

**Oracle® Communications**

Stateful Applications User's Guide

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# Introduction

This chapter provides a brief description of the Stateful Applications feature of the Oracle Communications EAGLE. The chapter also includes the scope, audience, and organization of the manual; how to find related publications; and how to contact Oracle for assistance.

## Overview

This manual provides feature descriptions, along with commands, maintenance, measurements, and configuration details associated with the Stateful Applications feature of the Oracle Communications EAGLE. The Stateful Applications feature allows the Signal Transfer Point (STP) to validate the messages coming in for a subscriber roaming out by validating them against the Visitor Location Register (VLR) the subscriber was last seen by the Home Location Register (HLR). If the HLR provides a validity of the new VLR, the EAGLE will let the message into the network; if not, the message will be handled per configuration (either silent discard, fallback, or respond with error).



## Scope and Audience

This manual is intended for anyone responsible for installing, maintaining, and using the Oracle Communications EAGLE Stateful Applications feature. Users of this manual must have a working knowledge of telecommunications and network installations.



## Documentation Admonishments

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

**Table 1-1 Admonishments**

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

**Table 1-1 (Cont.) Admonishments**

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

## Manual Organization

This manual is organized into the following chapters:

- [Introduction](#) contains general information about the Stateful Applications documentation, the organization of this manual, and how to request technical assistance.
- [Feature Description](#) provides a functional description of the Stateful Applications feature, including feature options, considerations, and call flows.
- [Commands](#) describes the commands that support the Stateful Applications feature.
- [Feature Configuration](#) contains procedures to configure the Stateful Applications feature.
- [Measurements](#) describes the measurements and reports available for the Stateful Applications feature.
- [Maintenance](#) describes maintenance information available for the Stateful Applications feature which may include: EAGLE status and alarms, hardware verification messages, system status reports and commands, code and application data loading, and alarms.

## My Oracle Support (MOS)

MOS (<https://support.oracle.com>) is your initial point of contact for all product support and training needs. A representative at Customer Access Support (CAS) can assist you with MOS registration.

Call the CAS main number at 1-800-223-1711 (toll-free in the US), or call the Oracle Support hotline for your local country from the list at <http://www.oracle.com/us/support/contact/index.html>. When calling, make the selections in the sequence shown below on the Support telephone menu:

1. Select 2 for New Service Request
2. Select 3 for Hardware, Networking and Solaris Operating System Support
3. Select one of the following options:
  - For Technical issues such as creating a new Service Request (SR), Select 1

- For Non-technical issues such as registration or assistance with MOS, Select 2

You will be connected to a live agent who can assist you with MOS registration and opening a support ticket.

MOS is available 24 hours a day, 7 days a week, 365 days a year.

## Emergency Response

In the event of a critical service situation, emergency response is offered by the Customer Access Support (CAS) main number at 1-800-223-1711 (toll-free in the US), or by calling the Oracle Support hotline for your local country from the list at <http://www.oracle.com/us/support/contact/index.html>. The emergency response provides immediate coverage, automatic escalation, and other features to ensure that the critical situation is resolved as rapidly as possible.

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

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

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

## Related Publications

For information about additional publications related to this document, refer to the Oracle Help Center site. See [Locate Product Documentation on the Oracle Help Center Site](#) for more information on related product publications.

## Customer Training

Oracle University offers training for service providers and enterprises. Visit our web site to view, and register for, Oracle Communications training:

<http://education.oracle.com/communication>

To obtain contact phone numbers for countries or regions, visit the Oracle University Education web site:

[www.oracle.com/education/contacts](http://www.oracle.com/education/contacts)

## Locate Product Documentation on the Oracle Help Center Site

Oracle Communications customer documentation is available on the web at the Oracle Help Center (OHC) site, <http://docs.oracle.com>. You do not have to register to access these documents. Viewing these files requires Adobe Acrobat Reader, which can be downloaded at <http://www.adobe.com>.

1. Access the Oracle Help Center site at <http://docs.oracle.com>.
2. Click `Industries`.
3. Under the Oracle Communications subheading, click the `Oracle Communications documentation` link.

The Communications Documentation page appears. Most products covered by these documentation sets will appear under the headings "Network Session Delivery and Control Infrastructure" or "Platforms."

4. Click on your Product and then the Release Number.

A list of the entire documentation set for the selected product and release appears.

5. To download a file to your location, right-click the PDF link, select `Save target as` (or similar command based on your browser), and save to a local folder.

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## Feature Description

This chapter describes the Stateful Applications feature.

