	on or off	3000000000100000

Table 4-3. Minor Platform Alarms

Alarm Text	Range of Values	Alarm Data String Value
Server Disk Space Warning	on or off	5000000000000001
Server Application Process Error	on or off	5000000000000002
Warning Server Hardware Configuration Error	on or off	5000000000000004
Server Software Configuration Error	on or off	5000000000000010
Server Swap Space Shortage Warning	on or off	5000000000000020
Server Temperature Warning	on or off	5000000000000080
Server NTP Daemon Not Synchronized	on or off	5000000000000200
Server CMOS Battery Voltage Low	on or off	5000000000000400
Server Disk Self Test Warning	on or off	5000000000000800
Device Interface Warning **NOTE: This alarm means that either the File Transfer Interface or the Maintenance Interface has one bonded link down.**	on or off	5000000000002000

EAGLE 5 ISS Alarms

Connectivity problems that occur on the Data Collection Interface between the EAGLE 5 ISS and ECAP server are raised as UAMs on the EAGLE 5 ISS. See Table 4-4 for a list of these UAMs.

Refer to the *Maintenance Manual* for more information on the EAGLE 5 ISS related alarms.

Table 4-4. EAGLE 5 ISS UAMs

UAM	Message Text	Resolution
0152	LIM(s) have been denied STPLAN service.	The SLAN subsystem cannot process all of the MSUs from the LIM and SCCP cards. MSUs have been discarded. Remedy: 1. Use the **rept-stat-slan** command to verify that the EAGLE 5 ISS SLAN subsystem is IS-NR and is sending MSU packets to ECAP. Refer to the *Commands Manual* for information on the **rept-stat-slan** command. 2. Perform a network health check (see "Network Check" on page 4-15). If not successful, configure the network using **platcfg** (see "Configuring ECAP Network Interfaces" on page 3-3). 3. Verify MeasServer is running by performing a process check (see "Process Check" on page 4-14). 4. SLAN capacity has been exceeded. Additional SLAN/ECAP pairs may be needed to increase MSU processing capacity.
0153	STPLAN not available	There are no SLAN cards in the IS-NR state. Remedy: 1. Use the **rept-stat-slan** command to verify that the EAGLE 5 ISS SLAN subsystem is IS-NR and is sending MSU packets to ECAP. Refer to the *Commands Manual* for information on the **rept-stat-slan** command. 2. Perform a network health check (see "Network Check" on page 4-15). If not successful, configure the network using **platcfg** (see "Configuring ECAP Network Interfaces" on page 3-3).

Table 4-4. EAGLE 5 ISS UAMs (Continued)

UAM	Message Text	Resolution
0155	STPLAN connection unavailable	SLAN link has been canceled or ECAP application MeasServer or TimeServer process terminated. Remedy: 1. Verify MeasServer and TimeServer are running by performing a process check (see "Process Check" on page 4-14). 2. The physical link between the EAGLE 5 ISS SLAN card and the ECAP server has been disconnected. Perform a network health check (see "Network Check" on page 4-15).

Integrated Accounting Feed Conditions

The conditions listed in Table 4-5 may impact Integrated Accounting Feed operation. If these conditions occur, follow the procedures listed in the Resolution column. If the provided corrective procedures do not work, contact the Tekelec Customer Care Center (see "Customer Care Center" on page 1-10).

Table 4-5. Integrated Accounting Feed Conditions

Condition	Resolution
No data files on the Aggregator	The ECAP server is operational and periodically generating data files, but the files are not being transferred to the Aggregator. Remedy: 1. Determine whether the Device Interface Error major platform alarm (see Table 4-2 on page 4-5) has been raised. If it has, go to Step 3. If not, go to Step 2. 2. Verify that FileMover is periodically running (see "Crontab Check" on page 4-14) and configured correctly via **`ecapcfg`**. If not, re-run **`ecapcfg`** to set up FileMover and / or start the ECAP processes. See "Configuring the Integrated Accounting Feed Application" on page 3-15. 3. Perform a network health check (see "Network Check" on page 4-15). If not successful, configure the ECAP network using **`platcfg`** (see "Configuring ECAP Network Interfaces" on page 3-3).

Table 4-5. Integrated Accounting Feed Conditions (Continued)

Condition	Resolution
Data files are zero length	The ECAP disk is probably full. This causes the filename to be generated, but no data is stored in the file. Remedy: 1. Check available disk space (see "Disk Space Check" on page 4-15). 2. Verify that FileMover and FileScrubber are periodically running (see "Crontab Check" on page 4-14) and configured correctly via **ecapcfg**. If not, re-run **ecapcfg** to set up the processes and / or start the ECAP processes (see "Configuring the Integrated Accounting Feed Application" on page 3-15).
Data file contains no records	The data file contains standard data header but no record entries. This occurs when no MSU records are received from EAGLE 5 ISS. There are no SLAN cards in the IS-NR state. Remedy: 1. Use the **rept-stat-slan** command to verify that the EAGLE 5 ISS SLAN subsystem is IS-NR and is sending MSU packets to ECAP. Refer to the *Commands Manual* for information on the **rept-stat-slan** command. 2. Verify gateway screens are properly configured (see "Configuring Gateway Screening" on page 3-19). The EAGLE 5 ISS SLAN card will only copy MSUs that have been screened.

