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3GPP IP Multimedia CN Subsystem - Registration flows

tatus of this Memo

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This document provides an overview by means of signalling flows of the methods by which 3GPP wishes to uses SIP for the specification of the IP Multimedia CN subsystem for the purposes of registering user equipment.

able of Contents

onventions used in this document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC-2119 [2].

ntroduction

The Third Generation Partnership Project (3GPP) is described in draft-3GPP-collaboration-00.txt.

The IP Multimedia CN Subsystem provides session control capabilities to user equipment accessing the system using the General Packet Radio Service, which supports the use of IP and applications that can use IP.

The IP Multimedia CN subsystem will be defined in a number of 3GPP documents. Documents currently under development include:

TS 22.228: “3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Service requirements for the IP Multimedia Core Network Subsystem (Stage 1)”.

TS 23.228: “3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; IP Multimedia (IM) Subsystem - Stage 2”.
TS 24.228: “3rd Generation Partnership Project; Technical Specification Group Core Network; Signalling flows for the IP multimedia call control based on SIP and SDP”.

TS 24.229: “3rd Generation Partnership Project; Technical Specification Group Core Network; IP Multimedia Call Control Protocol based on SIP and SDP”.

TS 23.218: “3rd Generation Partnership Project; Technical Specification Group Core Network; IP Multimedia (IM) Session Handling; IP Multimedia (IM) call model”.

and these may be found as described in draft-3GPP-collaboration-00.txt

This document describes how 3GPP intend to apply SIP to the registration of user equipment on the IM CN subsystem by means of diagrams showing the flow and contents of signalling information.

ecurity Considerations

None.

eferences

draft-3GPP-collaboration-00.txt “3GPP-IETF Standardization Collaboration” work in progress.

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ull Copyright Statement

nnex A

This Annex contains a copy of material in 3GPP TS 24.228 relating to registration of user equipment.

Signalling flows for REGISTER

Editor’s note: Security Related Issues. A well established trust relationship is required between SIP servers of different networks. If the P-CSCF is allowed to alter the SIP REGISTER message, a mechanism is required to establish the trust –relationship between the P-CSCF and I-CSCF. The P-CSCF is required to have the authority to register a visiting mobile.

Editor’s note: Security Related Issues The UE is required to send un-encrypted messages to the P-CSCF. The initial REGISTER message as shown in flow 3 can be cryptographically signed by the UE. In this case, the P-CSCF cannot replace the *Contact* field. Thus the above discussed solution for outbound proxy registration REQUIRES the UE to send messages with un-encrypted header fields to the P-CSCF. The P-CSCF can later encrypt these header fields before forwarding to the I-CSCF, if required. The un-encrypted header fields are listed as follows:

- To
- Via
- From
- Contact

- Expires
- Request URI

Editor's note: Call Flow/Protocol Related Issues. Passing S-CSCF selection information through SIP Register message from hI-CSCF to vI-CSCF According to the S2 call flows, the S-CSCF selection information is pull by the hI-CSCF , and forwarded to vI-CSCF via SIP message(REGISTER). The question is why can the vI-CSCF pull this information again from the HSS? If this information has to be forwarded via REGISTER message, how should it be carried? Call flow reference: Figure 2-2, flow 9, 10, and 13

Editor's note: Call Flow/Protocol Related Issues. Identifying Visited Network domain name from REGISTER message In S2 Visited Control Registration flows, hI-CSCF is required to forward the REGISTER message to vI-CSCF once the visited control decision is made by the HSS. In order to obtained the vI-CSCF's address, we need to construct a generic I-CSCF SIP Request URI using the Visited Network Domain Name derived from the REGITER message, and do a DNS look up. The issues is from which part of the message this information should be derived from? Should this information be passed using the message body? Can it be the Contact header (contains P-CSCF name/address), or the Via header (also contains the network address/hostname of P-CSCF), or even the use of the proposed Path extension? Call flow reference: Figure 2-2, flow 13

Editor's note: Call Flow/Protocol Related Issues. Passing forward rout information back to P-CSCF Currently, several solutions are being considered in CN1 WG. One solution is to use the SIP message body to carry this information, and the other is to use the proposed a generic extension to SIP (named Path header) to pass this information around during registration. This may require update to the call flows depends the outcome of CN1 WG decision.

