



## 3G-2G Location Change Reporting

3G/2G Location Change Reporting on the SGSN facilitates location-based charging on the GGSN by providing the UE's location information when it is in connected mode.

The SGSN notifies the GGSN whenever one of the following changes:

- The serving Cell Global Identity (CGI), or
- The Service Area Identity (SAI), or
- The Routing Area Identity (RAI).



### Important

With Release 16, the new "Location-reporting in connected-mode" license is required to enable Location Change Reporting functionality. For details, contact your Cisco Account Representative.

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## Feature Description

The 3G/2G Location Change Reporting feature enables the operator to charge the user for location-based services. Location-based charging is a values-added function that ensures subscribers pay a premium for operator-determined location-based services, such as service in a congested area.

This optional feature functions in accordance with 3GPP TS 23.060, Release 9, sections 12.7.5 and 15.1.3 and requires an additional license - the Location Reporting License. With the license, the operator uses the CLI to enable the feature independently for each access type: GPRS (2G) or UMTS (3G).

## Relationships

The SGSN works with the GGSN for this feature. The GGSN must send subscription information to the SGSN for the 3G/2G Location Change Reporting feature to work.

This feature is independent of user location information (ULI) configuration, which allows GTP-C messages to be used for carrying user location information to the GGSN.

## License

A feature-specific license is required. Please consult your Cisco Account Representative for information about the specific license. For information on installing and verifying licenses, refer to the "Managing License Keys" section of the *Software Management Operations* chapter in the *System Administration Guide*.

## Standards Compliance

The SGSN 3G/2G Location Change Reporting feature complies with the following standards:

- 3GPP TS 23.060 Release 9
- 3GPP TS 29.060 Release 9.7.0

## How it Works

When the Location Change Reporting feature is enabled, the SGSN advertizes support for location change reporting to the GGSN by including an extension header - MS-Info-Change-Reporting indication - in the Create-PDP-Context-Request (CPCQ) or the Update-PDP-Context-Request (UPCQ) GTP-C messages (as specified in section 6.1.5 of TS 23.060, R9).

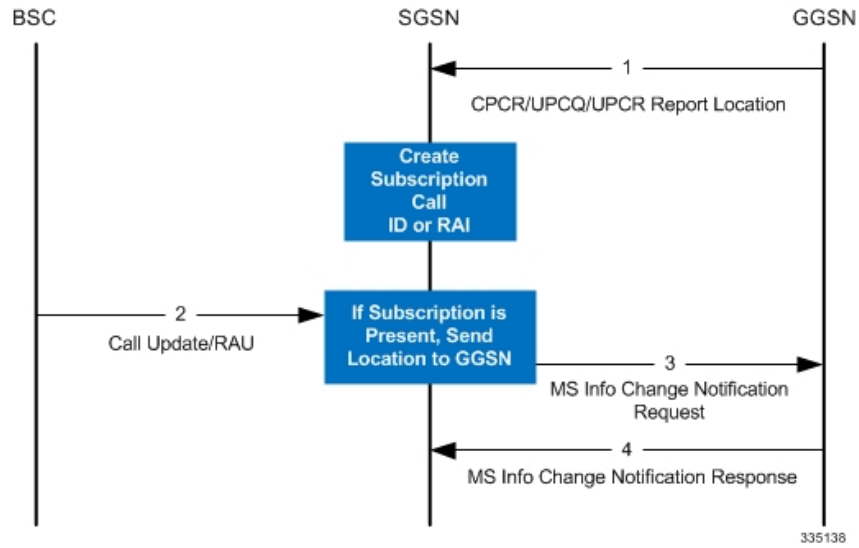
The SGSN initiates the process to report the UE location when subscription information is received from the GGSN. The SGSN decodes the MS-Info-Change-Reporting-Action IE in the CPCQ, the UPCQ, and the UPCUPCR messages received from the GGSN that request the SGSN to check user locations.

The SGSN uses cell update procedures, location reporting procedures, and routing area update (RAU) procedures to identify changes in the serving cell (2G), or in the service area (3G), or in the routing area respectively to identify location changes. In a 2G network, the SGSN sends location information to the GGSN when it receives a cell update from a BSC. In a 3G network, the SGSN sends information to the GGSN when it receives location reports from the RNC. If the GGSN subscribes to the RAI changes and the UE performs an RAU, then the SGSN informs the GGSN of the new RAI.

## Call Flows

The following call flows illustrate system behavior when the feature is enabled.

Figure 1: 2G Subscription



1. Subscription is created.
2. Determines if subscription is present.
3. Location is sent to all GGSNs to which the UE subscribes.

