SIP Telephony Service Examples With Call Flows

STATUS OF THIS Memo

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Abstract

This is an informational draft showing one implementation of a set of traditional telephony services using the Session Initiation Protocol. Diagrams of the SIP conversations and the complete SIP messages are provided.
Table of Contents:

1 Overview: .......................................................... 3

2 Call Flows - IP Desktop Services Features ....................... 4
   2.1 Call Hold .................................................. 4
   2.2 Consultation Hold ......................................... 16
   2.3 Unattended Transfer ....................................... 32
   2.4 Attended Transfer .......................................... 48
   2.5 Call Forwarding Unconditional ............................. 48
   2.6 Call Forwarding - Busy .................................... 54
   2.7 Call Forwarding û No Answer .............................. 61
   2.8 3-way Call .................................................. 67
   2.9 Single Line Extension ....................................... 67
   2.10 Find-Me .................................................... 68
   2.11 Call Management (Incoming Call Screening) ............... 77
   2.12 Call Management (Outgoing Call Screening) .............. 80

3 Author's Addresses ............................................. 83

4 Acknowledgments ................................................ 83

5 References ....................................................... 84
Overview:

This document provides call flows detailing a SIP implementation of the following traditional telephony services:

- Call Hold
- Consultation Hold
- Unattended Transfer
- Attended Transfer
- Unconditional Call Forwarding
- Busy Call Forwarding
- No Answer Call Forwarding
- 3-way Call
- Single-Line Extension
- Find-Me
- Incoming Call Screening
- Outgoing Call Screening

It is the hope of the authors that this document will be useful for SIP implementors, users, designers, and protocol researchers alike and will help further the goal of a standard SIP implementation for IP Telephony. It is envisioned that as changes to the standard and additional RFCs are added that this document will reflect those changes and represent the current state of a standard SIP IP Telephony implementation.

These flows assume the functionality described in "SIP Telephony Call Flow Examples" [2], which explores basic behavior and PSTN internetworking. Some of the scenarios described herein make use of "SIP Call Control Services" [3].

These flows were prepared assuming a network of proxies, registrars, PSTN gateways, and other SIP servers that have a pre-established trust relationship with each other, secured through other means than
SIP. User agents wishing to use the services in this network are required to authenticate themselves with an edge proxy using SIP Digest. All communication between these user agents and the remaining network elements MUST occur through the edge proxy. To improve the clarity of this document, this authentication step is not explicitly shown in all flows.

These flows use SIP as defined by RFC2543 [4] with the following changes/extensions assumed throughout:

A Contact header is included with every INVITE and 200 OK.
A Content-Length header is present in every message, set to zero if there is no message body.
The final entry in a Route header is always the Contact information obtained from the INVITE or 200 OK messages.

Each call flow is presented with a textual description of the scenario, a message flow diagram showing the messages exchanged between separate network elements, and the detailed contents of each message shown in the diagram.

Legend for Message Flows:

Dashed lines represent SIP messages. Optional messages have their labels surrounded with parenthesis. The direction of the message is indicated with < or >.

Example: Invite

--------->

Media paths are denoted with alternating dashes and ms. Direction is indicated as above.

Example: Both way RTP established

<--m-m-m-m-m-m-m-m-m-m-m-m-m-m-m-m-m-->

2 Call Flows - IP Desktop Services Features

2.1 Call Hold

User A           Proxy          User B

<table>
<thead>
<tr>
<th>INVITE F1</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>407 Proxy Authorization F2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACK F3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INVITE F4</td>
<td></td>
<td>INVITE F5</td>
</tr>
<tr>
<td>100 Trying F6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>180 Ringing F7</td>
<td></td>
<td>200 OK F9</td>
</tr>
<tr>
<td>180 Ringing F8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 OK F10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Both way RTP Established
<-m-m-m-m-m-m-m-m-m-m-m-m-m-m->

<table>
<thead>
<tr>
<th>ACK F11</th>
<th></th>
<th>ACK F12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both way RTP Established</td>
<td></td>
<td>INVITE (c=0) F13</td>
</tr>
<tr>
<td>INVITE (c=0) F14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 OK F15</td>
<td></td>
<td>200 OK F16</td>
</tr>
</tbody>
</table>

MCI WorldCom  
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INVITE sip:UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
t=3034423619 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F2 /* Proxy 1 challenges User A for authentication */
407 Proxy Authorization Required
Proxy 1 -> A

SIP/2.0 407 Proxy Authorization Required
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Proxy-Authenticate: Digest realm="MCI WorldCom SIP",
domain="wcom.com", nonce="ea9c8e88df84f1cecc4341ae6cbe5a359",
opaque="", stale="FALSE", algorithm="MD5"
Content-Length: 0

F3
ACK
A -> Proxy 1

ACK sip:UserB@ssl.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length: 0

F4 /* User A responds by re-sending the INVITE with authentication

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credentials in it. */

Invite
A -> Proxy 1

```
INVITE sip:UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345601@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Proxy-Authorization: DIGEST username="UserA", realm="MCI WorldCom SIP", nonce="ea9c8e88df84f1cec4341ae6cbe5a359", opaque="", uri="sip:ss1.wcom.com", response="dfe56131d1958046689cd83306477ecc"
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
t=3034423619 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000
```

F5 /* Proxy 1 accepts the credentials and forwards the INVITE User B. Client for A prepares to receive data on port 49170 from the network. */