### Introduction

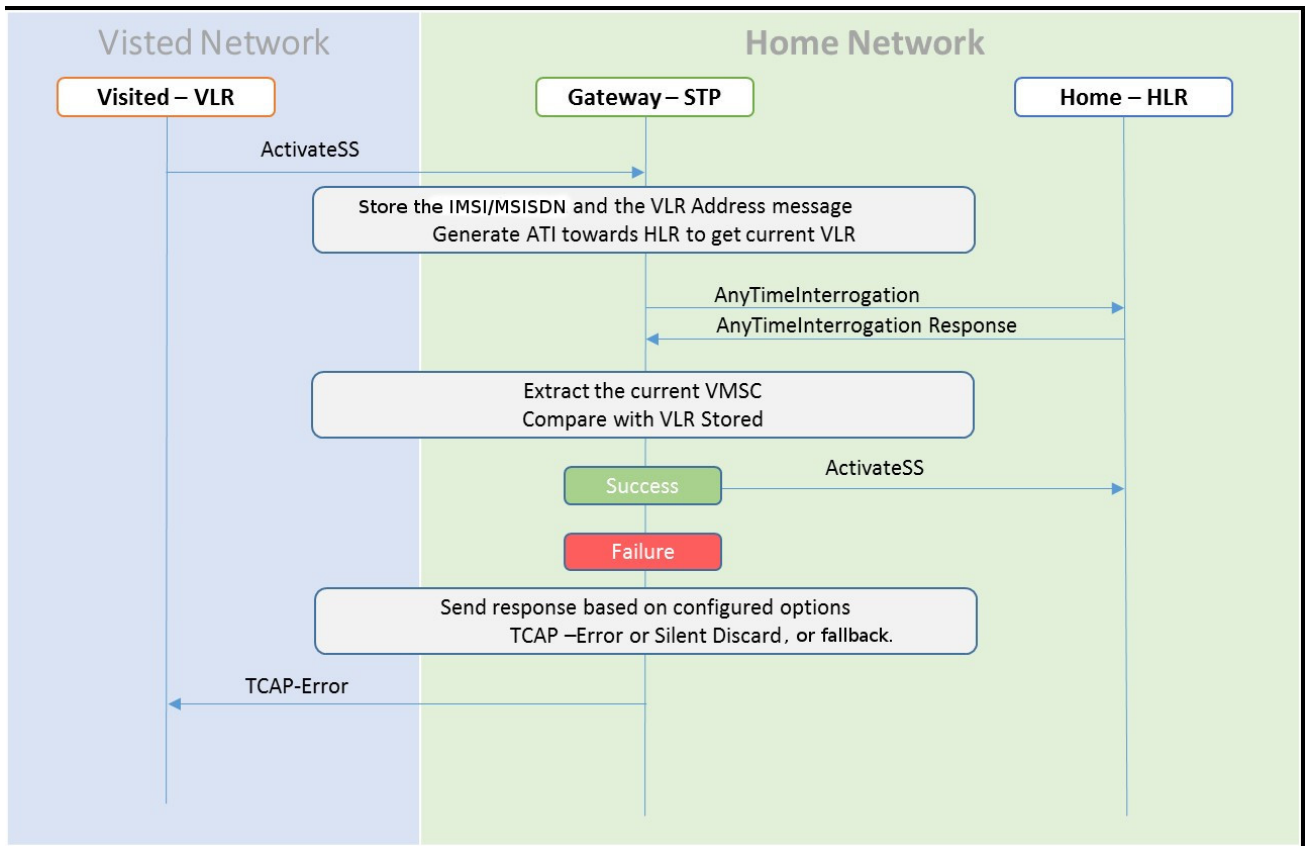
SS7 Firewall - Stateful Applications allows the Signaling Transfer Point (STP) to validate the messages coming in for a subscriber roaming out by validating them against the Visitor Location Register (VLR) the subscriber was last seen by the Home Location Register (HLR). Once the HLR provides a validity of the new VLR, the EAGLE then lets the message into the network. If the message is not validated, it is handled per configuration (either silent discard, fallback, or respond with error).

The message forwarding from LIM to SFAPP cards will only work with IPSG+GTT SLIC cards. For all other LIM cards, messages will be forwarded to the SCCP cards, which will then forward the message to the SFAPP SLIC cards.

### VLR Validation

As seen in the following figure, VLR Validation uses the information stored in the HLR about the current VLR to validate the VLR from which the message is received.

Figure 2-1 Call Flow for VLR Validation



1. The incoming message will be decoded.
  - a. An Error will be generated in case of decode failure.
2. The message information will be stored in the local database.
3. The Any Time Interrogation (ATI) request will be generated towards the HLR.
  - a. The ATI Request will be coded so that Acknowledgment is received on the same SLIC card, as the DB is local.
4. For a successful response from the HLR:
  - a. The ATI Response will be decoded to get the current VLR address.
  - b. The current VLR address will be compared with the CgPA stored in the local database for the subscriber.
  - c. On a successful Match, the message will be routed as per the GTT result.
  - d. In case of failure,
    - i. Send the configured response.
    - ii. Increment the measurement for failed messages.

The ATI sent to HLR must be formatted as follows:

1. MTP OPC=EAGLE SID, MTP DPC = HLR PC

2. SCCP CGPA (RI = SSN, PC = EAGLE SID, SSN = <SSFAPP SSN>, SCCP CDPA (received message CDPA)
3. TCAP BEGIN with valid MAP dialogue portion (as per MAP specification)
4. TCAP DTID = unique OTID generated for each ATI (The DTID will not be reused within 5 seconds)
5. ATI details: IMSI = IMSI/MSISDN received in received message, and other mandatory parameters

The EAGLE will validate the ATI\_ACK received from the HLR. A valid ATI\_ACK message is defined as:

1. It is a well formatted ANSI or ITU SCCP UDT, non-segmented XUDT message, with a valid TCAP END message, with valid dialogue portion, and single component in the component portion as return result with operation code = ATI\_ACK
2. Value of DTID received in TCAP END matches with one of the ongoing transactions
3. Component type is a return result and contains ATI\_ACK
4. VMSC digits are received in ATI\_ACK

## Velocity Check Using ATI

As seen in the following figure, Velocity Check using ATI uses the information stored in the HLR about the current VLR and the age of location parameter to identify if the new VLR is reachable from the current VLR, stored in HLR.

