

Configure CSFB to Activate in Cisco ASR5x00 Series MME



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Introduction

This document describes how to implement the change(s) specified for Circuit Switch Fall Back (CSFB) activation in order to allow the voice and Short Messaging Service (SMS) with Mobile Switching Center (MSC)/Visitor Location Registry (VLR) over a subscriber group (SG) interface. The SG interface is between Mobility Management Entity (MME) in the Evolved Packet System (EPS) and the VLR, in order to allow location management coordination and in order to relay certain messages related to circuit switched services over the EPS system.

This is implemented on a MME deployed on Cisco Aggregated Service Router (ASR) 5x00 series (ASR5x00).

Prerequisites

Requirements

Ensure that you have Show Support Details (SSDs), bulkstat files, syslog files and any additional CLI output as required for the identified ASR5x00 nodes.

Components Used

This document is not restricted to specific software and hardware versions.

The information in this document was created from the devices in a specific lab environment. All of the

devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

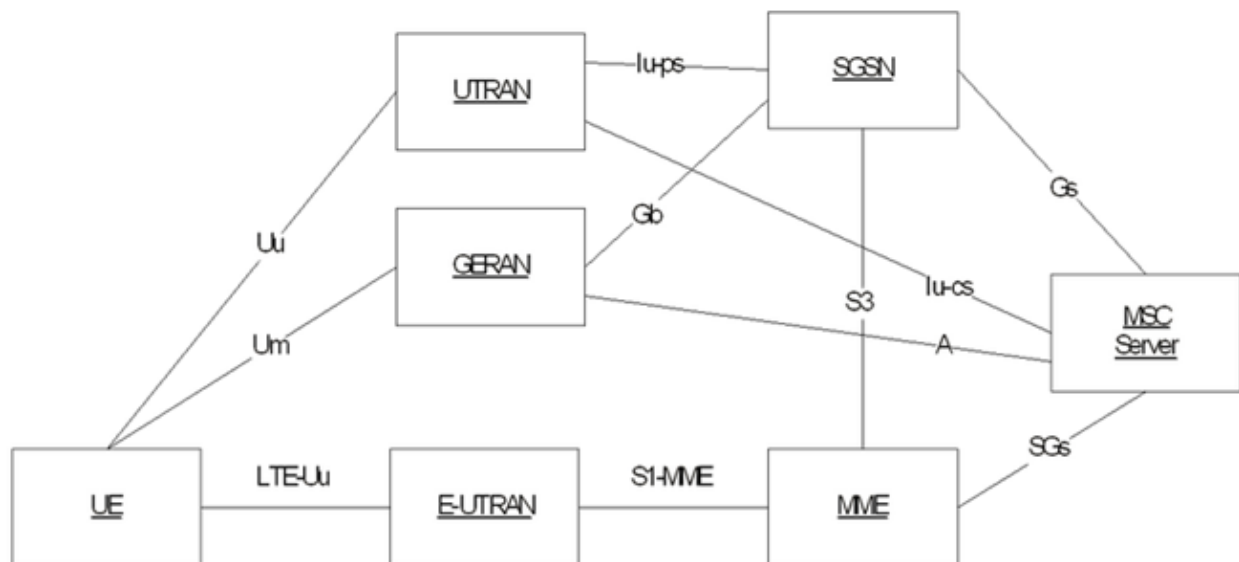
Background Information

What is CSFB?