Editor's note: Call Flow/Protocol Related Issues. Maintaining forward route when Firewall I_CSCF is used. When firewall I-CSCF is used, should both I-CSCF and S-CSCF to be maintained in the P-CSCF, or should only I-CSCF to be maintained in P-CSCF? One Solution is only I-CSCF to be maintained by P-CSCF, how does I-CSCF obtained the S-CSCF address? One possibility is to have the S-CSCF information saved in the HSS, and I-CSCF will query the HSS to obtain this information. Another solution is to use the proposed Path header to save both I-CSCF and S-CSCF name in P-CSCF. S-CSCF name should be encrypted by the I-CSCF in this case.

Editor's note: The format of the request URI in the REGISTER message is for further study. Should it be registrar.home1.net or home1.net or something else.

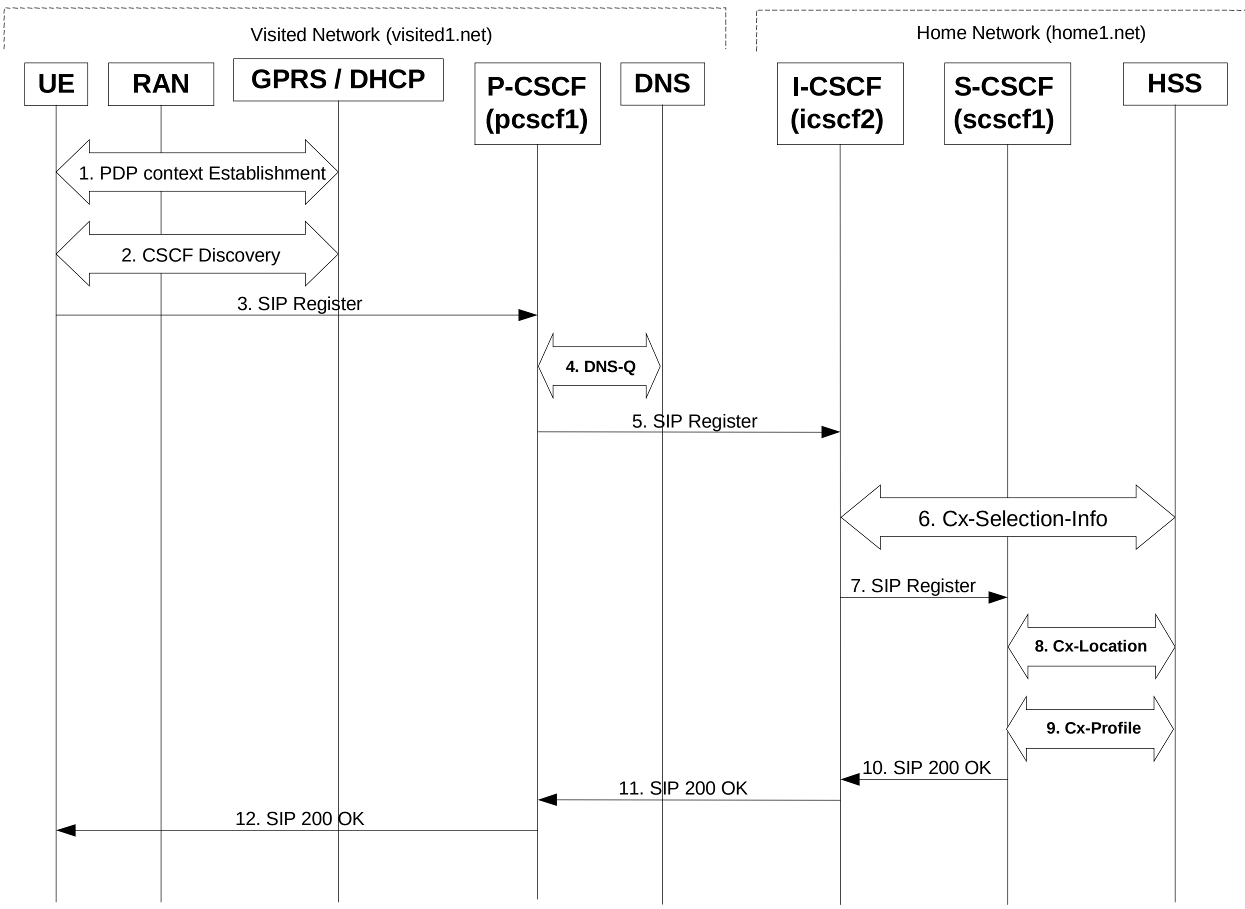
Editor's note: Is the formatting of a reregistration REGISTER message identical to the initial REGISTER message? Are any of the fields different, e.g. request-URI?

