### IMS Routing of Initial SIP Invite

**INVITE**

```
INVITE called@hims2.net SIP/2.0,  
P-Preferred-Identity: <caller@hims1.net>,  
Via: <Calling UE IP> :Port,  
Route: <P-CSCF address>,  
Route: <S-CSCF address>,  
Contact: <Calling UE IP> :Port,  
SDP: <Caller Supported Codec List>
```

The SIP phone sends the invite to called@hims2.net. The message contains Route entries for the terminal and the S-CSCF address that was extracted from the Service-Route header in the registration "200 OK" message. Security ports setup for IPSec SA establishment are used. "To" and "From" headers are also included in the message. These headers do not play a role in call processing.

*Make sure that INVITE was received over the IPSec Security Association*

*Make sure that the preferred public identity is currently registered*

*Use DNS to translate from scscf1.hims1.net to "Orig S-CSCF" IP address*

**INVITE**

```
INVITE called@hims2.net SIP/2.0,  
P-Asserted-Identity: <caller@hims1.net>,  
Via: <Orig P-CSCF> <Calling-UE>,  
Record-Route: <Orig P-CSCF>,  
Route: <Orig S-CSCF>,  
Contact: <Calling UE IP> :Port,  
SDP: <Caller Supported Codec List>
```

The P-CSCF replaces the preferred identity header with the asserted identity header and forwards the message to the S-CSCF in the home network. It adds a Record-Route header with its own address.

---

**IMS Routing of First Response to the SIP Invite**

**100 Trying**

```
100 Trying
```

The P-CSCF just acknowledges the INVITE to the UE. The "100 Trying" message indicates that the call setup is in progress.

**183 Session Progress**

```
183 Session Progress  
Via: <Orig P-CSCF> <Calling-UE>,  
Record-Route: <Term S-CSCF> <Orig P-CSCF>,  
SDP: <Codecs supported by Caller and Called>
```

The originating P-CSCF requests the Policy Decision Function (PDF) to generate a media authorization token. The token will be included...
Orig P-CSCF Interfaces (Caller and Called are IMS Subscribers)

<table>
<thead>
<tr>
<th>Calling UE</th>
<th>IMS Network</th>
<th>Called UE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caller User Equipment</td>
<td>Visited IMS 1</td>
<td>Home IMS 1</td>
</tr>
<tr>
<td>Orig P-CSCF</td>
<td>Orig S-CSCF</td>
<td>Term I-CSCF</td>
</tr>
</tbody>
</table>

183 Session Progress

Via: <Calling-UE>,
Record-Route: <Term S-CSCF>;port
Orig S-CSCF <Orig P-CSCF>,
SDP: <Codecs supported by Caller and Called>,
P-Media-Authorization

PDP Context Activation and Audio/Video Path Setup

PRACK

PRACK

200 OK

200 OK

UPDATE

UPDATE

200 OK

200 OK

180 Ringing

180 Ringing

PRACK

PRACK

200 OK

200 OK

200 OK

200 OK

ACK

ACK

in the "183 Session Progress" sent to the originating UE.

Just like other nodes, the Orig P-CSCF removes its own entry from the Via header. The P-CSCF also updates the Record-Route header to include the protected port number in its entry. This forces the terminal to send all responses using the protected IPSec SA. The message also includes the media authorization token. This token will have to be passed to the GGSN in the PDP context activation request.

The Caller now sends a PRACK to inform the called subscriber about the selected Codec. The message also indicates that currently the resources needed for meeting the quality of service requirements of the session are not available.

The called subscriber acknowledges the PRACK. The message also indicates that quality of service for the session is not met for the called subscriber.

Since the caller PDP context has been activated, notify the called end that the caller can now meet the quality of service in the send and receive direction.

The caller replies back to the called user. Note that the Local QoS is still set to none as the called PDP context activation has not been completed.

Inform the caller that the called subscriber is ringing. This serves as an implicit indication to the caller that the QoS at the called side has also been met.

The caller acknowledges the ringing message.

The called subscriber acknowledges the PRACK.

Notify the caller that the call has been answered.

The caller acknowledges the "200 OK" message. The call is now ready to enter conversation mode.