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A P-Served-User Header Field Parameter for Originating CDIV session case in Session Initiation Protocol (SIP)

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Abstract

This specification defines a new parameter of the P-Served-User header field in the Session Initiation Protocol (SIP). This new "orig-cdiv" parameter defines the session case used by a proxy when handling an originating session after Call Diversion (CDIV) services has been invoked for the served user. The P-Served-User header field is defined in RFC5502 to convey the identity of the served user and the session case that applies to this particular communication session and application invocation. This document updates RFC5502 to add the "originating after CDIV" session case and to provide more guidance for using the P-Served-User header field in IP networks that were missing in RFC5502.

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1. Introduction

1.1. General

The P-Served-User header field was defined in [RFC5502] to address an issue that was found in the 3rd Generation Partnership Project (3GPP) IMS (IP Multimedia Subsystem) between an S-CSCF (Serving Call Session Control Function) and an AS (Application Server) on the ISC (IMS Service Control) interface. For more information on the IMS, a detailed description can be found in [TS.3GPP.24.229].

This header field conveys the identity of the served user, his/her registration state and the session case that applies to this particular communication session and application invocation.

[RFC5502] defines the originating and terminating session cases for a registered or unregistered user. This document extends the P-Served-User header field to include the session case for a forwarded leg when a call diversion service (CDIV) has been invoked and if an originating service of the diverting user has to be triggered.

The sessioncase-param parameter of the P-Served-User header field is extended with the "orig-cdiv" parameter for this "originating after CDIV" session case.

The following section defines usage of the "orig-cdiv" parameter of P-Served-User header field, Section 2 specifies the proxy behavior for handling the new header field parameter, and Section 3 discusses the applicability and scope of this new header field parameter. Section 4 describes the syntax and correct the syntax of [RFC5502], Section 5 registers the P-Served-User header field parameters with IANA, and Section 6 discusses the security properties of the environment where this new header field parameter is intended to be used.

1.2. Use Case

In the 3GPP IMS (IP Multimedia Subsystem), the S-CSCF (Serving CSCF) is a SIP proxy that serves as a registrar and handles originating and terminating session states for users allocated to it. This means that any call that is originated by a specific user or any call that is terminated to that specific user will pass through the S-CSCF that is allocated to that user.

At the moment that an S-CSCF is allocated for a specific user, the user profile is downloaded to the S-CSCF from the HSS (Home Subscriber Server), see [TS.3GPP.29.228].

To be able to determine which responsibilities the S-CSCF and the Application Server have to perform and on which user's behalf, it is necessary to know who is the current served user, what is his/her "registration state" and on which "session case" is the session. [RFC5502] defines all those parameters and in particular the originating and terminating session cases.

In the case of a call diversion service, the received request is first considered as a terminating session case and the terminating filter criteria configured in the S-CSCF are performed. Receiving the call initiation request, the Application Server is able to determine the served user and the session case (here "term") from the received P-Served-User header field content and to execute terminating services. When the call diversion service is executed (as a terminating service), the Application Server changes the target (Request-URI) of the session and a new call leg is created. This new call leg could be considered as an originating call leg from the diverting user but this is not the case. Indeed, the originating user remains the same and some of the diverting user's originating services should not be triggered as if it was an originating call. For instance, the originating user identity should not be restricted

because the diverting user has a privacy service for his/her own identity. The privacy of the diverting user should apply to information related to this user (eg. in the Histroy-Info header field). In the same manner, some specific services will need to be specifically triggered on the outgoing leg after a call diversion. Without a dedicated session case for originating after CDIV, there is no possiblity for a proxy to trigger an originating service for the diverting user or for an Application Server to execute the procedures for this particular session case.

For this use case, this document creates a new parameter for the originating after CDIV session case to be embedded in the P-Served-User header field.

2. Proxy behavior and parameter handling

The "orig-cdiv" header field parameter can be used inside a trust domain of the P-Served-User header field by proxies that are processing call diversion services. The following section illustrates how this header field parameter can be used in a 3GPP network.

For a terminating call, when receiving the initial INVITE request, the S-CSCF will determine that the session case is for a terminating user as described in [RFC5502], then it determines the served user by looking at the Request-URI and saves this Request-URI. After that, the S-CSCF starts the analysis of filter criteria and triggers the served user Application Server for the terminating services to be executed including in the INVITE request the P-Served-User header field with the "sescase" parameter set to "term" and the regstate to the corresponding value.

Based on some criteria, the Application Server concludes that the request has to be diverted to another target user or application. The received Request-URI is then replaced with the new diverted-to address. The Application Server stores the successive Request-URI(s) values by adding one or two History-Info header field entry(ies) [RFC7044] in the outgoing INVITE. In the History-Info header field, the served user address is tagged thanks to the mp-param header field parameter added in entry associated to the diverted-to address created.