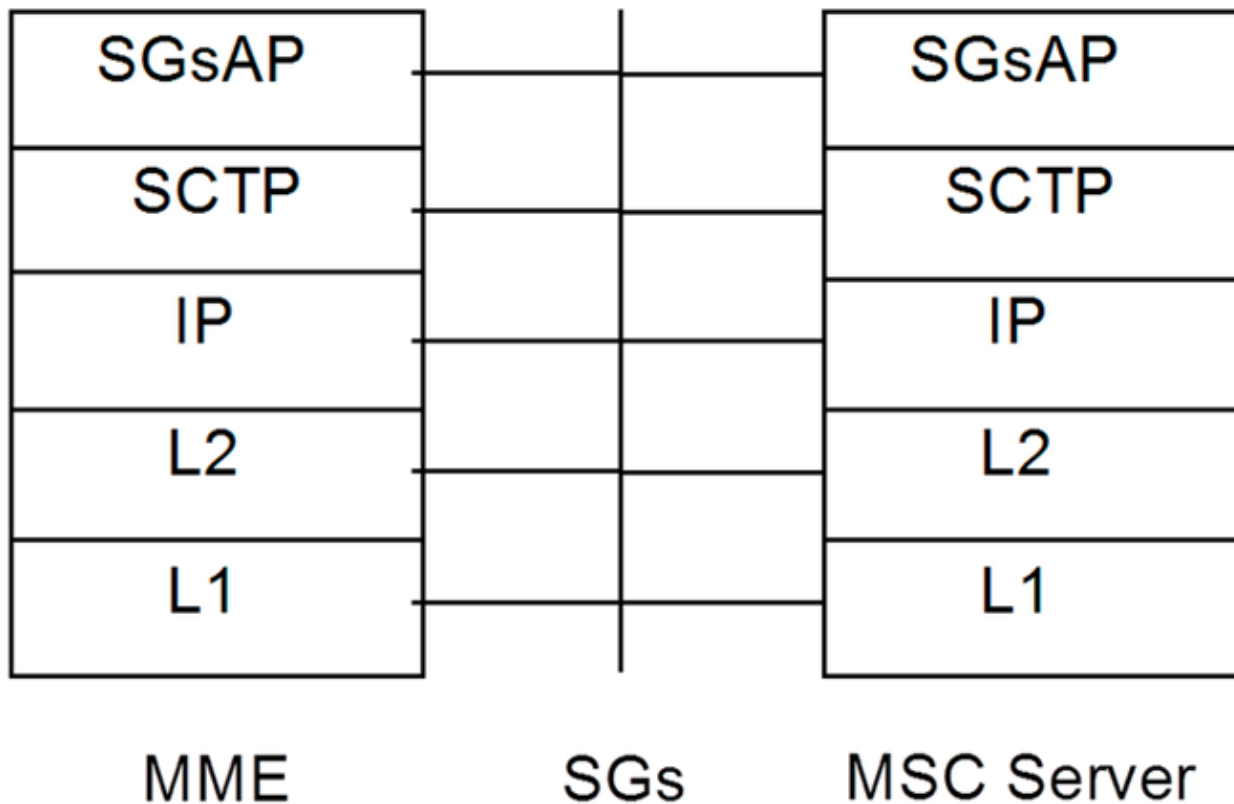
CSFB allows 3G/4G capable User Equipment (UE) to fallback to the 3G network for circuit switch functions, supports SMS, and voice calls.

References

- 3rd Generation Partnership Project (3GPP) Technical Specifications (TS) 23.272: Circuit Switch (CS) fallback in EPS
- 3GPP TS 29.118: SG interface specification

