The SIP Replaces Header

Abstract

This document describes an extension to the Session Initiation Protocol (SIP) [2]. The purpose of this extension is to provide a method for allowing an active call-lead to be replaced by a new incoming call-lead for the purposes of call handoff.

1 Overview

This document defines a SIP [2] extension to help provide attended transfer or call handoff capabilities. This header has its roots in [3], however both the syntax and semantics are changed.

Call handoff occurs when a SIP user agent which is involved in a 3-way call conference wishes to silently leave the call by requesting the two remote parties to establish a direct signalling relationship. While the transfer functionality provided by REFER [4] allows the conference initiator to connect the two remote parties, there is no standard way for the target of the transfer to associate the incoming call with the active one.

The header defined here is intended to provide a simple and backwards compatible method to allow this association to occur. We also define a signature scheme which allows the replacement request to be authenticated by the target user agent.
2 Rationale

1. Using a Replaces header in the request makes the intent obvious.

2. A unique call-id may be given to the replacement call, which helps call leg matching.

3. No adverse effects if the header is unsupported.

3 The Replaces Header

The Replaces header is used to indicate that the call leg identified in the header is to be shut down and logically replaced by the incoming INVITE in which it is contained. It is a request header only, and defined here only for INVITEs. The syntax is:

```plaintext
Replaces         = "Replaces": 1#replaces-values
replaces-values = callid *( ":" replaces-param )
callid           = token [ ":" token ]
replaces-param   = to-tag | from-tag | rep-signature
                  | extension-param
to-tag           = "to-tag=" UUID
from-tag         = "from-tag=" UUID
rep-signature    = signature-scheme *( "," sig-scheme-params )
signature-scheme = "scheme" "=" token
sig-scheme-parms = token "=" ( token | quoted-string )
```

3.1 Examples

Replaces: 98732@sip.billybiggs.com

Replaces: 12345@149.112.118.3;to-tag=12345;from-tag=54321

3.2 A PGP based signature-scheme

One signature-scheme for Replaces headers uses PGP as follows:

```plaintext
signature-scheme = "scheme" "=" "pgp"
sig-scheme-parms = pgp-version | signed-by | pgp-signature
```

pgp-version, signed-by and pgp-signature are defined in section 15.1 of RFC2543, with the modification that the signature is computed across the concatenation of the callid, to-tag, and from-tag in that order.

4 Behavior of SIP User Agents

The Replaces header contains matching information for a call-leg, identified by the call-id and related tags. Upon receiving an INVITE with a Replaces header, the user agent will attempt to match the information with any active call legs. If no match is found, the Replaces header MUST be ignored. The to tag and from tag should be matched as if they were present in an incoming request, that is, the to tag should match the local tag for the call leg, and the from tag should match the remote tag.
If the replaces header matches more than one call-leg, the user agent MAY use the Referred-By header if present to attempt to match the call with an appropriate call-leg, but should otherwise ignore the header.

If a matching call-leg is found and the signature checked, the user agent SHOULD silently accept the new call, replacing the old call in the user interface. The user agent SHOULD also shut down the replaced call leg by sending a BYE.

5 Attended Call Transfer to a Supporting Target

In these examples, the names of the actors are taken from [4].

In this scenario, the transferor is in a 3-way call with both the transferee and the transfer target and wishes to leave the call. The transferor REFERs the transferee to the transfer target, using the Replaces header to signify to the target that the incoming call should replace its current call to the transferor. The replaces header is placed as a header parameter in the SIP URI used in the Refer-To header.

After accepting the call, the target’s BYE is received by the transferor before it has a chance to send its own BYE.

6 Attended Call Transfer to an Unsupporting Target

In this scenario, the transfer target ignores the Replaces header. In this case, the transferor sends a BYE to confirm shutdown of the replaced call.
7 Author’s Addresses

Billy Biggs
3Com
3800 Golf Rd
Rolling Meadows, IL
USA

Phone: sip:Billy_Biggs@sip.3com.com
Email: Billy_Biggs@3com.com

Rick Dean
3Com
3800 Golf Rd
Rolling Meadows, IL
USA

Phone: sip:Rick_Dean@sip.3com.com
Email: Rick_Dean@3com.com

8 References