Table 4-5. Integrated Accounting Feed Conditions (Continued)

Condition	Resolution
MSU / octet counts are less than expected	The MSU peg counts reported by ECAP do not correspond to EAGLE 5 ISS measurements for the same time period. Remedy: 1. Check EAGLE 5 ISS alarm log for UAM 0152 (see "EAGLE 5 ISS UAMs" on page 4-7). If present, MSUs have been discarded during the copy to ECAP due to traffic volume or Data Collection Interface disconnect. Perform a network health check (see "Network Check" on page 4-15). 2. Verify gateway screens are properly configured (see "Configuring Gateway Screening" on page 3-19). The EAGLE 5 ISS SLAN card will only copy MSUs that have been screened. 3. Use the **rept-ftp-meas:type=systot:enttype=stplan** command to obtain an STPLAN measurement report. Use this report to determine the number of MSUs flowing to the ECAP server from EAGLE 5 ISS. Refer to the *Commands Manual* for information on the **rept-ftp-meas** command.

Disaster Recovery

No specific backup routine is provided by ECAP, therefore no specific restore routine is present.

The following failures could lead to disaster if allowed to persist for an ECAP server. See Table 4-5 for a list of associated condition messages and corrections.

- Aggregator and/or both File Transfer Interfaces to Aggregator down or misconfigured: This will eventually lead to a disk full condition on the ECAP server if not corrected within a week due to an accumulation of data files. If the Aggregator is down or in fault condition, this must be corrected according to methods and procedures described by Aggregator documentation. When the link becomes active, all accumulated data files are sent to the Aggregator at the next File Transfer interval. If a significant amount of data is sent to the Aggregator in one 30-minute interval, it could result in a degraded performance level for the ECAP server during the transfer.
- Dead Integrated Accounting Feed processes or Data Collection Interface down or misconfigured: Other ECAP servers in the ECAP system handle the load that would normally be sent to the ECAP server whose Data Collection Interface is down. If another ECAP server goes down or its Data Collection Interface goes down or is misconfigured, this could cause the ECAP/SLAN system to go into overload and lose data packets. Therefore, this scenario should also be corrected as soon as possible.

In the event of a catastrophic failure where ECAP hardware fails, contact the Tekelec Customer Care Center (see “Customer Care Center” on page 1-10).

Log Files

The Integrated Accounting Feed application generates log files for the following processes (see “Process Check” on page 4-14 for a description of the processes):

- MeasServer
- TimeServer
- FileMover
- FileScrubber
- Logd
- sentryd
- surv

These logs are written to the `/usr/TKLC/ecap/logs` directory. The current log file is `<process>.log`, where `<process>` is the name of the process that is writing to the log file.

When the log file for any of the processes reaches 16 MB, that file is archived to `<process>.log.1`. A maximum of four log archives are maintained in the `/usr/TKLC/ecap/logs` directory: `<process>.log.1` - `<process>.log.4` with `.1` being the newest archive and `.4` being the oldest. Each time a log file is archived to `.1`, the existing archives are renamed, and the oldest archive (`.4`) is discarded.

Savelogs

Logs and other relevant system information may be saved for debugging purposes by issuing the **`savelogs`** command. This command creates and stores a compressed tarball (`*.tar.Z`) in the `/tmp` directory to be offloaded by scp/sftp and viewed later.

Health Check

Use the health checks described in the following sections to ensure the Integrated Application Feed is running properly.

Process Check

The process health check ensures that processes associated with the Integrated Accounting Feed application are running.

The following processes should always be running:

- sentryd: Keeps the other Integrated Accounting Feed application processes up and running
- MeasServer: Receives and decodes EAGLE 5 ISS SLAN packets, and stores them to a data file
- TimeServer: Responds to time queries from the EAGLE 5 ISS SLAN card
- Logd: Manages all ECAP logging

The following processes run periodically:

- FileMover: Moves data files to the Aggregator then archives the files on the ECAP
- FileScrubber: Deletes data files that are more than 48 hrs old
- surv: Ensures the sentryd process is running

The process health check is performed by the **ps** and **grep** commands. The expected command / output is as follows:

```
#ps -ef | grep TimeServer
root 24159 1 0 08:50? 00:00:00/usr/TKLC/ecap/bin/TimeServer

#ps -ef | grep MeasServer
ecapadm 24159 1 0 08:50? 00:00:00/usr/TKLC/ecap/bin/MeasServer
```

Crontab Check

The **crontab** command is used to ensure that the FileMover and FileScrubber processes described above have been set up to be run periodically by the system.

