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Internet draft

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## Confirmation of SDP preconditions

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### Abstract

This document describes certain functionality that is missing in the current "Integration of Resource Management and SIP" [[1](#)] (a.k.a. manyfolks draft). An extension to add this functionality is outlined.

This functionality is needed in general to provide richer signalling capabilities and can be employed in several scenarios. This draft describes its use in third party call control applications.

If this extension is accepted it is foreseen that this draft would be merged with [[1](#)].

### **[1](#). Introduction**

"Integration of Resource Management in SIP" [[1](#)] provides a mechanism that allows a UA issuing a SIP message with SDP preconditions to ask the other party to confirm that the preconditions are met. The "confirm" attribute together with the COMET method are used for that purpose.

A typical situation where the "confirm" attribute is used is a two party session with QoS preconditions. The callee will request a

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confirmation message (COMET) from the caller by including a "confirm" attribute in a 183 response. As soon as the callee's UA has finished the resource reservation in the callee-caller direction (using RSVP for instance) and a COMET arrives from the caller (confirming that resources are also available in the caller-callee direction) the callee will be alerted.

The "confirm" attribute in (b) triggers the COMET in (e).

Caller	Callee
(a) INVITE	
----->	
(b) 183	
<-----	
(c) PRACK	
----->	
(d) 200 OK (PRACK)	
<-----	
(e) COMET	
----->	
(f) 200 OK (COMET)	
<-----	
(g) 200 OK (INVITE)	
<-----	
(h) ACK	
----->	

(a)

```
INVITE sip:callee@ws4321.provider2.com SIP/2.0
Via: SIP/2.0/UDP ws1234.provider1.com:5060
Require: 100rel
From: Caller <sip:caller@provider1.com>
To: Calee <sip:callee@provider2.com>
Call-ID: 12345678@ws1234.provider1.com
CSeq: 1 INVITE
Contact: Caller <sip:caller@ws1234.provider1.com>
Content-Type: application/sdp
Content-Length: 155
```

v=0  
o=Caller 2891234526 2891234526 IN IP4 ws1234.provider1.com  
s=Session SDP  
c=IN IP4 10.0.0.1  
t=0 0  
m=audio 20002 RTP/AVP 0  
a=qos:mandatory sendrecv

(b)

SIP/2.0 183 Session Progress

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Via: SIP/2.0/UDP ws1234.provider1.com:5060  
Require: 100rel  
RSeq: 112233  
From: Caller <sip:caller@provider1.com>  
To: Callee <sip:callee@provider2.com> ;tag=314159  
Call-ID: 12345678@ws1234.provider1.com  
CSeq: 1 INVITE  
Contact: Callee <sip:callee@ws4321.provider2.com>  
Content-Type: application/sdp  
Content-Length: 163

v=0  
o=Callee 2891234526 2891234526 IN IP4 ws4321.provider2.com  
s=Session SDP  
c=IN IP4 10.0.0.3  
t=0 0  
m=audio 30000 RTP/AVP 0  
a=qos:mandatory sendrecv confirm

(c)

PRACK sip:callee@ws4321.provider2.com SIP/2.0  
RAck: 112233 1 INVITE  
Via: SIP/2.0/UDP ws1234.provider1.com:5060  
From: Caller <sip:caller@provider1.com>  
To: Callee <sip:callee@provider2.com> ;tag=314159  
Call-ID: 12345678@ws1234.provider1.com  
CSeq: 2 PRACK

(d)

SIP/2.0 200 OK  
Via: SIP/2.0/UDP ws1234.provider1.com:5060  
From: Caller <sip:caller@provider1.com>  
To: Callee <sip:callee@provider2.com> ;tag=314159  
Call-ID: 12345678@ws1234.provider1.com

CSeq: 2 PRACK

(e)

COMET sip:callee@ws4321.provider2.com SIP/2.0  
Via: SIP/2.0/UDP ws1234.provider1.com:5060  
From: Caller <sip:caller@provider1.com>  
To: Callee <sip:callee@provider2.com> ;tag=314159  
Call-ID: 12345678@ws1234.provider1.com  
CSeq: 3 COMET  
Content-Type: application/sdp  
Content-Length: 149

v=0  
o=Caller 2891234526 2891234526 IN IP4 ws1234.provider1.com  
s=Session SDP  
c=IN IP4 10.0.0.1  
t=0 0  
m=audio 20002 RTP/AVP 0  
a=qos:success send