Invite
Proxy 1 -> B

```
INVITE sip:UserB@there.com SIP/2.0
Via: SIP/2.0/UDP ssl.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ssl.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345601@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
```
t=3034423619 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F6
(100 Trying)
Proxy 1-> A

SIP/2.0 100 Trying
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345601@here.com
CSeq: 1 INVITE
Content-Length: 0

F7
180 Ringing
B->Proxy 1

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345601@here.com
CSeq: 1 INVITE
Content-Length: 0

F8
180 Ringing
Proxy 1->A

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345601@here.com
CSeq: 1 INVITE
Content-Length: 0

F9
200 OK
B->Proxy 1
SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060

Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345601@here.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844527 2890844527 IN IP4 client.there.com
s=Session SDP
c=IN IP4 110.111.112.113
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F10
200 OK
Proxy 1-> A

SIP/2.0 200 OK
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345601@here.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844527 2890844527 IN IP4 client.there.com
s=Session SDP
c=IN IP4 110.111.112.113
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000
A->Proxy 1

ACK sip:UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
Route: <sip:UserB@there.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159

Content-Length:0

Proxy 1->B

ACK sip: UserB@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345601@here.com
CSeq: 1 ACK
Content-Length:0

User B places User A on hold. */

INVITE
B -> Proxy 1

INVITE sip:UserA@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP there.com:5060
Route: <sip:UserA@here.com>
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>
Call-Id: 12345601@here.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844527 2890844527 IN IP4 client.there.com
s=Session SDP
c=IN IP4 0.0.0.0
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F14
INVITE
Proxy 1 -> A

INVITE sip:UserA@here.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060

From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>
Call-Id: 12345601@here.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844527 2890844527 IN IP4 client.there.com
s=Session SDP
c=IN IP4 0.0.0.0
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F15
200 OK
A -> Proxy 1

SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345601@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 0.0.0.0
t=3034423619 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F16
200 OK
Proxy 1 -> B

SIP/2.0 200 OK
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345601@here.com
CSeq: 1 INVITE

Contact: TheBigGuy <sip:UserA@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 0.0.0.0
t=3034423619 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F17
ACK
B-> Proxy 1

ACK sip:UserA@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP there.com:5060
Route: <sip:UserB@there.com>
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345601@here.com
CSeq: 1 ACK
Content-Length: 0

F18
ACK
Proxy 1 -> A

ACK sip: UserA@here.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345601@here.com
CSeq: 1 ACK
Content-Length: 0

/* User B takes the call off hold */

F19
INVITE
B -> Proxy 1

INVITE sip:UserA@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP there.com:5060
Route: <sip:UserA@here.com>
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345601@here.com
CSeq: 2 INVITE
Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844527 2890844527 IN IP4 client.there.com
s=Session SDP
c=IN IP4 110.111.112.113
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F20
INVITE
Proxy 1 -> A

INVITE sip:UserA@here.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345601@here.com
CSeq: 2 INVITE
Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844527 2890844527 IN IP4 client.there.com
s=Session SDP
c=IN IP4 110.111.112.113
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F21
200 OK
A -> Proxy 1

SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345601@here.com
CSeq: 2 INVITE
Contact: TheBigGuy <sip:UserA@there.com>

Internet Draft Service Examples October 1999

Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s= Session SDP
c=IN IP4 100.101.102.103
t=3034423619 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F22
200 OK
Proxy 1 -> B

SIP/2.0 200 OK
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345601@here.com
CSeq: 2 INVITE
Contact: TheBigGuy <sip:UserA@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
t=3034423619 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F23
ACK
B -> Proxy1

ACK sip:UserA@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP there.com:5060
Route: <sip:UserA@here.com>
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345601@here.com
CSeq: 2 ACK
Content-Length: 0

F24
ACK
Proxy 1 -> A
ACK sip: UserA@here.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345601@here.com
CSeq: 2 ACK
Content-Length: 0

F25
BYE
A -> Proxy 1

BYE sip: UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
Route: <sip:userB@there.com>
From: TheBigGuy <sip:UserA@here.com>;tag=1234567
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345601@here.com
CSeq: 2 BYE
Content-Length: 0

F26
BYE
Proxy 1 -> B

BYE sip: UserB@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>;tag=1234567
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345601@here.com
CSeq: 2 BYE
Content-Length: 0

F27
200 OK
B -> Proxy 1

SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>;tag=1234567
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345601@here.com
CSeq: 2 BYE
F28
200 OK
Proxy 1 -> A

SIP/2.0 200 OK
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>;tag=1234567
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345601@here.com
CSeq: 2 BYE
Content-Length: 0

2.2 Consultation Hold

User A calls user B. User B places call on hold. User B calls User C, after that call is finished User B take the call with User A off hold.
Invite
A -> Proxy 1

INVITE sip:UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Proxy-Authorization: DIGEST username="UserA", realm="MCI WorldCom SIP", nonce="ea9c8e88df84f1cec4341ae6cbe5a359", opaque="", uri="sip:ss1.wcom.com", response="dfe56131d1958046689cd83306477ecc"
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
t=3034423619 0

m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F2 /* Proxy 1 accepts the credentials and forwards the INVITE User B. Client for A prepares to receive data on port 49170 from the network. */
Invite
Proxy 1 -> B

INVITE sip:UserB@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Content-Type: application/sdp
Content-Length: ...
v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
t=3034423619 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F3
(100 Trying)
Proxy 1-> A