NOTE: The minutes entry (5, 35) for FileMover may vary, but should be 30 minutes apart.

The expected command / output is as follows:

```
# crontab -1
5,35 * * * * /usr/TKLC/ecap/bin/FileMover
0 * * * * /usr/TKLC/ecap/bin/ FileScrubber-d
/usr/TKLC/ecap/xml/archive_ftp-t 172800
*/5 * * * * /usr/TKLC/ecap/bin/surv
```

Disk Space Check

The disk space check is used to verify that disk space on `/dev/vgapp/ecap-vol` is not approaching 100%.

The expected command output is as follows:

```
# df
...
/dev/vgapp/ecap-vol 103212320 40556 97928884 1% /usr/TKLC/ecap
...
```

Network Check

The Network Diagnostics commands are used to verify connectivity between the EAGLE 5 ISS SLAN card and the ECAP server and between the ECAP server and the Aggregator. Along with the conditions listed in Table 4-5 on page 4-9, this check should be done in response to the Device Interface Error or Device Interface Warning platform alarms (see Tables 4-2 and 4-3). These diagnostic tasks are accessed through **`platcfg`** and include the following:

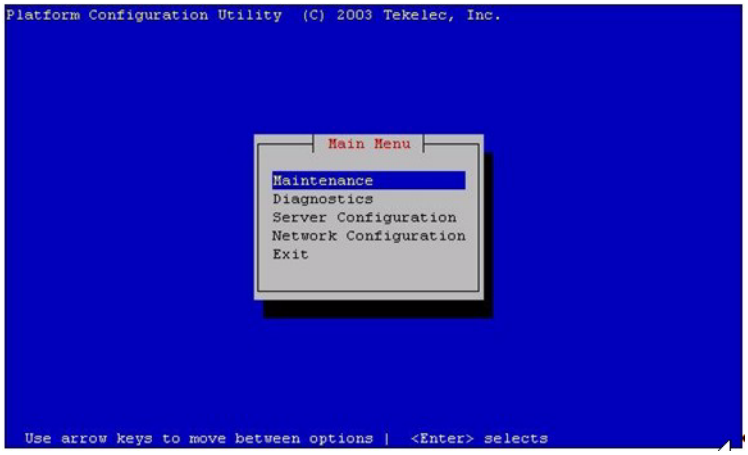
- Netstat: enables you to access network statistics for the ECAP server
- Ping: enables you to attempt an ICMP ping of another ECAP server on the network
- Traceroute: enables you to trace the network route to another ECAP server on the network.

Verifying EAGLE 5 ISS to ECAP Connectivity

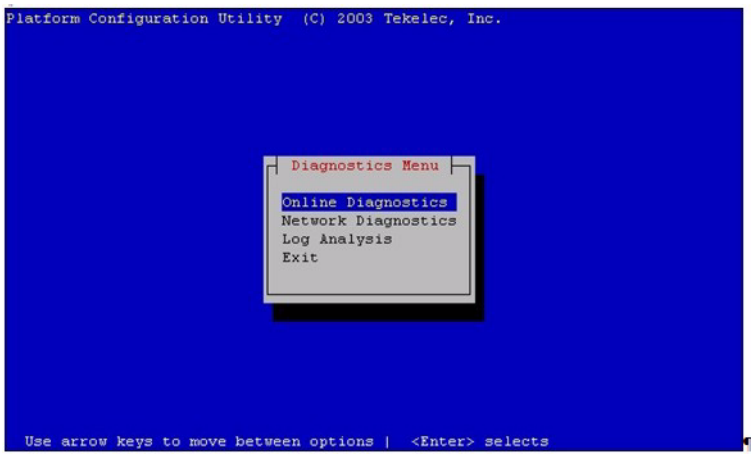
Use the following procedure to access the Network Diagnostics to verify connectivity between the EAGLE 5 ISS SLAN card and the ECAP Server.

Procedure 4-2. Verifying Connectivity between EAGLE 5 ISS SLAN Card and the ECAP Server

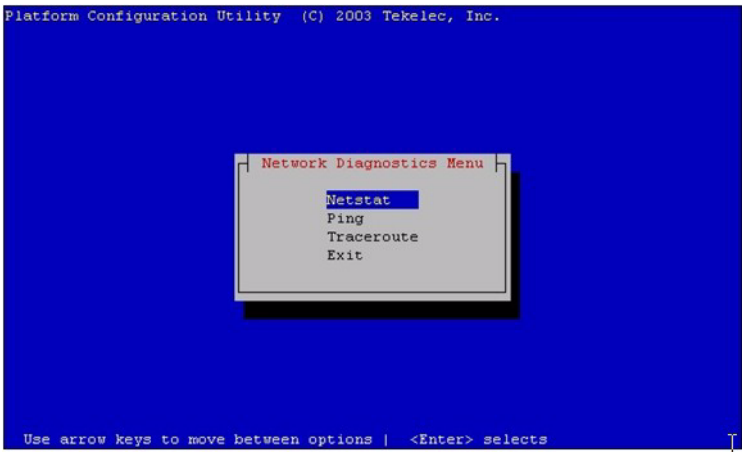
1. Log into ECAP as the **platcfg** user.