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(f)

SIP/2.0 200 OK  
Via: SIP/2.0/UDP ws1234.provider1.com:5060  
From: Caller <sip:caller@provider1.com>  
To: Callee <sip:callee@provider2.com> ;tag=314159  
Call-ID: 12345678@ws1234.provider1.com  
CSeq: 3 COMET

(g)

SIP/2.0 200 OK  
Via: SIP/2.0/UDP ws1234.provider1.com:5060  
From: Caller <sip:caller@provider1.com>  
To: Callee <sip:callee@provider2.com> ;tag=314159  
Call-ID: 12345678@ws1234.provider1.com  
CSeq: 1 INVITE  
Contact: Callee <sip:callee@ws4321.provider3.com>  
Content-Type: application/sdp  
Content-Length: 129

v=0  
o=Callee 2891234526 2891234526 IN IP4 ws4321.provider2.com  
s=Session SDP  
c=IN IP4 10.0.0.3  
t=0 0  
m=audio 30000 RTP/AVP 0

(h)

```
ACK sip:callee@ws4321.provider2.com SIP/2.0
Via: SIP/2.0/UDP ws1234.provider1.com:5060
From: Caller <sip:caller@provider1.com>
To: Callee <sip:callee@provider2.com> ;tag=314159
Call-ID: 12345678@ws1234.provider1.com
CSeq: 1 ACK
Contact: Caller <sip:caller@ws1234.provider1.com>
```

## 2. Caller triggering COMETs

Note that in the previous example, the COMET in (e) is sent because the callee wanted it to be sent - (b) contained a "confirm" parameter. If the caller included a "confirm" attribute in the INVITE (a), it would trigger a COMET from the callee to the caller.

The caller does not have a means for triggering COMETs from the caller to the callee. Similarly, the callee cannot trigger COMETs from the callee to the caller.

This mechanism is needed in certain situations, such as the ones described in [2]. The need of this mechanism is described in the "open issues" section of [2] and it was presented in the SIP WG meeting in Pittsburgh [3].

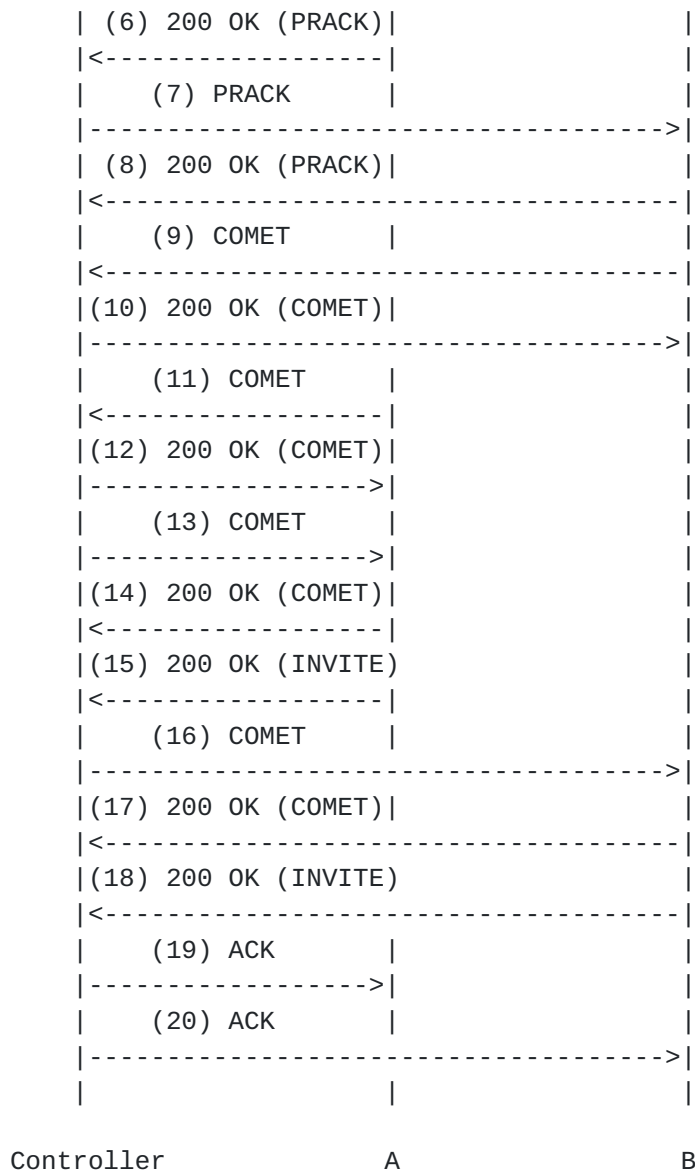
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### Confirmation of SDP preconditions