Editor's note: Current flows arbitrarily assign a timer value of 7200. Is this a recommended value, or can any value be chosen, and if so, what are the constraints?

1 Registration Signalling: User Not Registered

ıis shows the registration signalling flow for the scenario when the user is not registered. For the purpose of this registration ›w, the subscriber is considered to be roaming. In this signalling flow, the home network has network configuration hiding tive.

Figure 7.1-1: UE roaming



1 **GPRS Attach / PDP Context Establishment (UE to GPRS)**

This signalling flow is shown to indicate the GRPS Attach and PDP Context Activation procedures that must be completed prior to application registration. When complete, the UE will have acquired an IP address (provided by the GGSN) which serves as the host address for the duration of the PDP context.

2 **CSCF Discovery (UE to GPRS/ DHCP)**

This signalling flow is the procedure to discover the Proxy CSCF using DHCP. When complete, the address of the proxy server (pcscf.home.net) is made known to the UE.

3 **SIP REGISTER request (UE to P-CSCF) – see example in Table 7.1-3**

The purpose of this request is to register the user's SIP URI with a S-CSCF in the home network. This request is routed to the P-CSCF because it is the only SIP server known to the UE for the voice application. In the following SIP request, the Contact field contains the user's host address.

The P-CSCF will perform two actions, binding and forwarding. The binding is between the User's SIP address (user1@home1.net) and the host (terminal) address ([5555::aaa:bbb:ccc:ddd]) which was acquired during PDP context activation process.

Table 7.1-3 SIP REGISTER request (UE to P-CSCF)

```
GISTER sip:registrar.home1.net SIP/2.0
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om: <sip:user1@home1.net>
: <sip:user1@home1.net>
ntact: <Sip:[5555::aaa:bbb:ccc:ddd]>
ll-ID: 123456789@[5555::aaa:bbb:ccc:ddd]
eq: 1 REGISTER
pires: 7200
ntent-Length: 0
```

Request-URI: The Request-URI (the URI that follows the method name, “REGISTER”, in the first line) indicates the destination domain of this REGISTER request. The rules for routeing a SIP request describe how to use DNS to resolve this domain name (“home1.net”) into an address or entry point into the home operator’s network (the I-CSCF). This information is stored in the USIM.

Editor’s note: One proposal is that the above URI forms an integral part of a global private identifier.

Via: IPv6 PDP address of the SIP session allocated during the PDP Context Activation process.

From: This indicates the SIP identity of the user (stored in the USIM) originating the REGISTER request. In SIP, this can be a third-party.

Editor’s note: One proposal is: “This is a natural place for the private identifier or NAI for the subscriber. Forming a SIP URL from the NAI is a simple matter of prepending “sip:”. For example, if the subscriber’s NAI is 19725835472@operator.com, then the From: header would be sip:19725835472@operator.com.” Alternatively it could be the SIP-URL of the party registering.