SIP/2.0 100 Trying
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content-Length: 0

F4
180 Ringing
B->Proxy 1

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060

From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content Length:0

F5
180 Ringing
Proxy 1->A

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content Length: 0

200 OK
B->Proxy 1

SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844527 2890844527 IN IP4 client.there.com
s=Session SDP
c=IN IP4 110.111.112.113
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

200 OK
Proxy 1-> A

SIP/2.0 200 OK
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
Content-Length: ...

v=0
o=UserB 2890844527 2890844527 IN IP4 client.there.com
s=Session SDP
c=IN IP4 110.111.112.113
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F8
ACK
A->Proxy 1

ACK sip:UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
Route: <sip:UserB@there.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length:0

F9
ACK
Proxy 1->B

ACK sip: UserB@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length:0

F10 /* User B places User A on hold. */
INVITE
B -> Proxy 1

INVITE sip:UserA@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP there.com:5060
Route: <sip:UserA@here.com>
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844527 2890844527 IN IP4 client.there.com
s=Session SDP
c=IN IP4 0.0.0.0
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F11
INVITE
Proxy 1 -> A

INVITE sip:UserA@here.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844527 2890844527 IN IP4 client.there.com
s=Session SDP
c=IN IP4 0.0.0.0
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F12
200 OK
A -> Proxy 1

SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 0.0.0.0
t=3034423619 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F13
200 OK
Proxy 1 -> B

SIP/2.0 200 OK
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 0.0.0.0
t=3034423619 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F14
ACK
B-> Proxy 1

ACK sip:UserA@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP there.com:5060
Route: <sip:UserA@here.com>
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length: 0

F15
ACK
Proxy 1 -> A

ACK sip: UserA@here.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length: 0

F16
Invite
B -> Proxy 1

INVITE sip:UserC@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>
Call-Id: 9876543210@there.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844526 2890844526 IN IP4 client.there.com
s=Session SDP
c=IN IP4 110.111.112.113
t=3034423619 0
m=audio 50170 RTP/AVP 0
a=rtpmap:0 PCMU/8000
Invite
Proxy 1 -> C

INVITE sip:UserC@anywhere.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>
Call-Id: 9876543210@there.com
CSeq: 1 INVITE

Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844526 2890844526 IN IP4 client.there.com
s=Session SDP
c=IN IP4 110.111.112.113
t=3034423619 0
m=audio 50170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

(100 Trying)
Proxy 1-> B

SIP/2.0 100 Trying
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>
Call-Id: 9876543210@there.com
CSeq: 1 INVITE
Content-Length: 0

180 Ringing
C->Proxy 1
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
Call-Id: 9876543210@here.com
CSeq: 1 INVITE
Content Length:0

F20
180 Ringing
Proxy 1->B

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
Call-Id: 9876543210@there.com
CSeq: 1 INVITE
Content Length:0

MCI WorldCom                                                  [Page 25]

Internet Draft             Service Examples               October 1999

F21
200 OK
C->Proxy 1

SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
Call-Id: 9876543210@there.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserC@anywhere.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserC 2890844527 2890844527 IN IP4 client.anywhere.com
s=Session SDP
c=IN IP4 120.121.122.123
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F22
200 OK
Proxy 1-> B

SIP/2.0 200 OK
Via: SIP/2.0/UDP there.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
Call-Id: 9876543210@there.com
CSeq: 1 INVITE
Contact: TheOtherGuy <sip:UserC@anywhere.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserC 2890844527 2890844527 IN IP4 client.anywhere.com
s=Session SDP
c=IN IP4 120.121.122.123
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F23
ACK
B->Proxy 1

ACK sip:UserC@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP there.com:5060
Route: <sip:UserC@anywhere.com>
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
Call-Id: 9876543210@there.com
CSeq: 1 ACK
Content-Length:0

F24
ACK
Proxy 1->C

ACK sip: UserC@anywhere.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
Call-Id: 9876543210@there.com
CSeq: 1 ACK
Content-Length:0

F25
BYE
B -> Proxy 1

BYE sip: UserC@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP there.com:5060
Route: <sip:userC@anywhere.com>
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
Call-Id: 9876543210@there.com
CSeq: 2 BYE
Content-Length: 0

F26
BYE
Proxy 1 -> C

BYE sip: UserC@anywhere.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
Call-Id: 9876543210@there.com
CSeq: 2 BYE
Content-Length: 0

MCI WorldCom

Internet Draft Service Examples October 1999
SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
Call-Id: 9876543210@there.com
CSeq: 2 BYE
Content-Length: 0

F28
200 OK
Proxy 1 -> B

SIP/2.0 200 OK
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
Call-Id: 9876543210@there.com
CSeq: 2 BYE
Content-Length: 0

F29 /* User B takes the call off hold */
INVITE
B -> Proxy 1

INVITE sip:UserA@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP there.com:5060
Route: <sip:UserA@here.com>
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345600@here.com
CSeq: 2 INVITE
Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844527 2890844527 IN IP4 client.there.com
s=Session SDP
c=IN IP4 110.111.112.113
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F30
INVITE
Proxy 1 -> A

INVITE sip:UserA@here.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345600@here.com
CSeq: 2 INVITE
Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844527 2890844527 IN IP4 client.there.com
s=Session SDP
c=IN IP4 110.111.112.113
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F31
200 OK
A -> Proxy 1

SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345600@here.com
CSeq: 2 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
t=3034423619 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000
F32
200 OK
Proxy 1 -> B

SIP/2.0 200 OK
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345600@here.com
CSeq: 2 INVITE
Contact: TheBigGuy <sip:UserA@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o= UserA 2890844526 2890844526 IN IP4 client.here.com
s= Session SDP
c= IN IP4 100.101.102.103
t= 3034423619 0
m= audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F33
ACK
B -> Proxy1

ACK sip:UserA@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345600@here.com
CSeq: 2 ACK
Content-Length: 0

F34
ACK
Proxy 1 -> A

ACK sip: UserA@here.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>;tag=314159
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345600@here.com
CSeq: 2 ACK
F35
BYE
A -> Proxy 1

BYE sip: UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
Route: <sip:userB@there.com>
From: TheBigGuy <sip:UserA@here.com>;tag=1234567
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 2 BYE
Content-Length: 0

F36
BYE
Proxy 1 -> B

BYE sip: UserB@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>;tag=1234567
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 2 BYE
Content-Length: 0

F37
200 OK
B -> Proxy 1

SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>;tag=1234567
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 2 BYE
Content-Length: 0
F38
200 OK
Proxy 1 -> A

SIP/2.0 200 OK
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>;tag=1234567
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 2 BYE
Content-Length: 0

2.3 Unattended Transfer

User A call user B. User A then transfers User B to user C. User C then transfers User B to User D. User B hangs up the call.
200 OK F7

ACK F8

ACK F9

Both way RTP Established

<--m-m-m-m-m-m-m-m-m-m-m-m-m-m-->

BYE (Also C) F10

BYE (Also C) F11

200 OK F12

200 OK F13

INVITE (ReqBy A) F14

INVITE (ReqBy A) F15

(100 Trying) F16

180 Ringing F17

180 Ringing F18

200 OK F19

200 OK F20

ACK F21

ACK F22
INVITE sip:UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Proxy-Authorization: DIGEST username="UserA", realm="MCI WorldCom SIP", nonce="ea9c8e88df84f1ceec4341ae6cbe5a359", opaque="", uri="sip:ss1.wcom.com", response="dfe56131d1958046689cd83306477ecc"
Content-Type: application/sdp
Content-Length: ...

F2 /* Proxy 1 accepts the credentials and forwards the INVITE User B. Client for A prepares to receive data on port 49170 from the
network. */
Invite
Proxy 1 -> B

INVITE sip:UserB@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
t=3034423619 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F3
(100 Trying)
Proxy 1-> A

SIP/2.0 100 Trying
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content-Length: 0

F4
180 Ringing
B->Proxy 1

Internet Draft                Service Examples          October 1999
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content Length:0

F5
180 Ringing
Proxy 1->A

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content Length: 0

F6
200 OK
B->Proxy 1

SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844527 2890844527 IN IP4 client.there.com
s=Session SDP
c=IN IP4 110.111.112.113
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F7
200 OK
Proxy 1-> A
SIP/2.0 200 OK
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844527 2890844527 IN IP4 client.there.com
s=Session SDP
c=IN IP4 110.111.112.113
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F8
ACK
A->Proxy 1

ACK sip:UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
Route: <sip:UserB@there.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length:0

F9
ACK
Proxy 1->B

ACK sip:UserB@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length:0
/* User A transfers User B to User C */
BYE
A -> Proxy 1

BYE sip: UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
Route: <sip:userB@there.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 2 BYE
Also: TheOtherGuy <sip:UserC@anywhere.com>
Content-Length: 0

BYE sip: UserB@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 2 BYE
Also: TheOtherGuy <sip:UserC@anywhere.com>
Content-Length: 0

200 OK
B -> Proxy 1

SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 2 BYE
Content-Length: 0
200 OK  
Proxy 1 -> A  

SIP/2.0 200 OK  
Via: SIP/2.0/UDP here.com:5060  
From: TheBigGuy <sip:UserA@here.com>  
To: TheLittleGuy <sip:UserB@there.com>;tag=314159  
Call-Id: 12345600@here.com  
CSeq: 2 BYE  
Content-Length: 0

F14  
Invite  
B -> Proxy 1  

INVITE sip:UserC@ss1.wcom.com SIP/2.0  
Via: SIP/2.0/UDP there.com:5060  
From: TheLittleGuy <sip:UserB@there.com>  
To: TheOtherGuy <sip:UserC@anywhere.com>  
Call-Id: 9876543210@there.com  
CSeq: 1 INVITE  
Contact: TheLittleGuy <sip:UserB@there.com>  
Content-Type: application/sdp  
Requested-By: TheBigGuy <sip:UserA@here.com>  
Content-Length: ...

v=0  
o=UserB 2890844526 2890844526 IN IP4 client.there.com  
s=Session SDP  
c=IN IP4 110.111.112.113  
t=3034423619 0  
m=audio 50170 RTP/AVP 0  
a=rtpmap:0 PCMU/8000

F15  
Invite  
Proxy 1 -> C  

INVITE sip:UserC@anywhere.com SIP/2.0  
Via: SIP/2.0/UDP ss1.wcom.com:5060  
Via: SIP/2.0/UDP there.com:5060  
Record-Route: <sip:ss1.wcom.com>
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>
Call-Id: 9876543210@there.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Requested-By: TheBigGuy<sip:UserA@here.com>
Content-Length: ...

