

CSCF Gm Interface

Call Session Control Function

INTERWORK DESCRIPTION

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1 Introduction

The Gm interface between the User Equipment (UE) and the Proxy Call Session Control Function (P-CSCF) is described.

This document sometimes uses the term “CSCF” and sometimes “P-CSCF”. The CSCF is a common concept for different roles like P-CSCF, Serving CSCF (S-CSCF), and Interrogating CSCF (I-CSCF).

For information about status codes generated by the P-CSCF, refer to *CSCF Fault Codes Catalogue*.





2 Interface Overview

Figure 1 describes the Gm interface between the UE and the P-CSCF.

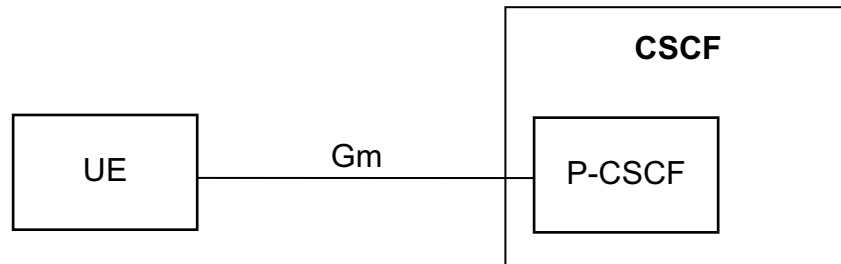


Figure 1 Interface Entities

The protocol used on Gm is the SIP protocol.

2.1 Interface Role

For information that is transferred on the Gm interface but used or generated by the S-CSCF, refer to *CSCF Mw Interface*.

2.2 Services

The services offered by the P-CSCF are shown in Table 1.

Table 1 Offered Services

Offered Service	Description
Protected connection (offered by CSCF native only)	The UE indicates that it wishes to set up protected connections. The P-CSCF sets up its end of the IPsec Security Associations.
Registration	The UE registers, reregisters, deregisters, and requests a list of contacts.
Standalone SIP Requests Initiated by the UE	The UE requests standalone SIP transactions or responds to standalone SIP transactions.

Offered Service	Description
Standalone SIP Requests Initiated towards the UE	The UE responds to standalone SIP transactions.
INVITE dialog initiated by the UE	The UE sets up and terminates an <code>INVITE</code> dialog. The UE sends requests within the dialog.
INVITE dialog initiated towards the UE	The UE is invited for and terminates an <code>INVITE</code> dialog. The UE receives requests within the dialog.
SUBSCRIBE dialog procedure	The UE initiates and terminates a subscription and gets notified of subscription events.
Network Monitoring	The P-CSCF offers network monitoring of all the configured neighboring SIP nodes by sending <code>SIP OPTIONS</code> .

The user services offered by the CSCF are shown in Table 2.

Table 2 Used Services

Used Service	Description
Not applicable.	

2.3 Encapsulation and Addressing

The P-CSCF supports SIP on User Datagram Protocol (UDP) and Transmission Control Protocol (TCP) on IPv4. The P-CSCF terminates a TCP connection after a configurable time of inactivity.

The P-CSCF follows the procedures for SIP routing as specified in the [RFC 3261 Session Initiation Protocol](#) and [RFC 3263 Session Initiation Protocol \(SIP\): Locating SIP Servers](#) specifications.

Clarifications are also given in the following subsections.

2.3.1 Number Internationalization

The sender of a SIP initial request addresses the destination using dialed information, for example, +46 (8) 719 7378.

The digits are transported as a telephone number in a SIP URI or in a tel URI.

The UE includes a `phone-context` parameter in case the telephone number is not fully international (global). The `phone-context` can be set to the home



domain name of the user, as described in Section 3.1.3 Parameters in UE on page 10.

Example: `tel:7197999;phone-context=ims.mnc015.mcc235.3gppnetworks.org`

If the telephone number is transported in a SIP URI, a user parameter is included (user=phone). The domain name of the SIP URI indicates the home domain name that is responsible to resolve the phone number to a SIP URI that is routable.

Example: `sip:7197999;phone-context=ims.mnc015.mcc235.3gppnetworks.org@ims.mnc015.mcc235.3gppnetworks.org;user=phone`

In either case the format of the dialed information can be the following:

- The international format, for example, +46(8)7197378
- The national format, for example, 08-7197378
- The local format, for example, 7197378

On receipt of dialed information, the P-CSCF adds or replaces the phone-context based on configured parameters.

Note: Some special (preconfigured) numbers are not internationalized.

2.3.2 Forking

Owing to forking, the P-CSCF transfers several responses for one request, refer to *CSCF Mw Interface*.

2.3.3 Routing on Ports When Using IPsec

When SIP traffic is supposed to be protected by IPsec, the UE and the P-CSCF (only supported on the native CSCF) are to adhere to the following rules to ensure that SIP messages are sent over IPsec Security Associations (SAs):

- Send messages from the local protected client port to the remote protected server port on the peer if UDP is used.
- When TCP transport is used, the end point wishing to send a request creates a TCP connection between its protected client port and the protected server port of the peer. When sending responses, the TCP connection over which request was received is reused if exists. If no TCP connection exists, a new TCP connection is created between the protected client port of the responder and the protected server port of the peer.

The UE can, but does not have to, reuse existing TCP connection both for sending responses and initiating new requests.

- Reject with 403 (Unprotected Traffic Forbidden) any unprotected request generated by UE registered as Authentication and Key Agreement (AKA). The exceptions are emergency calls and all registration traffic other than registration query and deregistration of a contact.
- Discard any response except error response which is received on unprotected ports.

For SIP REGISTER message, these rules apply with modifications, see Section 3.2 Protected Connection on page 11 for more information.

2.3.4 Illegal Character Handling

The characters “#”, “[”, “]”, “^”, “\”, “{”, “|”, and “}” are considered invalid in the user part of the SIP URI in the SIP request, according to the [RFC 3261 Session Initiation Protocol](#) specification.

The P-CSCF uses one of following mechanisms, depending on the configuration:

- Rejected. SIP requests containing any of the invalid characters are rejected with status code 400 (Bad Request). This is the default behavior.
- Escaped. Illegal characters are escaped to %HexHex, for example, “#” is replaced by “%23”.
- Forwarded.

3 Procedures

The most common signaling sequences are shown. For most of the sequences, the P-CSCF transfers the SIP request on the Mw interface, gets a response back, and transfers the response on the Gm interface. Only the signaling on the Gm interface is shown in the following figures.

The sequence for user registration is shown in Figure 2. The dotted arrows show the authentication procedure with a challenge performed by the S-CSCF. The sequence without the dotted arrows is valid for registration without authentication with a challenge.

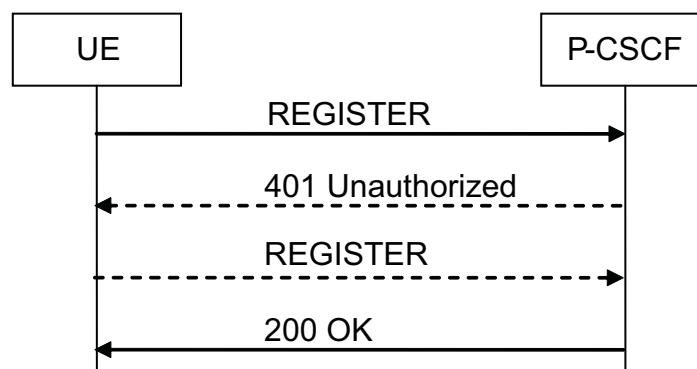


Figure 2 Authentication Procedure at Registration

The sequence when the UE initiates an `INVITE` session is shown in Figure 3. Dotted lines are valid at authentication with a challenge, performed by the S-CSCF.

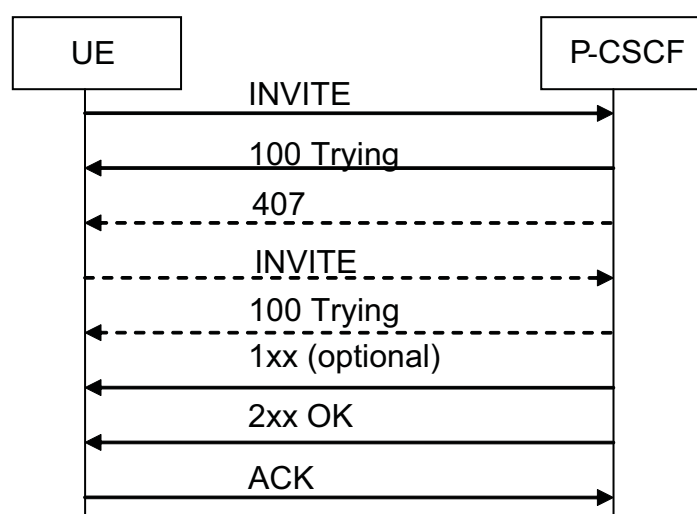


Figure 3 UE Initiating an `INVITE` Session

The sequence when the UE accepts an `INVITE` session is shown in Figure 4.

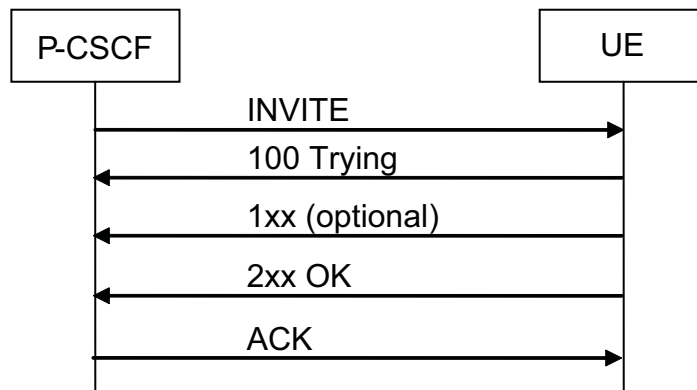


Figure 4 UE Accepting an INVITE Session

The sequence when the UE sends a subsequent request within a dialog is shown in Figure 5.

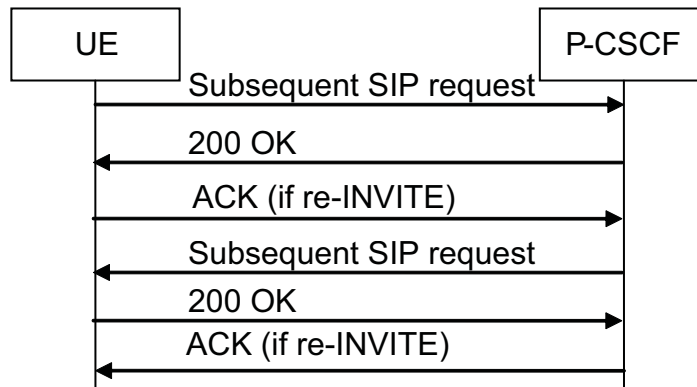


Figure 5 Subsequent Request Within an INVITE Dialog

The sequence when the UE initiates a termination of the `INVITE` dialog is shown in Figure 6. If the UE receives a subsequent request within a dialog, the arrow direction is reversed.

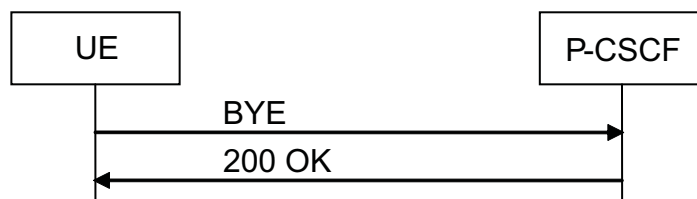


Figure 6 Terminating a Session

The sequence when the UE initiates a `SUBSCRIBE` dialog is shown in Figure 7. The sequence is also valid when the UE refreshes the subscription or requests a termination of the `SUBSCRIBE` dialog.

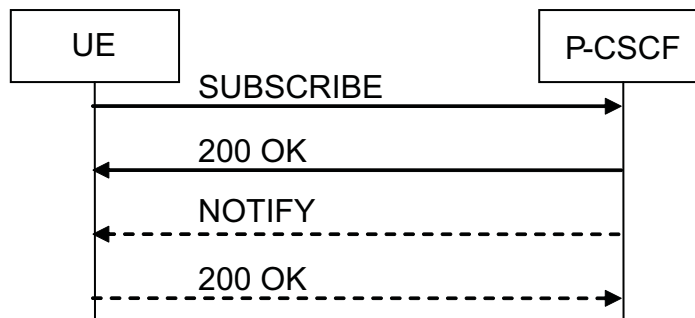


Figure 7 Initiating a SUBSCRIBE Dialog

The sequence when the UE sends a standalone request is shown in Figure 8. If the UE receives a standalone request, the arrow direction is reversed.

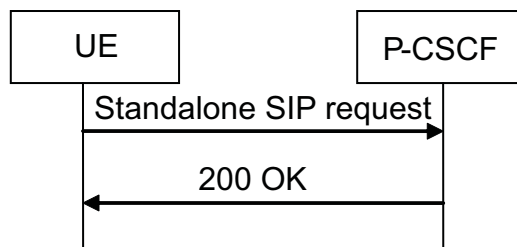


Figure 8 Sending a Standalone SIP Request

3.1 Lower-Level Procedures

3.1.1 Session Timer Procedure

The P-CSCF supports session timers as described in [RFC 4028 Session Timers in the Session Initiation Protocol \(SIP\)](#), with the following clarifications:

- A session is supervised by the P-CSCF if at least one of the endpoints support session timer.
- The P-CSCF adds the `Session-Expires` header and the `Min-SE` header to the message. The P-CSCF decreases the value in the `Session-Expires` header.
- If the `Session-Expires` header is present in the message and the `Session-Expires` value is less than the minimum allowed value, the P-CSCF rejects the `INVITE` by sending the 422 response message. The P-CSCF includes the `Min-SE` header in the response message, which includes the minimum allowed `Session-Expires` value.

For more information, refer to the [RFC 4028 Session Timers in the Session Initiation Protocol \(SIP\)](#) specification.

3.1.2 Privacy Procedure

Upon sending an initial SIP request to the terminating UE, the P-CSCF performs the following action:

- If the inviting UE has requested privacy by including a `Privacy` header with value of "ID" in the request, according to [RFC 3325 Private Extensions to the Session Initiation Protocol \(SIP\) for Asserted Identity within Trusted Networks](#), the P-CSCF removes all `P-Asserted-Identity` headers from the request before forwarding the request to the terminating UE.

Upon sending a SIP response to the originating UE, the P-CSCF performs the following action:

- If the terminating UE has requested privacy by including a `Privacy` header with value of "ID" in the response, according to [RFC 3325 Private Extensions to the Session Initiation Protocol \(SIP\) for Asserted Identity within Trusted Networks](#), the P-CSCF removes all `P-Asserted-Identity` headers from the message before forwarding the response to the originating UE.

3.1.3 Parameters in UE

The UE is to be provided with the following parameters:

- P-CSCF address, either through a P-CSCF discovery procedure or preconfigured in the UE.
- Public User Identity – This identity is a SIP URI or a tel URI, as described in TS 23.003, but only a SIP URI is allowed when the Public User Identity is used as an `address-of-record` in the `REGISTER` message. The Public User Identity is used in the `To` header for the `REGISTER` request and in the `From` header or in the `P-Preferred-Identity` header in non-`REGISTER` SIP requests outside a dialog. The UE can fetch this identity from the ISIM or derive it from SIM, USIM, or ISIM as described in TS 23.003. As an alternative, the identity can instead be preconfigured in the UE.
- Private User Identity – The UE can fetch this identity from the ISIM or derive it from SIM or USIM as described in TS 23.003. As an alternative, the identity can instead be preconfigured in the UE. The Private User Identity is used as a value in the `username` field in the SIP `Authorization` or `Proxy-Authorization` header.
- Home Domain Name – The UE uses the Home Domain Name in the `Request-URI` in the `REGISTER` request and also as a realm name in the `Authorization` header in the initial `REGISTER` request in the case HTTP Digest or USIM AKA is used. The Home Domain is fetched from the ISIM or derived from SIM or USIM as described in TS 23.003. As an alternative, the Home Domain Name can instead be preconfigured in the UE.
- If HTTP Digest is used, a shared secret (password) is also needed.



- If IMS AKA is used, a USIM/ISIM that shares a secret (master key) and a sequence number (SQN) with HSS is also needed. A piece of software acting as equivalence of USIM/ISIM is also applicable

For more about the TS 23.003, refer to the [3GPP TS 23.003 Numbering, addressing and identification](#) specification.

3.2 Protected Connection

The procedures for setting up protected connections between the UE and the P-CSCF are described. The native P-CSCF offers both protected and unprotected ports. All non-REGISTER transactions, except emergency calls, attempted on the unprotected port are to be rejected if the `Contact` is registered on a protected port. Protected connection requires that IMS AKA authentication procedures are performed. The S-CSCF must support IMS AKA authentication.

3.2.1 IMS AKA Authentication

3.2.1.1 Initial Registration Procedure Using IMS AKA

Figure 9 describes the IMS AKA-related procedure during initial registration. It only covers the positive case. For negative cases, see Section 3.2.2 Unsuccessful Cases at Protected Connection on page 21.

Note: Only security is focused on. The initial registration procedure is described in Section 3.3.1 User Registration on page 22.

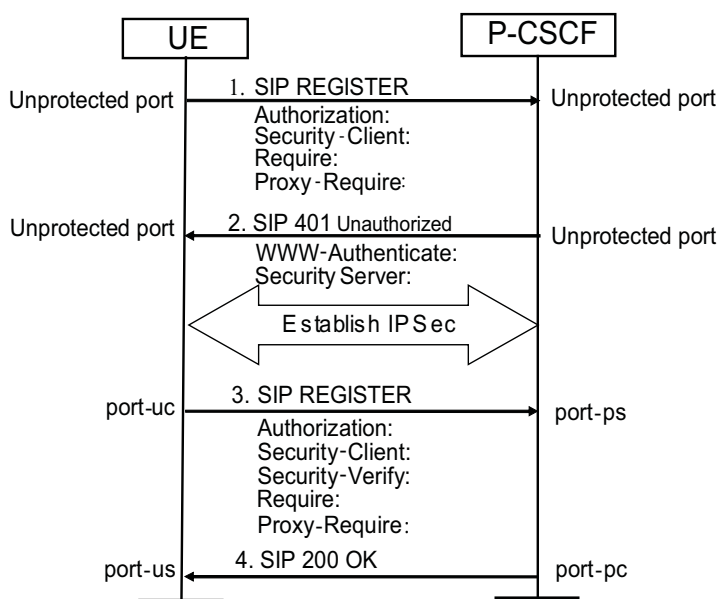


Figure 9 IMS AKA Procedure during Initial Registration

An IMS AKA procedure during initial registration is as follows:

- 1 The procedure starts when the UE sends the SIP REGISTER request to the unprotected port of the P-CSCF with following headers:
 - `Authorization` header includes information as described in *CSCF Mw Interface*.
 - One or more `Security-Client` headers include the following information:
 - `Mechanism-name` that can be any token but the only supported option by the P-CSCF is `ipsec-3gpp`. This parameter is mandatory.
 - `spi-s` and `spi-c`: the server of the UE and client SPIs respectively. Must be a value in the range 0–4294967195. `spi-s` and `spi-c` must not be equal. These parameters are mandatory.
 - `alg` with the name of integrity protection algorithm. The following algorithms are supported: `hmac-md5-96` and `hmac-sha-1-96`. The `alg` parameter is mandatory.
 - `ealg` with the name of encryption algorithm. The following algorithms are supported: `des-ede-cbc`, `aes-cbc`, `null`. If this parameter is omitted, the default value is `null` IPsec encryption algorithm.
 - `port-s` and `port-c`: the server of the UE and client ports respectively. The value must be number in range 0–65535. The values for `port-s` and `port-c` must not be the same.
- The following is an example of `Security-Client` header:
- ```
Security-Client: ipsec-3gpp; alg= hmac-md5-96;
ealg=aes-cbc;spi-c=20482;spi-s=20483;
port-c=62088;port-s=50271, ipsec-3gpp;
alg=hmac-sha-1-96;ealg= des-ede3-cbc;spi-c=20482;
spi-s=20483;port-c=62088;port-s=50271
```
- IPsec parameters `protocol` and `mode` are not necessary to be included, as they use the fixed values `esp` and `tran` respectively.
- `Require` header with the value of `sec-agree`
  - `Proxy-Require` header with the value of `sec-agree`

`Contact` header is mandatory in all `REGISTER` requests, except registration query. However, extra attention is needed in IMS AKA. The UE sets the IP address or FQDN of the `Contact` resolving to the IP address matching the source IP address this `REGISTER` request is sent from.

If multiple `Security-Client` headers are sent in the same `REGISTER` request, the values for `spi-c`, `spi-s`, `port-c`, and `port-s` must not alter from header to header.

Any `qvalue` discovered in `Security-Client` is to be ignored.





- 2 The P-CSCF forwards the request to the S-CSCF. When the P-CSCF receives a SIP 401 (Unauthorized) response, the P-CSCF transfers the response to the UE and sets up SAs with a preliminary lifetime. The response includes a WWW-Authenticate header, and also based on the security parameters it chooses for IPsec, includes a Security-Server header.

The detail of each header is described as follows:

- The WWW-Authenticate header includes information as described in *CSCF Mw Interface*.
- The Security-Server headers have similar syntax as Security-Client headers, but a preference parameter *q* is added. The *q* value must be set as specified in [RFC 3261 Session Initiation Protocol](#).