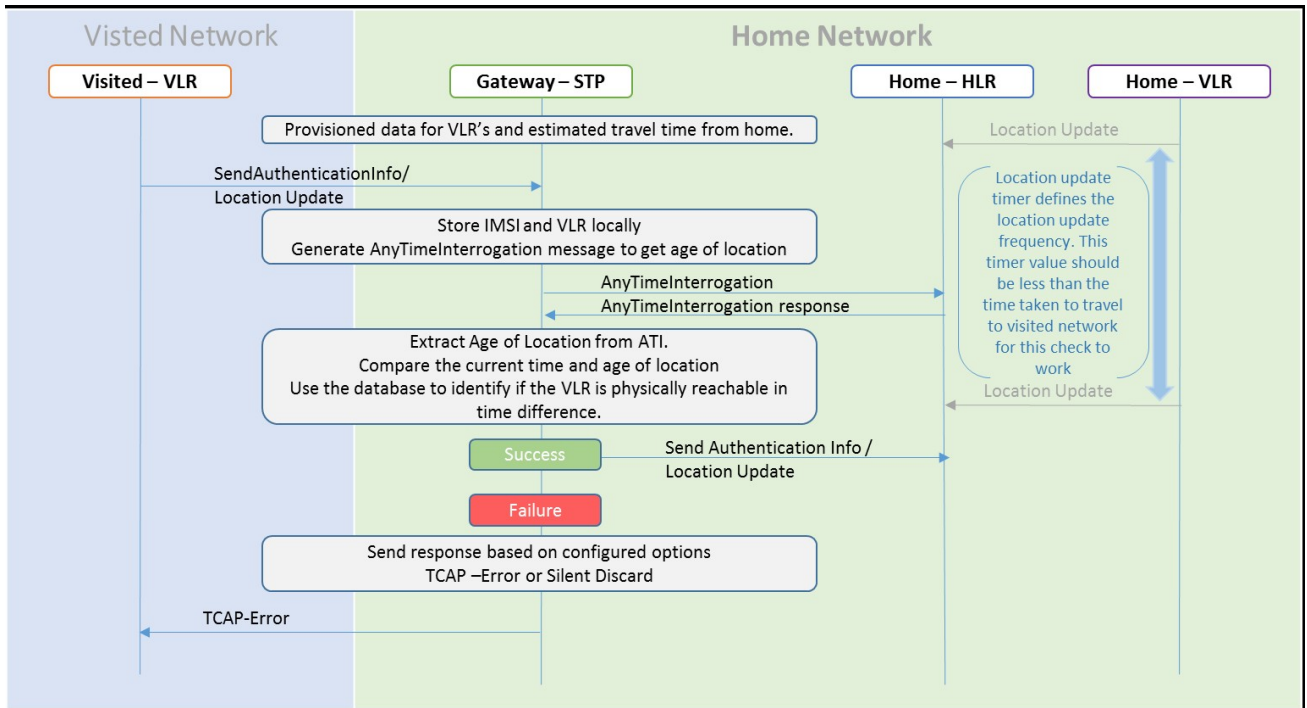
This use case is dependent on the validity of the information stored in the VLR and the T3212 timer (periodic update location timer). In case the time distance between two networks is less than the value of T3212 timer configured for the network, this use case test would provide false positives.

The assumption for successful execution of this use case are:

1. The First location update can be identified using the IMSI only in the address.
2. The Age of Location provided by HLR is accurate.
3. The quantum of information (Age of Location) will not be less than the time to get travel.

The ATI-based check can be completed in a reasonable amount of time for Location Update to succeed.

Figure 2-2 Call Flow for Velocity Check Using ATI



1. A local database on EAGLE will be configured to identify the network locations (using country codes for VLR addresses) and the shortest amount of time it may take to travel between them.
2. The incoming message will be decoded:
  - a. An Error will be generated in case of decode failure.
  - b. A Measurement will be pegged for the decode failure with OpCode and CgPA.
3. The message information will be stored in the local database.
4. The ATI request will be generated toward the HLR identified in the CdPA of the incoming message. The ATI request will be coded so that it is received on the same SLIC card, as DB is local.
5. In case the HLR sends a failure in the ATI response:
  - a. A measurement will be pegged to identify HLR error corresponding message from CgPA (VLR).
6. For a success response, extract the Age of Location from the ATI Response message and the VMSC address in the HLR.
7. In case the VLR from which the SAI/LU was received matches the VLR in the ATI response, do nothing.
8. In case the VLR addresses do not match:
  - a. Calculate the time difference between the current time and the Age of Location.



- b. Verify the age of location is less than the travel time configured in the local Database.
- c. In case the time value is not within limits:
  - i. A measurement will be pegged.
  - ii. Response will be generated based on the configured option.

## Velocity Check Flow Charts

The following flow charts provide an overview of the Velocity Check feature for Stateful Applications:

**Figure 2-3 SFAPP Process Message**

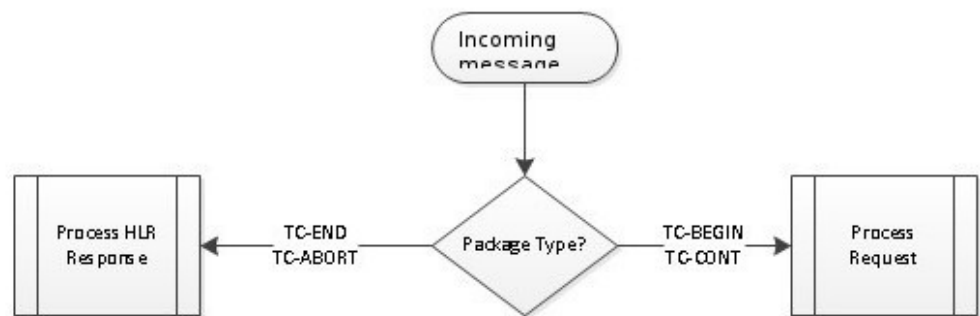


Figure 2-4 SFAPP Process Request

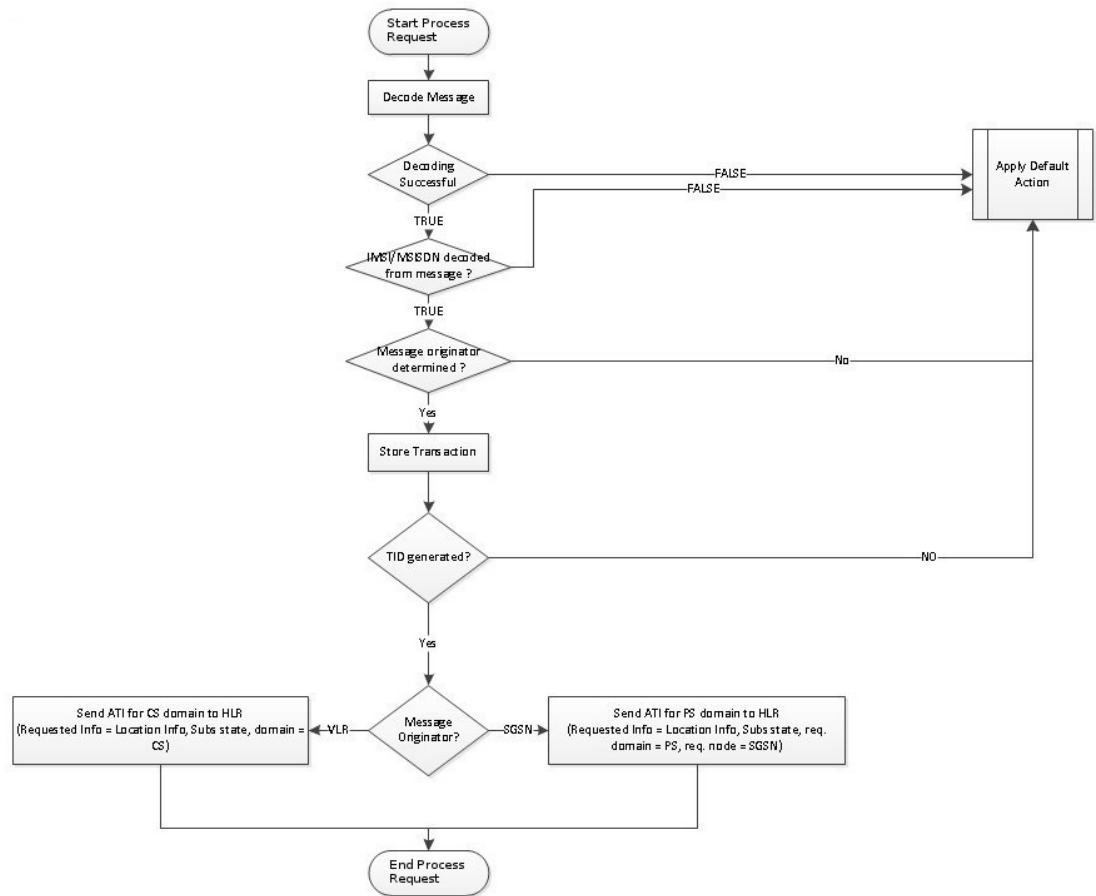
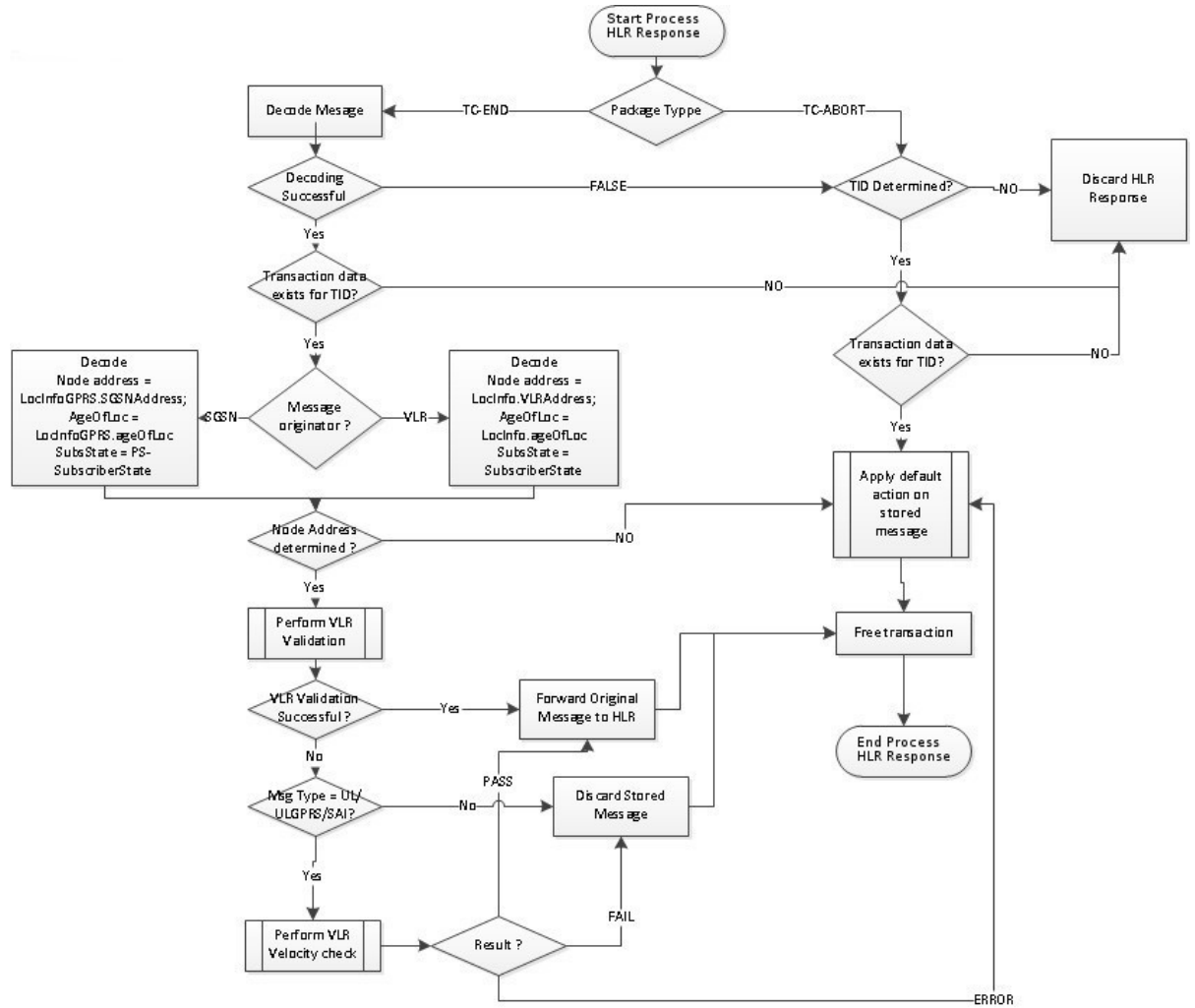
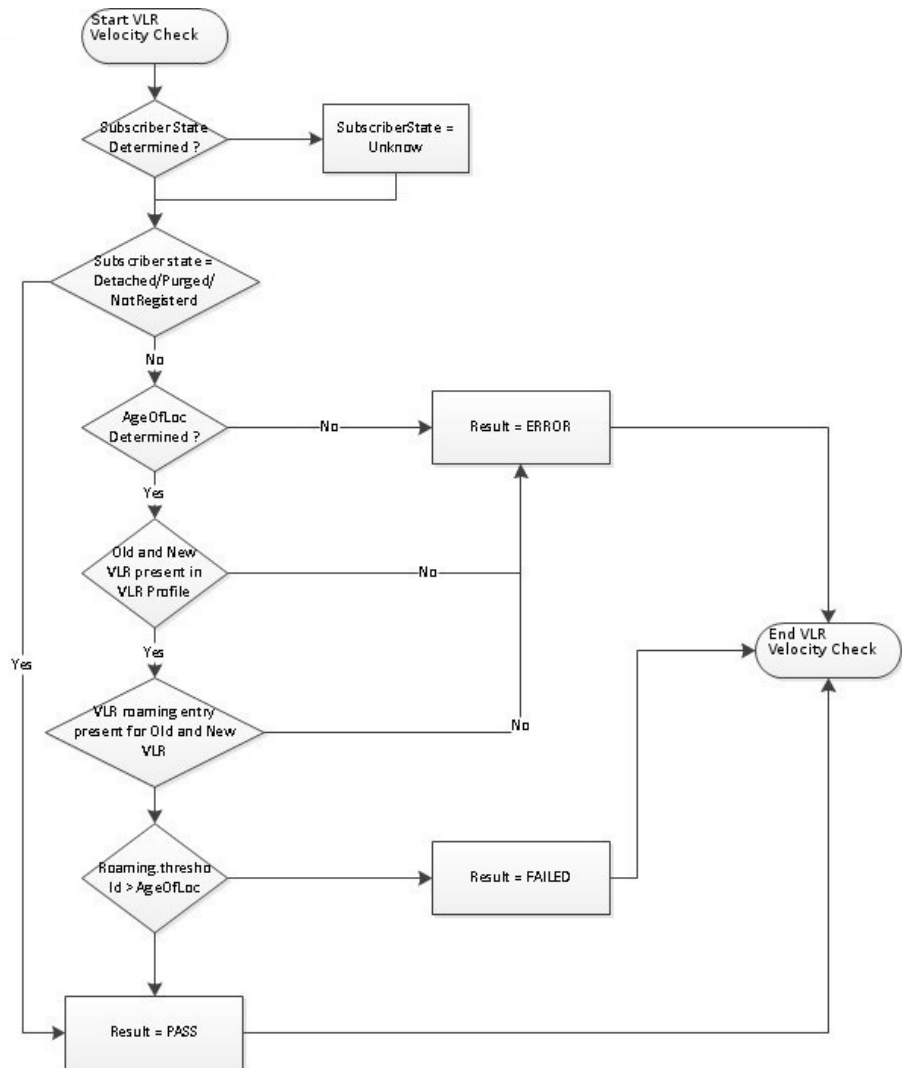