2. Select **Diagnostics** from the Platform Configuration Utility Main Menu and press **Enter**.



3. Select **Network Diagnostics** from the Diagnostics Menu and press **Enter**.



4. Select the desired task from the Network Diagnostics Menu and press **Enter**.

5. Perform the desired task.

6. Save and **Exit** the menu.

You have now completed this procedure.

Verifying ECAP to Aggregator Connectivity

Verify connectivity between the ECAP and the Aggregator using the Network Diagnostics tasks described in "Verifying EAGLE 5 ISS to ECAP Connectivity" on page 4-15.

In addition to these tasks, you must also perform a secure shell connectivity check.

The expected command output is as follows:

```
# cd ~
# touch sshtest
# scp sshtest aggregator_id@aggregator:/home/aggregator_t id
sshtest                                       100% 0 0.0KB/s --:--ETA
```

If the network check passes, you may safely remove the `sshtest` file by using the **`rm`** command on the ECAP server, and whatever method necessary on the Aggregator. If the **`scp`** command asks for a password, see the appropriate procedure for your operating system in "Configuring File Transfer" on page 3-7.

A

MSU to XML Field Mapping

Introduction

This appendix provides information on how the MSU parameters that come into the ECAP server relate to the peg count fields in the data file. An overview of the generated data files is provided, along with three samples: an ISUP MSU, an SCCP MSU, and an SCCP MSU with a TCAP layer (MAP MSU). For each example, the fields that are extracted from the MSU and copied to the data file are highlighted.

The MSU contents displayed in the following examples do not contain Layer 2 information, which causes the 3 octet discrepancy between the length of the MSU contents displayed and the `<octcount>` field in the XML output. The `<octcount>` field includes the 3 octets of Layer 2 in its count, e.g. the ISUP MSU contents show octets 0-27 (28 octets), while the `<octcount>` field shows 31.

Data Files

The Integrated Accounting Feed application generates data files periodically. These files are stored in the `/usr/TKLC/ecap/xml/pending_ftp` directory until they are copied to the Aggregator. Once a file has been copied to the Aggregator, it is moved to the `/usr/TKLC/ecap/xml/archive_ftp` directory where it remains for approximately 48 hours.

The Filename format adheres to the following:
`<stp>_<collector>_<enddate>_<endtime>.xml`

The data included in the filename adheres to the descriptions, ranges, and formats described for the corresponding tags in Table A-1.

The data files contain the measurement peg counts in an XML format. The file tags are described in Table A-1.

Table A-1. Data File Tags

Tag	Range of Values	Description
<ecapreport> </ecapreport>	N/A	A section delimiter that identifies a data file for a specific node and interval
<stp> </stp>	unrestricted	Character string representing the name of the STP node that generated the data file. Derived from the STP name entered via the Integrated Accounting Feed Configuration Menu (see See "Configuring the Integrated Accounting Feed Application" on page 3-15).
<collector> </collector>	63[[A..Z][a..z][0..9][-]]	String of up to 63 characters representing the hostname of the ECAP server generating the data file
<startdate> </startdate>	[01..31][01..12][0000..9999]	Decimal representation of the collection start date of the records contained in the data file. Date is local to the ECAP server generating the file. Format is DDMMYYYY.

Table A-1. Data File Tags (Continued)

Tag	Range of Values	Description
<starttime> </starttime>	[00..23][00..59] [00..59]	Decimal representation of the collection start time of the records contained in the data file. Time is local to the ECAP server generating the file. Format is HHMMSS.
<enddate> </enddate>	[01..31][01..12] [0000..9999]	Decimal representation of the collection end date of the records contained in the data file. Date is local to the ECAP server generating the file. Format is DDMMYYYY.
<endtime> </endtime>	[00..23][00..59] [00..59]	Decimal representation of the collection end time of the records contained in the data file. Time is local to the ECAP generating the file. Format is HHMMSS.
<record> </record>	N/A	Section delimiter that identities a new data file
<signallingstandard> </signallingstandard>	“ANSI”, “ITU-I”, “ITU-N”, or “undefined”	Character string (without quotes) representing the protocol by which the data file was decoded. “undefined” is an invalid protocol and represents an error in decoding.
<linkid> </linkid>	[0..65535]	EAGLE 5 ISS STP link ID on which the MSUs were received (incoming link). This is a decimal value.
<si> </si>	“isup” or “sccp”	Character string (without quotes) representing the message service type. “isup” represents an MTP message. “sccp” represents an SCCP or MAP message.
<mtp> </mtp>	N/A	Section delimiter that identifies the MTP layer point codes (Routing Label)