For example:

```
Security-Server: ipsec-3gpp ; q=0.1;
alg=hmac-md5-96; ealg=aes-cbc; spi-c=441;
spi-s=440; port-c=6001; port-s=6000
```

- The UE is expected to authenticate the network according to the [RFC 3310 Hypertext Transfer Protocol \(HTTP\) Digest Authentication Using Authentication and Key Agreement \(AKA\)](#) and [3GPP TS 33.102 3G Security; Security architecture](#) specifications.

If it succeeds, the UE is expected to respond to the challenge with a Digest response in an Authorization header in the new REGISTER request. The REGISTER request must include one or more Security-Client headers, one or more Security-Verify headers, Require, and Proxy-Require. Also, the UE must send the request from the local protected client port to the remote protected server port on the P-CSCF.

The Authorization header must include information as described in *CSCF Mw Interface*.

The Security-Client headers must be the same as the ones sent in the initial REGISTER request.

The Security-Verify headers must be a copy of the Security-Server headers sent in 401 (Unauthorized) response from the P-CSCF.

The Require header must have the value of *sec-agree*.

The Proxy-Require header must have the value of *sec-agree*.

If Contact header is present, it must specify as IP address the source address of the REGISTER request, and the port number must match port-s in the Security-Client headers.

- 3 The P-CSCF forwards the request to the S-CSCF. When the P-CSCF receives the 200 (OK) response, the P-CSCF updates the lifetime of SAs and forwards the response back to the UE over IPsec (in case IPsec established). At receiving 200 (OK), the UE is expected to update the lifetime of its SAs.

### 3.2.1.2 Reregistration, Deregistration, and Querying Registration Procedure Using IMS AKA

Figure 10 describes reregistration, deregistration, and querying registration-related procedure when using IMS AKA. In this case, reregistration, deregistration, and registration query are only accepted on the protected connection.

**Note:** Only Security is focused on. The reregistration and deregistration procedures are described in Section 3.3.1.2 Reregistration Procedure on page 25 and Section 3.3.1.3 Deregistration Procedure on page 25.

In such a procedure, it is assumed that the contact address is not changed. The S-CSCF can challenge the UE at receiving new `REGISTER` requests. This is a re-authentication procedure that will result in renegotiating security parameters and establishing new SAs, and it is discussed in next subsection. This subsection only covers the case that the S-CSCF responds to the `REGISTER` request with 2xx response.

As the UE does not know if the S-CSCF rechallenges it, it must always prepare to re-establish IPsec before sending a reregistration. This means that the UE must reserve a new pair of SPIs and a new protected client port; `port-uc2`, and must build a fresh `Security-Client` header for the `re-REGISTER` request. The request must be sent over established SAs.

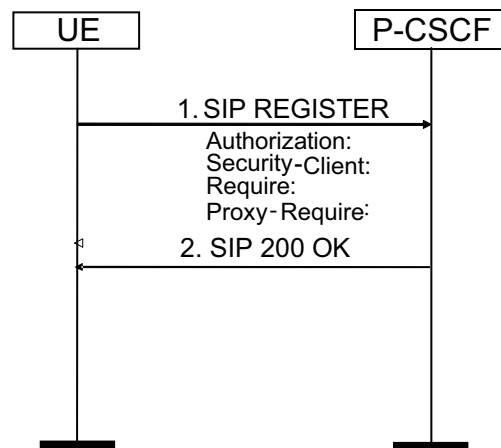


Figure 10 IMS AKA Procedure During Reregistration

An IMS AKA procedure during registration is as follows:

1. The procedure starts when the UE sends the `SIP REGISTER` request to the P-CSCF. The request is similar to the second `REGISTER` request in initial registration. It must contain `Authorization`, one or more `Security-Client`, `Require`, `Proxy-Require`, and `Security-Verify` headers. Once the headers are listed one by one, the `Authorization` header includes information as described in *CSCF Mw Interface*.



The `Security-Client` header must use the same syntax as the one in initial `REGISTER` request, but update the following security parameters:

- `spi-c`, with a fresh new value, different from the one in the old `Security-Client` header.
- `spi-s`, with a fresh new value, different from the one in the old `Security-Client` header.
- `port-c`, with a fresh new value, different from the one in the old `Security-Client` header.

**Note:** The `port-us` is not changed while `spi-s` is.

Require header with the value of `sec-agree`.

Proxy-Require header with the value of `sec-agree`.

Headers matching the earlier received `Security-Server` headers.

2. The P-CSCF forwards the request to the S-CSCF. When the P-CSCF receives `200 (OK)`, the P-CSCF forwards the response to the UE. At receiving `200 (OK)`, the UE is expected to continue to use old SAs.

### 3.2.1.3

#### Network-Initiated AKA Re-Authentication

Either the UE or the S-CSCF can decide to re-authenticate its peer. Figure 11 describes the flow when it is the S-CSCF that requested re-authentication.

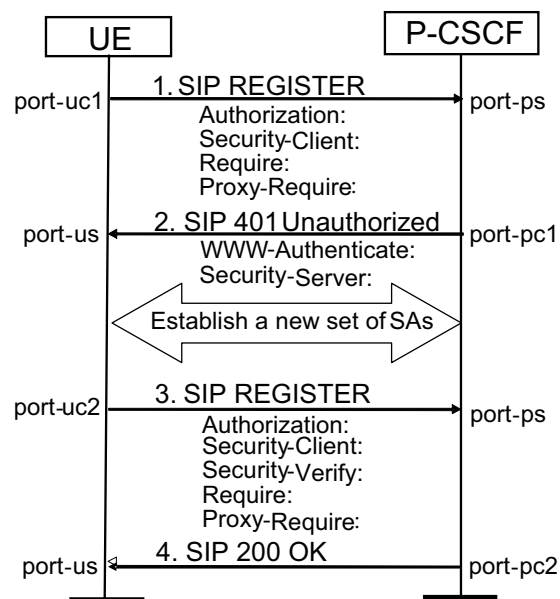


Figure 11 IMS AKA Procedure During Re-Authentication

A network-initiated AKA re-authentication procedure is as follows:

- 1 The procedure starts when the UE sends the SIP REGISTER request to the protected port of the P-CSCF. The request must be composed in the same way as for reregistration, which is described in the previous section.
- 2 The P-CSCF forwards the SIP request to the S-CSCF. When the P-CSCF receives a SIP 401 (Unauthorized) response, the P-CSCF transfers the response to the UE and sets up a new set of SAs with a preliminary lifetime based on the security parameters of the new SAs. The request includes a WWW-Authenticate header and also a new Security-Server header.

The detail of each header is described at follows:

- The WWW-Authenticate header includes information as described in *CSCF Mw Interface*.

The Security-Server headers have similar syntax as the old Security-Server headers, but updated with the following new values:

- spi-c, with a fresh new value, different from the one in the old Security-Server header.
- spi-s<sup>(1)</sup>, with a fresh new value, different from the one in the old Security-Server header.
- port-c, with a fresh new value, different from the one in the old Security-Server header.

The following is an example of the Security-Server header:

```
Security-Server: ipsec-3gpp ; q=0.1;
alg=hmaccmd5-96; ealg=aes-cbc; spi-c=441;
spi-s=443; port-c=6002; port-s=6000
```



- 3 The UE is expected to authenticate the network according to the [RFC 3310 Hypertext Transfer Protocol \(HTTP\) Digest Authentication Using Authentication and Key Agreement \(AKA\)](#) and [3GPP TS 33.102 3G Security; Security architecture](#) specifications.

If it succeeds, it responds to the challenge with a Digest response in an Authorization header in a new REGISTER request. Before sending the request, the UE must establish a new set of SAs with a temporary lifetime and send the request over the new SAs by choosing port-uc2 as local source port. The request must include Security-Client, Security-Verify, Require, Proxy-Require, and Authorization header.

The Authorization header must include the information as described in the *CSCF Mw Interface* document.

The Security-Client headers must be the same as the ones in the previous REGISTER request.

The Security-Verify headers must be a copy of the value of Security-Server headers sent from the P-CSCF in 401 (Unauthorized) response.

The Require header must have the value of sec-agree.

The Proxy-Require header must have the value of sec-agree.

- 4 The P-CSCF forwards the request to the S-CSCF. When receiving the 200 (OK) from the S-CSCF, the P-CSCF updates the lifetime of the new SAs, transfers 200 (OK) response back to the UE over new SAs, and discards the old SAs. At receiving 200 (OK), the UE is expected to update its new set of SAs and discards the old one.

(1) The port-s is not changed while spi-s is.

#### 3.2.1.4 UE-Initiated AKA Re-Authentication

The UE can initiate re-authentication by doing initial registration, see Section 3.3.1.1 Initial Registration Procedure on page 22.

The UE initiates re-authentication by sending an unprotected REGISTER at any time, for example, when it finds that the existing SAs have stopped working.

The UE is not to attempt initial registration directly after receiving 401, but is instead to wait a reasonable time for the authentication response state machine started in the S-CSCF at 401 time-out.

#### 3.2.1.5 Resynchronization in IMS AKA

The UE and its Authentication Center (AuC) maintain a common sequence number, SQN. The sequence number is stepped every time a new Authentication Vector (AV) is requested. In certain situations, the SQN can get out of sync between UE and AuC. The resynchronization procedure must

be activated by UE when it discovers that SQN is outside the configured window (fully implementation-specific). Upon successful completion of resynchronization AuC assigns the UE-provided new value for SQN.

The need for resynchronization is determined during the initial registration or authenticated reregistration. The resynchronization is always followed by a new full round of authenticated registration.

The UE wishing to resynchronize can use either an established SA-set, if it exists, or unprotected ports. This choice is illustrated in Figure 12.

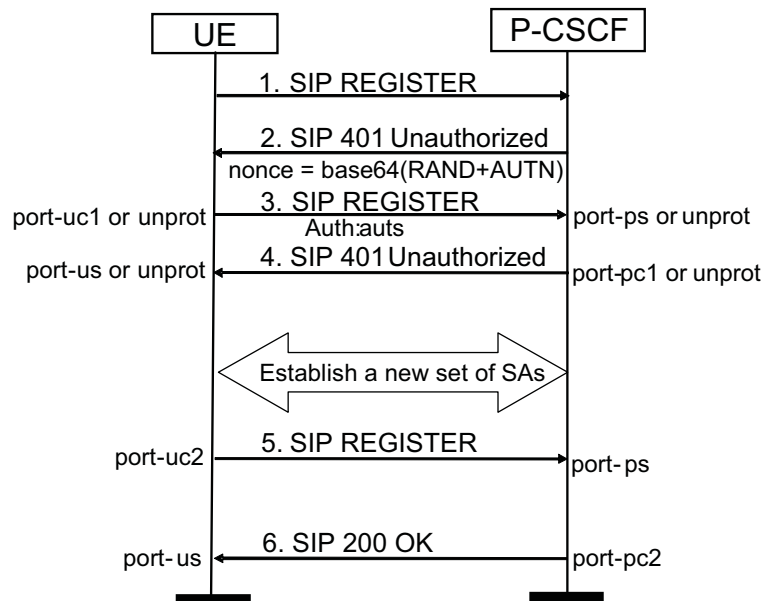


Figure 12 Resynchronization Using Established SAs or Unprotected Interface

A resynchronization in IMS AKA procedure is as follows:



- 1 The procedure starts when the UE sends the REGISTER request, either initial or protected to the CSCF.
- 2 The P-CSCF forwards the request to the S-CSCF. When the P-CSCF receives the 401 (Unauthorized), the P-CSCF establishes a new SA-set (temporary) and forwards 401 (Unauthorized) to UE as in ordinary authenticated registration.

The following headers are essential:

- The WWW-Authenticate header includes information as described in the *CSCF Mw Interface* document.
- The Security-Server headers have similar syntax as the old Security-Server headers (if any), but updated with the following new values:
  - spi-c, with a fresh new value, different from the one in the old Security-Server header.
  - spi-s<sup>(1)</sup>, with a fresh new value, different from the one in the old Security-Server header.
  - port-c, with a fresh new value, different from the one in the old Security-Server header.

The following is an example of Security-Server header:

```
Security-Server: ipsec-3gpp ; q=0.1;
alg=hmac-md5-96; ealg=aes-cbc; spi-c=441;
spi-s=443; port-c=6002; port-s=6000
```

- 3 The UE is expected to authenticate the P-CSCF according to the [RFC 3310 Hypertext Transfer Protocol \(HTTP\) Digest Authentication Using Authentication and Key Agreement \(AKA\)](#) and [3GPP TS 33.102 3G Security; Security architecture](#) specifications and finds that SQN is outside the allowed window.

The UE initiates the resync procedure by sending a new REGISTER request with an `auts` parameter containing expected SQN (as per TS33.102) in the `Authorization` header to the P-CSCF.

The REGISTER can be sent using established IPsec connection or to the unprotected port.

- The `Authorization` header must include information as described in *CSCF Mw Interface*.
  - The `Security-Client` headers filled with a fresh set of parameters for a new SA-set. The following parameters must be refreshed from the previous `Security-Client` header:
    - `spi-c`, with a fresh new value, different from the one in the old `Security-Client` header.
    - `spi-s`, with a fresh new value, different from the one in the old `Security-Client` header.
    - `port-c`, with a fresh new value, different from the one in the old `Security-Client` header.
  - The `Security-Verify` must be present if the message is sent on protected interface. The content of `Security-Verify` must match the `Security-Server` headers used when establishing the protected connection in use.
  - The `Require` header must have the value of `sec-agree`.
  - The `Proxy-Require` header must have the value of `sec-agree`.
- 4 The P-CSCF forwards the request to the S-CSCF. When the P-CSCF receives the 401 (Unauthorized), the P-CSCF removes temporary SA-set created in step 2, creates a new temporary SA-set, and forwards the 401 (Unauthorized) response to UE.





- 5 UE is expected to establish the temporary SA-set and sends REGISTER containing a response to the P-CSCF, as follows:
  - The `Authorization` header must include the information as described in *CSCF Mw Interface*.
  - The `Security-Client` headers must be the same as the ones in the previous REGISTER request.
  - The `Security-Verify` headers must be a copy of the value of `Security-Server` headers sent from the P-CSCF in 401 (Unauthorized) response.
  - The `Require` header must have the value of `sec-agree`.
  - The `Proxy-Require` header must have the value of `sec-agree`.
- 6 The P-CSCF forwards the request to the S-CSCF. When receiving the 200 (OK). The P-CSCF updates the lifetime of the new SAs and sends the 200 (OK) response back to the UE over new SAs.

(1) The `port-us` is not changed while `spi-s` is.

### 3.2.2

#### Unsuccessful Cases at Protected Connection

If the S-CSCF authenticates the SIP request and the authentication fails, the S-CSCF generates a final response with a Status Code and text as defined in the [RFC 2617 HTTP Authentication: Basic and Digest Access Authentication](#) and [RFC 3261 Session Initiation Protocol](#) specifications.

The UE is expected to check the `stale` parameter in the `WWW-Authenticate` header. If the value is `True`, the UE can recalculate the credentials and resubmit the request.

The status codes and reason phrases the P-CSCF generates as the result of an unsuccessful protected connection procedure, are described in *CSCF Fault Codes Catalogue*.

If the UE fails to authenticate the P-CSCF using AKA and when it is not a synchronization failure, it can consider to initiate a fresh new registration. In this situation, the UE is expected to send (unprotected or protected using established SAs) immediately a REGISTER without `auts` and without response. This causes the S-CSCF to end the challenge timer and send a 403 response, allowing the UE to retry without waiting for this registration to time out.

If the UE finds it is a synchronization failure of AKA, the UE is expected to generate `auts` into the `Authorization` header, with the value of `base64(AUTS)`. The token AUTS is defined in the [3GPP TS 33.102 3G Security: Security architecture](#) specification.

If the UE is trying to establish IPsec, the UE is expected to give up its attempt on receiving other final responses than 401, and keep using established SAs until they are expired.

**Note:** The action that the end user (or the UE) can take on the described type of errors can be different, for example, performing an initial registration can help. However, in most of the cases the end user has to contact the operator for more instructions.

## 3.3 Registration

### 3.3.1 User Registration

Registration includes procedures for the following:

- Initial registration
- Reregistration
- Deregistration
- Querying registration information

The security aspect of the registration and deregistration is described in Section 3.2 Protected Connection on page 11.

The UE uses the same `Call-ID` value for all SIP `REGISTER` requests in a Registration cycle (from Initial to deregistration) as recommended in the [RFC 3261 Session Initiation Protocol](#) specification.

The `Call-ID` value is at least to be the same for a Registration cycle (from Initial Registration to Deregistration).

The signaling sequence for registration is shown in Figure 2.

#### 3.3.1.1 Initial Registration Procedure

The registration is regarded as an initial registration when the Public User Identity is not registered in the P-CSCF or when a new contact is added.

When AKA is used, the initial and subsequent registrations use different interfaces (unprotected and protected respectively). If UE decides to use unprotected port to send `REGISTER` to the P-CSCF, the P-CSCF must assume that UE wishes to abandon whatever older AKA registration state there is in the P-CSCF for this Private User ID.

**Note:** This only concerns the AKA registered contact of the user and only after successful authentication.

The UE must send the SIP `REGISTER` request to the P-CSCF and it must include the information listed in Table 3.



The intention with this and following tables is to highlight important header field values in the messages. This information is to be used with Section 4.2 Important SIP Headers on page 56 and the referenced documents to compose SIP messages correctly.

*Table 3 Information in REGISTER Request*

| Header                | Comment       |
|-----------------------|---------------|
| Authorization         | See Table 36. |
| From                  | See Table 36. |
| To                    | See Table 36. |
| Contact               | See Table 36. |
| Via                   | See Table 36. |
| Expire                | See Table 36. |
| Request-URI           | See Table 36. |
| P-Access-Network-Info | See Table 36. |
| Security-Client       | See Table 36. |
| Security-Verify       | See Table 36. |
| Require               | See Table 36. |
| Proxy-Require         | See Table 36. |

The P-CSCF performs checks of the request and if not successful, the P-CSCF returns an error response as described in the *CSCF Fault Codes Catalogue*.

If the checks are successful, the P-CSCF sends the request to the S-CSCF. When the P-CSCF receives the response from the S-CSCF, the P-CSCF forwards the response to the UE according to one of the following:

- If authentication is required, the P-CSCF transfers the SIP 401 (Unauthorized) response and it includes the information listed in Table 4.

*Table 4 SIP 401 Unauthorized Response*

| Header           | Comment                                                                                                                                                                                                                        |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WWW-Authenticate | This header includes a challenge as described in <i>CSCF Mw Interface</i> .                                                                                                                                                    |
| Security-Server  | Contains the security mechanisms that the P-CSCF supports and related configuration parameters. This header is only present if the REGISTER indicated intention to negotiate security mechanism (sec-agree in Require header). |

- If authentication is successful or is not required, the P-CSCF transfers a SIP 200 (OK) including information according to Table 5 and starts the timer supervising the registration.

*Table 5 SIP 200 OK REGISTER*

| Header              | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P-Associated-URI    | <p>The P-Associated-URI header contains the list of Public User Identities that are associated to the Public User Identity under registration and which are not barred. The first URI in the list of Public User Identities indicates the default Public User Identity.</p> <p>Depending on configuration, the P-CSCF can merge multiple line-break separated P-Associated-URI headers into single-line representation.</p> <p>If the Public User Identity under registration is not included in an Implicit Registration Set, this header is not present in the message.</p> |
| Contact             | <p>Contact headers contain the following:</p> <ul style="list-style-type: none"> <li>• Currently registered contacts with Expires parameter indicating the contact expiration time for this Public User Identity.</li> <li>• Deregistered contacts with Expires parameter value set to zero.</li> </ul>                                                                                                                                                                                                                                                                       |
| Authentication-Info | <p>An Authentication-Info header can be present as described in <i>CSCF Mw Interface</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

If the UE has been challenged by the S-CSCF, the UE is expected to send the SIP REGISTER request to the P-CSCF and it must include the information listed in Table 3 including credentials.

In AKA case, this second round REGISTER is sent over a temporary protected connection.

The P-CSCF performs checks of the request and if not successful, the P-CSCF returns an error response as described in the *CSCF Fault Codes Catalogue*.

If the checks are successful, the P-CSCF sends the request to the S-CSCF. When the P-CSCF receives 200 (OK) from the S-CSCF, the P-CSCF transfers the SIP 200 (OK) including information according to Table 5 and starts the timer supervising the registration.



### 3.3.1.2 Reregistration Procedure

Only the procedures for the successful reregistration are described. For details about the unsuccessful cases, see Section 3.2.2 Unsuccessful Cases at Protected Connection on page 21.

A registration is regarded as a reregistration when the Public User Identity is already registered with one contact in the P-CSCF.

**Note:** If there is an AKA user, a REGISTER request arriving at unprotected port is to be treated as initial registration even if there is a registered AKA contact in the P-CSCF.

Before the registration timer expires, the UE is expected to send the SIP REGISTER request to the P-CSCF using the same address as used for the initial registration and it must include the information listed in Table 3.

The P-CSCF performs checks of the request and if not successful, the P-CSCF returns an error response as described in the *CSCF Fault Codes Catalogue*.

If the checks are successful, the P-CSCF sends the request to the S-CSCF. When the P-CSCF receives a response from the S-CSCF, the P-CSCF updates expiration time; and transfers the SIP 200 (OK) response and it includes the information listed in Table 5.

### 3.3.1.3 Deregistration Procedure

Only the procedures for the successful user-initiated deregistration are described. The user can initiate the deregistration procedure for all or some of the registered contacts. For details about the unsuccessful cases, see Section 3.3.2 Unsuccessful Cases at Registration on page 27.