Figure 2-5 SFAPP Process HLR Response



**Figure 2-6 Perform VLR Velocity Check**



## Hardware Requirements

- SS7 Firewall - Stateful Applications is only compatible with SLIC hardware.
- SS7 Firewall - Stateful Applications is only supported on the 64-bit flash GPL.
- An SFAPP card is able to run 4000 cat 3.1 or 3.2 validations per second.
- A maximum limit of six (6) SFAPP cards (n+1 configuration) per EAGLE is enforced on the OAM.

Stateful Applications on EAGLE is able to perform 20k TPS per node.

The EAGLE provides a mechanism to store the message information. It is possible to store the following information in the local DB:

- The IMSI or MSISDN from the incoming message
- CgPA
- CdPA

- MSISDN (if available)
- The incoming message



---

## Commands

This chapter contains brief descriptions of the EAGLE commands used for the configuration and control of the Stateful Applications feature.

### Introduction

This chapter contains the EAGLE commands used to support the Stateful Applications feature. Refer to *Commands User's Guide* for complete command descriptions, including parameter names, valid parameter values, examples, and dependencies.

### EAGLE Command Added to Support Stateful Applications

The new command to support configuration of the Stateful Applications feature is described as follows:

#### Status Command

##### **rept-stat-sfapp**

This command is used to display the overall status of the SFAPP Card service in the EAGLE.

Command Examples:

- `rept-stat-sfapp`
- `rept-stat-sfapp:peakreset=yes:loc=1101`
- `rept-stat-sfapp:loc=1101`

#### Visitor Location Register Commands

These commands are used to change, delete, enter, and display Visitor Location Register Profiles and Roaming entries:

##### **chg-vlr-prof**

Use this command to change a Visitor Location Register (VLR) Profile for a mobile subscriber. A VLR-Profile entry helps in getting information required to locate the user while roaming and is subsequently used in VLR-ROAM table.

Command Examples:

- `chg-vlr-prof:vlr=4234:filter=blacklist`
- `chg-vlr-prof:vlr=4234:ageofloc=no:lastact=yes`

##### **dlt-vlr-prof**

Use this command to delete a Visitor Location Register (VLR) Profile for a mobile subscriber for existing entries.

**Command Examples:**

- `dlt-vlr-prof:vlr=4234`

**ent-vlr-prof**

Use this command to enter a Visitor Location Register (VLR) Profile for a mobile subscriber. A VLR-Profile entry helps in getting information required to locate the user while roaming and is subsequently used in VLR-ROAM table.

**Command Examples:**

- `ent-vlr-prof:vlr=12345`
- `ent-vlr-prof:vlr=4234:filter=blacklist`
- `ent-vlr-prof:vlr=4234:filter=blacklist`

**rtrv-vlr-prof**

Use this command to display entries from the Visitor Location Register (VLR) Profile table.

**Command Examples:**

- `rtrv-vlr-prof`
- `rtrv-vlr-prof:num=2`
- `rtrv-vlr-prof:filter=blacklist`

**chg-vlr-roaming**

Use this command to change a Visitor Location Register (VLR) roaming entry for a mobile subscriber. A VLR-Roaming entry uses existing entries for both new as well as old entries from vlr-prof table.