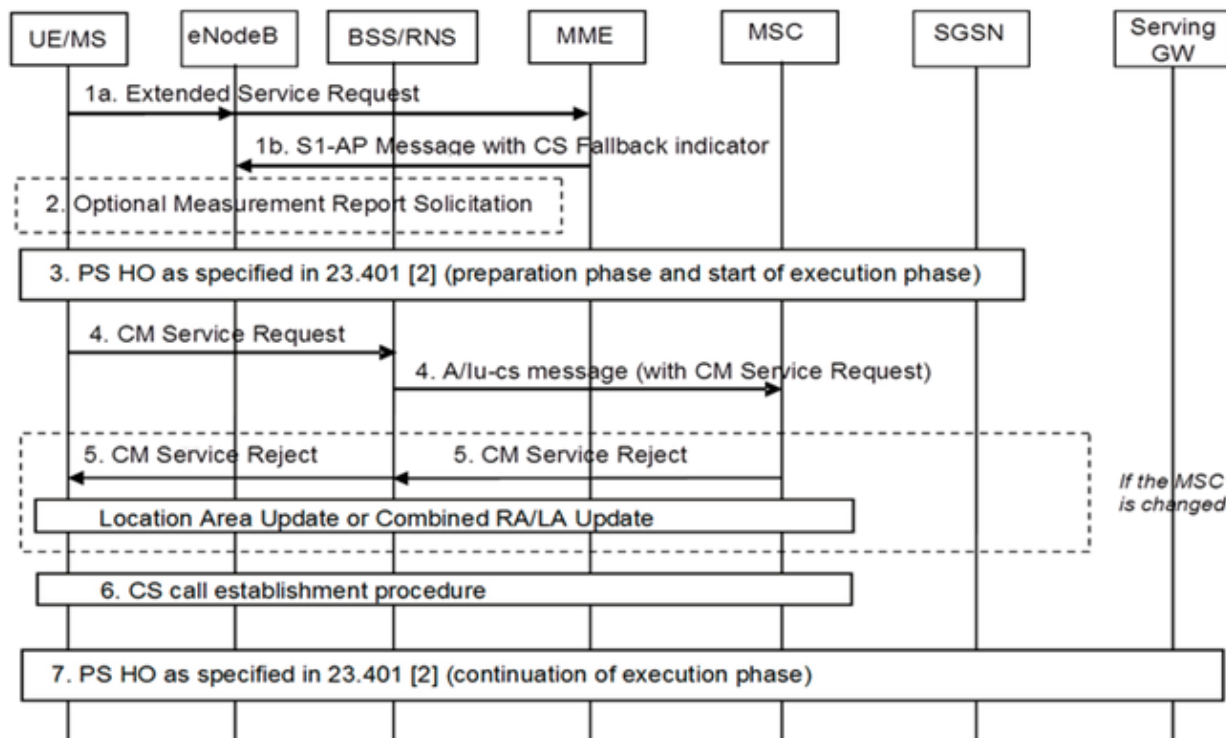


This diagram is based upon SGs that use Stream Control Transmission Protocol (SCTP) for transport:



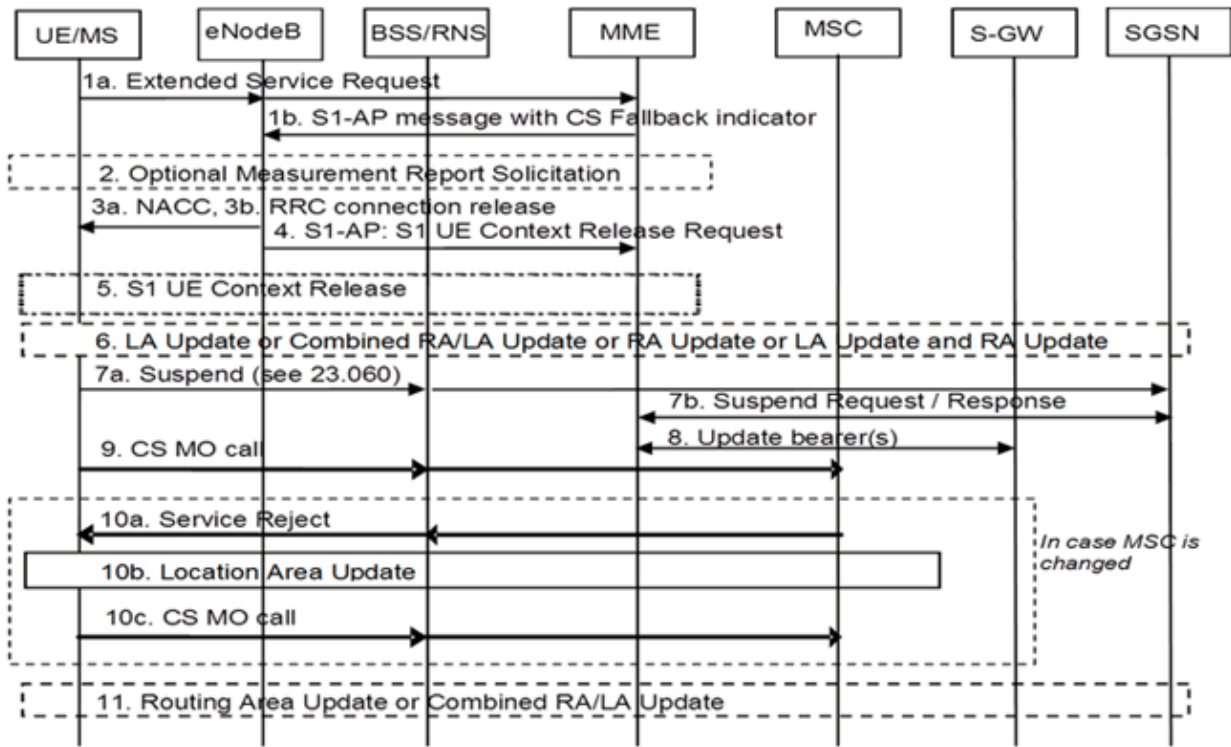
Mobile Originating Call (PS Handover)