The SIP REGISTER request includes the same value in the Call-ID header as in the initial registration.

The UE must send the SIP REGISTER request to the P-CSCF using the same address as used for the initial registration.

If the Contact that is being deregistered was registered with AKA authentication procedure, the deregistration is only allowed on the protected interface. An attempt to deregister Contact on the unprotected interface results in an error response.

The P-CSCF expects that the UE has populated the header fields as follows in the REGISTER request to deregister, see Table 6.

*Table 6 Deregistration Request*

| Header        | Comment       |
|---------------|---------------|
| Authorization | See Table 36. |

| Header          | Comment       |
|-----------------|---------------|
| From            | See Table 36. |
| To              | See Table 36. |
| Contact         | See Table 36. |
| Via             | See Table 36. |
| Expire          | See Table 36. |
| Request-URI     | See Table 36. |
| Security-Client | See Table 36. |
| Security-Verify | See Table 36. |
| Require         | See Table 36. |
| Proxy-Require   | See Table 36. |

The P-CSCF performs checks of the request and if not successful, the P-CSCF returns an error response as described in the *CSCF Fault Codes Catalogue*.

If the checks are successful, the P-CSCF sends the request to the S-CSCF. When the P-CSCF receives a response from the S-CSCF, the P-CSCF removes the contacts that are to be deregistered as described in the [RFC 3261 Session Initiation Protocol](#) specification. It is possible to indicate all contacts or one specific contact in the deregistration procedure.

If no more contacts remain for the user after this deregistration, then the P-CSCF removes all stored user information.

The P-CSCF transfers the SIP 200 (OK) response is and it includes the information described in Table 5.

#### 3.3.1.4 Querying Registration Information

Only the successful reading of registered contacts is described. For details about the unsuccessful cases, see Section 3.3.2 Unsuccessful Cases at Registration on page 27.

The signal sequence is shown in Figure 2.

The UE must send the SIP REGISTER request to the P-CSCF using the same address as used for the initial registration.

For an AKA user, querying is only supported over the established protected connection. Sending registration query to unprotected port results in error response.

The P-CSCF expects that the UE has populated the header fields as follows in the REGISTER request to request a list of contacts, see Table 7.



*Table 7 Information in REGISTER Query*

| Header        | Comment       |
|---------------|---------------|
| Authorization | See Table 36. |
| From          | See Table 36. |
| To            | See Table 36. |
| Via           | See Table 36. |
| Request-URI   | See Table 36. |

The P-CSCF performs checks of the request and if not successful, the P-CSCF returns an error response as described in the *CSCF Fault Codes Catalogue*.

The P-CSCF forwards the request towards the S-CSCF. When the P-CSCF receives a SIP 200 (OK) response, the P-CSCF forwards the response and it includes the information described in Table 5.

### 3.3.2 Unsuccessful Cases at Registration

For protocol errors or errors outside the scope of this description, refer to the [RFC 3261 Session Initiation Protocol](#) specification or relevant extensions to the RFC.

The status codes and reason phrases that the P-CSCF can generate as the result of a registration procedure are described in the *CSCF Fault Codes Catalogue*.

## 3.4 Standalone Requests Initiated by UE

A standalone SIP request is defined as; a SIP request that does not create a dialog and is sent outside an existing dialog. Only the SIP methods MESSAGE, OPTIONS, PUBLISH, and REFER are defined as possible to send as standalone SIP requests, but also other SIP methods are possible.

### 3.4.1 Preconditions

The preconditions are as follows:

- The inviting user must be registered according to Section 3.3.1 User Registration on page 22.
- The UE can include a P-Preferred-Identity including a Public User Identity which has been registered by the user. If a P-Associated-URI header has been received during registration, then any of the Public User Identities can be used that are contained within the header.

- If a `P-Preferred-Identity` is not included, then the `From` header must contain a Public User Identity which has been registered by the user.
- A temporary Public User Identity is not a Public User Identity suitable for use in the `P-Preferred-Identity` header or the `From` header, as it normally is barred.
- If privacy is required, the UE must set the `From` header to **Anonymous** and include a `Privacy` header in accordance with the [RFC 3325 Private Extensions to the Session Initiation Protocol \(SIP\) for Network Asserted Identity within Trusted Networks](#) specification.

The UE must include a `P-Preferred-Identity` including a Public User Identity if the `From` header is set to **Anonymous**.

- The UE can build a proper preloaded `Route-set` for all new dialog requests and standalone SIP requests. The UE can include a `Route` header value made out of the P-CSCF URI, containing the IP address or the FQDN.

### 3.4.2 Send a Standalone SIP Request

Only the procedure how the user successfully sends a standalone SIP request is defined. For details about the unsuccessful cases, see Section 3.4.3 Unsuccessful Cases at Standalone Requests on page 29.

The procedure is initiated by a UE, as defined in the [RFC 3261 Session Initiation Protocol](#) specification or other relevant extension to the RFC.

The signaling sequence is shown in Figure 8.

The UE sends a standalone SIP request to the P-CSCF and includes the information listed in Table 8.

*Table 8 Standalone SIP Request*

| Header               | Comment       |
|----------------------|---------------|
| Request-URI          | See Table 36. |
| Authorization        | See Table 36. |
| P-Preferred-Identity | See Table 36. |
| From                 | See Table 36. |
| To                   | See Table 36. |
| Privacy              | See Table 36. |
| Via                  | See Table 36. |
| Call-ID              | See Table 36. |
| Route                | See Table 36. |





The P-CSCF performs checks of the request and if they are unsuccessful, the P-CSCF returns an error response according to Section 3.4.3.1 CSCF Rejects a Standalone SIP Request on page 29.

If the checks are successful, the P-CSCF sends the request to the S-CSCF. When the P-CSCF receives a response from the S-CSCF, the P-CSCF transfers the SIP 2xx response to the UE and it includes the information listed in Table 9.

*Table 9 SIP 2xx Response to Standalone Request*

| Header              | Comment                                                                                                                                                         |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Status-Line         | Status-Line with status-code set to 2XX.                                                                                                                        |
| From                | Set to the value of the <code>From</code> header as sent by the UE in the request.                                                                              |
| To                  | Set to the value of the <code>To</code> header as sent by the UE in the request.                                                                                |
| Via                 | Set to the value of the <code>Via</code> header as sent by the UE in the request.                                                                               |
| Call-ID             | Set to the value of the <code>Call-ID</code> header as sent by the UE in the request.                                                                           |
| P-Asserted-Identity | Can presently be set to the value of the Public User Identity identifying the destination.<br><br>This information not available if privacy has been requested. |

### 3.4.3 Unsuccessful Cases at Standalone Requests

For protocol errors or errors outside the scope of this description, refer to the [RFC 3261 Session Initiation Protocol](#) specification and other relevant extensions to the RFC.

#### 3.4.3.1 CSCF Rejects a Standalone SIP Request

Only the procedure when the P-CSCF rejects the standalone SIP request is described.

The status codes and reason phrases that can be generated by the P-CSCF as a result of standalone SIP procedures are described in the *CSCF Fault Codes Catalogue*.

The sending of the standalone SIP request is initiated as per Section 3.4.2 Send a Standalone SIP Request on page 28.

The P-CSCF transfers the SIP final non-2xx response to the UE and it includes the information listed in Table 10.

*Table 10 SIP Final Non-2xx Response on Standalone Request*

| Header      | Comment                                                                            |
|-------------|------------------------------------------------------------------------------------|
| Status-Line | Status-Line with status-code set to non-2XX.                                       |
| From        | Set to the value of the <code>From</code> header sent by the UE in the request.    |
| To          | Set to the value of the <code>To</code> header sent by the UE in the request.      |
| Via         | Set to the value of the <code>Via</code> header sent by the UE in the request.     |
| Call-ID     | Set to the value of the <code>Call-ID</code> header sent by the UE in the request. |

## 3.5 Standalone Requests Initiated to UE

A standalone SIP request is defined as a SIP request that does not create a dialog and is sent outside an existing dialog. Only the SIP methods, `MESSAGE`, `OPTIONS`, `PUBLISH`, and `REFER` are defined as possible to send as standalone SIP requests, but also other SIP methods are possible.

### 3.5.1 Preconditions

The UE must be registered as described in Section 3.3.1 User Registration on page 22.

### 3.5.2 Receive Standalone SIP Requests

The unsuccessful cases are described in Section 3.5.3 Unsuccessful Cases at Standalone Requests on page 32.

The signaling sequence is shown in Figure 8.

When the P-CSCF receives a SIP request destined to the UE, it transfers the SIP request, using the address received during registration, and it includes the information listed in Table 11.

*Table 11 SIP Standalone Request on Terminating Side*

| Header      | Comment                                                                                                                 |
|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Request-URI | Set to the <code>Contact</code> address that UE has registered. The contact address is normally expressed as a SIP URI. |



| Header              | Comment                                                                                                                                                                                                         |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P-Asserted-Identity | The P-Asserted-Identity header can presently be set to the value of the Public User Identity identifying the calling user. This header is not available if privacy has been requested.                          |
| P-Called-Party-ID   | A P-Called-Party-ID header is included to indicate the addressed Public User Identity of the terminating user. Can be expressed either as a SIP URI or tel URI.                                                 |
| From                | Set to the SIP URI or tel URI that contains the Public User Identity that the calling user wants to be identified as. If calling user required privacy, then the From header would be set to <b>Anonymous</b> . |
| To                  | Set to the SIP URI or tel URI that contains the destination of this request.                                                                                                                                    |
| Contact             | The Contact header includes the contact address of the originating UE. The contact address is normally expressed as a SIP URI.                                                                                  |
| Via                 | Set to include the IP address of the P-CSCF in the sent-by field.                                                                                                                                               |
| Call-ID             | Set to a globally unique value as defined by <a href="#">RFC 3261</a> .                                                                                                                                         |

The UE is expected to send a SIP 2xx response and it must include the parameters listed in Table 12.

*Table 12 SIP 2xx Response to Standalone Request – Terminating Side*

| Header      | Comment                                                            |
|-------------|--------------------------------------------------------------------|
| Status-Line | Status-Line with status-code set to 2XX.                           |
| From        | Set to the value of the From header as received in the request.    |
| To          | Set to the value of the To header as received in the request.      |
| Via         | Set to the value of the Via header as received in the request.     |
| Call-ID     | Set to the value of the Call-ID header as received in the request. |

The P-CSCF performs checks and if successful the SIP 2xx response is forwarded to the remote end.

### 3.5.3 Unsuccessful Cases at Standalone Requests

For protocol errors or errors outside the scope of this description, refer to the [RFC 3261 Session Initiation Protocol](#) specification and other relevant extensions to the RFC.

#### 3.5.3.1 SIP Request Rejected by UE

At reception of the standalone SIP request, the UE sends a SIP final non-2xx response to the P-CSCF that includes the information listed in Table 13.

*Table 13 SIP Final non-2xx Response to Standalone Request – Terminating*

| Header      | Comment                                                                                   |
|-------------|-------------------------------------------------------------------------------------------|
| Status-Line | Status-Line with status-code set to 2XX.                                                  |
| From        | Set to the value of the <code>From</code> header as received by the UE in the request.    |
| To          | Set to the value of the <code>To</code> header as received by the UE in the request.      |
| Via         | Set to the value of the <code>Via</code> header as received by the UE in the request.     |
| Call-ID     | Set to the value of the <code>Call-ID</code> header as received by the UE in the request. |

## 3.6 INVITE Dialog Initiated by UE

### 3.6.1 Preconditions

The preconditions in Section 3.4.1 Preconditions on page 27 are valid with the following addition:

- The UE must build a proper preloaded `Route-set` for all new dialog requests and standalone SIP requests. The UE must include a `Route` header value made out of the P-CSCF URI, containing the IP address or the FQDN learned through the P-CSCF discovery procedures.

### 3.6.2 Create INVITE Dialog

Only successful cases of how the UE, the inviting user, creates an `INVITE` dialog are defined. For details about the unsuccessful cases, see Section 3.6.7 Unsuccessful Cases at INVITE on page 40.

The procedure is initiated by the UE, as defined in the [RFC 3261 Session Initiation Protocol](#) specification.



The SIP `INVITE` dialog is valid until the inviting user terminates the dialog, see Section 3.6.4 Terminate `INVITE` Dialog on page 37, or until the network or the invited UE terminates the dialog, see Section 3.7.4 Terminate a Dialog on page 47.

The inviting user can cancel the creation of a dialog as described in the Section 3.6.5 Cancel SIP `INVITE` Request on page 38 and Section 3.6.6 Rejection of Cancel on page 39.

The status codes and reason phrases that the P-CSCF can generate as part of the create `INVITE` dialog procedures are described in the *CSCF Fault Codes Catalogue*.

The signaling sequence is shown in Figure 3.

The UE must send a SIP `INVITE` request to the P-CSCF using the same address as used for the initial registration.

The P-CSCF expects that the UE has populated the header fields as follows in the `INVITE` request, see Table 14.

**Table 14** *SIP `INVITE` Request*

| Header               | Comment       |
|----------------------|---------------|
| Request-URI          | See Table 36. |
| Authorization        | See Table 36. |
| P-Preferred-Identity | See Table 36. |
| From                 | See Table 36. |
| To                   | See Table 36. |
| Privacy              | See Table 36. |
| Contact              | See Table 36. |
| Via                  | See Table 36. |
| Call-ID              | See Table 36. |
| Session-Expires      | See Table 36. |
| Supported            | See Table 36. |
| Route                | See Table 36. |

The P-CSCF performs checks of the request and if unsuccessful, the P-CSCF returns an error response as described in the *CSCF Fault Codes Catalogue*.

The P-CSCF sends the SIP `100` (`Trying`) response to the UE including the information listed in Table 15.

*Table 15 SIP 100 Trying*

| Header      | Comment                                                                                      |
|-------------|----------------------------------------------------------------------------------------------|
| Status-Line | Status-Line with status-code set to 100 and reason-phrase set to <b>Trying</b> .             |
| From        | Set to the value of the From header sent by the UE in the INVITE request.                    |
| To          | Set to the value of the To header sent by the UE in the INVITE request.                      |
| Via         | Via header, set to the value of the Via header sent by the UE in the INVITE request.         |
| Call-ID     | Call-ID header, set to the value of the Call-ID header sent by the UE in the INVITE request. |

The P-CSCF sends the SIP message to the S-CSCF.

Optionally, the P-CSCF transfers SIP provisional responses to the UE if received from the S-CSCF. The P-CSCF never generates 1XX response for the INVITE request, except for 100 (Trying). The message depends on the network element that generated the message, but the message can include information listed in Table 16.

*Table 16 SIP 1xx Response*

| Header       | Comment                                                                                      |
|--------------|----------------------------------------------------------------------------------------------|
| Status-Line  | Status-Line with status-code set to 1XX.                                                     |
| From         | Set to the value of the From header sent by the UE in the INVITE request.                    |
| To           | Set to the value of the To header sent by the UE in the INVITE request.                      |
| Via          | Set to the value of the Via header sent by the UE in the INVITE request.                     |
| Call-ID      | Set to the value of the Call-ID header sent by the UE in the INVITE request.                 |
| Record-Route | One or more Record-Route headers can be present when the route-set of the dialog is created. |
| Contact      | A Contact header can be present when the route-set of the dialog is created.                 |

If the P-CSCF receives a 2xx response from the S-CSCF, the P-CSCF transfers the SIP 2xx response to the UE. The P-CSCF never generates 2xx response for the INVITE request. The message depends on the network element that generated the message, but the message can include information listed in Table 17.



*Table 17 SIP 2xx Response (INVITE)*

| Header              | Comment                                                                                                                                                                                                      |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Status-Line         | Status-Line with status-code set to 2XX.                                                                                                                                                                     |
| From                | Set to the value of the <code>From</code> header sent by the UE in the <code>INVITE</code> request.                                                                                                          |
| To                  | Set to the value of the <code>To</code> header sent by the UE in the <code>INVITE</code> request.                                                                                                            |
| Via                 | Set to the value of the <code>Via</code> header sent by the UE in the <code>INVITE</code> request.                                                                                                           |
| Call-ID             | Set to the value of the <code>Call-ID</code> header sent by the UE in the <code>INVITE</code> request.                                                                                                       |
| Record-Route        | One or more <code>Record-Route</code> headers can be present when the <code>route-set</code> of the dialog is created.                                                                                       |
| Contact             | A <code>Contact</code> header must be present when the <code>route-set</code> of the dialog is created.                                                                                                      |
| Session-Expires     | A <code>Session-Expires</code> header is included if the session timer procedure is activated for this dialog, according to <a href="#">RFC 4028</a> .                                                       |
| P-Asserted-Identity | <p>A <code>P-Asserted-Identity</code> header can be present and set to the value of public identity identifying the destination.</p> <p>This information is not available if privacy has been requested.</p> |

If session timers are initiated for the dialog, the P-CSCF starts the SIP session timer as described in Section 3.1.1 Session Timer Procedure on page 9.

The UE is expected to send a SIP ACK request to the P-CSCF. The P-CSCF expects that the UE has populated the header fields as follows in the ACK request, see Table 18.

*Table 18 SIP ACK Request*

| Header      | Comment                                                                                                                                                                               |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Request-URI | Set according to the route set established; or if the ACK message is sent as a response to a non-2xx response message, the same value as in the original <code>INVITE</code> request. |
| From        | Set to the value of the <code>From</code> header sent by the UE in the <code>INVITE</code> request.                                                                                   |
| To          | Set to the value of the original <code>INVITE</code> request with the addition of the <code>To</code> tag received.                                                                   |
| Via         | See Table 36.                                                                                                                                                                         |

| Header  | Comment                                                                                                                                                                                                                                               |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Call-ID | Set to the value of the <code>Call-ID</code> header sent by the UE in the <code>INVITE</code> request.                                                                                                                                                |
| Route   | One or more <code>Route</code> headers, set according to the route set established; or if the <code>ACK</code> message is sent as response to a non-2xx response message, the <code>Route</code> headers in the original <code>INVITE</code> message. |

### 3.6.3 Send Request Within INVITE Dialog

Only the procedures about how to send a SIP request successfully within a dialog are defined. For details about the unsuccessful cases, see Section 3.6.7 Unsuccessful Cases at `INVITE` on page 40.

The procedure for sending a SIP `BYE` request is described in Section 3.6.4 Terminate `INVITE` Dialog on page 37.

The signaling sequence is shown in Figure 5.

**Note:** The SIP `ACK` must only be sent in case the SIP request is a SIP `re-INVITE` request.

The procedure starts when the UE sends a SIP request to the P-CSCF within the existing SIP dialog. The P-CSCF expects that the UE has populated the header fields as follows in the SIP request, see Table 19.

Table 19 SIP Subsequent Request

| Header          | Comment       |
|-----------------|---------------|
| Request-URI     | See Table 36. |
| From            | See Table 36. |
| To              | See Table 36. |
| Via             | See Table 36. |
| Call-ID         | See Table 36. |
| Route           | See Table 36. |
| Contact         | See Table 36. |
| Session-Expires | See Table 36. |
| Supported       | See Table 36. |

The P-CSCF performs checks of the request and if not successful, the P-CSCF returns an error response as described in the *CSCF Fault Codes Catalogue*.





If the SIP request is a SIP `INVITE` request or a SIP `UPDATE` request, the SIP session timer is checked as described in Section 3.1.1 Session Timer Procedure on page 9.

If the checks are successful, the P-CSCF sends the request to the S-CSCF. When the P-CSCF receives a response from the S-CSCF, the P-CSCF transfers a SIP 2xx response to the UE and includes the information listed in Table 17.

The UE is expected to send a SIP `ACK` request to the P-CSCF if the request was an `INVITE` and it must include the information listed in Table 18.

### 3.6.4 Terminate `INVITE` Dialog

Only how to terminate a dialog successfully is defined. For details about the unsuccessful cases, see Section 3.6.7 Unsuccessful Cases at `INVITE` on page 40.

This procedure is initiated by UE, as defined in the [RFC 3261 Session Initiation Protocol](#) specification.

The signaling sequence is shown in Figure 6.

**Note:** The UE in the figure can be the inviting or invited user.

The procedure starts when the UE sends a SIP `BYE` request to the P-CSCF. The UE is expected to stop sending media and to ignore any received media. The P-CSCF expects that the UE has populated the header fields as follows in the `BYE` request, see Table 20.

Table 20 SIP `BYE` Request

| Header      | Comment       |
|-------------|---------------|
| Request-URI | See Table 36. |
| From        | See Table 36. |
| To          | See Table 36. |
| Via         | See Table 36. |
| Call-ID     | See Table 36. |
| Route       | See Table 36. |

The P-CSCF performs checks of the request and if not successful, the P-CSCF returns an error response as described in the *CSCF Fault Codes Catalogue*.

If successful, the P-CSCF initiates clearing of the remote UE as described in Section 3.7.4 Terminate a Dialog on page 47.

The P-CSCF transfers a SIP 200 (OK) response to the UE and includes the information listed in Table 17.

The P-CSCF releases the resources reserved for the call, if there is no event subscription active for the session. If an event subscription is active, then the dialog state is kept in the P-CSCF, the `SUBSCRIBE` request sent within the dialog.

The UE releases Real-Time Transport Protocol (RTP) and RTP Control Protocol (RTCP) resources reserved for the call.

### 3.6.5 Cancel SIP INVITE Request

Figure 13 defines how to successfully cancel a SIP `INVITE` request. For details about the unsuccessful cases, see Section 3.6.7 Unsuccessful Cases at `INVITE` on page 40.