**Command Examples:**

- `chg-vlr-roaming:oldvlr=1234:newvlr=56545:time=20`

**dlt-vlr-roaming**

Use this command to delete a Visitor Location Register (VLR) Roaming entry for a mobile subscriber for existing entries.

**Command Examples:**

- `dlt-vlr-roaming:newvlr=12345:oldvlr=56780`

**ent-vlr-roaming**

Use this command to enter a Visitor Location Register (VLR) roaming entry for a mobile subscriber. A VLR-Roaming entry uses existing entries for both new as well as old entries from vlr-prof table.

**Command Examples:**

- `ent-vlr-roaming:newvlr=12345:oldvlr=56780:time=10`



**rtrv-vlr-roaming**

Use this command to display entries from the Visitor Location Register (VLR) Profile table.

Command Examples:

- rtrv-vlr-roaming
- rtrv-vlr-roaming:num=2
- rtrv-vlr-roaming: newvlr=12345:oldvlr=56780

## EAGLE Commands Modified to Support Stateful Applications

These commands are modified as described below to support the Stateful Applications feature:

**Table 3-1 EAGLE Commands Modified to Support SFAPP**

Modifications	Affected Commands
Generate measurements reports and FTPed SFAPP measurements data	chg-measopts rept-meas rtrv-measopts rtrv-mtc-measopts
Support SFAPP GPL	act-gpl chg-gpl init-card rept-stat-card rept-stat-gpl rtrv-gpl
Support appl=sfapp for SFAPP cards	dlt-ss-appl ent-card ent-ss-appl init-card rept-stat-card
Support display of alarms	chg-th-alm rept-stat-alm rtrv-alm rtrv-th-alm
Support SFAPP cards	dlt-card ent-card rtrv-card
Support Global Title Translation (GTT) Action	chg-gttact ent-gttact rtrv-gttact
Support status display of databases on SFAPP cards	rept-stat-db



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## Feature Configuration

This chapter provides the procedure for configuring the EAGLE Stateful Applications feature.

### Introduction

This chapter contains example commands for configuring the Stateful Applications feature of the Oracle Communications EAGLE.

Refer to *Commands User's Guide* for complete command descriptions including parameter names, valid parameter values, examples, and dependencies.

### Stateful Applications Configuration

Example commands for configuring the SFAPP feature are as follows:

1. Provision the SFAPP card.

```
ent-card:loc=1108:type=slic:appl=sfapp
```

2. Provision the SFAPP Local Subsystem.

```
ent-ss-appl:appl=sfapp:ssn=18:stat=online
```

3. Provision SFAPP GTT Actions.

```
ent-gttact:actid=tcape:act=tcaperr
```

```
ent-
gttact:actid=sfappt:act=sfapp:on=uimreqd:failactid=tcape:defa
ctid=fallback:scfaddr=1911111111
```

```
ent-gttact:actid=udtse:act=udts
```

```
ent-
gttact:actid=sfappf:act=sfapp:on=uimreqd:failactid=fallback:d
efactid=udtse:scfaddr=1922334455
```

```
ent-gttact:actid=fwd1:pci=3-2-5:ri=gt:act=fwd:mrnset=none
```

```
ent-gttact:actid=disc:act=disc
```

```
ent-
gttact:actid=sfapfwd:act=sfapp:hlraddr=fwdact:fwdgtt=fwd1:scf
addr=1911111111:defactid=disc:failactid=disc
```

```
ent-
gttact:actid=sfaptparm:act=sfapp:hlraddr=tcapparm:scfaddr=191
1111111:defactid=disc:failactid=disc:tt=29
```

```
ent-
gttact:actid=sfappa:act=sfapp:on=uimreqd:failactid=udtse:defa
ctid=tcape:scfaddr=1911111111
```

4. Provision the GTT actions in actionset.

```
ent-gttaset:actsn=sfaptparm:actidl=sfaptparm
ent-gttaset:actsn=sfappt:actidl=sfappt
ent-gttaset:actsn=sfappf:actidl=sfappf
ent-gttaset:actsn=sfapfwd :actidl=sfapfwd
ent-gttaset:actsn=sfappa:actidl=sfappa
```

5. Provision the actionset for relevant GTT entries.

```
ent-gttset:gttsn=sfapp:netdom=itu:settype=cdgta
ent-gttset:gtt=4:cdgttsn=sfapp:tt=27:np=e214:nai=intl
```

6. Provision Country Codes in the VLR Profile Table.

```
ent-vlr-prof:vlr=12345
ent-vlr-prof:vlr=12346
ent-vlr-prof:vlr=12346
```

**Example 4-1 ent-vlr-roaming:oldvlr=12345:newvlr=12346:time=1440 Additional Configuration Commands**

GTA entries for SFAPP GTT Action:

- ent-  
gta:gttsn=sfapp:gta=2222222265:egta=2222222267:actsn=sfappt:  
xlat=dpc:ri=gt:pci=1-3-2:mrnsset=none
- ent-  
gta:gttsn=sfapp:gta=2222222268:xlat=dpc:ri=gt:pci=1-3-2:mrns  
et=none:actsn=sfappa
- ent-  
gta:gttsn=sfapp:gta=2222222269:xlat=dpc:ri=gt:pci=1-3-2:mrns  
et=none:actsn=sfappt
- ent-  
gta:gttsn=sfapp:gta=2222222270:xlat=dpc:ri=gt:pci=1-3-2:mrns  
et=none:actsn=sfappf
- ent-  
gta:gttsn=sfapp:gta=2222222271:xlat=dpc:ri=gt:pci=1-3-2:mrns  
et=none:actsn=sfappa
- ent-  
gta:gttsn=sfapp:gta=2222222272:xlat=dpc:ri=gt:pci=1-3-2:mrns  
et=none:actsn=sfappa