To: This indicates the public identifier being registered. This is the identity by which other parties know this subscriber. It is obtained from the USIM.

Editor’s note: One proposed additional text: “In this case, this is the global SIP URL for the subscriber.”

Contact: This indicates the point-of-presence for the subscriber – the IP address of the UE. This is the temporary point of contact for the subscriber that is being registered. Subsequent requests destined for this subscriber will be sent to this address. This information is stored in the P-CSCF.

Editor’s note: It is for further study whether this information is stored in the HSS and the S-CSCF for the subscriber in order to support multiple registrations.

Call Id: Call Identifier for this Registration generated as per (RFC 2543)

Cseq: Cseq for this Registration generated as per (RFC 2543)

Editor’s note: At this point, all that is missing from the REGISTER request is the visited operator’s domain name. This piece of information is inserted into the Contact: header by the P-CSCF in the visited network upon receiving the REGISTER request from the UE. The P-CSCF takes the Contact: header indicating the IP address of the UE and replaces it with a new Contact: header indicating the address of the P-CSCF (including the visited operator’s domain name). The IP address of the UE is stored in the P-CSCF for routing incoming requests to the appropriate UE.

For example, the UE’s Contact: address (“sip:[5555::aaa:bbb:ccc:ddd]”) is replaced by a Contact: address for the proxy (“sip:sean.olson%40home1.net@pcscf1.visited1.net”). This new Contact: address contains a specially encoded version of the subscriber’s identity (To: header), plus the address of the P-CSCF.

If the proposed private identifier is not included in the From header, a mechanism is also needed to transfer this proposed private identifier.

Upon receiving this request the P-CSCF will set it's SIP registration timer for this UE to the Expires time in this request.

4 **DNS-Q**

Based on the user's URI, the P-CSCF determines that UE is registering from a visiting domain and performs a DNS query to locate the I-CSCF in the home network. The look up in the DNS is based on the address specified in the Request URI. The DNS provides the P-CSCF with an address of the I-CSCF in the home network.

5 **SIP REGISTER request (P-CSCF to I-CSCF) – see example in Table 7.1-5**

Since this P-CSCF is call stateful, it is required to be in the path for all Mobile Originated and Mobile Terminated requests for this user. To ensure this, the P-CSCF has to put itself into the path for future requests. One solution of achieving this is to have the P-CSCF as the contact point for this user at the home registrar.

To do this the P-CSCF creates a temporary SIP URI for the user called user1%40home1.net@pcscf1.visited1.net. As part of its internal registration procedure the P-CSCF binds the temporary SIP URI to the user's SIP URI which was also bound to the IP address of the UE as shown in signalling flow 3. The P-CSCF then forwards the REGISTER request for user1@home1.net, to the home registrar, using a contact address of user1%40home.net@pcscf1.visited1.net.

This signalling flow shows the SIP REGISTER being forward from the P-CSCF to the I-CSCF in the home domain.

Table 7.1-5 SIP REGISTER request (P-CSCF to I-CSCF)

```
GISTER sip:registrar.home1.net SIP/2.0
a: SIP/2.0/UDP pcscf1.visited1.net,
   SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
th: <sip:pcscf1.visited1.net>
oxy-require: path
quire: path
om:
:
ntact: <sip:user1%40home1.net@pcscf1.visited1.net>
ll-ID:
eq:
pires:
ntent-Length:
```

Path: This is the address of the P-CSCF and is included to inform the S-CSCF where to route terminating sessions.

Require, Proxy-Require: These headers are included to ensure that the recipient correctly handles the Path header. If the recipient does not support the path header, a response will be received with a status code of 420 and an Unsupported header indicating "path". Such a response indicates a misconfiguration of the routing tables and the request has been routed outside the IM CN subsystem.

6 **Cx-Selection-Info**

The I-CSCF requests information related to the required S-CSCF capabilities from the HSS which shall be input into the S-CSCF selection function. The HSS sends the capability information required for S-CSCF selection. The I-CSCF uses this information to select a suitable S-CSCF.