The UE can cancel the SIP `INVITE` request as described in the [RFC 3261 Session Initiation Protocol](#) specification

Status codes generated by the P-CSCF are describes in the *CSCF Fault Codes Catalogue*.

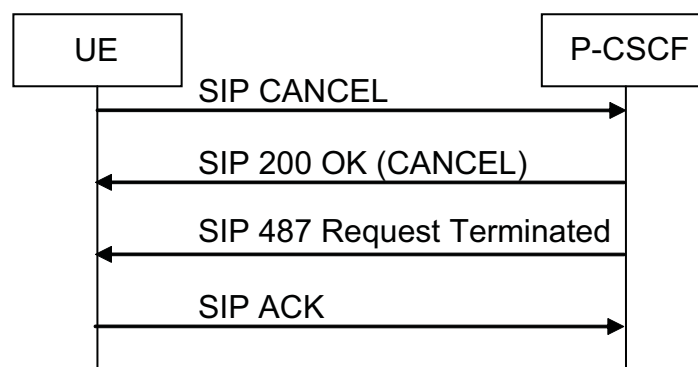


Figure 13 Cancel SIP `INVITE`

The procedure starts when the UE sends the SIP `CANCEL` request to the P-CSCF before the terminating UE has sent a final response. It must include the information listed in Table 21.

Table 21 SIP `CANCEL` Request

| Header      | Comment                                                       |
|-------------|---------------------------------------------------------------|
| Request-URI | Set to the value in the original <code>INVITE</code> request. |
| From        | Set to the value in the original <code>INVITE</code> request. |
| To          | Set to the value in the original <code>INVITE</code> request. |
| Via         | See Table 36.                                                 |
| Call-ID     | Set to the value in the original <code>INVITE</code> request. |

The P-CSCF performs checks of the request and if not successful, the P-CSCF returns an error response as described in the *CSCF Fault Codes Catalogue*.



The P-CSCF generates a SIP 200 (OK) response to the UE and includes the information listed in Table 17.

The P-CSCF sends the SIP CANCEL to the S-CSCF. When the P-CSCF receives a SIP 487 from the S-CSCF, it transfers a SIP 487 (Request terminated) response to the UE and the message can include the information listed in Table 22.

*Table 22 SIP Final Non-2xx Response*

| Header      | Comment                                                                                                                |
|-------------|------------------------------------------------------------------------------------------------------------------------|
| Status-Line | Status-Line with status-code set to non-2XX.                                                                           |
| From        | Set to the value of the From header sent by the UE in the INVITE request.                                              |
| To          | Set to the value of the To header sent by the UE in the INVITE request.                                                |
| Via         | Set to the value of the Via header sent by the UE in the INVITE request.                                               |
| Call-ID     | Set to the value of the Call-ID header sent by the UE in the INVITE request.                                           |
| Min-SE      | A Min-SE header can be included if the value in the Session-Expires header in the original request INVITE was too low. |

The UE sends the SIP ACK request to the P-CSCF and include the information listed in Table 18.

### 3.6.6 Rejection of Cancel

Figure 14 defines how the UE cancels a SIP INVITE when the invited user has already generated a 200 (OK) response for the dialog establishment, but the inviting user has not received the 200 (OK). For details about the unsuccessful cases, see Section 3.6.7 Unsuccessful Cases at INVITE on page 40.

The UE can cancel a SIP INVITE request as described in the [RFC 3261 Session Initiation Protocol](#) specification.

Status codes generated by the P-CSCF are described in the *CSCF Fault Codes Catalogue* document.

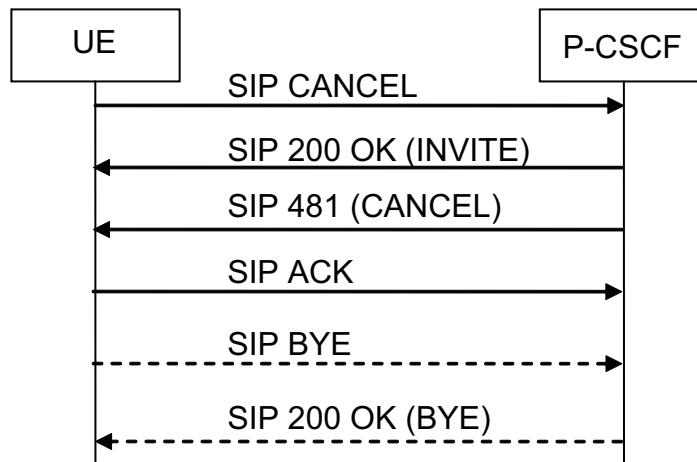


Figure 14 Rejection of Cancel of SIP INVITE Request

The procedure starts when the UE sends a SIP `CANCEL` request to the P-CSCF and it must include the information listed in Table 21.

The P-CSCF receives a `200 (OK)` response for the `INVITE` request from the invited user and forwards the response to the UE. The P-CSCF includes the information listed in Table 17.

The P-CSCF receives the `CANCEL` request from the UE and responds with a SIP `481 (Call/Transaction Does Not Exist)` to the UE.

The UE is expected to send a SIP `ACK` request to the P-CSCF and include the information listed in Table 18.

The UE can keep the established dialog or can terminate the dialog with a SIP `BYE` request.

### 3.6.7 Unsuccessful Cases at INVITE

For protocol errors or errors outside the scope of this description, refer to the [RFC 3261 Session Initiation Protocol](#) specification or relevant extensions to the RFC.

#### 3.6.7.1 INVITE Rejected by Network

The P-CSCF can reject the SIP `INVITE` request as the result of an unsuccessful procedure, see Figure 15.

Status codes generated by the P-CSCF are described in the *CSCF Fault Codes Catalogue*.

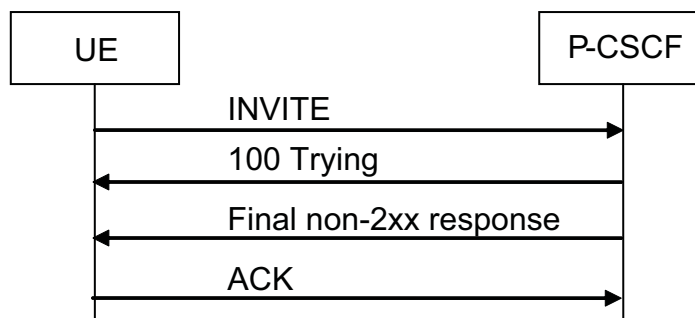


Figure 15 P-CSCF Rejects the INVITE

The procedure is initiated as per Section 3.6.2 Create INVITE Dialog on page 32.

The P-CSCF sends a SIP final non-2xx response and includes the information listed in Table 22. This final response can be generated by the P-CSCF or received from the S-CSCF.

The UE sends a SIP ACK request to the P-CSCF and includes the information listed in Table 18.

### 3.6.7.2 CSCF Rejects a SIP Request Within a Dialog

Figure 16 describes the procedure when the P-CSCF rejects the SIP request sent by the UE within a dialog.

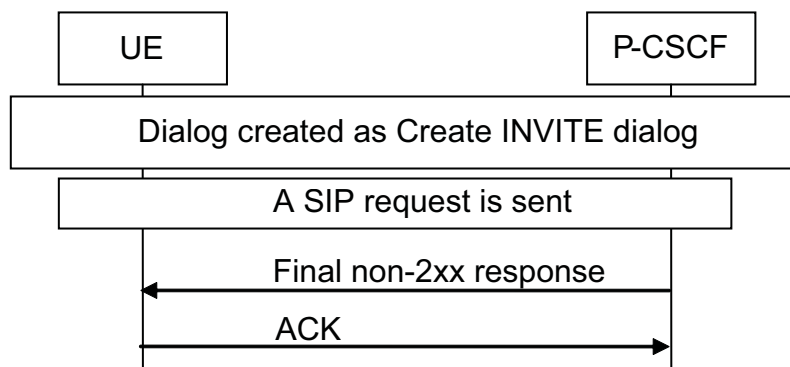


Figure 16 P-CSCF Rejects a SIP Request Within a Dialog

The sending of the SIP request is initiated as Section 3.6.3 Send Request Within INVITE Dialog on page 36, Section 3.6.4 Terminate INVITE Dialog on page 37, or Section 3.6.5 Cancel SIP INVITE Request on page 38.

The P-CSCF sends the SIP final non-2xx response to the UE and it includes the information listed in Table 22. This final response can be generated by the P-CSCF or received from the S-CSCF.

The UE is expected to send a SIP ACK request to the P-CSCF if the request was an INVITE and to include the information listed in Table 18.

The status codes and reason phrases the P-CSCF can generate as the result of `INVITE` dialog procedures are described in the *CSCF Fault Codes Catalogue*.

## 3.7 INVITE Dialog Initiated towards UE

### 3.7.1 Preconditions

The UE must be registered as described in Section 3.3.1 User Registration on page 22.

### 3.7.2 Create INVITE Dialog

Only the procedure for creating a successful terminating `INVITE` dialog is defined. For details about the unsuccessful cases, see Section 3.7.6 Unsuccessful Cases at `INVITE` on page 49.

The SIP `INVITE` dialog is valid until the inviting user terminates the dialog, see Section 3.6.4 Terminate `INVITE` Dialog on page 37, or until the network or the invited user terminates the dialog, see section Section 3.7.4 Terminate a Dialog on page 47.

The signaling sequence is shown in Figure 4.

The procedure starts when P-CSCF receives a SIP `INVITE` request from the S-CSCF. The P-CSCF transfers the SIP `INVITE` request to the registered UE, using the address received during registration, and includes the information listed in Table 23. The message depends on the network element that generated the message, but the message can include information listed in Table 23.

Table 23 SIP `INVITE` Request on Terminating Side

| Header              | Comment                                                                                                                                                                                |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Request-URI         | Request-URI set to the <code>Contact</code> address that UE has registered. The contact address is normally expressed as a SIP URI.                                                    |
| P-Asserted-Identity | The P-Asserted-Identity header can presently be set to the value of the Public User Identity identifying the calling user. This header is not available if privacy has been requested. |
| P-Called-Party-ID   | A P-Called-Party-ID header is included to indicate the addressed Public User Identity of the terminating user. Can be expressed either as a SIP URI or tel URI.                        |



| Header          | Comment                                                                                                                                                                                                                                         |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| From            | Set to the SIP URI or tel URI that contains the Public User Identity that the user wants to be identified as. If the originating user required privacy, then the From header would be set to <b>Anonymous</b> .                                 |
| To              | Set to the SIP URI or tel URI that contains the destination of this request.                                                                                                                                                                    |
| Contact         | The Contact header includes the contact address of the originating UE. The contact address is normally expressed as a SIP URI.                                                                                                                  |
| Via             | Set to include the IP address of the P-CSCF in the sent-by field.                                                                                                                                                                               |
| Call-ID         | Set to a globally unique value as defined by <a href="#">RFC 3261</a> .                                                                                                                                                                         |
| Session-Expires | A Session-Expires header can be included if the originating UE supports session timer according to <a href="#">RFC 4028</a> . The recommendation is that the UEs support the session timer procedure according to <a href="#">RFC 4028</a> .    |
| Supported       | The Supported header can be included by the originating UE if certain SIP extension procedures are supported by the UE. The recommendation is that the UE supports at least the session timer procedure according to <a href="#">RFC 4028</a> . |
| Record-Route    | A Record-Route header is present that is set to the P-CSCF address. The Record-Route is expressed as a SIP URI.                                                                                                                                 |

Optionally, the UE can send the SIP 100 (Trying) response to the P-CSCF including the information listed in Table 24.

*Table 24 SIP 100 Trying on Terminating Side*

| Header      | Comment                                                                                                                 |
|-------------|-------------------------------------------------------------------------------------------------------------------------|
| Status-Line | Status-Line with status-code set to 100 and reason-phrase set to <b>Trying</b> .                                        |
| From        | Set to the value of the From header received in the INVITE request.                                                     |
| To          | Set to the value of the To header received in the INVITE request. A To tag has been added if a dialog has been created. |
| Via         | Set to the value of the Via header received in the INVITE request.                                                      |

| Header       | Comment                                                                                               |
|--------------|-------------------------------------------------------------------------------------------------------|
| Call-ID      | Set to the value of the <code>Call-ID</code> header received in the <code>INVITE</code> request.      |
| Record-Route | Set to the value of the <code>Record-Route</code> header received in the <code>INVITE</code> request. |

Optionally, the UE can send one or more provisional responses, other than the `SIP 100 (Trying)` response, to the P-CSCF including the information listed in Table 25.

*Table 25 SIP 1xx, Except 100, on Terminating Side*

| Header      | Comment                                                                                                                                     |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Status-Line | Status-Line with <code>status-code</code> set to 1xx.                                                                                       |
| From        | Set to the value of the <code>From</code> header received in the <code>INVITE</code> request.                                               |
| To          | Set to the value of the <code>To</code> header received in the <code>INVITE</code> request.                                                 |
| Via         | Set to the value of the <code>Via</code> header received in the <code>INVITE</code> request.                                                |
| Call-ID     | Set to the value of the <code>Call-ID</code> header received in the <code>INVITE</code> request.                                            |
| Contact     | The <code>Contact</code> header includes the contact address of the terminating UE. The contact address is normally expressed as a SIP URI. |

The P-CSCF performs checks and if the checks are successful, the SIP provisional response is sent to the S-CSCF.

The UE is expected to send a SIP 2xx response including the information listed in Table 26.

*Table 26 SIP 2xx Response on Terminating Side*

| Header      | Comment                                                                                                                                                 |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Status-Line | Status-Line with <code>status-code</code> set to 2xx.                                                                                                   |
| From        | Set to the value of the <code>From</code> header received in the <code>INVITE</code> request.                                                           |
| To          | Set to the value of the <code>To</code> header received in the <code>INVITE</code> request. A <code>To</code> tag is to be added by the terminating UE. |
| Via         | Set to the value of the <code>Via</code> header received in the <code>INVITE</code> request.                                                            |





| Header          | Comment                                                                                                                                             |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Call-ID         | Set to the value of the <code>Call-ID</code> header received in the <code>INVITE</code> request.                                                    |
| Record-Route    | Set to the value of the <code>Record-Route</code> header received in the <code>INVITE</code> request.                                               |
| Contact         | The <code>Contact</code> header includes the contact address of the terminating UE. The contact address is normally expressed as a SIP URI.         |
| Session-Expires | A <code>Session-Expires</code> header is included if the session timer procedure is active for this dialog, according to <a href="#">RFC 4028</a> . |

The P-CSCF performs checks and if the checks are successful, the SIP 2xx is sent to the S-CSCF.

When P-CSCF receives a SIP ACK from the S-CSCF, the P-CSCF transfers the SIP ACK to the UE including the information listed in Table 27.

*Table 27 SIP ACK Request on Terminating Side*

| Header      | Comment                                                                                                                                                                                            |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Request-URI | Set according to the route set established for the dialog; or set to the same value as in the original <code>INVITE</code> request if the ACK request is sent as a response to a non-2xx response. |
| From        | Set to the value of the <code>From</code> header received in the <code>INVITE</code> request.                                                                                                      |
| To          | Set to the value of the original <code>INVITE</code> request with the addition of the <code>To</code> tag if a dialog was established.                                                             |
| Via         | Set to include the IP address of the P-CSCF in the <code>sent-by</code> field.                                                                                                                     |
| Call-ID     | Set to the value of the <code>Call-ID</code> header received in the <code>INVITE</code> request.                                                                                                   |

The P-CSCF starts the SIP session timer as described in Section 3.1.1 Session Timer Procedure on page 9.

### 3.7.3

#### Deliver a SIP Request Within an INVITE Dialog

Only the procedure for a successful delivery of a SIP request within a dialog is defined.

For details about the unsuccessful cases, see Section 3.7.6 Unsuccessful Cases at INVITE on page 49.

The signaling sequence is shown in Figure 5.

The procedure starts when the P-CSCF receives a SIP request within a dialog from the S-CSCF. The P-CSCF transfers the SIP request to the UE including the information listed in Table 28.

*Table 28 SIP Request Within Established Dialog on Terminating Side*

| Header          | Comment                                                                                                                                                                                                                                                                                                                                                              |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Request-URI     | Set to the route set established for the dialog.                                                                                                                                                                                                                                                                                                                     |
| From            | <p>If the request is sent by the inviting party, set to the value of the <code>From</code> header in the original <code>INVITE</code> request.</p> <p>If the request is sent by the invited party, set to the value of <code>To</code> header sent as a response to the original <code>INVITE</code> request.</p>                                                    |
| To              | <p>If the request is sent by the inviting party, set to the value of the <code>To</code> header received in the response to the original <code>INVITE</code> request, including the <code>To</code> tag.</p> <p>If the request is sent by the invited party, set to the value of the <code>From</code> header received the original <code>INVITE</code> request.</p> |
| Via             | Set to include the IP address of the P-CSCF in the <code>sent-by</code> field.                                                                                                                                                                                                                                                                                       |
| Call-ID         | Set to the value in the original <code>INVITE</code> request.                                                                                                                                                                                                                                                                                                        |
| Contact         | The <code>Contact</code> header includes the contact address of the UE issuing the request. The contact address is normally expressed as a SIP URI.                                                                                                                                                                                                                  |
| Session-Expires | <code>Session-Expires</code> header can be included if the UE issuing the request supports session timer according to <a href="#">RFC 4028</a> . The recommendation is that the support session timer procedure of the UE according to <a href="#">RFC 4028</a> .                                                                                                    |
| Supported       | The <code>Supported</code> header can be included by the UE issuing the request supports certain SIP extension procedures. The recommendation is that the UE supports at least the session timer procedure according to <a href="#">RFC 4028</a> .                                                                                                                   |

The UE is expected to send a SIP 2xx response to the P-CSCF including the information listed in Table 26.

The P-CSCF performs checks and if the checks are successful, the SIP 2xx response is sent to the S-CSCF.



If the SIP request was a SIP *re-INVITE* request, the P-CSCF transfers the SIP ACK request when received from the S-CSCF to the UE including the information listed in Table 27.

### 3.7.4 Terminate a Dialog

Only the procedure for the successful termination of a dialog is described. For details about the unsuccessful cases, see Section 3.7.6 Unsuccessful Cases at INVITE on page 49.

The sequence is shown in Figure 6.

The procedures start when the P-CSCF receives a SIP *BYE* request from the S-CSCF, or when the P-CSCF generates a SIP *BYE* request, in case of P-CSCF-initiated termination. The P-CSCF transfers the SIP *BYE* request to the UE and includes the information listed in Table 29.

*Table 29 SIP BYE Request on Terminating Side*

| Header      | Comment                                                                                                 |
|-------------|---------------------------------------------------------------------------------------------------------|
| Request-URI | Set to the route set established for the dialog.                                                        |
| From        | Set to the value of the original <i>INVITE</i> request.                                                 |
| To          | Set to the value in the original <i>INVITE</i> request with the addition of the received <i>To</i> tag. |
| Via         | See Table 36.                                                                                           |
| Call-ID     | Set to the value in the original <i>INVITE</i> request.                                                 |

The UE stops sending and receiving media and releases all resources reserved for the call.

The UE is expected to send a SIP *200 (OK)* response to the P-CSCF including the information listed in Table 26.

The P-CSCF performs checks and if the checks are successful, the SIP *200 (OK)* response is sent to the S-CSCF. The P-CSCF releases the resources reserved for the call if there is no event subscription active for the session. If an event subscription is active, then the dialog state is kept in the CSCF (*SUBSCRIBE* request sent within the dialog) until the subscription is terminated.

### 3.7.5 Cancel a SIP INVITE Requested

Only a successful cancellation of an *INVITE* request is described. For details about the unsuccessful cases, see Section 3.7.6 Unsuccessful Cases at INVITE on page 49.

The P-CSCF initiates the procedure when receiving a cancel request from the terminating S-CSCF, see Figure 17.

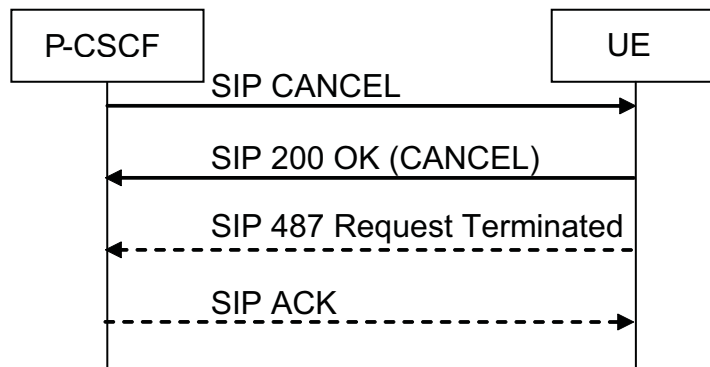


Figure 17 Cancel of INVITE Request on Terminating Side

The P-CSCF sends the SIP `CANCEL` request to the UE and it includes the information listed in Table 30.

Table 30 SIP `CANCEL` Request on Terminating Side

| Header      | Comment                                                       |
|-------------|---------------------------------------------------------------|
| Request-URI | Set to the value in the original <code>INVITE</code> request. |
| From        | Set to the value in the original <code>INVITE</code> request. |
| To          | Set to the value in the original <code>INVITE</code> request. |
| Via         | Set to the value in the original <code>INVITE</code> request. |
| Call-ID     | Set to the value in the original <code>INVITE</code> request. |

The UE is expected to send the SIP `200 (OK)` response including the information listed in Table 26.