When third party call control is performed, the controller wants to be sure that the session establishment does not go on until it sends a COMET. The following example, taken from [2], helps understand this need.

Controller	A	B
(1) INVITE		
----->		
(2) 183 SDP A		
<-----		
(3) INVITE SDP A		
----->		
(4) 183 SDP B		
<-----		
(5) PRACK SDP B		
----->		



### Confirmation of SDP preconditions

After (12), all the preconditions are met. However, the controller does not send a COMET to B (16) until A has answered the INVITE (15). Therefore, if A relied on mechanisms different than COMET (such as ResvConf in RSVP) to check if the resource reservation was already done third party call control mechanisms would fail, since A would go on with the session establishment after (12), instead of waiting for (15). Preconditions met confirmations must rely solely on application layer mechanisms - SIP.

Thus, a mechanism that allows the controller to ask A to wait for the COMET before continuing with the session is needed.

### 3. Solution

A direction attribute is needed in order to indicate to which direction the "confirm" attribute applies. That is, which party sends the COMET.

Section 4 of [1] would look as follows:

```
qos-attribute      = "a=qos:" strength-tag SP direction-tag
                    [SP confirmation-tag]
strength-tag       = ("mandatory" | "optional" | "success" |
                    "failure")
direction-tag      = ("send" | "recv" | "sendrecv")
confirmation-tag   = "confirm" SP direction-tag
```

The SDP contained in INVITE (a) would look as follows:

```
v=0
o=Caller 2891234526 2891234526 IN IP4 ws1234.provider1.com
s=Session SDP
c=IN IP4 10.0.0.1
t=0 0
m=audio 20002 RTP/AVP 0
a=qos:mandatory sendrecv confirm send
```

The SDP in (b) would be then:

```
v=0
o=Callee 2891234526 2891234526 IN IP4 ws4321.provider2.com
s=Session SDP
c=IN IP4 10.0.0.3
t=0 0
m=audio 30000 RTP/AVP 0
a=qos:mandatory sendrecv confirm recv
```

The following table illustrates the allowed values for the direction attribute in the response. Each row represents a value of the direction in the SIP INVITE, and each column the value in the response. An entry of N/A means that this combination is not allowed. A value of A->B (B->A) implies that the COMET will be sent from A to B (B to A). A value of A<->B means that the will be two

used by both parties.

A: request	B: response			
	send	recv	sendrecv	none
send	N/A	A->B	A<->B	N/A
recv	B->A	N/A	A<->B	N/A
sendrecv	N/A	N/A	A<->B	N/A
none	B->A	A->B	A<->B	No COMETs

This table assumes that the preconditions suggested in the INVITE (e.g. mandatory sendrecv) are accepted and thus included in the response. If the response does not include all of them (e.g. mandatory recv) there are interactions with the direction attribute regarding COMETs and this table would not be valid. Some N/A entries would become valid combinations. These interactions are already present in the current approach [1].

#### **4. Backward compatibility**

An implementation that does not understand the direction attribute introduced by this draft would find the "a=qos" line malformed and it will thus return an error to the UA issuing the INVITE. The UA can then fall back to the previous syntax (defined by [1]) if it wishes to proceed anyway.

#### **5. References**

- [1] W. Marshall et al, "Integration of Resource Management and SIP", [draft-manyfolks-sip-resource-01.txt](#), IETF; June 2000. Work in progress.
- [2] G. Camarillo, "Third party call control with SDP preconditions", [draft-camarillo-3pcc-qos-00.txt](#), IETF; July 2000. Work in progress.
- [3] <http://www.softarmor.com/sipwg/meets/IETF48/slides/pres-camarillo-3pccprecon-sip-48.ppt>

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