7 **SIP REGISTER request (I-CSCF to S-CSCF) – see example in Table 7.1-7**

This signalling flow forwards the SIP REGISTER from the I-CSCF to the S-CSCF selected. The address in the request line is changed to the address of the S-CSCF.

Table 7.1-7 SIP REGISTER request (I-CSCF to S-CSCF)

```
GISTER sip: scscf1.home1.net SIP/2.0
a: SIP/2.0/UDP icscf2.home1.net,
   SIP/2.0/UDP pcscf1.visited1.net,
   SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
th: <sip:icscf2.home1.net>,
    <sip:pcscf1.visited1.net>
oxy-require:
quire:
om:
:
ntact:
ll-ID:
eq:
pires:
ntent-Length:
```

Path: The S-CSCF stores the contents of the Path headers and uses these addresses for routing mobile terminated sessions.

Upon receiving this request the S-CSCF will set it's SIP registration timer for this UE to the Expires time in this request.

8 **Cx-Location**

The S-CSCF shall send its location information to the HSS. The HSS stores the S-CSCF name for that subscriber. The HSS sends a response to the I-CSCF to acknowledge the sending of location information.

9 **Cx-Profile**

The S-CSCF shall send the subscriber's identity to the HSS in order to be able to download the subscriber profile to the S-CSCF. The HSS returns the subscriber's profile to the S-CSCF. The S-CSCF shall store the subscriber profile for that indicated user.

10 **SIP 200 OK response (S-CSCF to I-CSCF) – see example in Table 7.1-10**

The S_CSCF determines the contact name for the P-CSCF (S-CSCF or I-CSCF), and add this information to the 200 OK response. The S-CSCF sends acknowledgment to the I-CSCF indicating that Registration was successful. This response will traverse the path that the REGISTER request took as described in the Via list.

Table 7.1-10 SIP 200 OK response (S-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf2.home1.net,
   SIP/2.0/UDP pcscf1.visited1.net,
   SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
th: <sip:scscf1.home1.net>,
    <sip:icscf2.home1.net>,
    <sip:pcscf1.visited1.net>
om:
:
ll-ID:
eq:
pires:
ntent-Length:
```

11 **SIP 200 OK response (I-CSCF to P-CSCF) – see example in Table 7.1-11**

The I-CSCF translates the S-CSCF name in the Path header. The I-CSCF forwards acknowledgment from the S-CSCF to the P-CSCF indicating that Registration was successful. This response will traverse the path that the REGISTER request took as described in the Via list.

Table 7.1-11 SIP 200 OK response (I-CSCF to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.visited1.net,
   SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
th: <sip:token(scscf1.home1.net)>,
    <sip:icscf2.home1.net>,
    <sip:pcscf1.visited1.net>
om:
:
ll-ID:
eq:
pires:
ntent-Length:
```

12 **SIP 200 OK response (P-CSCF to UE) – see example in Table 7.1-12**

The P-CSCF stores the names from the Path header (except the last one i.e. <sip:pcscf1.visited1.net>) and associates it with the UE. The P-CSCF then removes the Path header from the 200 OK response. The P-CSCF then forwards acknowledgment from the I-CSCF to the UE indicating that Registration was successful.

Table 7.1-12 SIP 200 OK response (P-CSCF to UE)

```
P/2.0 200 OK
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
pires:
ntent-Length:
```

2 Registration Signalling: Re-registration – User Currently Registered

r the purpose of this re-registration flow, the subscriber is considered to be roaming. In this signalling flow, the home network s network configuration hiding active.

is flow assumes :