Table A-1. Data File Tags (Continued)

Tag	Range of Values	Description
<opc> </opc>	[000..255][000..255][000..255] (ANSI), or [000..007][000..255][000.007] (ITU-I), or [0..16383] (ITU-N)	Decimal representation of the Originating Point Code from the MTP layer
<dpc> </dpc>	[000..255][000..255][000..255] (ANSI), or [000..007][000..255][000.007] (ITU-I), or [0..16383] (ITU-N)	Decimal representation of the Destination Point Code from the MTP layer
<sccp> </sccp>	N/A	A section identifier that identifies the SCCP layer information
<cgpadigits> </cgpadigits>	[], [0..999999999999999999999] [0..FFFFFFFFFFFFFFFFFFF]	Decimal or hexadecimal representation of the Calling Party Address. This field is optional or may contain up to 21 digits.
<cdpadigits> </cdpadigits>	[], [0..999999999999999999999] [0..FFFFFFFFFFFFFFFFFFF]	Decimal or hexadecimal representation of the Called Party Address. This field is optional or may contain up to 21 digits.
<cgpapc> </cgpapc>	[], [000..255][000..255][000..255] (ANSI), or [000..007][000..255][000.007] (ITU-I), or [0..16383] (ITU-N)	Decimal representation of the Originating Point Code from the SCCP layer. This field is optional.
<cdpapc> </cdpapc>	[], [000..255][000..255][000..255] (ANSI), or [000..007][000..255][000.007] (ITU-I), or [0..16383] (ITU-N)	Decimal representation of the Destination Point Code from the SCCP layer. This field is optional.
<map> </map>	N/A	A section identifier that identifies the MAP layer information
<opcode> </opcode>	[0..255]	Decimal representation of the MAP operation code. Identifies the MAP operation performed.

Table A-1. Data File Tags (Continued)

Tag	Range of Values	Description
<msucount> </msucount>	[1..4294967295]	Decimal representation of the number of MSUs processed with the specified MTP and/or SCCP parameters
<octcount> </octcount>	[1..4294967295]	Decimal representation of the number of octets processed with the specified MTP and/or SCCP parameters. This number excludes the Layer 1 Flag and CRC information.

Data File XML DTD

The XML DTD describes the content and structure of the measurement report data fields.

```
<!ELEMENT ecapreport (stp,collector,date,time,record*)>
<!ELEMENT stp (#PCDATA)>
<!ELEMENT collector (#PCDATA)>
<!ELEMENT startdate (#PCDATA)>
<!ELEMENT starttime (#PCDATA)>
<!ELEMENT enddate (#PCDATA)>
<!ELEMENT endtime (#PCDATA)>
<!ELEMENT record (signallingstandard,linkid,si,mtp,sccp?,map?,msucount,octcount)>
<!ELEMENT signallingstandard (#PCDATA)>
<!ELEMENT linkid (#PCDATA)>
<!ELEMENT si (#PCDATA)>
<!ELEMENT mtp (opc,dpc)>
<!ELEMENT opc (#PCDATA)>
<!ELEMENT dpc (#PCDATA)>
<!ELEMENT sccp (cgpadigits?,cdpadigits?,cgpapc?,cdpapc?)>
<!ELEMENT cgpadigits (#PCDATA)>
<!ELEMENT cdpadigits (#PCDATA)>
<!ELEMENT cgpapc (#PCDATA)>
<!ELEMENT cdpapc (#PCDATA)>
<!ELEMENT map (opcode)>
<!ELEMENT opcode (#PCDATA)>
<!ELEMENT msucount (#PCDATA)>
<!ELEMENT octcount (#PCDATA)>
```