Mobile Originating Call (PS Handover)



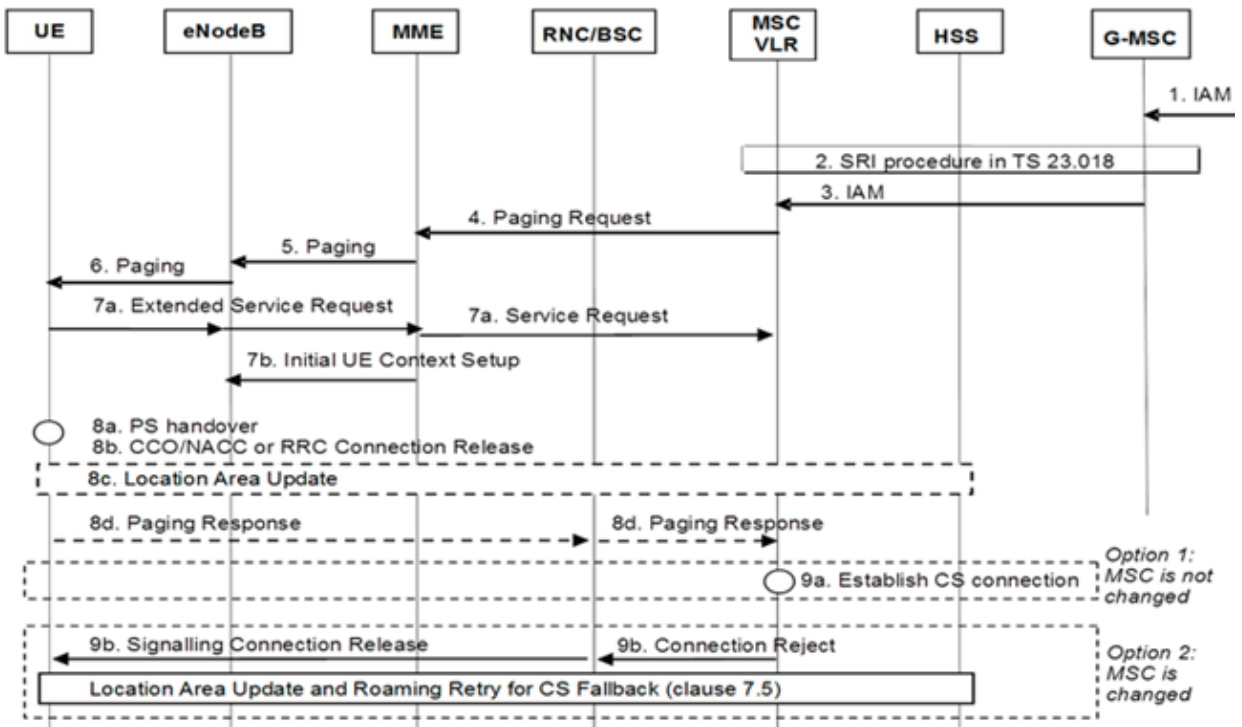
Mobile Originating Call (PS Suspension)