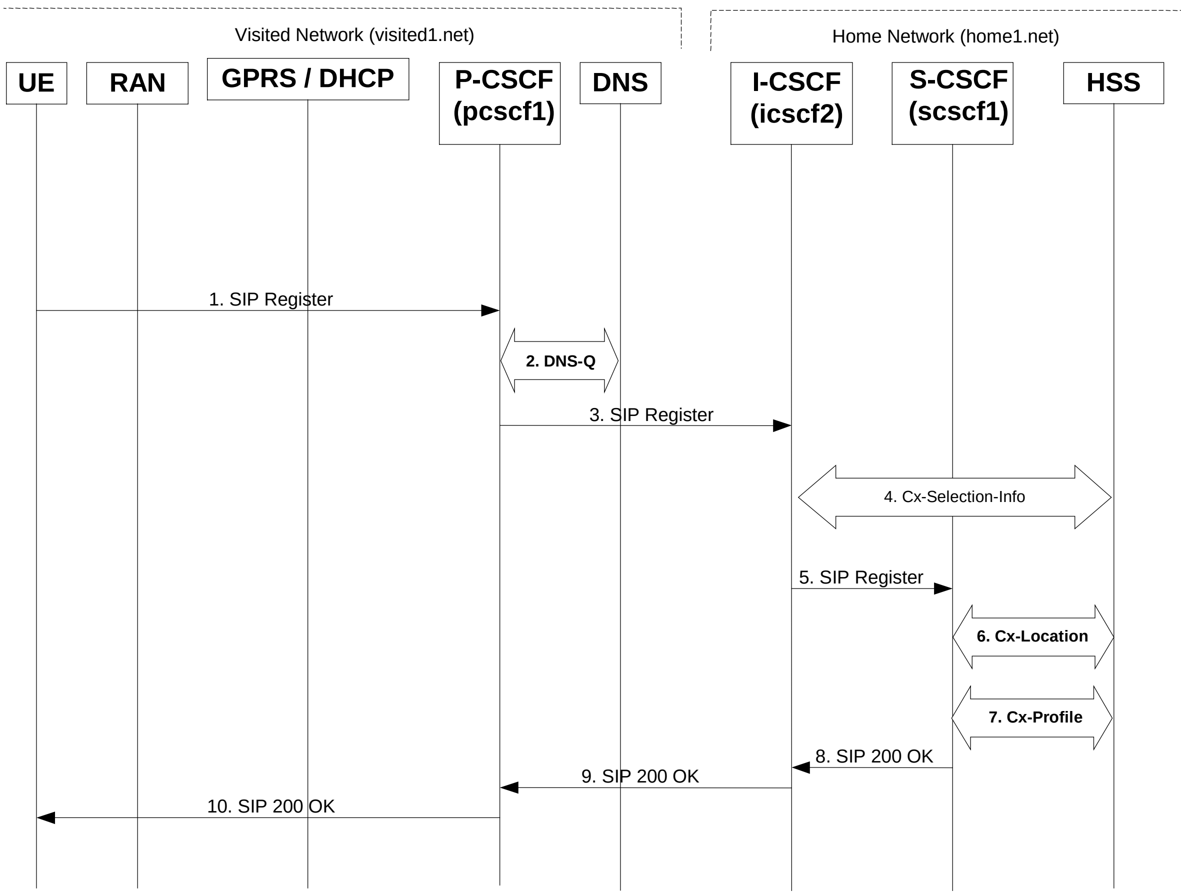
1. That the same PDP Context allocated during the initial registration scenario is still used for re-registration. For the case when the UE does not still have an active PDP context then PDP context procedures from section 7.1 must first be completed.

2. The DHCP procedure employed for P-CSCF discovery is not needed.

3. The S-CSCF selection procedure invoked by the I-CSCF is not needed.

riodic application level re-registration is initiated by the UE either in response to the expiration of the existing registration formation or in response to a change in the registration status of the UE. Re-registration follows the same path as described in bclause 7.1.

Figure 7.2-1: UE roaming



1 **SIP REGISTER request (UE to P-CSCF) – see example in Table 7.2-1**

The registration expires in the UE. The UE re-registers by sending a new REGISTER request. This request is sent to the same P-CSCF with which the UE initially registered. The P-CSCF maintains the same binding between the User's SIP public address (user_public1@home1.net) and the host (terminal) address ([5555::aaa:bbb:ccc:ddd]) which it established during the original registration.