ISUP MSU

The following is an example of ISUP MSU with the ECAP data file.

```
*** Start of MTP Level 3 ***
                          MSU
0000 00000101 05
     ----0101    ----.-- Service Indicator                      ISDN User Part
     --00----    ----.--  Spare                                 0
     00------    ----.--  Network Indicator                       00 - International Network
0001 00100010 22 K---.-- Destination Point Code                 2-4-2
0002 10010000 90
     --010000
     10------    K---.-- Origination Point Code                 2-2-2
0003 00000100 04
0004 00000100 04
     ----0100
     0000----    ----.-- Signalling Link Code                   0

*** Start of ISDN User Part ***
                           Initial address
0005 00000000 00 K---.-- Circuit Identification Code           0
0006 00000000 00
     ----0000
     0000----    ----.-- Spare                                 0
0007 00000001 01 .T-..E. Message Type                          01
0008 00000000 00         Nature of connection indicators
     ------00    ----.-- Satelite Indicator                     00 - no satelite circuit in
the connection
     ----00--    ----.-- Continuity Check Indicator            00 - continuity check not
required
     ---0----    ----.-- Echo Control Device Indicator         0 - outgoing half echo
control dev not inclu
     000-----    ----.-- Spare                                 0
                           Forward call indicators
0009 00000000 00
     -------0    ----.-- National/International Call Indicator  0 - call to be treated as
national call
     -----00-    ----.-- End-to-End Method Indicator           00 - no end-to-end method
available
     ----0---    ----.-- Interworking Indicator                0 - no interworking
encountered
     ---0----    ----.-- End-to-End Information Indicator      0 - no end-to-end
information available
     --0-----    ----.-- ISDN User Part Indicator              0 - ISDN user part not used
all the way
     00------    ----.-- ISDN User Part Preference Indicator   00 - ISDN user part
preferred all the way
0010 00000000 00
     -------0    ----.-- ISDN Access Indicator                 0 - originating access
non-ISDN
     -----00-    ----.-- SCCP Method Indicator                 00 - no indication
     ----0---    ----.-- Spare                                 0
     0000----    ----.-- Reserved for National Use             0
0011 00000000 00 ----.-- Calling party's category              00000000 - Calling party's
cagtegory unknown at this time
0012 00000000 00 ----.-- Transmission Medium Requirement       00000000 - speech
                           Variable Portion
0013 00000010 02 .---.-- Called party number Pointer           Offset 0015
0014 00000000 00 .---.-- Optional Portion Pointer              Points to Nothing
                           Called party number
0015 00001100 0c .--..-- Called party number Length            12
0016 00000000 00
     -0000000    ----.-- Nature of Address Indicator           0000000 - spare
     0-------    ----.-- Odd/Even Indicator                    0 - even number of address
signals
0017 00000000 00
     ----0000    ----.-- Spare                                 0
     -000----    ----.-- Numbering Plan Indicator              000 - spare
     0-------    ----.-- Internal network number indicator     0 - routing to internal
network number allowed
0018 00000000 00 ------- Address                               00000000000000000000
0019 00000000 00
0020 00000000 00
0021 00000000 00
0022 00000000 00
```

```
0023 00000000 00
0024 00000000 00
0025 00000000 00
0026 00000000 00
0027 00000000 00
```

ECAP XML Output

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE ecapreport SYSTEM "ecapreport.dtd">
<ecapreport>
  <stp>e1021201</stp>
  <collector>nc11xvader</collector>
  <startdate>26092005</startdate>
  <starttime>102800</starttime>
  <enddate>26092005</enddate>
  <endtime>102900</endtime>

  <record>
    <signallingstandard>ITU-I</signallingstandard>
    <linkid>1</linkid>
    <si>isup</si>
    <mtp>
      <opc>002-002-002</opc>
      <dpc>002-004-002</dpc>
    </mtp>
    <msucount>1</msucount>
    <octcount>31</octcount>
  </record>

</ecapreport>
```

SCCP MSU

The following is an example of SCCP MSU with the ECAP data file. If an SCCP MSU contains a CgPA or CdPA point code, the point code is copied to the peg count report, but only if the point code differs from the OPC or DPC.

```
*** Start of MTP Level 3 ***
                          MSU
0000 00000011 03
     ----0011    ----.-- Service Indicator                    SCCP
     --00----    ----.-- Spare                                0
     00------    ----.-- Network Indicator                    00 - International Network
0001 00010010 12 K---.-- Destination Point Code               2-2-2
0002 01010000 50
     --010000
     01------    K---.-- Origination Point Code               2-2-1
0003 00000100 04
0004 00000100 04
     ----0100
     0000----    ----.-- Signalling Link Code                 0