The P-CSCF performs checks and if the checks are successful, the SIP `200 (OK)` response is sent to the S-CSCF.

The UE is expected to send a SIP `487 (Request Terminated)` response to the SIP `INVITE` request if no final response is sent yet including the information listed in Table 31.

Table 31 SIP Final Non-2xx Response on Terminating Side

| Header      | Comment                                                                                       |
|-------------|-----------------------------------------------------------------------------------------------|
| Status-Line | Status-Line with <code>status-code</code> set to non-2XX.                                     |
| From        | Set to the value of the <code>From</code> header received in the <code>INVITE</code> request. |
| To          | Set to the value of the <code>To</code> header received in the <code>INVITE</code> request.   |
| Via         | Set to the value of the <code>Via</code> header received in the <code>INVITE</code> request.  |



| Header  | Comment                                                                                                                                              |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Call-ID | Set to the value of the <code>Call-ID</code> header received in the <code>INVITE</code> request.                                                     |
| Min-SE  | A <code>Min-SE</code> header can be included if the value in the <code>Session-Expires</code> header in the <code>INVITE</code> request was too low. |

The P-CSCF performs checks and if the checks are successful, the SIP 487 response is sent towards the S-CSCF.

When the P-CSCF receives a SIP ACK from S-CSCF, the P-CSCF sends the SIP ACK to the UE and it includes the information listed in Table 27.

### 3.7.6 Unsuccessful Cases at INVITE

For protocol errors or errors outside the scope of this description, refer to the [RFC 3261 Session Initiation Protocol](#) specification and other relevant extensions to the RFC.

#### 3.7.6.1 Terminate UE Rejects INVITE

Figure 18 describes the procedures when the terminating UE rejects the `INVITE` request.

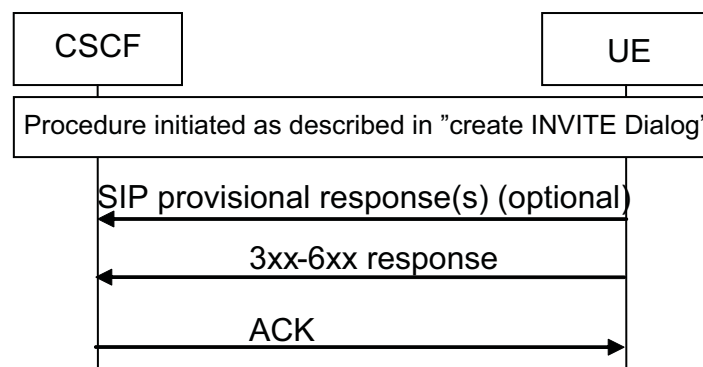


Figure 18 Terminating UE Rejects the `INVITE`

The `INVITE` is sent as per Section 3.6.2 Create `INVITE` Dialog on page 32.

The UE can return none, one, or more SIP provisional responses before sending the SIP final reject response.

The UE sends a SIP final non-2xx response to the P-CSCF and includes the information listed in Table 31.

The P-CSCF performs checks and if the checks are successful, the SIP final non-2xx response is sent towards the S-CSCF.

When the P-CSCF receives a SIP ACK from the S-CSCF, the P-CSCF sends the SIP ACK request to the UE and it includes the information listed in Table 27.

## 3.8 SUBSCRIBE Dialog

### 3.8.1 Preconditions

The preconditions in Section 3.4.1 Preconditions on page 27 are valid.

### 3.8.2 Create SUBSCRIBE Dialog

Only how the UE successfully creates a SUBSCRIBE initiated dialog is defined.

For details about the unsuccessful cases, see Section 3.8.5 Unsuccessful Cases at SUBSCRIBE on page 53.

The procedure is initiated by the UE, as defined in the [RFC 3261 Session Initiation Protocol](#) and [RFC 3265 Session Initiation Protocol \(SIP\) Specific Event Notification](#) specifications.

The SIP SUBSCRIBE dialog is valid until the subscriber explicitly terminates the dialog, see Section 3.8.4 Terminate SUBSCRIBE Dialog on page 52, or until the dialog expires, or the notifier explicitly terminates the dialog.

The signaling sequence is shown in Figure 7.

The procedure starts when the UE sends a SIP SUBSCRIBE request to the P-CSCF using the same address as used for the initial registration including the information listed in Table 32.

*Table 32 SIP SUBSCRIBE Request*

| Header               | Comment       |
|----------------------|---------------|
| Request-URI          | See Table 36. |
| Authorization        | See Table 36. |
| P-Preferred-Identity | See Table 36. |
| From                 | See Table 36. |
| To                   | See Table 36. |
| Privacy              | See Table 36. |
| Contact              | See Table 36. |
| Via                  | See Table 36. |
| Call-ID              | See Table 36. |
| Supported            | See Table 36. |



| Header  | Comment                                                                                      |
|---------|----------------------------------------------------------------------------------------------|
| Route   | See Table 36.                                                                                |
| Event   | Set to the event package that UE wants to subscribe to.                                      |
| Expires | An <code>Expires</code> header can be included to indicate the duration of the subscription. |

The P-CSCF performs the checks and if the checks are successfully, routes the SIP `SUBSCRIBE` to the S-CSCF.

When the P-CSCF receives a 2xx from S-CSCF, the P-CSCF transfers the SIP 2xx response to the UE and includes the information listed in Table 33, and starts the subscription supervision timer.

*Table 33 SIP 2xx Response on SUBSCRIBE on Originating Side*

| Header              | Comment                                                                                                                                                                                               |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Status-Line         | Status-Line with <code>status-code</code> set to 2xx                                                                                                                                                  |
| From                | Set to the value of the <code>From</code> header sent by the UE in the <code>SUBSCRIBE</code> request.                                                                                                |
| To                  | Set to the value of the <code>To</code> header sent by the UE in the <code>SUBSCRIBE</code> request.                                                                                                  |
| Via                 | Set to the value of the <code>Via</code> header sent by the UE in the <code>SUBSCRIBE</code> request.                                                                                                 |
| Call-ID             | Set to the value of the <code>Call-ID</code> header sent by the UE in the <code>SUBSCRIBE</code> request.                                                                                             |
| Record-Route        | One or more <code>Record-Route</code> headers can be present when the route set of the dialog is created.                                                                                             |
| Contact             | A <code>Contact</code> header can be present when route set of the dialog is created.                                                                                                                 |
| P-Asserted-Identity | The <code>P-Asserted-Identity</code> header can presently be set to the value of public identity identifying the destination.<br><br>This information is not available if privacy has been requested, |
| Allow-Events        | The <code>Allow-Events</code> header can be included by the notifier to indicate supported event packages.                                                                                            |
| Expires             | Set to the duration of the subscription.                                                                                                                                                              |

### 3.8.3 Refresh SUBSCRIBE Dialog

Subscriptions can expire and must be refreshed by subsequent SUBSCRIBE messages to maintain the dialog.

Only the procedures to send a SIP SUBSCRIBE refresh successfully within a dialog are defined. For details about the unsuccessful cases, see Section 3.8.5 Unsuccessful Cases at SUBSCRIBE on page 53.

If the subscription expires in the P-CSCF, the subscription dialog is removed in the P-CSCF without informing the user.

The signaling sequence is shown in Figure 7.

The procedure starts when the UE sends a SIP SUBSCRIBE request to the P-CSCF within the existing SIP dialog and it includes the information listed in Table 19.

The P-CSCF performs checks of the request and if the checks are unsuccessful, the P-CSCF returns an error response according to Section 3.8.5.1 SUBSCRIBE Rejected by Network on page 53.

If the checks are performed successfully, the P-CSCF sends the SIP SUBSCRIBE to the S-CSCF. The P-CSCF restarts the subscription supervision timer.

When the P-CSCF receives the 2xx response from the S-CSCF, the P-CSCF transfers the SIP 2xx response to the UE and includes the information listed in Table 33.

### 3.8.4 Terminate SUBSCRIBE Dialog

Only how the user successfully terminates a SUBSCRIBE dialog is defined. For details about the unsuccessful cases, see Section 3.8.5 Unsuccessful Cases at SUBSCRIBE on page 53.

The procedure is initiated by the UE, as defined in the [RFC 3261 Session Initiation Protocol](#) and [RFC 3265 Session Initiation Protocol \(SIP\) Specific Event Notification](#) specifications.

The signaling sequence is shown in Figure 7.

The procedure starts when the UE sends a SIP SUBSCRIBE request including an `Expire` header with a value of zero to the P-CSCF. The SIP SUBSCRIBE request includes the information listed in Table 32.

The P-CSCF performs checks of the request and if the checks are unsuccessful, the P-CSCF returns an error response according to Section 3.8.5.1 SUBSCRIBE Rejected by Network on page 53.





If the checks are performed successfully, the P-CSCF sends the `SUBSCRIBE` to the S-CSCF when the P-CSCF receives the `200 (OK)` from the S-CSCF. The P-CSCF transfers the SIP `200 (OK)` response to the UE including the information listed in Table 33.

If the P-CSCF receives a `NOTIFY` from the S-CSCF, the `NOTIFY` is sent to the UE. The UE is expected to respond with a `2xx`, which the P-CSCF forwards to the S-CSCF.

### 3.8.5 Unsuccessful Cases at SUBSCRIBE

For protocol errors or errors outside the scope of this description, refer to the [RFC 3261 Session Initiation Protocol](#) and [RFC 3265 Session Initiation Protocol \(SIP\) Specific Event Notification](#) specifications and other relevant extensions to the RFC.

#### 3.8.5.1 SUBSCRIBE Rejected by Network

The P-CSCF can reject the SIP `SUBSCRIBE` request as the result of an unsuccessful procedure described in Section 3.8.2 Create `SUBSCRIBE` Dialog on page 50

Status codes generated by the P-CSCF are describes in the *CSCF Fault Codes Catalogue*.

The procedure is initiated as per Section 3.8.2 Create `SUBSCRIBE` Dialog on page 50.

The P-CSCF sends a SIP final non-`2xx` response and it includes the information listed in Table 34.

Table 34 SIP Final Non-`2xx` Response to `SUBSCRIBE`

| Header       | Comment                                                                                                                                |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Status-Line  | Status-Line with <code>status-code</code> set to non- <code>2XX</code> .                                                               |
| From         | Set to the value of the <code>From</code> header sent by the UE in the <code>SUBSCRIBE</code> request.                                 |
| To           | Set to the value of the <code>To</code> header sent by the UE in the <code>SUBSCRIBE</code> request.                                   |
| Via          | Set to the value of the <code>Via</code> header sent by the UE in the <code>SUBSCRIBE</code> request.                                  |
| Call-ID      | Set to the value of the <code>Call-ID</code> header sent by the UE in the <code>SUBSCRIBE</code> request.                              |
| Allow-Events | If <code>489 (Bad Event)</code> the notifier must include an <code>Allow-Events</code> header indicating the supported event packages. |

The dialog state in the UE and the P-CSCF is unchanged. In case of failure at the dialog creation, the dialog state is uninitiated.

## 3.9 Network Monitoring

Network monitoring of the unreachable configured neighboring SIP nodes is possible by sending SIP `OPTIONS` requests. A node can be regarded as unreachable owing to various reasons, for example, time-out, ICMP failure, transport failure, or overload.

SIP `OPTIONS` requests are sent either according to the `retry-after` header that can exist in the SIP error response SIP 503, or according to a configurable monitoring frequency until the node is considered reachable, that is, a SIP `OPTIONS` response other than SIP 503 is received. Network monitoring is configurable.



## 4 Information Model

### 4.1 Supported SIP Methods

The following SIP methods, see Table 35, are listed in TS 24.229 as supported methods. Refer to the [3GPP TS 24.229 IP Multimedia call control protocol based on Session Initiation Protocol \(SIP\) and Session Description Protocol \(SDP\)](#) specification.

*Table 35 Supported SIP Methods*

| SIP Method        | CSCF -> UE     | UE -> CSCF | Reference                |
|-------------------|----------------|------------|--------------------------|
| ACK request       | Supported      | Supported  | <a href="#">RFC 3261</a> |
| BYE request       | Supported      | Supported  | <a href="#">RFC 3261</a> |
| CANCEL request    | Supported      | Supported  | <a href="#">RFC 3261</a> |
| INVITE request    | Supported      | Supported  | <a href="#">RFC 3261</a> |
| MESSAGE request   | Supported      | Supported  | <a href="#">RFC 3428</a> |
| NOTIFY request    | Supported      | Supported  | <a href="#">RFC 3265</a> |
| OPTIONS request   | Supported      | Supported  | <a href="#">RFC 3261</a> |
| PRACK request     | Supported      | Supported  | <a href="#">RFC 3262</a> |
| PUBLISH request   | Supported      | Supported  | <a href="#">RFC 3903</a> |
| REFER request     | Supported      | Supported  | <a href="#">RFC 3515</a> |
| REGISTER request  | Not applicable | Supported  | <a href="#">RFC 3261</a> |
| SUBSCRIBE request | Supported      | Supported  | <a href="#">RFC 3265</a> |
| UPDATE request    | Supported      | Supported  | <a href="#">RFC 3311</a> |

The minimum requirement on the UE is that this supports all SIP methods defined in the [RFC 3261 Session Initiation Protocol](#) specification.

Other SIP methods can be required from service perspectives but are optional regarding the P-CSCF.

## 4.2 Important SIP Headers

Some of the more important headers that are expected from the UE are described in Table 36.

*Table 36 Important SIP Headers Expected from UE*

| Header        | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Authorization | <p>Included in this header is the <code>username</code> field, set to the value of the Private User Identity.</p> <p>If the UE has valid credentials, then this information is also to be included in the <code>Authorization</code> header.</p> <p>If AKA is used, this header is mandatory.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Call-ID       | <p>REGISTER: to a globally unique value as defined by <a href="#">RFC 3261</a>. The <code>Call-ID</code> value is to be the same for a Registration cycle, from Initial Registration to Deregistration.</p> <p>INITIAL REQUESTS: Set to a globally unique value as defined by <a href="#">RFC 3261</a>.</p> <p>SUBSEQUENT REQUESTS: Set to the value in the original <code>INVITE</code> request.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Contact       | <p>REGISTER:</p> <p>The <code>Contact</code> header includes a SIP URI containing the IP address of the UE in the <code>hostport</code> parameter or FQDN. At deregistration, the same contact must be used as at registration. A '*' indicates deregistration of all contacts.</p> <p>In first-round REGISTER of AKA authentication procedure, the <code>Contact</code> header must be (or DNS resolvable to) the IP address of the UE.</p> <p>In second-round REGISTER of AKA authentication procedure and all subsequent REGISTER requests, the <code>Contact</code> header must be (or DNS resolvable to) the IP address and protected server port of UE as negotiated during security mechanism agreement procedure (<code>port-ps</code>).</p> <p>OTHER SIP METHODS:</p> <p>Set to the SIP URI containing the IP address of the UE in the <code>hostport</code> parameter or FQDN.</p> |



| Header  | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Expires | <p><b>REGISTER:</b></p> <p>At registration an Expires header, or the Expires parameter within the Contact header is set to any value as desired during the registration. The Expires header is used for contacts (bindings) that does not contain an Expires parameter, (in accordance with <a href="#">RFC 3261</a>).</p> <p>The P-CSCF can decrease the duration of the registration in accordance with network policy. Registration attempts with a registration period of less than a predefined minimum value defined in the registrar is rejected with a 423 (Interval To Brief) response. The P-CSCF accepts a REGISTER without Expiry information.</p> <p>At deregistration an Expires header, or the Expires parameter within the Contact header must be set to the value of zero.</p> |
| From    | <p><b>REGISTER:</b></p> <p>Included in this header is a SIP URI of the Public User Identity to be registered or deregistered</p> <p><b>OTHER INITIAL SIP REQUEST:</b></p> <p>Set to the SIP URI or tel URI that contains the Public User Identity that the user wants to be identified as. If privacy is required, in any initial request for a dialog or request for a standalone transaction, the UE must set the From header to <b>Anonymous</b>.</p> <p><b>SUBSEQUENT REQUEST:</b></p> <p>Set to the From value of the original INVITE request.</p>                                                                                                                                                                                                                                         |

| Header               | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P-Preferred-Identity | <p>A P-Preferred-Identity header can be included with the Public User Identity that the calling user wants to be identified as. The UE can include any of the following in the P-Preferred-Identity header:</p> <ul style="list-style-type: none"> <li>• A Public User Identity which has been registered by the user.</li> <li>• A Public User Identity returned in a P-Associated-URI in 200 (OK) to a REGISTER request message.</li> </ul> <p><b>Notice:</b></p> <p>The temporary Public User Identity is not a Public User Identity suitable for use in the P-Preferred-Identity header.</p> <p>Procedures in the network require international public telecommunication numbers when telephone numbers are used in the P-Preferred-Identity header.</p> |
| Privacy              | <p>A Privacy header must be included if the UE requires privacy of the P-Asserted-Identity. The P-CSCF guarantees privacy in accordance with <a href="#">RFC 3325</a>.</p> <p><b>Notice:</b> Some headers can reveal information about the identity of the user. Where privacy is required, implementers are also considers headers that can reveal identity information</p>                                                                                                                                                                                                                                                                                                                                                                                 |
| Proxy-Require        | <p>REGISTER: Contains sec-agree to indicate that security mechanism agreement procedure is required. The security parameter exchange is performed in Security-Client and Security-Server headers.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Request-URI          | <p>REGISTER: A Request-URI set to the SIP URI of the domain name of the home network for the public user to be registered or deregistered.</p> <p>OTHER INITIAL SIP REQUESTS: Set to the destination of this request. The destination can be expressed either as a SIP URI or tel URI. SUBSEQUENT REQUEST: Set to the route set established for the dialog.</p>                                                                                                                                                                                                                                                                                                                                                                                              |
| Require              | <p>REGISTER: Contains sec-agree to indicate that security mechanism agreement procedure is required. The security parameter exchange is performed in Security-Client and Security-Server headers.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |



| Header          | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Route           | <p>INITIAL REQUEST: For all new dialogs and standalone SIP requests, the UE must include a preloaded <code>Route</code> header containing the P-CSCF address in the form of an IP address or an FQDN.</p> <p>SUBSEQUENT REQUEST: For SIP requests sent within a dialog, the UE must include <code>Route</code> headers according to the route set (Record-Route headers) received in the 2xx response to the dialog establishment.</p>                                                                                                                                                                                   |
| Security-Client | REGISTER: Contains the security mechanisms that UE supports and related configuration parameters. This header must be present if <code>sec-agree</code> option is indicated in <code>Require</code> header. Otherwise it must not be present.                                                                                                                                                                                                                                                                                                                                                                            |
| Security-Verify | Contains a copy of <code>Security-Server</code> headers received earlier, if any. This can not be present in initial REGISTER, must not be present if <code>sec-agree</code> extension is not specified, otherwise it must be present.                                                                                                                                                                                                                                                                                                                                                                                   |
| Session-Expires | A <code>Session-Expires</code> header can be included if the UE supports session timer according to <a href="#">RFC 4028</a> . The recommendation is that the UE supports the session timer procedure according to <a href="#">RFC 4028</a> .                                                                                                                                                                                                                                                                                                                                                                            |
| Supported       | A <code>Supported</code> header can be included if the UE supports certain SIP extension procedures. The recommendation is that the UE supports at least the session timer procedure according to <a href="#">RFC 4028</a> .                                                                                                                                                                                                                                                                                                                                                                                             |
| To              | <p>REGISTER: Included in this header is a SIP URI of the Public User Identity to be registered or deregistered. The Public User Identity that is registered can be temporary Public User Identity as defined in <a href="#">TS23.003</a>.</p> <p>OTHER INITIAL SIP REQUESTS: Set to the SIP URI or tel URI that contains the destination of this request.</p> <p>SUBSEQUENT REQUEST: Set to the value of the <code>To</code> header in the original INVITE request, with the addition of the received <code>To</code> tag</p>                                                                                            |
| Via             | <p>A <code>Via</code> header which includes the IP address or FQDN of the UE in the <code>sent-by</code> field.</p> <p><b>Notice:</b> If the UE specifies its FQDN in the host parameter in the <code>Contact</code> header and in the <code>sent-by</code> field in the <code>Via</code> header, then it has to ensure that the given FQDN resolves to the IP address that is bound to the UE. In all protected AKA requests that the single <code>Via</code> header must be (or resolvable to) the IP address and the protected server port of the UE as negotiated during security mechanism agreement procedure.</p> |

## 4.3 Supported SIP Headers Within SIP Methods

All headers that must be supported according to TS24.229 are listed in Table 37. A reference to the relevant RFC is indicated.