- ent-  
gta:gttsn=sfapp:gta=2222222273:xlat=dpc:ri=gt:pci=1-3-2:mrns  
et=none:actsn=sfappf
- ent-  
gta:gttsn=sfapp:gta=2222222274:xlat=dpc:ri=gt:pci=1-3-2:mrns  
et=none:actsn=sfappt
- ent-  
gta:gttsn=sfapp:gta=2222222276:xlat=dpc:ri=gt:pci=1-3-2:mrns  
et=none:actsn=sfappa
- ent-  
gta:gttsn=sfapp:gta=2222222277:xlat=dpc:ri=gt:pci=1-3-2:mrns  
et=none:actsn=sfapfwd
- ent-  
gta:gttsn=sfapp:gta=2222222278:xlat=dpc:ri=gt:pci=1-3-2:mrns  
et=none:actsn=sfaptparm
- ent-  
gta:gttsn=sfapp:gta=2222222279:actsn=sfapp:xlat=dpc:ri=gt:pci=1-3-2:mrnset=none:actsn=sfappa

## GTA entries for SFAPP GTT Action:

- ent-  
gta:gttsn=sfapp:gta=3222222265:egta=3222222267:actsn=sfappt:  
xlat=dpc:ri=gt:pci=1-2-2:mrnset=none
- ent-  
gta:gttsn=sfapp:gta=3222222268:xlat=dpc:ri=gt:pci=1-2-2:mrns  
et=none:actsn=sfappa
- ent-  
gta:gttsn=sfapp:gta=3222222269:xlat=dpc:ri=gt:pci=1-2-2:mrns  
et=none:actsn=sfappt
- ent-  
gta:gttsn=sfapp:gta=3222222270:xlat=dpc:ri=gt:pci=1-2-2:mrns  
et=none:actsn=sfappf
- ent-  
gta:gttsn=sfapp:gta=3222222271:xlat=dpc:ri=gt:pci=1-2-2:mrns  
et=none:actsn=sfappa
- ent-  
gta:gttsn=sfapp:gta=3222222272:xlat=dpc:ri=gt:pci=1-2-2:mrns  
et=none:actsn=sfappa
- ent-  
gta:gttsn=sfapp:gta=3222222273:xlat=dpc:ri=gt:pci=1-2-2:mrns  
et=none:actsn=sfappf
- ent-  
gta:gttsn=sfapp:gta=3222222274:xlat=dpc:ri=gt:pci=1-2-2:mrns  
et=none:actsn=sfappt

- ent-  
gta:gttsn=sfapp:gta=3222222276:xlat=dpc:ri=gt:pci=1-2-2:mrns  
et=none:actsn=sfappa
- ent-  
gta:gttsn=sfapp:gta=3222222277:xlat=dpc:ri=gt:pci=1-2-2:mrn  
set=none:actsn=sfapfwd
- ent-  
gta:gttsn=sfapp:gta=3222222278:xlat=dpc:ri=gt:pci=1-2-2:mrns  
et=none:actsn=sfaptparm
- ent-  
gta:gttsn=sfapp:gta=3222222279:actsn=sfapp:xlat=dpc:ri=gt:pc  
i=1-2-2:mrnset=none:actsn=sfappa

Entries for GTT Selector:

- ent-gttsel:cdgttsn=sfapp:gtii=4:tt=29:np=e212:nai=intl
- ent-  
gta:gttsn=sfapp:gta=22222222000:egta=222222229999:xlat=dpc:  
ri=gt:pci=3-1-5:mrnset=none:

GTA entries for GTT Action:

- ent-  
gta:gttsn=sfapp:gta=4222222265:egta=4222222267:actsn=sfappt:  
xlat=dpc:ri=gt:pci=1-5-2:mrnset=none
- ent-  
gta:gttsn=sfapp:gta=4222222268:xlat=dpc:ri=gt:pci=1-5-2:mrns  
et=none:actsn=sfappa
- ent-  
gta:gttsn=sfapp:gta=4222222269:xlat=dpc:ri=gt:pci=1-5-2:mrns  
et=none:actsn=sfappt
- ent-  
gta:gttsn=sfapp:gta=4222222270:xlat=dpc:ri=gt:pci=1-5-2:mrns  
et=none:actsn=sfappf
- ent-  
gta:gttsn=sfapp:gta=4222222271:xlat=dpc:ri=gt:pci=1-5-2:mrns  
et=none:actsn=sfappa
- ent-  
gta:gttsn=sfapp:gta=4222222272:xlat=dpc:ri=gt:pci=1-5-2:mrns  
et=none:actsn=sfappa
- ent-  
gta:gttsn=sfapp:gta=4222222273:xlat=dpc:ri=gt:pci=1-5-2:mrns  
et=none:actsn=sfappf
- ent-  
gta:gttsn=sfapp:gta=4222222274:xlat=dpc:ri=gt:pci=1-5-2:mrns  
et=none:actsn=sfappt

- ent-  
gta:gttsn=sfapp:gta=4222222276:xlat=dpc:ri=gt:pci=1-5-2:mrns  
et=none:actsn=sfappa
- ent-  
gta:gttsn=sfapp:gta=4222222277:xlat=dpc:ri=gt:pci=1-5-2:mrns  
et=none:actsn=sfapfwd
- ent-  
gta:gttsn=sfapp:gta=4222222278:xlat=dpc:ri=gt:pci=1-5-2:mrns  
et=none:actsn=sfaptparm
- ent-  
gta:gttsn=sfapp:gta=4222222279:actsn=sfapp:xlat=dpc:ri=gt:pc  
i=1-5-2:mrnset=none:actsn=sfappa





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## Measurements

This chapter describes the measurements information available from the EAGLE Stateful Applications feature.

### Stateful Applications Measurements

Refer to *Measurements Reference* for information about measurement systems and reporting.

Refer to *Commands User's Guide* for descriptions of commands used to generate, schedule, and transfer measurements reports.

Refer to *Database Administration - System Management User's Guide* for provisioning information and procedures for these measurement systems:

- Measurements Platform
- E5-OAM Integrated Measurements

Supported report types include SYSTOT and MTCDD. For Stateful Applications, the EAGLE allows the capturing of the following measurement reports:

- Successful validations
- Failed validations

The EAGLE will keep the message and its information for at maximum 5 seconds. The message will be dropped and a measurement pegged in case a response is not received within the 5 second time frame.