Table 7.2-1 SIP REGISTER (UE to P-CSCF)

```
GISTER sip:registrar.home1.net SIP/2.0
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om: <sip:user_private1@home1.net>
: <sip:user_public1@home1.net>
ntact: <Sip:[5555::aaa:bbb:ccc:ddd]>
ll-ID: 123456789@[5555::aaa:bbb:ccc:ddd]
eq: 1 REGISTER
pires: 7200
ntent-Length: 0
```

The header field usage is the same as for the initial registration scenario:

Editor's note: Align element names to the method described in N1-010265.

From: This indicates the private identity of the user (stored in the USIM) originating the REGISTER request.

Editor's note: The requirement for and impact on third party registration with this usage of the From header needs further study.

To: This indicates the target of the REGISTER request. The target is the public identity that is being registered. This is the identity by which other parties know this subscriber.

Contact: This indicates the point-of-presence for the subscriber – the IP address of the UE. This is the temporary identifier for the subscriber that is being registered. Subsequent requests destined for this subscriber will be sent to this address. This information is stored in the P-CSCF.

Editor's note: It is for further study whether this information is stored in the HSS and the S-CSCF for the subscriber in order to support multiple registrations.

Request-URI: The Request-URI (the URI that follows the method name, "REGISTER", in the first line) indicates the destination domain of this REGISTER request. The rules for routeing a SIP request describe how to use DNS to resolve this domain name ("home1.net") into an address or entry point into the home operator's network (the I-CSCF). This information is stored in the USIM.

Editor's note: At this point, all that is missing from the REGISTER request is the visited operator's domain name. This piece of information is inserted into the Contact: header by the P-CSCF in the visited network upon receiving the REGISTER request from the UE. The P-CSCF takes the Contact: header indicating the IP address of the UE and replaces it with a new Contact: header indicating the address of the P-CSCF (including the visited operator's domain name). The IP address of the UE is stored in the P-CSCF for routing incoming requests to the appropriate UE.

For example, the UE's Contact: address ("sip:[5555::aaa:bbb:ccc:ddd]") is replaced by a Contact: address for the proxy ("sip:sean.olson%40home1.net@pcscf1.visited1.net"). This new Contact: address contains a specially encoded version of the subscriber's identity (To: header), plus the address of the P-CSCF.

Upon receiving this request the P-CSCF will detect that it already has a registration record for this UE and will reset it's SIP registration timer for this UE to the Expires time in this request.

2 **DNS-Q**

Based on the user's URI, the P-CSCF determines that UE is registering from a visiting domain and performs a DNS query to locate the I-CSCF in the home network. The look up in the DNS is based on the address specified in the Request URI. The DNS provides the P-CSCF with an address of the I-CSCF in the home network. The P-CSCF must not use the I-CSCF address cached as a result of the previous registration.

3 **SIP REGISTER request (P-CSCF to I-CSCF) – see example in Table 7.2-3**

This signalling flow shows the SIP Register request being forward from the P-CSCF to the I-CSCF in the home domain.

Table 7.2-3 SIP REGISTER request (P-CSCF to I-CSCF)

```
GISTER sip:registrar.home1.net SIP/2.0
a: SIP/2.0/UDP pcscf1.visited1.net,
   SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
th: <sip:pcscf1.visited1.net>
oxy-require: path
quire: path
om:
:
ntact: <sip:user1%40home1.net@pcscf1.visited1.net>
ll-ID: CSeq:
pires:
ntent-Length:
```

Path: This is the address of the P-CSCF and is included to inform the S-CSCF where to route terminating sessions.

Require, Proxy-Require: These headers are included to ensure that the recipient correctly handles the Path header. If the recipient does not support the path header, a response will be received with a status code of 420 and an Unsupported header indicating "path". Such a response indicates a misconfiguration of the routing tables and the request has been routed outside the IM CN subsystem.