*Table 37 Supported SIP Headers Within SIP Methods*

| Headers             | Reference                                            |
|---------------------|------------------------------------------------------|
| Accept              | <a href="#">RFC 3261</a>                             |
| Accept-Contact      | <a href="#">RFC 3841</a>                             |
| Accept-Encoding     | <a href="#">RFC 3261</a>                             |
| Accept-Language     | <a href="#">RFC 3261</a>                             |
| Alert-Info          | <a href="#">RFC 3261</a>                             |
| Allow               | <a href="#">RFC 3261</a>                             |
| Allow-Events        | <a href="#">RFC 3265</a>                             |
| Answer-Mode         | draft-willis-sip-answeralert-01                      |
| Authorization       | <a href="#">RFC 3261</a><br><a href="#">RFC 2617</a> |
| Call-ID             | <a href="#">RFC 3261</a>                             |
| Call-Info           | <a href="#">RFC 3261</a>                             |
| Contact             | <a href="#">RFC 3261</a>                             |
| Content-Disposition | <a href="#">RFC 3261</a>                             |
| Content-Encoding    | <a href="#">RFC 3261</a>                             |
| Content-Language    | <a href="#">RFC 3261</a>                             |
| Content-Length      | <a href="#">RFC 3261</a>                             |
| Content-Type        | <a href="#">RFC 3261</a>                             |
| Cseq                | <a href="#">RFC 3261</a>                             |
| Date                | <a href="#">RFC 3261</a>                             |
| Error-info          | <a href="#">RFC 3261</a>                             |
| Event               | <a href="#">RFC 3265</a>                             |
| Expires             | <a href="#">RFC 3261</a>                             |
| From                | <a href="#">RFC 3261</a>                             |
| In-reply-to         | <a href="#">RFC 3261</a>                             |
| Join                | <a href="#">RFC 3911</a>                             |
| Max-Forwards        | <a href="#">RFC 3261</a>                             |
| MIME-Version        | <a href="#">RFC 3261</a>                             |





| Headers                       | Reference                                        |
|-------------------------------|--------------------------------------------------|
| Min-Expires                   | <a href="#">RFC 3261</a>                         |
| Min-SE                        | <a href="#">RFC 4028</a>                         |
| Organization                  | <a href="#">RFC 3261</a>                         |
| P-Access-Network-Info         | <a href="#">RFC 3455</a>                         |
| P-Answer-State                | draft-allen-sipping-poc-p-answer-state-header-01 |
| P-Asserted-Identity           | <a href="#">RFC 3325</a>                         |
| P-Called-Party-ID             | <a href="#">RFC 3455</a>                         |
| P-Charging-Function-Addresses | <a href="#">RFC 3455</a>                         |
| P-Charging-Vecto              | <a href="#">RFC 3455</a>                         |
| P-Media-Authorization         | <a href="#">RFC 3313</a>                         |
| P-Preferred-Identity          | <a href="#">RFC 3325</a>                         |
| P-Visited-Network-ID          | <a href="#">RFC 3455</a>                         |
| Path                          | <a href="#">RFC 3327</a>                         |
| Priority                      | <a href="#">RFC 3261</a>                         |
| Priv-Answer-Mode              | draft-willis-sip-answeralert-01                  |
| Privacy                       | <a href="#">RFC 3323</a>                         |
| Proxy-Authenticate            | <a href="#">RFC 3261</a>                         |
| Proxy-Authorization           | <a href="#">RFC 3261</a>                         |
| Proxy-Require                 | <a href="#">RFC 3261</a>                         |
| Rack                          | <a href="#">RFC 3262</a>                         |
| Reason                        | <a href="#">RFC 3326</a>                         |
| Record-Route                  | <a href="#">RFC 3261</a>                         |
| Referred-By                   | <a href="#">RFC 3892</a>                         |
| Refer-Sub                     | draft-ietf-sip-refer-with-norefersub-04          |
| Reject-Contact                | <a href="#">RFC 3841</a>                         |
| Replaces                      | <a href="#">RFC 3891</a>                         |
| Reply-To                      | <a href="#">RFC 3261</a>                         |
| Request-Disposition           | <a href="#">RFC 3841</a>                         |
| Require                       | <a href="#">RFC 3261</a>                         |
| Retry-After                   | <a href="#">RFC 3261</a>                         |
| Route                         | <a href="#">RFC 3261</a>                         |

| Headers          | Reference                |
|------------------|--------------------------|
| Rseq             | <a href="#">RFC 3262</a> |
| Security-Client  | <a href="#">RFC 3329</a> |
| Security-Server  | <a href="#">RFC 3329</a> |
| Security-Verify  | <a href="#">RFC 3329</a> |
| Server           | <a href="#">RFC 3261</a> |
| Session-Expires  | <a href="#">RFC 4028</a> |
| SIP-If-Match     | <a href="#">RFC 3903</a> |
| Subject          | <a href="#">RFC 3261</a> |
| Supported        | <a href="#">RFC 3261</a> |
| Timestamp        | <a href="#">RFC 3261</a> |
| To               | <a href="#">RFC 3261</a> |
| Unsupported      | <a href="#">RFC 3261</a> |
| User-Agent       | <a href="#">RFC 3261</a> |
| Via              | <a href="#">RFC 3261</a> |
| Warning          | <a href="#">RFC 3261</a> |
| WWW-Authenticate | <a href="#">RFC 3261</a> |

The different status codes used in the tables are explained in Table 38.

*Table 38 Key to Status Codes*

| Status Code | Meaning                                                                                                                                                                                                                                                                                       |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| m           | Mandatory. The header is mandatory in the SIP message according to the present profile.                                                                                                                                                                                                       |
| n/a         | Not applicable. No relevant traffic case exists where the header can be present.                                                                                                                                                                                                              |
| x           | Prohibited (excluded). The header is not allowed in the SIP message according to this profile. The header is removed by the P-CSCF if present.                                                                                                                                                |
| t           | Transparent. This header is not generated by the P-CSCF. If this header is inserted by a remote end point, then this header is transported transparently by the P-CSCF. Depending on the services used, the UE can need to interpret and understand the header according to the relevant RFC. |

The following subsections list the SIP requests and responses that must be supported according to the following [3GPP TS 24.229 IP Multimedia call control](#)



[protocol based on Session Initiation Protocol \(SIP\) and Session Description Protocol \(SDP\) specification.](#)

Only the headers that are mandatory or that need a special comment are listed per SIP method.

#### 4.3.1 Supported Headers Within ACK Request

The supported headers within the ACK request are shown in Table 39.

*Table 39 Supported Headers Within ACK Request*

| SIP Method     | P-CSCF -> UE                              | UE -> P-CSCF                                                  | Reference                |
|----------------|-------------------------------------------|---------------------------------------------------------------|--------------------------|
| Call-ID        | m                                         | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length | m                                         | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq           | m                                         | m                                                             | <a href="#">RFC 3261</a> |
| From           | m                                         | m                                                             | <a href="#">RFC 3261</a> |
| Max-Forwards   | m                                         | m                                                             | <a href="#">RFC 3261</a> |
| Route          | See Section 4.3.26.24 Route, 1 on page 93 | m                                                             | <a href="#">RFC 3261</a> |
| To             | m                                         | m                                                             | <a href="#">RFC 3261</a> |
| Via            | m                                         | m                                                             | <a href="#">RFC 3261</a> |

#### 4.3.2 Supported Headers Within BYE Request

The supported headers within the BYE request are shown in Table 40.

*Table 40 Supported Headers Within BYE Request*

| SIP Method     | P-CSCF -> UE | UE -> P-CSCF                                                  | Reference                |
|----------------|--------------|---------------------------------------------------------------|--------------------------|
| Call-ID        | m            | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length | m            | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq           | m            | m                                                             | <a href="#">RFC 3261</a> |
| From           | m            | m                                                             | <a href="#">RFC 3261</a> |

| SIP Method          | P-CSCF -> UE                                | UE -> P-CSCF                                         | Reference                |
|---------------------|---------------------------------------------|------------------------------------------------------|--------------------------|
| Max-Forwards        | m                                           | m                                                    | <a href="#">RFC 3261</a> |
| Proxy-Authorization | n/a                                         | See Section 4.3.26.17 Proxy-Authorization on page 92 | <a href="#">RFC 3261</a> |
| Route               | See Section 4.3.26.24 Route, 1 on page 93   | See Section 4.3.26.25 Route, 2 on page 93            | <a href="#">RFC 3261</a> |
| To                  | m                                           | m                                                    | <a href="#">RFC 3261</a> |
| User-Agent          | See Section 4.3.26.34 User-Agent on page 94 | See Section 4.3.26.34 User-Agent on page 94          |                          |
| Via                 | m                                           | m                                                    | <a href="#">RFC 3261</a> |

### 4.3.3 Supported Headers Within BYE Responses

The supported headers within BYE responses are shown in Table 41.

Table 41 Supported Headers Within BYE Responses

| SIP Method          | P-CSCF -> UE                                        | UE -> P-CSCF                                                  | Reference                |
|---------------------|-----------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Authentication-Info | See Section 4.3.26.2 Authentication-Info on page 90 | n/a                                                           | <a href="#">RFC 3261</a> |
| Call-ID             | m                                                   | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length      | m                                                   | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                | m                                                   | m                                                             | <a href="#">RFC 3261</a> |
| From                | m                                                   | m                                                             | <a href="#">RFC 3261</a> |
| Proxy-Authorization | n/a                                                 | See Section 4.3.26.17 Proxy-Authorization on page 92          | <a href="#">RFC 3261</a> |
| Route               | See Section 4.3.26.16 Proxy-Authenticate on page 92 | n/a                                                           | <a href="#">RFC 3261</a> |



| SIP Method  | P-CSCF -> UE                                 | UE -> P-CSCF | Reference                |
|-------------|----------------------------------------------|--------------|--------------------------|
| To          | m                                            | m            | <a href="#">RFC 3261</a> |
| Unsupported | See Section 4.3.26.32 Supported 3 on page 94 | t            | <a href="#">RFC 3261</a> |
| Via         | m                                            | m            | <a href="#">RFC 3261</a> |

#### 4.3.4 Supported Headers Within CANCEL Request

The supported headers within the CANCEL request are shown in Table 42.

Table 42 Supported Headers Within CANCEL Request

| SIP Method     | P-CSCF -> UE                              | UE -> P-CSCF                                                  | Reference                    |
|----------------|-------------------------------------------|---------------------------------------------------------------|------------------------------|
| Call-ID        | m                                         | m                                                             | <a href="#">RFC 3261</a>     |
| Content-Length | m                                         | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a>     |
| Cseq           | m                                         | m                                                             | <a href="#">RFC 3261</a>     |
| From           | m                                         | m                                                             | <a href="#">RFC 3261</a>     |
| Max-Forwards   | m                                         | m                                                             | <a href="#">RFC 3261</a>     |
| Route          | See Section 4.3.26.24 Route, 1 on page 93 | m                                                             | <a href="#">RFC 3261</a>     |
| To             | m                                         | m                                                             | <a href="#">RFC 3261</a>     |
| Via            | m                                         | m                                                             | <a href="#">RFC 3261</a>     |
| Reason         | See Section 4.3.26.19 Reason on page 92   | t                                                             | [ <a href="#">RFC 3326</a> ] |

#### 4.3.5 Supported Headers Within CANCEL Responses

The supported headers within CANCEL responses are shown in Table 43.

Table 43 Supported Headers Within CANCEL Responses

| SIP Method | P-CSCF -> UE | UE -> P-CSCF | Reference                |
|------------|--------------|--------------|--------------------------|
| Call-ID    | m            | m            | <a href="#">RFC 3261</a> |

| SIP Method     | P-CSCF -> UE | UE -> P-CSCF                                                  | Reference                |
|----------------|--------------|---------------------------------------------------------------|--------------------------|
| Content-Length | m            | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq           | m            | m                                                             | <a href="#">RFC 3261</a> |
| From           | m            | m                                                             | <a href="#">RFC 3261</a> |
| To             | m            | m                                                             | <a href="#">RFC 3261</a> |
| Via            | m            | m                                                             | <a href="#">RFC 3261</a> |

### 4.3.6

### Supported Headers Within INVITE Request

The supported headers within the `INVITE` request are shown in Table 44.

Table 44 Supported Headers Within INVITE Request

| SIP Method          | P-CSCF -> UE                                         | UE -> P-CSCF                                                  | Reference                |
|---------------------|------------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Accept-Contact      | t                                                    | See Section 4.3.26.1 Accept-Contact on page 90                | <a href="#">RFC 3841</a> |
| Call-ID             | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length      | m                                                    | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| From                | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Max-Forwards        | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Min-SE              | See Section 4.3.26.9 Min-SE on page 91               | See Section 4.3.26.9 Min-SE on page 91                        | <a href="#">RFC 4028</a> |
| P-Asserted-Identity | See Section 4.3.26.11 P-Asserted-Identity on page 91 | x                                                             | <a href="#">RFC 3325</a> |
| P-Caller-Party-ID   | m                                                    | x                                                             | <a href="#">RFC 3455</a> |



| SIP Method           | P-CSCF -> UE                                     | UE -> P-CSCF                                          | Reference                |
|----------------------|--------------------------------------------------|-------------------------------------------------------|--------------------------|
| P-Preferred-Identity | n/a                                              | See Section 4.3.26.13 P-Preferred-Identity on page 91 | <a href="#">RFC 3325</a> |
| Privacy              | n/a                                              | See Section 4.3.26.15 Privacy on page 91              | <a href="#">RFC 3323</a> |
| Proxy-Authorization  | n/a                                              | See Section 4.3.26.17 Proxy-Authorization on page 92  | <a href="#">RFC 3261</a> |
| Proxy-Require        | n/a                                              | See Section 4.3.26.18 Proxy-Require on page 92        | <a href="#">RFC 3261</a> |
| Record-Route         | m                                                | See Section 4.3.26.20 Record-Route, 1 on page 92      | <a href="#">RFC 3261</a> |
| Reject-Contact       | See Section 4.3.26.22 Reject-Contact on page 92  | See Section 4.3.26.22 Reject-Contact on page 92       | <a href="#">RFC 3841</a> |
| Route                | See Section 4.3.26.24 Route, 1 on page 93        | See Section 4.3.26.25 Route, 2 on page 93             | <a href="#">RFC 3261</a> |
| Session-Expires      | See Section 4.3.26.29 Session-Expires on page 93 | See Section 4.3.26.29 Session-Expires on page 93      | <a href="#">RFC 4028</a> |
| Supported            | See Section 4.3.26.30 Supported 1 on page 94     | See Section 4.3.26.30 Supported 1 on page 94          | <a href="#">RFC 3261</a> |
| To                   | m                                                | m                                                     | <a href="#">RFC 3261</a> |
| User-Agent           | See Section 4.3.26.34 User-Agent on page 94      | See Section 4.3.26.34 User-Agent on page 94           | <a href="#">RFC 3261</a> |
| Via                  | m                                                | m                                                     | <a href="#">RFC 3261</a> |

### 4.3.7 Supported Headers Within INVITE Responses

The supported headers within `INVITE` responses are shown in Table 45.

*Table 45 Supported Headers Within INVITE Responses*

| SIP Method          | P-CSCF -> UE                                         | UE -> P-CSCF                                                  | Reference                |
|---------------------|------------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Authentication-Info | See Section 4.3.26.2 Authentication-Info on page 90  | n/a                                                           | <a href="#">RFC 3841</a> |
| Call-ID             | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length      | m                                                    | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| From                | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Min-SE              | See Section 4.3.26.9 Min-SE on page 91               | See Section 4.3.26.9 Min-SE on page 91                        | <a href="#">RFC 4028</a> |
| P-Asserted-Identity | See Section 4.3.26.11 P-Asserted-Identity on page 91 | x                                                             | <a href="#">RFC 3325</a> |
| Privacy             | n/a                                                  | See Section 4.3.26.15 Privacy on page 91                      | <a href="#">RFC 3323</a> |
| Proxy-Authenticate  | See Section 4.3.26.16 Proxy-Authenticate on page 92  | n/a                                                           | <a href="#">RFC 3261</a> |
| Record-Route        | See Section 4.3.26.21 Record-Route, 2 on page 92     | See Section 4.3.26.21 Record-Route, 2 on page 92              | <a href="#">RFC 3261</a> |
| Session-Expires     | See Section 4.3.26.29 Session-Expires on page 93     | See Section 4.3.26.29 Session-Expires on page 93              | <a href="#">RFC 4028</a> |
| To                  | m                                                    | m                                                             | <a href="#">RFC 3261</a> |





| SIP Method  | P-CSCF -> UE                                 | UE -> P-CSCF | Reference                |
|-------------|----------------------------------------------|--------------|--------------------------|
| Unsupported | See Section 4.3.26.32 Supported 3 on page 94 | t            | <a href="#">RFC 3261</a> |
| Via         | m                                            | m            | <a href="#">RFC 3261</a> |

#### 4.3.8 Supported Headers Within MESSAGE Request

The supported headers within the MESSAGE request are shown in Table 46.

Table 46 Supported Headers Within MESSAGE Request

| SIP Method           | P-CSCF -> UE                                         | UE -> P-CSCF                                                  | Reference                |
|----------------------|------------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Accept-Contact       | t                                                    | See Section 4.3.26.1 Accept-Contact on page 90                | <a href="#">RFC 3841</a> |
| Call-ID              | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length       | m                                                    | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                 | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| From                 | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Max-Forwards         | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| P-Asserted-Identity  | See Section 4.3.26.11 P-Asserted-Identity on page 91 | x                                                             | <a href="#">RFC 3325</a> |
| P-Called-Party-ID    | m                                                    | x                                                             | <a href="#">RFC 3455</a> |
| P-Preferred-Identity | n/a                                                  | See Section 4.3.26.13 P-Preferred-Identity on page 91         | <a href="#">RFC 3325</a> |
| Privacy              | n/a                                                  | See Section 4.3.26.15 Privacy on page 91                      | <a href="#">RFC 3323</a> |

| SIP Method          | P-CSCF -> UE                                    | UE -> P-CSCF                                         | Reference                |
|---------------------|-------------------------------------------------|------------------------------------------------------|--------------------------|
| Proxy-Authorization | n/a                                             | See Section 4.3.26.17 Proxy-Authorization on page 92 | <a href="#">RFC 3261</a> |
| Proxy-Require       | n/a                                             | See Section 4.3.26.18 Proxy-Require on page 92       | <a href="#">RFC 3261</a> |
| Reject-Contact      | See Section 4.3.26.22 Reject-Contact on page 92 | See Section 4.3.26.22 Reject-Contact on page 92      | <a href="#">RFC 3841</a> |
| Route               | See Section 4.3.26.24 Route, 1 on page 93       | See Section 4.3.26.24 Route, 1 on page 93            | <a href="#">RFC 3261</a> |
| To                  | t                                               | t                                                    | <a href="#">RFC 3261</a> |
| User-Agent          | See Section 4.3.26.34 User-Agent on page 94     | See Section 4.3.26.34 User-Agent on page 94          | <a href="#">RFC 3261</a> |
| Via                 | m                                               | m                                                    | <a href="#">RFC 3261</a> |

### 4.3.9

### Supported Headers Within MESSAGE Responses

The supported headers within MESSAGE responses are shown in Table 47.

Table 47 Supported Headers Within MESSAGE Responses

| SIP Method          | P-CSCF -> UE                                        | UE -> P-CSCF                                                  | Reference                |
|---------------------|-----------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Authentication-Info | See Section 4.3.26.2 Authentication-Info on page 90 | n/a                                                           | <a href="#">RFC 3261</a> |
| Call-ID             | m                                                   | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length      | m                                                   | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                | m                                                   | m                                                             | <a href="#">RFC 3261</a> |
| From                | m                                                   | m                                                             | <a href="#">RFC 3261</a> |



| SIP Method          | P-CSCF -> UE                                         | UE -> P-CSCF                                         | Reference                |
|---------------------|------------------------------------------------------|------------------------------------------------------|--------------------------|
| P-Asserted-Identity | See Section 4.3.26.11 P-Asserted-Identity on page 91 | x                                                    | <a href="#">RFC 3325</a> |
| Privacy             | n/a                                                  | See Section 4.3.26.15 Privacy on page 91             | <a href="#">RFC 3323</a> |
| Proxy-Authenticate  | n/a                                                  | See Section 4.3.26.17 Proxy-Authorization on page 92 | <a href="#">RFC 3261</a> |
| To                  | m                                                    | m                                                    | <a href="#">RFC 3261</a> |
| Unsupported         | See Section 4.3.26.32 Supported 3 on page 94         | t                                                    | <a href="#">RFC 3261</a> |
| Via                 | m                                                    | m                                                    | <a href="#">RFC 3261</a> |

#### 4.3.10

#### Supported Headers Within NOTIFY Request

The supported headers within the NOTIFY request are shown in Table 48.

Table 48 Supported Headers Within NOTIFY Request

| SIP Method          | P-CSCF -> UE                                         | UE -> P-CSCF                                                  | Reference                |
|---------------------|------------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Accept-Contact      | t                                                    | See Section 4.3.26.1 Accept-Contact on page 90                | <a href="#">RFC 3841</a> |
| Call-ID             | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length      | m                                                    | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| From                | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Max-Forwards        | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| P-Asserted-Identity | See Section 4.3.26.11 P-Asserted-Identity on page 91 | x                                                             | <a href="#">RFC 3325</a> |

| SIP Method           | P-CSCF -> UE                                    | UE -> P-CSCF                                          | Reference                |
|----------------------|-------------------------------------------------|-------------------------------------------------------|--------------------------|
| P-Preferred-Identity | n/a                                             | See Section 4.3.26.13 P-Preferred-Identity on page 91 | <a href="#">RFC 3325</a> |
| Privacy              | n/a                                             | See Section 4.3.26.15 Privacy on page 91              | <a href="#">RFC 3323</a> |
| Proxy-Authorization  | n/a                                             | See Section 4.3.26.17 Proxy-Authorization on page 92  | <a href="#">RFC 3261</a> |
| Proxy-Require        | n/a                                             | See Section 4.3.26.18 Proxy-Require on page 92        | <a href="#">RFC 3261</a> |
| Record-Route         | m                                               | n/a                                                   | <a href="#">RFC 3261</a> |
| Reject-Contact       | See Section 4.3.26.22 Reject-Contact on page 92 | See Section 4.3.26.22 Reject-Contact on page 92       | <a href="#">RFC 3841</a> |
| Route                | See Section 4.3.26.24 Route, 1 on page 93       | m                                                     | <a href="#">RFC 3261</a> |
| Supported            | t                                               | t                                                     | <a href="#">RFC 3261</a> |
| To                   | m                                               | m                                                     | <a href="#">RFC 3261</a> |
| User-Agent           | See Section 4.3.26.34 User-Agent on page 94     | See Section 4.3.26.34 User-Agent on page 94           | <a href="#">RFC 3261</a> |
| Via                  | m                                               | m                                                     | <a href="#">RFC 3261</a> |

**Note:** Normally, the NOTIFY request is not sent by a UE. Instead, the request is originated in an Application Server. The P-CSCF does not, however, exclude the possibility to subscribe to events that are generated by a UE.