There are 32 SFAPP GTT actions. Each SFAPP GTT action will have the following four (4) measurement pegs:

1. PASSED - Number of messages that were successfully routed after the validation passed.
2. FAILED - Number of messages for which validation was performed and the validation did not pass.
3. ERROR1 - All errors due to which validation could not be performed on the messages that the EAGLE did not generate (ActivateSS, UpdateLocation, for example).
4. ERROR2 - All errors due to which validation could not be performed on the messages that the EAGLE generated or their response (ATI, ATI\_ACK, for example).



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## Maintenance

This chapter describes the maintenance information available from the Stateful Applications feature. The information includes status, alarms (UAMs), and information messages (UIMs).

### Alarms

Refer to *Unsolicited Alarm and Information Messages Reference* for descriptions and corrective procedures for alarms related to EAGLE features and functions.

This section lists new Unsolicited Alarm Messages (UAMs) used to support the EAGLE Stateful Applications feature.

**Table 6-1** *Unsolicited Alarm Messages*

UAM	Message Text	Description	Severity	Output Group
634	SFAPP is available	All SFAPP cards are IS-NR	Normal	SFAPP
635	SFAPP is not available	All SFAPP cards are isolated	Critical	SFAPP
636	SFAPP is removed	Last SFAPP card is deleted from the system	Normal	SFAPP
637	SFAPP Threshold Level1 Exceeded	SFAPP Threshold Level1 Exceeded	Minor	CARD
638	SFAPP Threshold Level2 Exceeded	SFAPP Threshold Level2 Exceeded	Major	CARD
639	SFAPP Threshold Level Critical	SFAPP traffic is above the system supported traffic limit	Critical	CARD
640	SFAPP Threshold Condition Cleared	SFAPP Threshold Condition Cleared	Normal	CARD

**Table 6-1 (Cont.) Unsolicited Alarm Messages**

<b>UIM</b>	<b>Message Text</b>	<b>Description</b>	<b>Severity</b>	<b>Output Group</b>
641	SFAPP Capacity normal, card(s) abnormal	SFAPP Capacity normal, card(s) abnormal	Minor	SFAPP
642	System SFAPP TPS normal	Isolated SFAPP card comes in service	Normal	SFAPP
643	System SFAPP Threshold Exceeded	System SFAPP Threshold Exceeded	Major	SFAPP
644	System SFAPP Capacity Exceeded	System SFAPP capacity Exceeded	Critical	SFAPP
645	LIM/SCCP card(s) denied SFAPP service	One or more LIM/SCCP cards has been denied SFAPP service	Major	SFAPP

## UIMs

This section lists new Unsolicited Information Messages (UIMs) used to support the EAGLE Stateful Applications feature. Refer to *Unsolicited Alarm and Information Messages Reference* for complete descriptions of all UIM text and formats.

**Table 6-2 Unsolicited Information Messages**

<b>UIM</b>	<b>Text</b>	<b>Description</b>	<b>Output Group</b>
1477	SFAPP Validation Response Timeout Error	An SFAPP validation response timeout error has occurred	SFAPP
1478	SFAPP Validation Encoding Error	And SFAPP validation encoding error has occurred	SFAPP
1479	SFAPP Validation Matching State not fnd	An SFAPP validation matching state was not found	SFAPP
1480	SFAPP Validation Error	An SFAPP validation error has occurred	SFAPP
1481	SFAPP Validation Velocity Chk Failed	An SFAPP validation velocity check has failed	SFAPP

**Table 6-2 (Cont.) Unsolicited Information Messages**

UIM	Text	Description	Output Group
1482	SFAPP Validation Failed	An SFAPP validation failure has occurred	SFAPP

## Thermal Management Parameters

The SFAPP card supports thermal monitoring to protect the temperature-sensitive hardware components. The processor on the SFAPP card can overheat as a result of high ambient temperature or airflow blockage. If the junction temperature increases above operating limits, the CPU halts and the SFAPP card shuts itself down to prevent permanent, catastrophic damage. In the event of thermal shutdown all processor activity ceases.

To minimize data loss due to overheating, a graceful shutdown is implemented to detect and alert the user to the increasing thermal conditions. When the CPU temperature rises above nominal range and exceeds a thermal threshold (Temperature Level 1), a major alarm is raised against the SFAPP card. If the temperature continues to increase and exceeds a second thermal threshold (Temperature Level 2), a critical alarm is raised against the SFAPP card and traffic processing is stopped. When the second thermal threshold is exceeded, the application is notified from the operating system. The state of card will transition to the IN-ANR Restricted state. The following table shows the thermal events, actions, and alarms.

After the temperature decreases below the Temperature Level 2 threshold, the raised critical alarm is cleared and the corresponding major alarm is raised. When the temperature returns to its nominal range (below Temperature Level 1), a clearing alarm will be raised for the SFAPP card and the SFAPP card resumes traffic processing. These thermal thresholds (Temperature Level 1 and Temperature Level 2) are user-configurable using the `chg-thm-alm` command.

**Table 6-3 Thermal Management Parameters**

Board Temperature	Actions / Clearing Condition	UAM
Temperature Level 1 Exceeded on SFAPP card; Major	Major alarm UAM 0078 raised on SFAPP card	0078 Card temperature exceeds nominal lvl:T1
Temperature Level 2 Exceeded on SFAPP card; Critical	Critical alarm UAM 0077 raised on SFAPP card; State of SFAPP card transitions to IS-ANR/Restricted	0077 Card temperature is at critical lvl:T2
Temperature abated (cooling below Temp Level 2 but at level 1)	Major alarm UAM 0078 raised on SFAPP card; State of SFAPP card transitions to IS-NR/Active	0078 Card temperature exceeds nominal lvl:T1
Temperature abated (cooling below Temp Level 1)	Major alarm UAM 0078 cleared	0079 Card temperature again at nominal level