Mobile Originating Call (PS Suspension)



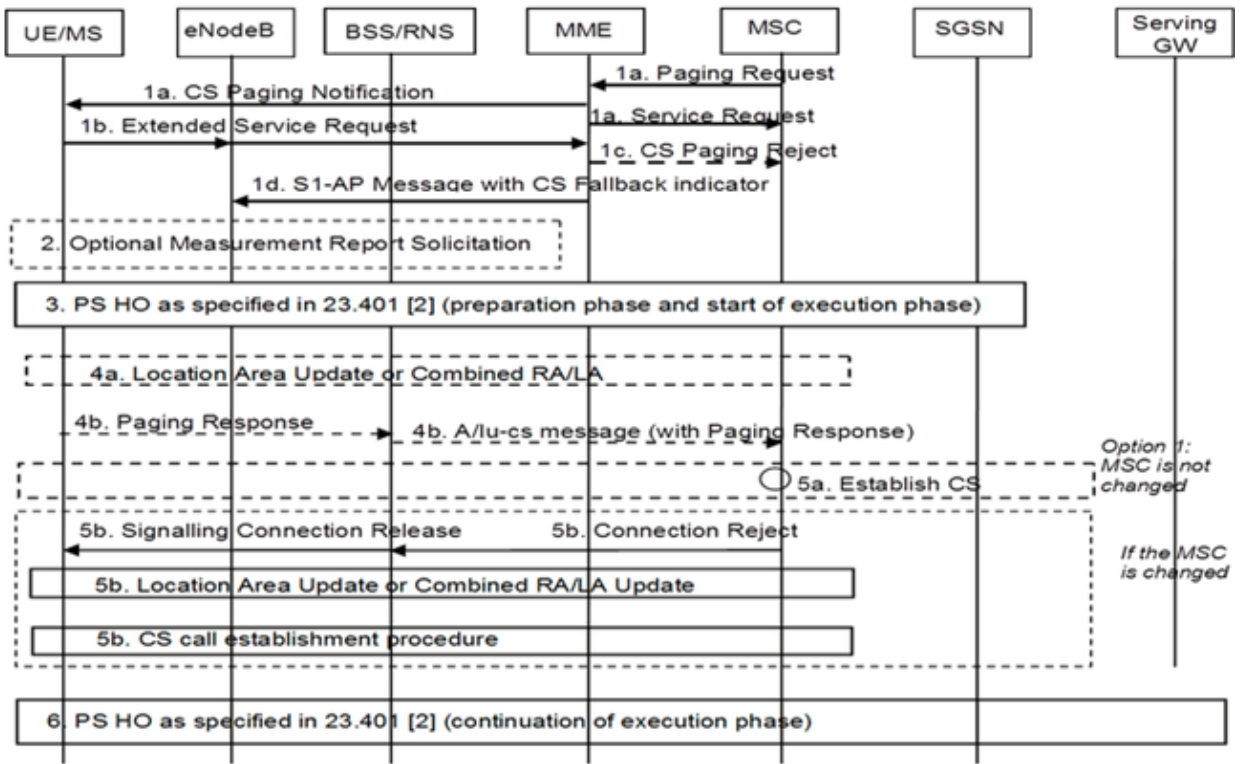
Mobile Terminating Call (Idle Mode)

Mobile Terminating Call (Idle Mode)



Mobile Terminating Call (PS Handover)