#### 4.3.11 Supported Headers Within NOTIFY Responses

The supported headers within NOTIFY responses are shown in Table 49.



**Table 49** Supported Headers Within NOTIFY Responses

| SIP Method          | P-CSCF -> UE                                         | UE -> P-CSCF                                                  | Reference                |
|---------------------|------------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Authentication-Info | See Section 4.3.26.2 Authentication-Info on page 90  | n/a                                                           | <a href="#">RFC 3261</a> |
| Call-ID             | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length      | m                                                    | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| From                | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| P-Asserted-Identity | See Section 4.3.26.11 P-Asserted-Identity on page 91 | m                                                             | <a href="#">RFC 3325</a> |
| Proxy-Authenticate  | See Section 4.3.26.16 Proxy-Authenticate on page 92  | n/a                                                           | <a href="#">RFC 3261</a> |
| Privacy             | n/a                                                  | See Section 4.3.26.15 Privacy on page 91                      | <a href="#">RFC 3323</a> |
| To                  | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Unsupported         | See Section 4.3.26.32 Supported 3 on page 94         | m                                                             | <a href="#">RFC 3261</a> |
| Via                 | m                                                    | m                                                             | <a href="#">RFC 3261</a> |

#### 4.3.12

#### Supported Headers Within OPTIONS Request

The supported headers within the `OPTIONS` request are shown in Table 50.

**Table 50** Supported Headers Within OPTIONS Request

| SIP Method     | P-CSCF -> UE | UE -> P-CSCF                                   | Reference                |
|----------------|--------------|------------------------------------------------|--------------------------|
| Accept-Contact | t            | See Section 4.3.26.1 Accept-Contact on page 90 | <a href="#">RFC 3841</a> |

| SIP Method           | P-CSCF -> UE                                         | UE -> P-CSCF                                                  | Reference                |
|----------------------|------------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Call-ID              | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length       | m                                                    | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                 | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| From                 | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Max-Forwards         | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| P-Asserted-Identity  | See Section 4.3.26.11 P-Asserted-Identity on page 91 | x                                                             | <a href="#">RFC 3325</a> |
| P-Called-Party-ID    | m                                                    | x                                                             | <a href="#">RFC 3455</a> |
| P-Preferred-Identity | n/a                                                  | See Section 4.3.26.13 P-Preferred-Identity on page 91         | <a href="#">RFC 3325</a> |
| Privacy              | n/a                                                  | See Section 4.3.26.15 Privacy on page 91                      | <a href="#">RFC 3323</a> |
| Proxy-Authorization  | n/a                                                  | See Section 4.3.26.17 Proxy-Authorization on page 92          | <a href="#">RFC 3261</a> |
| Proxy-Require        | n/a                                                  | See Section 4.3.26.18 Proxy-Require on page 92                | <a href="#">RFC 3261</a> |
| Record-Route         | m                                                    | n/a                                                           | <a href="#">RFC 3261</a> |
| Reject-Contact       | See Section 4.3.26.22 Reject-Contact on page 92      | See Section 4.3.26.22 Reject-Contact on page 92               | <a href="#">RFC 3841</a> |
| Route                | See Section 4.3.26.24 Route, 1 on page 93            | See Section 4.3.26.25 Route, 2 on page 93                     | <a href="#">RFC 3261</a> |
| Supported            | t                                                    | t                                                             | <a href="#">RFC 3261</a> |
| To                   | m                                                    | m                                                             | <a href="#">RFC 3261</a> |



| SIP Method | P-CSCF -> UE                                | UE -> P-CSCF                                | Reference                |
|------------|---------------------------------------------|---------------------------------------------|--------------------------|
| User-Agent | See Section 4.3.26.34 User-Agent on page 94 | See Section 4.3.26.34 User-Agent on page 94 | <a href="#">RFC 3261</a> |
| Via        | m                                           | m                                           | <a href="#">RFC 3261</a> |

### 4.3.13

### Supported Headers Within OPTIONS Responses

The supported headers within OPTIONS responses are shown in Table 51.

*Table 51 Supported Headers Within OPTIONS Responses*

| SIP Method          | P-CSCF -> UE                                         | UE -> P-CSCF                                                  | Reference                |
|---------------------|------------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Authentication-Info | See Section 4.3.26.2 Authentication-Info on page 90  | n/a                                                           | <a href="#">RFC 3261</a> |
| Call-ID             | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length      | m                                                    | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| From                | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| P-Asserted-Identity | See Section 4.3.26.11 P-Asserted-Identity on page 91 | x                                                             | <a href="#">RFC 3325</a> |
| Proxy-Authenticate  | See Section 4.3.26.16 Proxy-Authenticate on page 92  | n/a                                                           | <a href="#">RFC 3261</a> |
| Privacy             | n/a                                                  | See Section 4.3.26.15 Privacy on page 91                      | <a href="#">RFC 3323</a> |
| Supported           | See Section 4.3.26.32 Supported 3 on page 94         | t                                                             | <a href="#">RFC 3261</a> |
| To                  | m                                                    | m                                                             | <a href="#">RFC 3261</a> |

| SIP Method  | P-CSCF -> UE                                 | UE -> P-CSCF | Reference                |
|-------------|----------------------------------------------|--------------|--------------------------|
| Unsupported | See Section 4.3.26.32 Supported 3 on page 94 | t            | <a href="#">RFC 3261</a> |
| Via         | m                                            | m            | <a href="#">RFC 3261</a> |

#### 4.3.14 Supported Headers Within PRACK Request

The supported headers within the PRACK request are shown in Table 52.

Table 52 Supported Headers Within PRACK Request

| SIP Method          | P-CSCF -> UE                              | UE -> P-CSCF                                                  | Reference                |
|---------------------|-------------------------------------------|---------------------------------------------------------------|--------------------------|
| Call-ID             | m                                         | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length      | m                                         | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                | m                                         | m                                                             | <a href="#">RFC 3261</a> |
| From                | m                                         | m                                                             | <a href="#">RFC 3261</a> |
| Max-Forwards        | m                                         | m                                                             | <a href="#">RFC 3261</a> |
| Proxy-Authorization | n/a                                       | See Section 4.3.26.17 Proxy-Authorization on page 92          | <a href="#">RFC 3261</a> |
| Proxy-Require       | n/a                                       | See Section 4.3.26.18 Proxy-Require on page 92                | <a href="#">RFC 3261</a> |
| Rack                | m                                         | m                                                             | <a href="#">RFC 3262</a> |
| Route               | See Section 4.3.26.24 Route, 1 on page 93 | m                                                             | <a href="#">RFC 3261</a> |
| To                  | m                                         | m                                                             | <a href="#">RFC 3261</a> |
| Via                 | m                                         | m                                                             | <a href="#">RFC 3261</a> |

#### 4.3.15 Supported Headers Within PRACK Responses

The supported headers within PRACK responses are shown in Table 53.





*Table 53 Supported Headers Within PRACK Responses*

| SIP Method          | P-CSCF -> UE                                        | UE -> P-CSCF                                                  | Reference                |
|---------------------|-----------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Authentication-Info | See Section 4.3.26.2 Authentication-Info on page 90 | n/a                                                           | <a href="#">RFC 3261</a> |
| Call-ID             | m                                                   | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length      | m                                                   | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                | m                                                   | m                                                             | <a href="#">RFC 3261</a> |
| From                | m                                                   | m                                                             | <a href="#">RFC 3261</a> |
| Proxy-Authenticate  | See Section 4.3.26.16 Proxy-Authenticate on page 92 | n/a                                                           | <a href="#">RFC 3261</a> |
| To                  | m                                                   | m                                                             | <a href="#">RFC 3261</a> |
| Unsupported         | See Section 4.3.26.32 Supported 3 on page 94        | t                                                             | <a href="#">RFC 3261</a> |
| Via                 | m                                                   | m                                                             | <a href="#">RFC 3261</a> |

#### 4.3.16 Supported Headers Within PUBLISH Request

The supported headers within the PUBLISH request are shown in Table 54.

*Table 54 Supported Headers Within PUBLISH Request*

| SIP Method     | P-CSCF -> UE | UE -> P-CSCF                                                  | Reference                |
|----------------|--------------|---------------------------------------------------------------|--------------------------|
| Accept-Contact | t            | See Section 4.3.26.1 Accept-Contact on page 90                | <a href="#">RFC 3841</a> |
| Call-ID        | m            | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length | m            | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |

| SIP Method           | P-CSCF -> UE                                         | UE -> P-CSCF                                          | Reference                |
|----------------------|------------------------------------------------------|-------------------------------------------------------|--------------------------|
| Cseq                 | m                                                    | m                                                     | <a href="#">RFC 3261</a> |
| From                 | m                                                    | m                                                     | <a href="#">RFC 3261</a> |
| Max-Forwards         | m                                                    | m                                                     | <a href="#">RFC 3261</a> |
| P-Asserted-Identity  | See Section 4.3.26.11 P-Asserted-Identity on page 91 | x                                                     | <a href="#">RFC 3325</a> |
| P-Caller-Party-ID    | m                                                    | x                                                     | <a href="#">RFC 3455</a> |
| P-Preferred-Identity | n/a                                                  | See Section 4.3.26.13 P-Preferred-Identity on page 91 | <a href="#">RFC 3325</a> |
| Privacy              | n/a                                                  | See Section 4.3.26.15 Privacy on page 91              | <a href="#">RFC 3323</a> |
| Proxy-Authorization  | n/a                                                  | See Section 4.3.26.17 Proxy-Authorization on page 92  | <a href="#">RFC 3261</a> |
| Proxy-Require        | n/a                                                  | See Section 4.3.26.18 Proxy-Require on page 92        | <a href="#">RFC 3261</a> |
| Reject-Contact       | See Section 4.3.26.22 Reject-Contact on page 92      | See Section 4.3.26.22 Reject-Contact on page 92       | <a href="#">RFC 3841</a> |
| Route                | See Section 4.3.26.24 Route, 1 on page 93            | See Section 4.3.26.25 Route, 2 on page 93             | <a href="#">RFC 3261</a> |
| Supported            | t                                                    | t                                                     | <a href="#">RFC 3261</a> |
| To                   | m                                                    | m                                                     | <a href="#">RFC 3261</a> |
| User-Agent           | See Section 4.3.26.34 User-Agent on page 94          | See Section 4.3.26.34 User-Agent on page 94           | <a href="#">RFC 3261</a> |
| Via                  | m                                                    | m                                                     | <a href="#">RFC 3261</a> |



**Note:** Normally, the PUBLISH request is not routed to the terminating UE. Instead, the request is terminated in an Application Server. The P-CSCF does not, however, exclude the possibility for a UE to publish event state to another UE.

#### 4.3.17

### Supported Headers Within PUBLISH Responses

The supported headers within PUBLISH responses are shown in Table 55.

*Table 55 Supported Headers Within PUBLISH Responses*

| SIP Method          | P-CSCF -> UE                                         | UE -> P-CSCF                                                  | Reference                |
|---------------------|------------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Authentication-Info | See Section 4.3.26.2 Authentication-Info on page 90  | n/a                                                           | <a href="#">RFC 3261</a> |
| Call-ID             | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length      | m                                                    | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| From                | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| P-Asserted-Identity | See Section 4.3.26.11 P-Asserted-Identity on page 91 | x                                                             | <a href="#">RFC 3325</a> |
| Proxy-Authenticate  | See Section 4.3.26.16 Proxy-Authenticate on page 92  | n/a                                                           | <a href="#">RFC 3261</a> |
| Privacy             | n/a                                                  | See Section 4.3.26.15 Privacy on page 91                      | <a href="#">RFC 3323</a> |
| To                  | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Unsupported         | See Section 4.3.26.32 Supported 3 on page 94         | t                                                             | <a href="#">RFC 3261</a> |
| Via                 | m                                                    | m                                                             | <a href="#">RFC 3261</a> |

**Note:** Normally the PUBLISH request is not routed to the terminating UE. Instead, the request is terminated in an Application Server. The P-CSCF does not, however, exclude the possibility for a UE to publish event state to another UE.

### 4.3.18 Supported Headers Within REFER Request

The supported headers within the `REFER` request are shown in Table 56.

*Table 56 Supported Headers Within REFER Request*

| SIP Method           | P-CSCF -> UE                                         | UE -> P-CSCF                                                  | Reference                |
|----------------------|------------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Accept-Contact       | t                                                    | See Section 4.3.26.1 Accept-Contact on page 90                | <a href="#">RFC 3841</a> |
| Call-ID              | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length       | m                                                    | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                 | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| From                 | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Max-Forwards         | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| P-Asserted-Identity  | See Section 4.3.26.11 P-Asserted-Identity on page 91 | x                                                             | <a href="#">RFC 3325</a> |
| P-Called-Party-ID    | m                                                    | x                                                             | <a href="#">RFC 3455</a> |
| P-Preferred-Identity | n/a                                                  | See Section 4.3.26.13 P-Preferred-Identity on page 91         | <a href="#">RFC 3325</a> |
| Privacy              | n/a                                                  | See Section 4.3.26.15 Privacy on page 91                      | <a href="#">RFC 3323</a> |
| Proxy-Authorization  | n/a                                                  | See Section 4.3.26.17 Proxy-Authorization on page 92          | <a href="#">RFC 3261</a> |
| Proxy-Require        | n/a                                                  | See Section 4.3.26.18 Proxy-Require on page 92                | <a href="#">RFC 3261</a> |
| Record-Route         | m                                                    | n/a                                                           | <a href="#">RFC 3261</a> |



| SIP Method     | P-CSCF -> UE                                    | UE -> P-CSCF                                    | Reference                |
|----------------|-------------------------------------------------|-------------------------------------------------|--------------------------|
| Reject-Contact | See Section 4.3.26.22 Reject-Contact on page 92 | See Section 4.3.26.22 Reject-Contact on page 92 | <a href="#">RFC 3841</a> |
| Route          | See Section 4.3.26.24 Route, 1 on page 93       | See Section 4.3.26.25 Route, 2 on page 93       | <a href="#">RFC 3261</a> |
| Supported      | t                                               | t                                               | <a href="#">RFC 3261</a> |
| To             | m                                               | m                                               | <a href="#">RFC 3261</a> |
| User-Agent     | See Section 4.3.26.34 User-Agent on page 94     | See Section 4.3.26.34 User-Agent on page 94     | <a href="#">RFC 3261</a> |
| Via            | m                                               | m                                               | <a href="#">RFC 3261</a> |

#### 4.3.19

#### Supported Headers Within REFER Responses

The supported headers within `REFER` responses are shown in Table 57.

Table 57 Supported Headers Within `REFER` Responses

| SIP Method          | P-CSCF -> UE                                         | UE -> P-CSCF                                                  | Reference                |
|---------------------|------------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Authentication-Info | See Section 4.3.26.2 Authentication-Info on page 90  | n/a                                                           | <a href="#">RFC 3261</a> |
| Call-ID             | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Contact             | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length      | m                                                    | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| From                | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| P-Asserted-Identity | See Section 4.3.26.11 P-Asserted-Identity on page 91 | x                                                             | <a href="#">RFC 3325</a> |

| SIP Method         | P-CSCF -> UE                                        | UE -> P-CSCF                                     | Reference                |
|--------------------|-----------------------------------------------------|--------------------------------------------------|--------------------------|
| Privacy            | n/a                                                 | See Section 4.3.26.15 Privacy on page 91         | <a href="#">RFC 3323</a> |
| Proxy-Authenticate | See Section 4.3.26.16 Proxy-Authenticate on page 92 | n/a                                              | <a href="#">RFC 3261</a> |
| Record-Route       | See Section 4.3.26.21 Record-Route, 2 on page 92    | See Section 4.3.26.21 Record-Route, 2 on page 92 | <a href="#">RFC 3261</a> |
| To                 | m                                                   | m                                                | <a href="#">RFC 3261</a> |
| Unsupported        | See Section 4.3.26.32 Supported 3 on page 94        | t                                                | <a href="#">RFC 3261</a> |
| Via                | m                                                   | m                                                | <a href="#">RFC 3261</a> |

#### 4.3.20 Supported Headers Within REGISTER Request

The supported headers within the REGISTER request are shown in Table 58.

Table 58 Supported Headers Within REGISTER Request

| SIP Method     | P-CSCF -> UE | UE -> P-CSCF                                                   | Reference                                            |
|----------------|--------------|----------------------------------------------------------------|------------------------------------------------------|
| Authorization  | n/a          | See Section 4.3.26.3 Authorization on page 90                  | <a href="#">RFC 3261</a><br><a href="#">RFC 2617</a> |
| Call-ID        | n/a          | m                                                              | <a href="#">RFC 3261</a>                             |
| Contact        | n/a          | See Section 4.3.26.4 Contact 1 in Register Requests on page 90 | <a href="#">RFC 3261</a>                             |
| Content-Length | n/a          | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90  | <a href="#">RFC 3261</a>                             |
| Cseq           | n/a          | m                                                              | <a href="#">RFC 3261</a>                             |



| SIP Method            | P-CSCF -> UE | UE -> P-CSCF                                           | Reference                                            |
|-----------------------|--------------|--------------------------------------------------------|------------------------------------------------------|
| Expires               | n/a          | See Section 4.3.26.7 Expires on page 90                | <a href="#">RFC 3261</a>                             |
| From                  | n/a          | m                                                      | <a href="#">RFC 3261</a>                             |
| Max-Forwards          | n/a          | m                                                      | <a href="#">RFC 3261</a>                             |
| P-Access-Network-Info | n/a          | See Section 4.3.26.10 P-Access-Network-Info on page 91 | <a href="#">RFC 3455</a>                             |
| Path                  | n/a          | See Section 4.3.26.14 Path on page 91                  | <a href="#">RFC 3327</a>                             |
| Proxy-Require         | n/a          | See Section 4.3.26.23 Require on page 93               | <a href="#">RFC 3261</a><br><a href="#">RFC 3840</a> |
| Require               | n/a          | See Section 4.3.26.23 Require on page 93               | <a href="#">RFC 3261</a><br><a href="#">RFC 3840</a> |
| Route                 | n/a          | m                                                      | <a href="#">RFC 3261</a>                             |
| Security-Client       | n/a          | See Section 4.3.26.26 Security-Client on page 93       | TS 24.229                                            |
| Security-Verify       | n/a          | See Section 4.3.26.28 Security-Verify on page 93       | TS 24.229                                            |
| Supported             | n/a          | See Section 4.3.26.31 Supported 2 on page 94           | <a href="#">RFC 3261</a>                             |
| To                    | n/a          | m                                                      | <a href="#">RFC 3261</a>                             |
| Unsupported           | n/a          | See Section 4.3.26.34 User-Agent on page 94            | <a href="#">RFC 3261</a>                             |
| Via                   | n/a          | m                                                      | <a href="#">RFC 3261</a>                             |

### 4.3.21 Supported Headers Within REGISTER Responses

The supported headers within REGISTER responses are shown in Table 59.

*Table 59 Supported Headers Within REGISTER Responses*

| SIP Method          | P-CSCF -> UE                                                  | UE -> P-CSCF | Reference                |
|---------------------|---------------------------------------------------------------|--------------|--------------------------|
| Authentication-Info | See Section 4.3.26.2 Authentication-Info on page 90           | n/a          | <a href="#">RFC 3261</a> |
| Call-ID             | m                                                             | n/a          | <a href="#">RFC 3261</a> |
| Contact             | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | n/a          | <a href="#">RFC 3261</a> |
| Content-Length      | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | n/a          | <a href="#">RFC 3261</a> |
| Cseq                | m                                                             | n/a          | <a href="#">RFC 3261</a> |
| From                | m                                                             | n/a          | <a href="#">RFC 3261</a> |
| Min-Expires         | See Section 4.3.26.8 Min-Expires on page 91                   | n/a          | <a href="#">RFC 3261</a> |
| P-Asserted-URI      | See Section 4.3.26.12 P-Associated-URI on page 91             | n/a          | <a href="#">RFC 3455</a> |
| Security-Server     | See Section 4.3.26.27 Security-Server on page 93              | n/a          | TS 24.229                |
| To                  | m                                                             | n/a          | <a href="#">RFC 3261</a> |
| Via                 | m                                                             | n/a          | <a href="#">RFC 3261</a> |
| WWW-Authenticate    | See Section 4.3.26.35 WWW-Authenticate on page 94             | n/a          | <a href="#">RFC 3261</a> |





#### 4.3.22

### Supported Headers Within SUBSCRIBE Request

The supported headers within the SUBSCRIBE request are shown in Table 60.