In the next step, the Application Server forwards the INVITE request back to the S-CSCF. When receiving back the INVITE request, the S-CSCF can see that the topmost Route header field contains its own hostname but the Request-URI does not match the saved Request-URI. In this case, the S-CSCF updates the P-Served-User header field

content by replacing the "sescase" parameter by the "orig-cdiv" parameter. The PServedUser-value remains unchanged.

Then the procedure continues by forwarding the INVITE request over to an AS that hosts the originating services of the served user (diverting user) that specifically need to be executed on the forwarded leg after a call diversion service.

When the Application Server receives the INVITE request, it determines that the session case is for "orig-cdiv" session case and will perform the originating services to be executed after retargeting for the diverting user (i.e. served user).

This document also provides the following guidance that reminds or clarifies the P-Served-User handling that are missing in [RFC5502]:

- This header is forbidden to be repeated within a request for a particular session at a particular time for the reason that session cases are mutually exclusive. This document updates [RFC5502] to clearly state that P-Served-User header field MUST not contain different values either comma-separated or header-separated. This documents also updates the syntax of the header as defined in [RFC5502] to reflect this uniqueness of parameters values.

- Whether the "regstate" parameter is removed or not by the S-CSCF when processing the orginating after CDIV session case is out of the scope of this document. In one hand, it can either be considered that the S-CSCF is able to store the previous regstate value and that the same value applies or that the "regstate" is not relevant after a diverting service. On the other hand, the regstate can be combined to the orig-cdiv session case to provide different services if the served user is registered or unregistered. These choices are implementation dependent.

3. Applicability

The use of the P-Served-User header field extensions is only applicable inside a Trust Domain for P-Served-User. Nodes in such a Trust Domain explicitly trust each other to convey the served user and to be responsible for withholding that information outside of the Trust Domain. The means by which the network determines the served user and the policies that are executed for a specific served user is outside the scope of this document.

4. Syntax

4.1. General

[RFC5502] defines the P-Served-User header field with the sessioncase-param parameter "sescase" which is specified as having "orig" and "term" predefined values. This document defines an additional parameter for the sessioncase-param: "orig-cdiv".

Because this document extends the existing sessioncase-param parameter in a special way and that it has been identified errors in the syntax of the P-Served-User header field as defined in [RFC5502], this document corrects and extends the header at the same time.

The extension of the sessioncase-param parameter to add the "orig-cdiv" session case is done in a way to fit the parameter format introduced in release 11 of the 3GPP [TS.3GPP.24.229] and keep a backward compatibility.

"EQUAL", "HCOLON", "SEMI", "name-addr", "addr-spec", and "generic-param" are defined in [RFC3261].

4.2. ABNF

The augmented Backus-Naur Form (ABNF) [RFC5234] syntax of the P-Served-User header field is described in [RFC5502].

This document updates [RFC5502] to correct the P-Served-User header field ABNF syntax and extend it as following:

```
P-Served-User            = "P-Served-User" HCOLON PServedUser-value
                           *(SEMI served-user-param)
served-user-param        = sessioncase-param
                           / registration-state-param
                           / generic-param
PServedUser-value        = name-addr / addr-spec
sessioncase-param        = 1("sescase" EQUAL 1("orig" / "term")/ orig-cdiv)
registration-state-param = "regstate" EQUAL 1("unreg" / "reg")
orig-cdiv                = "orig-cdiv"
```

Examples of possible P-Served-User header field:

```
P-Served-User: <sip:user@example.com>; orig-cdiv; regstate=reg
or
P-Served-User: <sip:user@example.com>; orig-cdiv
or
P-Served-User: <sip:user@example.com>; sescase=term; regstate=unreg
```

5. IANA Considerations

The syntax of the P-Served-User header field is defined in [RFC5502] and updated in Section 4 of this document.

This document requests IANA to update the existing row for the P-Served-User header field in the "Header Fields" sub-registry:

Header Name	Compact Form	Reference
P-Served-User	none	[RFC5502][RFCXXXX]

Note to RFC Editor: Please replace XXXX with the RFC number of this document.

This document requests IANA to add new rows for the P-Served-User header field parameters in the "Header Field Parameters and Parameter Values" sub-registry as per the registry created by [RFC3968]:

Header Field	Parameter Name	Predefined Values	Reference
P-Served-User	sescase	Yes	[RFC5502][RFCXXXX]
P-Served-User	regstate	Yes	[RFC5502][RFCXXXX]
P-Served-User	orig-cdiv	No	[RFCXXXX]

Note to RFC Editor: Please replace XXXX with the RFC number of this document.

6. Security Considerations

The security considerations in [RFC5502] apply.

As the "orig-cdiv" parameter of P-Served-User header field can be used to trigger applications, it is important to ensure that the parameter has not been added to the SIP message by an unauthorized SIP entity.

7. Acknowledgments

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8. References

8.1. Normative References

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8.2. Informative References

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