4 **Cx-Selection-Info**

The I-CSCF requests information related to the required S-CSCF capabilities from the HSS which shall be input into the S-CSCF selection function. The HSS sends the capability information required for S-CSCF selection. The I-CSCF uses this information to select a suitable S-CSCF.

5 **SIP REGISTER request (I-CSCF to S-CSCF) – see example in Table 7.2-5**

This signalling flow forwards the SIP REGISTER request from the I-CSCF to the S-CSCF selected. The address in the request line is changed to the address of the S-CSCF. The I-CSCF address written in the Path header is not necessarily the same as that used for initial registration.

Table 7.2-5 SIP REGISTER request (I-CSCF to S-CSCF)

```
GISTER sip: scscf1.home1.net SIP/2.0
a: SIP/2.0/UDP icscf2.home1.net,
   SIP/2.0/UDP pcscf1.visited1.net,
   SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
th: <sip:icscf2.home1.net>,
    <sip: pcscf1.visited1.net
oxy-require:
quire:
om:
:
ntact:
ll-ID:
eq:
pires:
ntent-Length:
```

Path: The S-CSCF stores the contents of the Path headers and uses these addresses for routing mobile terminated sessions.

Upon receiving this request the S-CSCF will detect that it already has a registration record for this UE and will reset it's SIP registration timer for this UE to the Expires time in this request.

6 **Cx-Location**

The S-CSCF shall send its location information to the HSS. The HSS stores the S-CSCF name for that subscriber. The HSS sends a response to the I-CSCF to acknowledge the sending of location information.

Editor's Note: Since the S-CSCF has detected this as a re-registration it may omit this step as an optimisation.

7 **Cx-Profile**

The S-CSCF shall send the subscriber's identity to the HSS in order to be able to download the subscriber profile to the S-CSCF. The HSS returns the subscriber's profile to the S-CSCF. The S-CSCF shall store the subscriber profile for that indicated user.

Editor's Note: Since the S-CSCF has detected this as a re-registration it may omit this step as an optimisation.

8 **SIP 200 OK response (S-CSCF to I-CSCF) – see example in Table 7.2-8**

The S_CSCF determines the contact name for the P-CSCF (S-CSCF or I-CSCF), and add this information to the 200 OK response. The S-CSCF sends acknowledgment to the I-CSCF indicating that Registration was successful. This response will traverse the path that the REGISTER request took as described in the Via list.

Table 7.2-8 SIP 200 OK response (S-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf2.home1.net,
   SIP/2.0/UDP pcscf1.visited1.net,
   SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
th: <sip: scscf2.home1.net>,
    <sip: icscf2.home1.net>,
    <sip: pcscf1.visited1.net>
om:
:
ll-ID:
eq:
pires:
ntent-Length:
```

9 **SIP 200 OK response (I-CSCF to P-CSCF) – see example in Table 7.2-9**

The I-CSCF translates the S-CSCF name in the Path header. The I-CSCF forwards acknowledgment from the S-CSCF to the P-CSCF indicating that Registration was successful. This response will traverse the path that the REGISTER request took as described in the Via list.

Table 7.2-9 SIP 200 OK response (I-CSCF to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.visited1.net,
   SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
th: <sip:token(scscf2.home1.net)>,
    <sip: icscf2.home1.net>,
    <sip: pcscf1.visited1.net>
om:
:
ll-ID:
eq:
pires:
ntent-Length:
```

10 **SIP 200 OK response (P-CSCF to UE) – see example in Table 7.2-10**

The P-CSCF stores the names from the Path header (except the last one i.e. <sip:pcscf1.visited1.net>) and associates it with the UE. The P-CSCF then removes the Path header from the 200 OK response. The P-CSCF then forwards acknowledgment from the I-CSCF to the UE indicating that Registration was successful.

Table 7.2-10 SIP 200 OK response (P-CSCF to UE)

```
P/2.0 200 OK
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
pires: Content-Length:
```

3 Registration Signalling: Mobile Initiated Deregistration