v=0
o=UserB 2890844526 2890844526 IN IP4 client.there.com
s=Session SDP
c=IN IP4 110.111.112.113
t=3034423619 0
m=audio 50170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F16
(100 Trying)
Proxy 1-> B
SIP/2.0 100 Trying
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>
Call-Id: 9876543210@there.com
CSeq: 1 INVITE
Content-Length: 0

F17
180 Ringing
C->Proxy 1
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
Call-Id: 9876543210@here.com
CSeq: 1 INVITE
Content Length:0
180 Ringing
Proxy 1->B

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
Call-Id: 9876543210@there.com
CSeq: 1 INVITE
Content Length: 0

200 OK
C->Proxy 1

SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
Call-Id: 9876543210@there.com
CSeq: 1 INVITE

Contact: TheLittleGuy <sip:UserC@anywhere.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserC 2890844527 2890844527 IN IP4 client.anywhere.com
s=Session SDP
c=IN IP4 120.121.122.123
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

200 OK
Proxy 1-> B

SIP/2.0 200 OK
Via: SIP/2.0/UDP there.com:5060
Record-Route: <sip:ssl.wcom.com>
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
Call-Id: 9876543210@there.com
CSeq: 1 INVITE
Contact: TheOtherGuy <sip:UserC@anywhere.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserC 2890844527 2890844527 IN IP4 client.anywhere.com
s=Session SDP
c=IN IP4 120.121.122.123
t=3034423619 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F21
ACK
B->Proxy 1

ACK sip:UserC@ssl.wcom.com SIP/2.0
Via: SIP/2.0/UDP there.com:5060
Route: <sip:UserC@anywhere.com>
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
Call-Id: 9876543210@there.com
CSeq: 1 ACK
Content-Length: 0

F22
ACK
Proxy 1->C

ACK sip: UserC@anywhere.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
Call-Id: 9876543210@there.com
CSeq: 1 ACK
200 OK
C -> Proxy 1

SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP anywhere.com:5060
From: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
To: TheLittleGuy <sip:UserB@there.com>;tag=1234567
Also: TheNewGuy <sip:UserD@nowhere.com>
Call-Id: 9876543210@there.com
CSeq: 200 BYE
Content-Length: 0
F26
200 OK
Proxy 1 -> B

SIP/2.0 200 OK
Via: SIP/2.0/UDP anywhere.com:5060
From: TheOtherGuy <sip:UserC@anywhere.com>;tag=456654
To: TheLittleGuy <sip:UserB@there.com>;tag=1234567
Call-Id: 9876543210@there.com
CSeq: 200 BYE
Content-Length: 0

F27
Invite
B -> Proxy 1

INVITE sip:UserD@ssl.wcom.com SIP/2.0
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheNewGuy <sip:UserD@nowhere.com>
Call-Id: 123123123@there.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Requested-By: TheOtherGuy <sip:UserC@here.com>
Content-Length: ...

v=0
o=UserB 2890844526 2890844526 IN IP4 client.there.com
s=Session SDP
c=IN IP4 110.111.112.113
t=3034423619 0
m=audio 50170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F28 /* Proxy 1 accepts the credentials and forwards the INVITE to User D. Client for B prepares to receive data on port 49170 from the network. */
Invite
Proxy 1 -> D

INVITE sip:UserD@nowhere.com SIP/2.0
Via: SIP/2.0/UDP ssl.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
Record-Route: <sip:ssl.wcom.com>
From: TheLittleGuy <sip:UserB@there.com>
To: TheNewGuy <sip:UserD@nowhere.com>
Call-Id: 123123123@there.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB@there.com>
Content-Type: application/sdp
Requested-By: TheOtherGuy <sip:UserC@here.com>
Content-Length: ...

v=0
o=UserB 2890844526 2890844526 IN IP4 client.there.com
s=Session SDP
c=IN IP4 110.111.112.113
t=3034423619 0
m=audio 50170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F29
(100 Trying)
Proxy 1-> B

SIP/2.0 100 Trying
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheNewGuy <sip:UserD@nowhere.com>
Call-Id: 123123123@there.com
CSeq: 1 INVITE
Content-Length: 0

F30
180 Ringing
D->Proxy 1

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheNewGuy <sip:UserD@nowhere.com>;tag=789789
Call-Id: 123123123@there.com
CSeq: 1 INVITE
Content-Length: 0

F31
180 Ringing
Proxy 1->B

SIP/2.0 180 Ringing
From: TheLittleGuy <sip:UserB@there.com>
To: TheNewGuy <sip:UserD@nowhere.com>;tag=789789
Call-Id: 123123123@there.com
CSeq: 1 INVITE
Content Length: 0

200 OK
D->Proxy 1
SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheLittleGuy <sip:UserB@there.com>
To: TheNewGuy <sip:UserD@nowhere.com>;tag=789789
Call-Id: 123123123@there.com
CSeq: 1 INVITE
Contact: TheNewGuy <sip:UserD@nowhere.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserD 2890844527 2890844527 IN IP4 client.nowhere.com
s=Session SDP
c=IN IP4 150.151.152.153
t=3094598698 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

200 OK
Proxy 1-> B
SIP/2.0 200 OK
Via: SIP/2.0/UDP there.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheLittleGuy <sip:UserB@there.com>
To: TheNewGuy <sip:UserD@nowhere.com>;tag=789789
Call-Id: 123123123@there.com
CSeq: 1 INVITE
Contact: TheNewGuy <sip:UserD@nowhere.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserD 2890844527 2890844527 IN IP4 client.nowhere.com
s=Session SDP
c=IN IP4 150.151.152.153