Figure 2: 3G Subscription

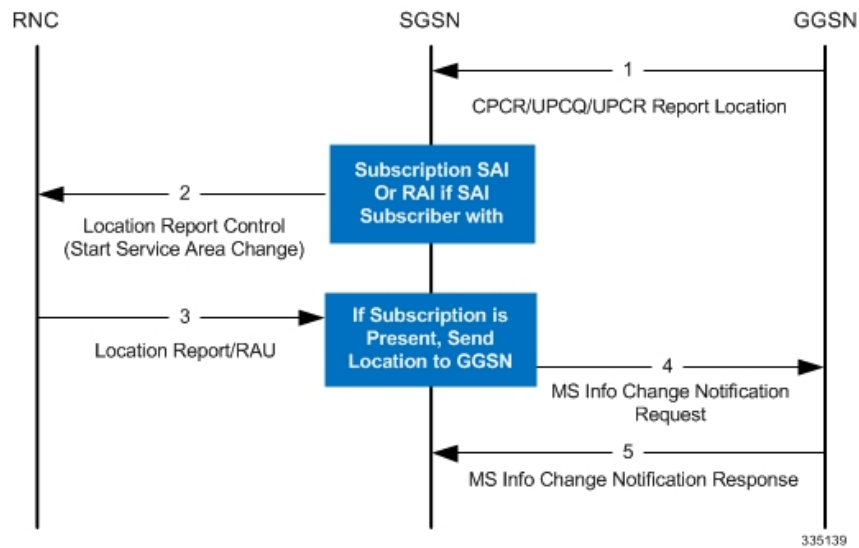
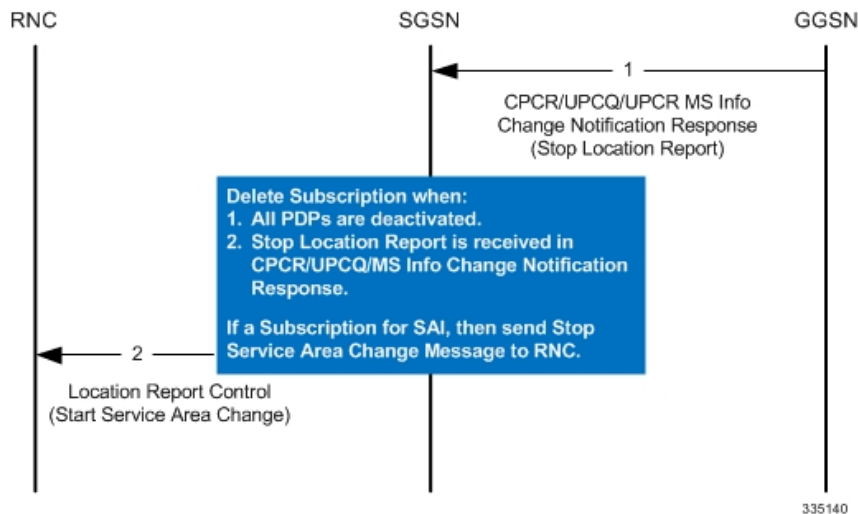


Figure 3: Delete Subscription



## Configuring Location Change Reporting

By default, Location Change Reporting is disabled. Reporting to the GGSN is easily enabled in the Call Control Profile configuration mode.

The following configuration enables this feature:

```

config
  call-control-profile <cc_profile_name>
    location-reporting { gprs | umts }
  exit
  
```

Notes:

- The command can be repeated to enable location change reporting for GPRS (2G) and UMTS (3G).

The following configuration disables this feature:

```

config
  call-control-profile <cc_profile_name>
    remove location-reporting { gprs | umts }
  exit
  
```

Notes:

- Using the **remove** keyword with the command disables the feature.

## Verifying the Location Change Reporting Configuration

This section explains how to display the configuration after saving it in the .cfg file as described in the *System Administration Guide*.

Verification for the call control profile configuration is accomplished via the corresponding show command in Exec Mode:

**show call-control-profile**

```
[local]S4SGSN_Sim show call-control-profile full name ccprof1
```

```
Call Control Profile Name = ccprof1
```

```
Accounting Mode (SGW)           : None  
GPRS Attach All                 : Allow  
GPRS Attach All Failure Code    : 14  
UMTS Attach All                 : Allow  
UMTS Attach All Failure Code    : 14
```

```
. . .  
. . .
```

```
Location Reporting for UMTS           : Enabled
```

```
Location Reporting for GPRS          : Enabled
```

```
EPS Attach Restrict  
  Voice Unsupported              : FALSE  
IMSI Attach Fail                 : FALSE  
CSFB Restrictions
```