*** Start of SCCP ***
                          Unitdata
0005 00001001 09 .T-..E. Message Type                         09
0006 10000000 80
     ----0000    .....-- Protocol Class                       Class 0
                          Variable Portion
     1000----    ----.-- Message Handling                     1000 - return message on
error
0007 00000011 03 .---.-- Called Party Address                 Offset 0010
0008 00010011 13 .---.-- Calling Party Address                Offset 0027
0009 00100011 23 .---.-- Data Portion Pointer                 Offset 0044
0010 00010000 10 .--..-- Called Party Address Length          16
0011 01001011 4b
     -------1    .--..-. Point Code Indicator                 Included
     ------1-    .--..-. Subsystem Number Indicator           Included
     --0010--    .....-- Global Title indicator               0010 - Global title w/
translation type
     -1------    ----.-- Routing indicator                    1 - route on SSN
     0-------    ----.-- Reserved for National use            0 - Reserved for National
use
0012 00010010 12 ----.-- Signalling Point Code                4-2-2
0013 00100000 20
0014 00000000 00 ----.-- Subsystem Number                     0
0015 00001000 08 ----.-- Translation Type                     8
0016 00100001 21 ------- Address information                  12345678901234567890 10
0017 01000011 43
0018 01100101 65
0019 10000111 87
0020 00001001 09
0021 00100001 21
0022 01000011 43
0023 01100101 65
0024 10000111 87
0025 00001001 09
0026 00000001 01
0027 00010000 10 .--..-- Calling Party Address Length         16
0028 01001011 4b
     -------1    .--..-. Point Code Indicator                 Included
     ------1-    .--..-. Subsystem Number Indicator           Included
     --0010--    ......-- Global Title indicator              0010 - Global title w/
translation type
     -1------    ----.-- Routing indicator                    1 - route on SSN
     0-------    ----.-- Reserved for National use            0 - Reserved for National
use
0029 00010001 11 ----.-- Signalling Point Code                4-2-1
0030 00100000 20
0031 00000000 00 ----.-- Subsystem Number                     0
0032 00000010 02 ----.-- Translation Type                     2
0033 10010000 90 ------- Address information                  09876543210987654321 90
0034 01111000 78
0035 01010110 56
0036 00110100 34
0037 00010010 12
0038 10010000 90
```

```
0039 01111000 78
0040 01010110 56
0041 00110100 34
0042 00010010 12
0043 00001001 09
                          Data Portion

*** Start of TCAP and SCCP Management ***
                          TCAP Layer
0044 00000101 05 .--..-- TCAP Length                              5
0045 01100010 62 .T-..E. Begin Message                            98
0046 00000011 03 .--..-- Message Length                           3
                          Transaction Portion
0047 01001000 48 .--..-. Originating TX ID                        72
0048 00000001 01 .--..-- Transaction ID Length                    1
0049 00000000 00 ----.-- Originating Transaction ID               00
                          Optional Dialogue Portion
                          -
                          Optional Comonent Portion
```

ECAP XML Output

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE ecapreport SYSTEM "ecapreport.dtd">
<ecapreport>
  <stp>e1021201</stp>
  <collector>nc11xvader</collector>
  <startdate>27092005</startdate>
  <starttime>111700</starttime>
  <enddate>27092005</enddate>
  <endtime>111800</endtime>

  <record>
    <signallingstandard>ITU-I</signallingstandard>
    <linkid>0</linkid>
    <si>sccp</si>
    <mtp>
      <opc>002-002-001</opc>
      <dpc>002-002-002</dpc>
    </mtp>
    <sccp>
      <cgpadigits>098765432109876543210</cgpadigits>
      <cdpadigits>1234567890123456789010</cdpadigits>
      <cgpapc>004-002-001</cgpapc>
      <cdpapc>004-002-002</cdpapc>
    </sccp>
    <msucount>1</msucount>
    <octcount>53</octcount>
  </record>

</ecapreport>
```