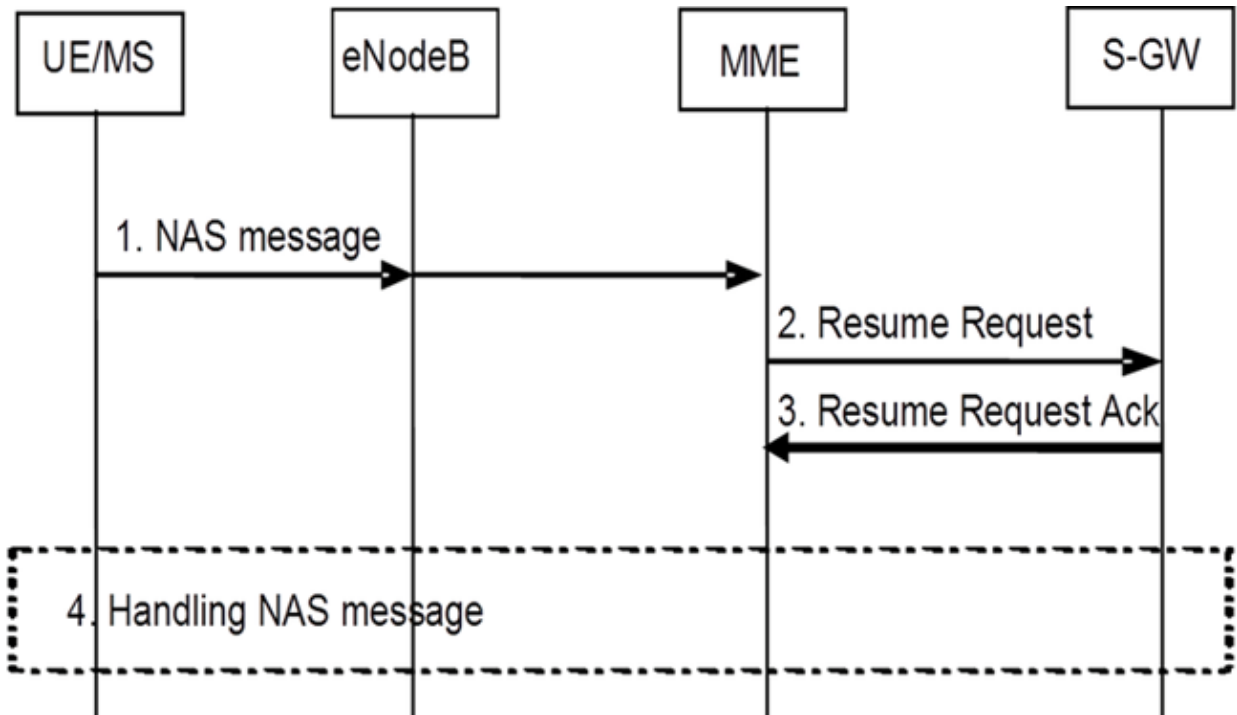
Mobile Terminating Call (PS Handover)



3G-to-4G Reversion

- UE Decides
- If Packet Switch (PS) Hand-over (HO) occurred, reversion is normal 3G-to-4G HO
- If PS Suspension occurred, network recovers suspended bearers for UE that returns

Mobile Call (PS Resumption)



Configure

Note: Use the Command Lookup Tool (registered customers only) in order to obtain more information on the commands used in this section.

Pre-Activation Health Check

Collect the output of these commands:

```
show configuration
```

```
show crash list
```

```
show alarm all
```

```
show snmp trap history
```

```
show configuration errors
```

```
show logs
```

```
show card table
```

```
show card hardware
```

```
show subscribers summary
```

```
show leds all
```

```
show port utilization table
```

```
show linecard table
```

```
show card mapping
```

```
show session progress
```

```
show threshold
```

```
show ntp associations
```

```
show cpu table
```

```
show ntp status
```

```
show system uptime
```

```
show clock
```

```
show license information
```

```
show task resource
```

```
show ip interface summary
```

Repeat below steps over all context

```
Context <context_name>
```

```
show ip interface summary
```

```
show ip route
```

```
show egtp-service all
show egtpc statistics
show session disconnect-reasons
show mme-service all
show mme-service enode-association all
show hss-peer-service service all
show diameter peers full
show sgs-service all
show sgs-service vlr-status full
Logs checkpoint
clear snmp trap history
```