*Table 60 Supported Headers Within SUBSCRIBE Request*

| SIP Method           | P-CSCF -> UE                                         | UE -> P-CSCF                                                  | Reference                |
|----------------------|------------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Accept-Contact       | t                                                    | See Section 4.3.26.1 Accept-Contact on page 90                | <a href="#">RFC 3841</a> |
| Call-ID              | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Contact              | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length       | m                                                    | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                 | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| From                 | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| Max-Forwards         | m                                                    | m                                                             | <a href="#">RFC 3261</a> |
| P-Asserted-Identity  | See Section 4.3.26.11 P-Asserted-Identity on page 91 | x                                                             | <a href="#">RFC 3455</a> |
| P-Called-Party-ID    | m                                                    | x                                                             | <a href="#">RFC 3455</a> |
| P-Preferred-Identity | n/a                                                  | See Section 4.3.26.13 P-Preferred-Identity on page 91         | <a href="#">RFC 3325</a> |
| Privacy              | n/a                                                  | See Section 4.3.26.15 Privacy on page 91                      | <a href="#">RFC 3323</a> |
| Proxy-Authorization  | n/a                                                  | See Section 4.3.26.17 Proxy-Authorization on page 92          | <a href="#">RFC 3261</a> |
| Proxy-Require        | n/a                                                  | See Section 4.3.26.18 Proxy-Require on page 92                | <a href="#">RFC 3261</a> |

| SIP Method     | P-CSCF -> UE                                    | UE -> P-CSCF                                     | Reference                |
|----------------|-------------------------------------------------|--------------------------------------------------|--------------------------|
| Record-Route   | m                                               | See Section 4.3.26.20 Record-Route, 1 on page 92 | <a href="#">RFC 3261</a> |
| Reject-Contact | See Section 4.3.26.22 Reject-Contact on page 92 | See Section 4.3.26.22 Reject-Contact on page 92  | <a href="#">RFC 3841</a> |
| Route          | See Section 4.3.26.24 Route, 1 on page 93       | See Section 4.3.26.25 Route, 2 on page 93        | <a href="#">RFC 3261</a> |
| Supported      | t                                               | t                                                | <a href="#">RFC 3261</a> |
| To             | m                                               | m                                                | <a href="#">RFC 3261</a> |
| User-Agent     | See Section 4.3.26.34 User-Agent on page 94     | See Section 4.3.26.34 User-Agent on page 94      | <a href="#">RFC 3261</a> |
| Via            | m                                               | n/a                                              | <a href="#">RFC 3261</a> |

**Note:** Normally the SUBSCRIBE request is not routed to terminating UE. Instead, the request is terminated in an Application Server. The P-CSCF does not, however, exclude the possibility to subscribe to events that are generated by a UE.

### 4.3.23 Supported Headers Within SUBSCRIBE Responses

The supported headers within SUBSCRIBE responses are shown in Table 61.

Table 61 Supported Headers Within SUBSCRIBE Responses

| SIP Method          | P-CSCF -> UE                                        | UE -> P-CSCF                                                  | Reference                |
|---------------------|-----------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Authentication-Info | See Section 4.3.26.2 Authentication-Info on page 90 | n/a                                                           | <a href="#">RFC 3261</a> |
| Call-ID             | m                                                   | m                                                             | <a href="#">RFC 3261</a> |
| Contact             | m                                                   | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length      | m                                                   | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                | m                                                   | m                                                             | <a href="#">RFC 3261</a> |



| SIP Method          | P-CSCF -> UE                                         | UE -> P-CSCF                                     | Reference                |
|---------------------|------------------------------------------------------|--------------------------------------------------|--------------------------|
| From                | m                                                    | m                                                | <a href="#">RFC 3261</a> |
| P-Asserted-Identity | See Section 4.3.26.11 P-Asserted-Identity on page 91 | x                                                | <a href="#">RFC 3325</a> |
| Proxy-Authenticate  | See Section 4.3.26.16 Proxy-Authenticate on page 92  | n/a                                              | <a href="#">RFC 3261</a> |
| Privacy             | n/a                                                  | See Section 4.3.26.15 Privacy on page 91         | <a href="#">RFC 3323</a> |
| Record-Route        | See Section 4.3.26.21 Record-Route, 2 on page 92     | See Section 4.3.26.21 Record-Route, 2 on page 92 | <a href="#">RFC 3261</a> |
| To                  | m                                                    | n/a                                              | <a href="#">RFC 3261</a> |
| Unsupported         | See Section 4.3.26.32 Supported 3 on page 94         | t                                                | <a href="#">RFC 3261</a> |
| Via                 | m                                                    | n/a                                              | <a href="#">RFC 3261</a> |

**Note:** Normally the SUBSCRIBE request is not routed to terminating UE. Instead, the request is terminated in an Application Server. The P-CSCF does not, however, exclude the possibility to subscribe to events that are generated by a UE.

#### 4.3.24

#### Supported Headers Within UPDATE Request

The supported headers within the UPDATE request are shown in Table 62.

Table 62 Supported Headers Within UPDATE Request

| SIP Method     | P-CSCF -> UE | UE -> P-CSCF                                   | Reference                |
|----------------|--------------|------------------------------------------------|--------------------------|
| Accept-Contact | t            | See Section 4.3.26.1 Accept-Contact on page 90 | <a href="#">RFC 3841</a> |
| Call-ID        | m            | m                                              | <a href="#">RFC 3261</a> |
| Contact        | m            | m                                              | <a href="#">RFC 3261</a> |

| SIP Method          | P-CSCF -> UE                                    | UE -> P-CSCF                                                  | Reference                |
|---------------------|-------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Content-Length      | m                                               | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                | m                                               | m                                                             | <a href="#">RFC 3261</a> |
| From                | m                                               | m                                                             | <a href="#">RFC 3261</a> |
| Max-Forwards        | m                                               | m                                                             | <a href="#">RFC 3261</a> |
| Min-SE              | See Section 4.3.26.9 Min-SE on page 91          | See Section 4.3.26.9 Min-SE on page 91                        | <a href="#">RFC 4028</a> |
| Proxy-Authorization | n/a                                             | See Section 4.3.26.17 Proxy-Authorization on page 92          | <a href="#">RFC 3261</a> |
| Proxy-Require       | n/a                                             | See Section 4.3.26.18 Proxy-Require on page 92                | <a href="#">RFC 3261</a> |
| Reject-Contact      | See Section 4.3.26.22 Reject-Contact on page 92 | See Section 4.3.26.22 Reject-Contact on page 92               | <a href="#">RFC 3841</a> |
| Route               | See Section 4.3.26.24 Route, 1 on page 93       | m                                                             | <a href="#">RFC 3261</a> |
| Supported           | t                                               | t                                                             | <a href="#">RFC 3261</a> |
| To                  | m                                               | m                                                             | <a href="#">RFC 3261</a> |
| User-Agent          | See Section 4.3.26.34 User-Agent on page 94     | See Section 4.3.26.34 User-Agent on page 94                   | <a href="#">RFC 3261</a> |
| Via                 | m                                               | m                                                             | <a href="#">RFC 3261</a> |

#### 4.3.25 Supported Headers Within UPDATE Responses

The supported headers within UPDATE responses are shown in Table 63.



*Table 63 Supported Headers Within UPDATE Responses*

| <b>SIP Method</b>   | <b>P-CSCF -&gt; UE</b>                              | <b>UE -&gt; P-CSCF</b>                                        | <b>Reference</b>         |
|---------------------|-----------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Authentication-Info | See Section 4.3.26.2 Authentication-Info on page 90 | n/a                                                           | <a href="#">RFC 3261</a> |
| Call-ID             | m                                                   | m                                                             | <a href="#">RFC 3261</a> |
| Contact             | m                                                   | m                                                             | <a href="#">RFC 3261</a> |
| Content-Length      | m                                                   | See Section 4.3.26.5 Contact 2 in 200 OK Responses on page 90 | <a href="#">RFC 3261</a> |
| Cseq                | m                                                   | m                                                             | <a href="#">RFC 3261</a> |
| From                | m                                                   | m                                                             | <a href="#">RFC 3261</a> |
| Min-SE              | See Section 4.3.26.9 Min-SE on page 91              | See Section 4.3.26.9 Min-SE on page 91                        | <a href="#">RFC 4028</a> |
| Proxy-Authenticate  | See Section 4.3.26.16 Proxy-Authenticate on page 92 | n/a                                                           | <a href="#">RFC 3261</a> |
| Session-Expires     | See Section 4.3.26.29 Session-Expires on page 93    | See Section 4.3.26.29 Session-Expires on page 93              | <a href="#">RFC 4028</a> |
| To                  | m                                                   | m                                                             | <a href="#">RFC 3261</a> |
| Unsupported         | See Section 4.3.26.32 Supported 3 on page 94        | t                                                             | <a href="#">RFC 3261</a> |
| Via                 | m                                                   | m                                                             | <a href="#">RFC 3261</a> |

## 4.3.26

### Header Notes

This section describes the header notes referenced in Section 4.3.1 Supported Headers Within ACK Request on page 63 to Section 4.3.25 Supported Headers Within UPDATE Responses on page 88.

#### 4.3.26.1 **Accept-Contact**

The `Accept-Contact` header can be included by the originating UE when requesting support for certain capabilities by the terminating UE (contact). The CSCF only routes the request to terminating contacts of the UE that match the capabilities requested.

#### 4.3.26.2 **Authentication-Info**

This header is transferred to the S-CSCF.

For more information, refer to *CSCF Mw Interface*.

#### 4.3.26.3 **Authorization**

This header is transferred to the S-CSCF.

For more information, refer to *CSCF Mw Interface*.

#### 4.3.26.4 **Contact 1 in Register Requests**

The `Contact` header is mandatory except for the case when a `REGISTER` request message is sent to request the total list of contacts for a Public User Identity.

#### 4.3.26.5 **Contact 2 in 200 OK Responses**

The `Contact` header is present with the `Expire` parameter containing the contact expiration time in SIP 2xx responses when the user has one or more contacts currently registered.

The `Contact` header is present with the `Expire` parameter set to value zero in SIP 2xx responses for all contacts that have been deregistered.

#### 4.3.26.6 **Content-Length**

The `Content-Length` header is mandatory if TCP is used as transport. The P-CSCF always includes a `Content-Length` in SIP requests sent towards the UE independent of transport.

#### 4.3.26.7 **Expires**

An expiration time received in the `Contact` header is valid for that contact only. An expiration time received in the `Expires` header is valid for all contacts without defined expiration times.



#### 4.3.26.8 Min-Expires

The `Min-Expires` header is present in the SIP response 423 (`Interval To Brief`). This indicates that the expiry time is too short.

#### 4.3.26.9 Min-SE

The `Min-SE` header can be present in the request if session timers are requested and the UE or the P-CSCF requests a minimum session interval higher than the default.

#### 4.3.26.10 P-Access-Network-Info

This header is transferred to the S-CSCF.

For more information, refer to *CSCF Mw Interface*.

#### 4.3.26.11 P-Asserted-Identity

The `P-Asserted-Identity` header is present unless privacy has been requested.

#### 4.3.26.12 P-Associated-URI

The `P-Associated-URI` is present in SIP 2xx responses in case the user has an Implicit Registration Set with additional associated Public User Identities with the Public User Identity that is being registered.

#### 4.3.26.13 P-Preferred-Identity

The `P-Preferred-Identity` header is used by the UE to indicate the preferred Public User Identity to the P-CSCF. If the header is not present, the P-CSCF determines the users Public User Identity from the `From` header.

#### 4.3.26.14 Path

The `Path` header is not normally to be included by the UE. There can however exist cases where a SIP proxy is deployed in the path between the UE and the P-CSCF, the `Path` header can be used in such cases.

#### 4.3.26.15 Privacy

The `Privacy` header must be present in the request or response if privacy is requested by originating or terminating UE.

**4.3.26.16 Proxy-Authenticate**

This header is transferred to the S-CSCF.

For more information, refer to *CSCF Mw Interface*.

**4.3.26.17 Proxy-Authorization**

This header is transferred to the S-CSCF.

For more information, refer to *CSCF Mw Interface*.

**4.3.26.18 Proxy-Require**

The `Proxy-Require` header can be included by the originating UE when requiring support for certain capabilities or procedures by the P-CSCF, or both. If the requested capability is not supported by the P-CSCF, the P-CSCF rejects the request.

**4.3.26.19 Reason**

If the `Reason` header is present in a received `CANCEL` request, the P-CSCF copies the `Reason` header to the outgoing `CANCEL` request.

When the P-CSCF generates a `CANCEL` request, a `Reason` header with protocol SIP, cause, and text is included.

**4.3.26.20 Record-Route, 1**

The `Record-Route` header is not normally to be included by the UE. There can however exist cases where a SIP proxy is deployed in the path between the UE and the P-CSCF, the `Record-Route` header can be used in such cases.

**4.3.26.21 Record-Route, 2**

The `Record-Route` header must be present in SIP 1xx and 2xx responses that are part of a dialog establishment.

**4.3.26.22 Reject-Contact**

The `Reject-Contact` header can be included by the originating UE when requesting that the terminating UE does not support for certain capabilities.

This header is transferred to the S-CSCF.

For more information, refer to *CSCF Mw Interface*.





#### 4.3.26.23 **Require**

The UE can include a `Require` header field with the value `pref` that indicates that the CSCF stores feature parameters included in the `Contact` header.

The UE can include the tag `sec-agree` to indicate that security mechanism agreement is required.

All other `Require` header field values included in the `REGISTER` request is rejected with 420 (`Bad Extension`).

#### 4.3.26.24 **Route, 1**

The `Route` header is not normally to be included by the P-CSCF. There can however exist cases where a SIP proxy is deployed in the path between the UE and the P-CSCF, the `Route` header can be used in such cases.

#### 4.3.26.25 **Route, 2**

If the UE has a preloaded `Route` set, the UE can include a `Route` header in SIP request messages outside an established dialog. For SIP request messages within an established dialog, the UE must insert `Route` headers based on the `Route` set valid for this session.

#### 4.3.26.26 **Security-Client**

If the `Require` header contains the tag `sec-agree`, then this header is mandatory, otherwise it is not applicable.

#### 4.3.26.27 **Security-Server**

If security mechanism agreement was requested, then this header is mandatory, otherwise it is not applicable.

#### 4.3.26.28 **Security-Verify**

If the `Require` header contains the tag `sec-agree`, then this header is mandatory, otherwise not applicable.

#### 4.3.26.29 **Session-Expires**

If the originating or terminating UE supports session timers, the UE can include a `Session-Expires` header into the SIP request message or response. The recommendation is that the originating and terminating UE support session timers according to [RFC 4028 Session Timers in the Session Initiation Protocol \(SIP\)](#) and therefore include a `Session-Expires` header in the request and corresponding response.

#### 4.3.26.30 **Supported 1**

If the UE supports certain capabilities or procedures, the UE can indicate this by including a `Supported` header into the SIP message.

The P-CSCF checks that the `Supported` header includes `Timer`, to enable time supervisions or not.

#### 4.3.26.31 **Supported 2**

The UE can include `Supported` header containing the option tag `path`. If the header is not present, then the P-CSCF inserts the header before forwarding the request.

#### 4.3.26.32 **Supported 3**

The P-CSCF includes the following supported capabilities when its capabilities are requested; `Timer`, `Path`, `Pref`, `100rel`, `Precondition`. When the P-CSCF proxies a `200 (OK)`, the `Supported` header is transparent.

#### 4.3.26.33 **Unsupported**

The `Unsupported` header is included in the response if the request contained a `Require` or `Proxy-Require` header field listing a feature not supported by either the CSCF (`Proxy-Require`) or the terminating UE (`Require`).

#### 4.3.26.34 **User-Agent**

If `User-Agent` restriction is defined in the P-CSCF and is activated, then the `User-Agent` header is mandatory. If `User-Agent` restriction is not defined, then the `User-Agent` header is ignored and sent transparently to the other end point, or it is ignored in case of `REGISTER` request.

#### 4.3.26.35 **WWW-Authenticate**

This header is transferred to the S-CSCF.

For more information, refer to *CSCF Mw Interface*.

## 4.4 **SDP**

The information in the SDP must be according to the following [RFC 3264 An Offer/Answer Model with the Session Description Protocol \(SDP\)](#) and [RFC 4566 SDP: Session Description Protocol](#) specifications.

In addition to the standard, the P-CSCF also supports the private address information of the access network.



The private address information is contained in a media-level attribute `X-privaddr` with the following syntax:

```
a=X-privaddr:<raddr> <rport> [<rport_rtcp>] <laddr> <lport>
```

- `raddr`: The remote IP address from the perspective of the Border Gateway Function on the private side of the SBC, that is, `raddr` represents the UE IP address. The SBC is expected to take the address from the SDP c-line if no Network Address Translation (NAT) is detected. Otherwise, it is fetched from the `received` parameter of the `Via` header.
- `rport`: The remote media port from the perspective of the Border Gateway Function on the private side of the SBC; that is, `rport` represents the UE media port for a particular m-line. The SBC is expected to take the port from the SDP m-line.
- `laddr`: The local IP address of the Border Gateway Function on the private side of the relay.
- `lport`: The local media port of the Border Gateway Function on the private side of the relay.





## 5 Formal Syntax

Not applicable.





## 6 Security Considerations

### 6.1 IPsec Tunnel

In some deployment, SIP proxy nodes are located between the UEs and the P-CSCF. The communication between the P-CSCF and the SIP proxy nodes can be secured using IPsec (Zb interface) on the IP transport layer. For more information, refer to the [3GPP TS 33.210 3G security; Network Domain Security \(NDS\); IP network layer security](#) specification.

IP Security (IPsec) tunnels can be defined between the nodes. Internet Key Exchange version 1 (IKEv1) performs mutual authentication between the two nodes and establishes an IKE Security Association that includes shared secret information used to establish IPsec Security Associations (SAs). Different forms of authentication and encryptions can be selected when defining the IPsec tunnels. For the native CSCF, refer to *Security Management User Guide*, and for the virtual CSCF, refer to *eVIP Management Guide*.







## 7 Related Standards

The related standards are mainly the [3GPP TS 24.229 IP Multimedia call control protocol based on Session Initiation Protocol \(SIP\) and Session Description Protocol \(SDP\)](#) and [RFC 3261 Session Initiation Protocol](#) specifications.

Other standards are also applicable:

- [RFC 1951 DEFLATE Compressed Data Format Specification version 1.3](#)
- [RFC 2543 SIP: Session Initiation Protocol](#)
- [RFC 2617 HTTP Authentication: Basic and Digest Access Authentication](#)
- [RFC 3262 Reliability of provisional responses in Session Initiation Protocol \(SIP\)](#)
- [RFC 3263 Session Initiation Protocol \(SIP\): Locating SIP Servers](#)
- [RFC 3264 An Offer/Answer Model with the Session Description Protocol \(SDP\)](#)
- [RFC 3265 Session Initiation Protocol \(SIP\) Specific Event Notification](#)
- [RFC 3310 Hypertext Transfer Protocol \(HTTP\) Digest Authentication Using Authentication and Key Agreement \(AKA\)](#)
- [RFC 3311 The Session Initiation Protocol \(SIP\) UPDATE method](#)
- [RFC 3313 Private Session Initiation Protocol \(SIP\) Extensions for Media Authorization](#)
- [RFC 3323 A Privacy Mechanism for the Session Initiation Protocol \(SIP\)](#)
- [RFC 3325 Private Extensions to the Session Initiation Protocol \(SIP\) for Network Asserted Identity within Trusted Networks](#)
- [RFC 3326 The Reason Header Field for the Session Initiation Protocol \(SIP\)](#)
- [RFC 3327 Session Initiation Protocol Extension Header Field for Registering Non-Adjacent Contacts](#)
- [RFC 3329 Security Mechanism Agreement for the Session Initiation Protocol \(SIP\)](#)
- [RFC 3428 Session Initiation Protocol \(SIP\) Extension for Instant Messaging](#)
- [RFC 3455 Private Header \(P-Header\) Extensions to the Session Initiation Protocol \(SIP\) for the 3rd-Generation Partnership Project \(3GPP\)](#)
- [RFC 3515 The Session Initiation Protocol \(SIP\) REFER method](#)

- [RFC 3608 Session Initiation Protocol \(SIP\) Extension Header Field for Service Route Discovery During Registration](#)
- [RFC 3840 Indicating User Agent Capabilities in the Session Initiation Protocol \(SIP\)](#)
- [RFC 3841 Caller Preferences for the Session Initiation Protocol \(SIP\)](#)
- [RFC 3891 The Session Initiation Protocol \(SIP\) “Replaces” Header](#)
- [RFC 3892 The Session Initiation Protocol \(SIP\) Referred-By Mechanism](#)
- [RFC 3903 An Event State Publication Extension to the Session Initiation Protocol \(SIP\)](#)
- [RFC 3911 The Session Initiation Protocol \(SIP\) “Join Header”](#)
- [RFC 4028 Session Timers in the Session Initiation Protocol \(SIP\)](#)
- [RFC 4488 Suppression of Session Initiation Protocol REFER Method Implicit Subscription](#)
- [RFC 4566 SDP: Session Description Protocol](#)
- [RFC 4964 The P-Answer-State Header Extension to the Session Initiation Protocol \(SIP\) for the Open Mobile Alliance \(OMA\) Push to talk over Cellular](#)
- [RFC 5373 Requesting Answering and Alerting Modes for the Session Initiation Protocol \(SIP\)](#)
- [3GPP TS 23.003 Numbering, addressing and identification](#)
- [3GPP TS 33.102 3G Security; Security architecture](#)
- [3GPP TS 33.203 3G security; Access security for IP-based services](#)
- [3GPP TS 33.210 3G security; Network Domain Security \(NDS\); IP network layer security](#)

For information about deviations from the standards, refer to *CSCF Statement of Compliance Overview*.