MAP MSU

The following is an example of SCCP MSU with a TCAP layer with the ECAP data file.

```
*** Start of MTP Level 3 ***
                          MSU
0000 00000011 03
     ----0011    ----.-- Service Indicator                    SCCP
     --00----    ----.-- Spare                                0
     00------    ----.-- Network Indicator                    00 - International Network
0001 00010010 12 K---.-- Destination Point Code               2-2-2
0002 01010000 50
     --010000
     01------    K---.-- Origination Point Code               2-2-1
0003 00000100 04
0004 00000100 04
     ----0100
     0000----    ----.-- Signalling Link Code                 0

*** Start of SCCP ***
                           Unitdata
0005 00001001 09 .T-..E. Message Type                        09
0006 10000000 80
     ----0000    ......-- Protocol Class                     Class 0
                           Variable Portion
     1000----    ----.-- Message Handling                     1000 - return message on
error
0007 00000011 03 .---.-- Called Party Address                Offset 0010
0008 00010011 13 .---.-- Calling Party Address               Offset 0027
0009 00100011 23 .---.-- Data Portion Pointer                Offset 0044
0010 00010000 10 .--..-- Called Party Address Length         16
0011 00001011 0b
     -------1    .--..-. Point Code Indicator                Included
     ------1-    .--..-. Subsystem Number Indicator          Included
     --0010--    ......-- Global Title indicator             0010 - Global title w/
translation type
     -0------    ----.-- Routing indicator                   0 - route on GT
     0-------    ----.-- Reserved for National use           0 - Reserved for National
use
0012 00010010 12 ----.-- Signalling Point Code               4-2-2
0013 00100000 20
0014 00000000 00 ----.-- Subsystem Number                    0
0015 00001000 08 ----.-- Translation Type                    8
0016 00100001 21 ------- Address information                 123456789012345678901O
0017 01000011 43
0018 01100101 65
0019 10000111 87
0020 00001001 09
0021 00100001 21
0022 01000011 43
0023 01100101 65
0024 10000111 87
0025 00001001 09
0026 00000001 01
0027 00010000 10 .--..-- Calling Party Address Length        16
0028 01001011 4b
     -------1    .--..-. Point Code Indicator                Included
     ------1-    .--..-. Subsystem Number Indicator          Included
     --0010--    ......-- Global Title indicator             0010 - Global title w/
translation type
     -1------    ----.-- Routing indicator                   1 - route on SSN
     0-------    ----.-- Reserved for National use           0 - Reserved for National
use
0029 00010001 11 ----.-- Signalling Point Code               4-2-1
0030 00100000 20
0031 00000000 00 ----.-- Subsystem Number                    0
0032 00000010 02 ----.-- Translation Type                    2
0033 10010000 90 ------- Address information                 098765432109876543210
0034 01111000 78
0035 01010110 56
0036 00110100 34
0037 00010010 12
0038 10010000 90
0039 01111000 78
0040 01010110 56
```

```
0041 00110100 34
0042 00010010 12
0043 00001001 09
                          Data Portion

*** Start of TCAP and SCCP Management ***
                          TCAP Layer
0044 00100010 22 .--..-- TCAP Length                          34
0045 01100001 61 .T-..E. Unidirectional Message               97
0046 00100000 20 .--..-- Message Length                       32
                           Optional Dialogue Portion
                           Dialogue Portion
0047 01101011 6b .--..-. Dialogue Portion Tag                 107
0048 00010100 14 .--..-- Dialogue Portion Length              20
0049 00101000 28 .--..-. External Tag                         40
0050 00010010 12 .--..-- External Length                      18
0051 00000110 06 .--..-. Object Identifier Tag                06
0052 00000111 07 .--..-- Object Identifier Length             7
                           Dialogue-as-ID value
0053 00000000 00 .--..-. CCITT Q Recommendation               00
0054 00010001 11 .--..-. Q                                    17
0055 10000110 86 .--..-. Document 773 (X'305)                 1414
0056 00000101 05
0057 00000001 01 .--..-. as(1)                                01
0058 00000001 01 .--..-. dialoguePDU                          01
0059 00000001 01 .--..-. Version1 (1)                         01
0060 10100000 a0 .--..-. ASN.1-type Tag                       160
0061 00000111 07 .--..-- ASN.1-type Length                    7
0062 01100000 60 ---..-- Dialogue PDU Selection               Dialogue Request Tag
0063 00000101 05 .--..-- Request Length                       5
                           Optional Protocol Version
                           -
0064 10100001 a1 .--..-. Application Context name Tag         161
0065 00000011 03 .--..-- AC Length                            3
0066 00000110 06 .--..-. Object Identifier Tag                6
0067 00000001 01 .--..-- Object Identifier Length             1
0068 00000110 06 .--..-. Context Data                         06
                           Optional User Information
                           -
                           -
                           Component Portion
0069 01101100 6c .--..-. Component Portion Tag                108
0070 00001000 08 .--..-- Component Portion Length             8
                           Invoke Component
0071 10100001 a1 .--..-. Invoke Tag                           161
0072 00000110 06 .--..-- Invoke Length                        6
                           Invoke ID
0073 00000010 02 .--..-. Invoke ID Tag                        2
0074 00000001 01 .--..-- Invoke ID Length                     1
0075 00000000 00 ----.-- Invoke ID                            0
                           Optional Linked ID
                           -
                           Operation Code
0076 00000010 02 ---..-- Operation Code Tag                   Local Operation Code
0077 00000001 01 .--..-- Operation Code Length                1
0078 00000101 05 ----.-- Operation Code                       05
                           Optional parameters
```

ECAP XML Output

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE ecapreport SYSTEM "ecapreport.dtd">
<ecapreport>
  <stp>e1021201</stp>
  <collector>nc1lxvader</collector>
  <startdate>26092005</startdate>
  <starttime>154300</starttime>
  <enddate>26092005</enddate>
  <endtime>154400</endtime>

  <record>
    <signallingstandard>ITU-I</signallingstandard>
    <linkid>0</linkid>
    <si>sccp</si>
```

```
    <mtp>
      <opc>002-002-001</opc>
      <dpc>002-002-002</dpc>
    </mtp>
    <sccp>
      <cgpadigits>09876543210987654321 90</cgpadigits>
      <cdpadigits>1234567890123456789010</cdpadigits>
      <cgpapc>004-002-001</cgpapc>
      <cdpapc>004-002-002</cdpapc>
    </sccp>
    <map>
      <opcode>5</opcode>
    </map>
    <msucount>1</msucount>
    <octcount>82</octcount>
  </record>

</ecapreport>
```

Index

A

C

D

E