Pre-Activation Procedure

1. Save the current configuration to the Flash drive for backup.
2. Use the Naming conventions as per Operator Nomenclature:

```
[local] #save configuration /flash/Config_Date_before_activity.cfg -r -no
```

3. Enter the *show support details* command in order to see the details of the chassis:

```
[local] #show support details
```

4. Enter the *show boot* command in order to confirm the existing boot order:

```
[local] #show boot
```

```
boot system priority 7 \  
image /flash/production.37140.st40.bin \  
config /flash/QGLC-final-25-08-11.cfg  
  
boot system priority 8 \  
image /flash/production.37140.st40.bin \  
config /flash/config_g101.cfg  
  
boot system priority 9 \  
image /flash/production.34838.st40.bin \  
config /flash/config_g101.cfg  
  
boot system priority 10 \  
image /flash/st40.bin \  
config /flash/system.cfg
```

Enter the *show license information* command in order to confirm the installed CSFB license on the chassis:

```
[local] #show license information
```

Key Information (installed key):

```
Comment          MME/SGSN 1 SO:50931561,51138669
Device 1 Model:      "VICF4GB"
                  Serial Number: "VICF4GB00000B7B"
Device 2 Model:      "VICF4GB"
                  Serial Number: "VICF4GB00000COD"
Issued            Monday November 28 12:05:59 EST 2014
Issued By        Cisco Systems
Key Number       48086
```

Enabled Features:

```
Feature                               Applicable Part Numbers
-----
IPv4 Routing Protocols                [ none ]
IPv6                                    [ N/A / N/A ]
Lawful Intercept                       [ ASR5K-00-CSXXLI ]
RADIUS AAA Server Groups               [ ASR5K-00-CSXXAAA ]
SGSN Software License                  [ ASR5K-00-SN10SESS / ASR5K-00-SN01SESS ]
MME license:                           [ ASR5K-00-ME01BASE / ASR5K-00-ME10LIC ]
+ Session Recovery                     [ ASR5K-00-PN01REC / ASR5K-00-HA01REC
ASR5K-00-00000000 / ASR5K-00-GN01REC
ASR5K-00-SN01REC / ASR5K-00-AN01REC
ASR5K-00-IS10PXY / ASR5K-00-IS01PXY
ASR5K-00-HWXXSREC / ASR5K-00-PW01REC
ASR5K-05-PHXXSREC / ASR5K-00-SY01R-K9
ASR5K-00-IG01REC / ASR5K-00-PC10SR
ASR5K-00-EG01SR / ASR5K-00-FY01SR
ASR5K-00-CS01LASR / ASR5K-00-FY01USR ]
+ Enhanced Lawful Intercept           [ ASR5K-00-CS01ELI / ASR5K-00-CS10ELI ]
APN Aliasing                           [ ASR5K-00-SNXXALES ]
```

Circuit Switched Fallback [ASR5K-00-CS01CSFB]

Session Limits:

```

Sessions  Session Type
-----  -
610000   MME license

```

CARD License Counts:

[none]

Status:

```

Device 1           Matches card 8 flash
Device 2           Matches card 9 flash
License Status     Good (Redundant)

```

CSFB Activation Procedure

1. Configure the SG interface with the given IP address.
2. Configure the SG service with the Stream Control Transmission Protocol (SCTP) port number, Tracking Area Code (TAC) to Location Area Code (LAC) mapping, pool area, and so forth.
3. Bind the interface IP address to the SG service and associate a SCTP template if any:

```

[local]#config

[local](config)#context mme

[mme](config-ctx)#interface sgs

[mme](config-if-eth)#ip address xxx.xxx.xxx.xxx 255.255.255.xxx

[mme](config-if-eth)#exit

[mme](config-ctx)#sgs-service sgs_svc

[mme](config-sgs-service)#sctp port xxxx

[mme](config-sgs-service)#tac-to-lac-mapping any-tac map-to lac xxx

[mme](config-sgs-service)#vlr VLR1 ipv4 xxx.xxx.xxx.xxx
ipv4-address xxx.xxx.xxx.xxx port xxx

[mme](config-sgs-service)#pool-area east_nodes

[mme](config-sgs-pool-area)#lac xxx

[mme](config-sgs-pool-area)#hash-value non-configured-values use-vlr VLR1

[mme](config-sgs-pool-area)#exit

[mme](config-sgs-service)#bind ipv4 xxx.xxx.xxx.xxx

[mme](config-sgs-service)#associate sctp-param-template sgs_svc

[mme](config-sgs-service)#exit