Internet Draft Service Examples October 1999

t=3094598698 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F34
ACK
B->Proxy 1

ACK sip:UserD@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP there.com:5060
Route: <sip:UserD@nowhere.com>
From: TheLittleGuy <sip:UserB@there.com>
To: TheNewGuy <sip:UserD@nowhere.com>;tag=789789
Call-Id: 123123123@there.com
CSeq: 1 ACK
Content-Length:0

F35
ACK
Proxy 1->D

ACK sip: UserD@nowhere.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheNewGuy <sip:UserD@nowhere.com>;tag=789789
Call-Id: 123123123@there.com
CSeq: 1 ACK
Content-Length:0

F36
BYE
B -> Proxy 1
BYE sip: UserD@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP there.com:5060
Route: <sip:userD@nowhere.com>
From: TheLittleGuy <sip:UserB@there.com>
To: TheNewGuy <sip:UserD@nowhere.com>;tag=789789
Call-Id: 123123123@there.com
CSeq: 2 BYE
Content-Length: 0

F37
BYE
Proxy 1 -> D

BYE sip: UserD@nowhere.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060

MCI WorldCom

Internet Draft             Service Examples               October 1999

Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheNewGuy <sip:UserD@nowhere.com>;tag=789789
Call-Id: 123123123@there.com
CSeq: 2 BYE
Content-Length: 0

F38
200 OK
D -> Proxy 1

SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
To: TheNewGuy <sip:UserD@nowhere.com>;tag=789789
Call-Id: 123123123@there.com
CSeq: 2 BYE
Content-Length: 0

F39
200 OK
Proxy 1 -> B

SIP/2.0 200 OK
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>
2.4 Attended Transfer

User A calls user B. User A puts User B on hold, and Calls user C to announce transfer. User A terminates call with User C. User A transfers User B to User C. The call flow for this session would be a combination of Consultation Hold and Unattended Transfer.

2.5 Call Forwarding Unconditional

User B wants all calls forwarded to a Private Dialing Plan number 777-3660. (This information is known by the proxy). User A calls User B. The Proxy server rewrites the request URI, and forwards the INVITE to a gateway.
INVITE F1
---------------> INVITE F2
(100 Trying) F3
---------------> 180 Ringing F4
180 Ringing F5
---------------> 200 OK F6
200 OK F7
--------------->
ACK F8
---------------> ACK F9
Both way RTP Established
--------------->
BYE F10
---------------> BYE F11
--------------->
200 OK F12
--------------->
200 OK F13
--------------->

F1
INVITE
A-->Proxy
INVITE sip:UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Proxy-Authorization: DIGEST username="UserA", realm="MCI WorldCom SIP", nonce="ea9c8e88df84f1cecc4341ae6cbe5a359",
opaque="", uri="sip:ss1.wcom.com",
response="dfe56131d1958046689cd83306477ecc"
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
t=3034423619 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F2 /* Proxy 1 accepts the credentials and forwards the INVITE the
gateway for the extension that User B wants his calls forwarded to.
Client for A prepares to receive data on port 49170 from the
network. */
INVITE
Proxy->B2

INVITE sip:7773660,phone-context=p1234@gw1.wcom.com;user=phone SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
c=IN IP4 100.101.102.103
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000
(100 Trying)
Proxy→A

SIP/2.0 100 Trying
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content-Length: 0

F4
180 Ringing
B2→Proxy

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP ssl.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content-Length: 0

F5
180 Ringing
Proxy→A

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content-Length: 0

F6
200 OK
B2→Proxy

SIP/2.0 200 OK
Via: SIP/2.0/UDP ssl.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ssl.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: <sip:7773660,phone-context=p1234@gw1.wcom.com;user=phone>
Content-Type: application/sdp
Content-Length: ...

v=0
o=GATEWAY1 2890844527 2890844527 IN IP4 gatewayone.wcom.com
t=0 0
c=IN IP4 gatewayone.wcom.com
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F7
200 OK
Proxy->A

SIP/2.0 200 OK
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ssl.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:7773660,phone-context=p1234@gw1.wcom.com;user=phone>
Content-Type: application/sdp
Content-Length: ...

v=0
o=GATEWAY1 2890844527 2890844527 IN IP4 gatewayone.wcom.com
t=0 0
c=IN IP4 gatewayone.wcom.com
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F8
ACK
A->Proxy

ACK sip:7773660,phone-context=p1234@gw1.wcom.com;user=phone
SIP/2.0
Via: SIP/2.0/UDP here.com:5060
Route: < sip:7773660,phone-context=p1234@gw1.wcom.com;user=phone >
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length:0

F9
ACK
Proxy->B4

ACK sip:7773660,phone-context=p1234@gw1.wcom.com;user=phone
SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length:0

F10
BYE
A -> Proxy 1

BYE sip:7773660,phone-context=p1234@gw1.wcom.com;user=phone
SIP/2.0
Via: SIP/2.0/UDP here.com:5060
Route: < sip:7773660,phone-context=p1234@gw1.wcom.com;user=phone >
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 2 BYE
Content-Length: 0