```

4. Associate the SG service name with MME service:

```
[mme](config-ctx)#mme-service mme_svc
```

```
[mme](config-mme-service)#associate sgs-service sgs_svc context mme
```

```
[mme](config-mme -service)#end
```

5. Configure the Virtual LAN (VLAN) for the SG interface and bind to the respective context name:

```
[local]#config
```

```
[local](config)#port ethernet 17/1
```

```
[local](config-port-17/1)#vlan 181
```

```
[local](config-port-17/1-vlan-181)#no shutdown
```

```
[local](config-port-17/1-vlan-181)#bind interface sgs mme
```

```
[local](config-port-17/1-vlan-181)#end
```

Post-Activation Procedure

1. Save the current configuration to the Flash drive for backup.
2. Use the Naming conventions as per Operator Nomenclature:

```
[local] #save configuration /flash/Config_Date_After_activity.cfg -r -no
```

3. Enter the **show support details** command in order to display the details of the chassis:

```
[local] #show support details
```

4. Enter these commands in order to capture the activity statistics:

```
local]#show sgs-service all
```

```
[local]#show sgs-service vlr-status full
```

```
[local]#show sgs-service statistics all
```

```
[local]#show crash list
```

```
[local]#show alarm all
```

```
[local]#show snmp trap history
```

```
[local]#show configuration errors
```

5. Enter these commands in order to capture the hardware statistics:

```
[local]#show task resource
```

```
[local]#show alarm outstanding
```

```
[local]#show cpu table
```

```
[local]#show port utilization table
```

```
[local]#show npu utilization table
```

```
[local]#show snmp trap
```

```
[local]#show card table all
```

6. Enter these commands in order to capture the service status:

```
[local]#show mme-service all
```

```

[local]#show mme-service db record all

[local]#show mme-service enode-association all

[local]#show mme-service id summary

[local]#show mme-service session full

[local]#show session disconnect-reasons

[local]#show session progress

[local]#show mme-service statistics

[local]#show hss-peer-service service all

[local]#show subscriber mme-only summary

[local]#show subscriber mme-only data-rate

[local]#show hss-peer-service statistics all

[local]#show egtp-service all

[local]#show egtpc statistics

[local]#show diameter peers full

[local]#show sgs-service all

[local]#show sgs-service vlr-status full

```

Note: This output is captured with reference to Long Term Evolution (LTE) network. If the chassis includes other services, then include related statistics.

Rollback Process

In the event that the new configuration or changes do not work properly or other problems arise, revert to the previous configuration:

1. Enter these commands in order to remove the SG interface and SG service from the configured context:

```

[local]#config

[local](config)#context mme

[mme](config-ctx)#no interface sgs

[mme](config-if-eth)#exit

[mme](config-ctx)#no sgs-service sgs_svc

```

2. Enter these commands in order to remove the SG service association from MME service:

```

[mme](config-ctx)#mme-service mme_svc

[mme](config-mme-service)#no associate sgs-service

[mme](config-mme -service)#end

```

3. Enter these commands in order to remove the VLAN configured for the SG interface:

```
[local]#config

[local](config)#port ethernet 17/1

[local](config-port-17/1)#no vlan 181

[local](config-port-17/1)#end
```

Statistics/Status

```
show sgs-service service-name <name>
  show sgs-service statistics
  show sgs-service vlr-status { full }
  show mme-service session full
```

Verify

There is currently no verification procedure available for this configuration.

Troubleshoot

There is currently no specific troubleshooting information available for this configuration.