F11
BYE
Proxy 1 -> B2

BYE sip:7773660,phone-context=p1234@gw1.wcom.com;user=phone
SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
 Via: SIP/2.0/UDP here.com:5060
 From: TheBigGuy <sip:UserA@here.com>
 To: TheLittleGuy <sip:UserB@there.com>;tag=314159
 Call-Id: 12345600@here.com
 CSeq: 2 BYE
 Content-Length: 0

MCI WorldCom

Internet Draft Service Examples October 1999

F12
200 OK
B2 -> Proxy 1

SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 2 BYE
Content-Length: 0

F13
200 OK
Proxy 1 -> A

SIP/2.0 200 OK
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314159
Call-Id: 12345600@here.com
CSeq: 2 BYE
Content-Length: 0
2.6 Call Forwarding - Busy

User B wants calls to B1 forwarded to B2 if B1 is busy (this information is known to the proxy). User A calls B1, B1 is busy, the proxy server places call to B2.

```
User A            Proxy            User B1            User B2
| INVITE F1       | ------------------|------------------|
| ----------------| INVITE F2         |
| (100 Trying) F3| (100 Trying) F3  | 486 Busy Here F4|
| <---------------| 486 Busy Here F4 | ACK F5          |
| 180 Ringing F8 | 180 Ringing F8   | 200 OK F9       |
| <---------------| 200 OK F10        | ACK F12         |
```
INVITE sip:UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Proxy-Authorization: DIGEST username="UserA", realm="MCI WorldCom SIP", nonce="ea9c8e88df84f1cecc4341ae6cbe5a359", opaque="", uri="sip:ss1.wcom.com", response="dfe56131d1958046689cd83306477ecc"
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s= Session SDP
c=IN IP4 100.101.102.103
t=0 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F2
INVITE
Proxy->B1

INVITE sip:UserB1@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060; branch=1
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:SS2@ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
t=0 0
m=audio 49170 RTP/AVP 0

MCI WorldCom [Page 55]

Internet Draft Service Examples October 1999

a=rtpmap:0 PCMU/8000

F3
(100 Trying)
Proxy->A

SIP/2.0 100 Trying
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content-Length: 0
486 Busy Here
B1->Proxy

SIP/2.0 486 Busy Here
Via: SIP/2.0/UDP ss1.wcom.com:5060;branch=1
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=123456
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content-Length: 0

ACK
Proxy->B1

ACK sip: UserB1@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060; branch=1
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=123456
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length: 0

INVITE
Proxy->B2

INVITE sip:UserB2@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060;branch=2
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>

Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
t=0 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F7
180 Ringing
B4->Proxy

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP ss1.wcom.com:5060; branch=2
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=7654321
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content-Length: 0

F8
180 Ringing
Proxy -> A

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=7654321
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content-Length: 0

F9
200 OK
B2->Proxy

SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060; branch=2
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=7654321
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB2@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844527 2890844527 IN IP4 client2.there.com
s=Session SDP
c=IN IP4 110.111.112.114
t=0 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F10
200 OK
Proxy-->A

SIP/2.0 200 OK
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=7654321
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB2@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844527 2890844527 IN IP4 client2.there.com
s=Session SDP
c=IN IP4 110.111.112.114
t=0 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F11
ACK
A-->Proxy

ACK sip:UserB2@there.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
Route: <sip:UserB2.there.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=7654321
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length: 0
F12
ACK
Proxy→B2

ACK sip: UserB2@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=7654321
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length: 0

F13 /* RTP streams are established between A and B2 */ /* User A eventually hangs up with User B2. */
BYE
A→Proxy

BYE sip: UserB2@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
Route: <sip:userB2@there.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=7654321
Call-Id: 12345600@here.com
CSeq: 2 BYE
Content-Length: 0

F14
BYE
Proxy→B2

BYE sip: UserB2@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=7654321
Call-Id: 12345600@here.com
CSeq: 2 BYE
Content-Length: 0

F15
200 OK
B2→Proxy
SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>

To: TheLittleGuy <sip:UserB@there.com>;tag=7654321
Call-Id: 12345600@here.com
CSeq: 2 BYE
Content-Length: 0

F16
200 OK
Proxy->A

SIP/2.0 200 OK
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=7654321
Call-Id: 12345600@here.com
CSeq: 2 BYE
Content-Length: 0
2.7 Call Forwarding û No Answer

User B wants calls to B1 forwarded to B2 if B1 is not answered (information is known to the proxy server). User A calls B1 and no one answers. The proxy server then places the call to B2.
ACK F12
--------------------------->
ACK F13

Both way RTP Established
<-m-m-m-m-m-m-m-m-m-m-m-m-m-m-m-m-m-m->

BYE F14
--------------------------->
BYE F15

200 OK F17
<-------------------------->
200 OK F16

MCI WorldCom

Internet Draft Service Examples October 1999

F1
INVITE
A->Proxy

INVITE sip:UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Proxy-Authorization: DIGEST username="UserA", realm="MCI WorldCom SIP", nonce="ea9c8e88df84f1cec4341ae6cbe5a359", opaque="", uri="sip:ss1.wcom.com", response="dfe56131d1958046689cd83306477ecc"
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
t=0 0
m=audio 49170 RTP/AVP 0
INVITE sip:UserB1@there.com SIP/2.0
to: UserB@there.com
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
t=0 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000
INVITE
Proxy->B2

INVITE sip:UserB@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060;branch=2
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
t=0 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

180 Ringing
B2->Proxy

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP ss1.wcom.com:5060;branch=2
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=123456
Call-Id: 12345600@here.com
CSeq: 1 INVITE

Content-Length: 0
SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060; branch=2
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=123456
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB2@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o= UserB 2890844527 2890844527 IN IP4 client2.there.com
s= Session SDP
c= IN IP4 110.111.112.114
t= 0 0
m= audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

MCI WorldCom
ACK
A->Proxy

ACK sip:UserB2@there.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
Route: <sip:UserB2@there.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=123456
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length: 0

ACK
Proxy->B2

ACK sip: UserB2@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=123456
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length: 0

/* RTP streams are established between A and B2*/
/* User A Hangs Up with User B2. */

BYE
A->Proxy

BYE sip: UserB2@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
Route: <sip:userB2@there.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=123456
Call-Id: 12345600@here.com
CSeq: 2 BYE
Content-Length: 0

BYE
Proxy->B2

BYE sip: UserB2@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
User A calls User B, User B then invites User C to a 3-way call. User B will mix the audio streams (act as the conference bridge). If user B drops out of the call then the entire call is dropped. This is not a fully meshed conference, and does not make use of the concepts in the call control draft.

The signaling for this scenario is as follows: User A calls User B, this establishes the call between A and B. User B calls User C,
this establishes the call between B and C. User B will mix the audio streams, sending media originating at A to C, and media originating at C to A. There is no SIP signalling relationship between User A and User C.

2.9 Single Line Extension

Single Line Extension (Sequential, First Wins implementation), a call will ring several extensions in sequence. The extension to answer the call becomes the active set, no other sets may join the call. The signalling for this implementation of Single Line Extension and Find-Me is the same, the difference may be in the provisioning of the service.

2.10 Find-Me

A call to a user will attempt to locate that user by calling locations from a list of contacts. The location to answer the call becomes the active set, no other sets may join the call.

It is anticipated that the Find-me feature will be associated with individual users. The signalling for the implementation of Single Line Extension and Find-Me is the same, the difference may be in the provisioning of the service.
F1
INVITE
A->Proxy

INVITE sip:UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Proxy-Authorization: DIGEST username="UserA", realm="MCI WorldCom SIP", nonce="ea9c8e88df84f1cecc4341ae6cbe5a359", opaque="", uri="sip:ss1.wcom.com", response="dfe56131d1958046689cd83306477ecc"
Content-Type: application/sdp
Content-Length: ...

v=0
s= Session SDP
o=UserA 2890844526 2890844526 IN IP4 client.here.com
c=IN IP4 100.101.102.103
t=0 0
m=audio 49170 RTP/AVP 0

F2
INVITE
Proxy->B1

INVITE sip:UserB1@ there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060; branch=1
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Content-Type: application/sdp
Content-Length: ...
v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
t= 0 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F3
(100 Trying)
Proxy->A

SIP/2.0 100 Trying
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content-Length: 0

F4
180 Ringing
B1->Proxy

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP ss1.wcom.com:5060; branch=1
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=123456
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content-Length: 0

F5
180 Ringing
Proxy->A

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=123456
Call-Id: 12345600@here.com
CSeq: 1 INVITE
F6 /* B1 rings for until a configurable timer in the Proxy expires. The Proxy then sends Cancel and proceeds down the list of routes. */

CANCEL
Proxy->B1

CANCEL sip:UserB1@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060; branch=1
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 CANCEL
Content-Length: 0

F7
200 OK
B1->Proxy

SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060; branch=1
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 CANCEL
Content-Length: 0

F8
INVITE
Proxy->B2

INVITE sip:UserB2@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060; branch=2
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>

Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s= Session SDP
c=IN IP4 100.101.102.103
t=0 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F9
480 Not Logged In
B2-->Proxy

SIP/2.0 480 Not Logged In
Via: SIP/2.0/UDP ss1.wcom.com:5060; branch=2
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314756
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content-Length: 0

F10
ACK
Proxy-->B2

ACK sip: UserB2@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060; branch=2
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=314756
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length: 0

F11
INVITE
Proxy-->B3

INVITE sip:UserB3@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060; branch=3
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
t=0 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F12
486 Busy Here
B3->Proxy

SIP/2.0 486 Busy Here
Via: SIP/2.0/UDP ss1.wcom.com:5060; branch=3
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=7654321
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length: 0

F13
ACK
Proxy->B3

ACK sip: UserB3@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=7654321
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length: 0

F14
INVITE
Proxy->B4

INVITE sip:UserB4@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060;branch=4
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
t=0 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F15
180 Ringing
B4->Proxy

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP ss1.wcom.com:5060; branch=4
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=7137136
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Content-Length: 0

F16
200 OK
B4->Proxy

SIP/2.0 200 OK
Via: SIP/2.0/UDP ss1.wcom.com:5060; branch=4
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ss1.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=7137136
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB4@there.com>
Content-Type: application/sdp
Content-Length: ...
v=0
o=UserB 2890844527 2890844527 IN IP4 client4.there.com
s=Session SDP
c=IN IP4 110.111.112.116
t=0 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

MCI WorldCom

Internet Draft Service Examples October 1999

F17
200 OK
Proxy->A

SIP/2.0 200 OK
Via: SIP/2.0/UDP here.com:5060
Record-Route: <sip:ssl.wcom.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=7137136
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheLittleGuy <sip:UserB4@there.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserB 2890844527 2890844527 IN IP4 client4.there.com
s=Session SDP
c=IN IP4 110.111.112.116
t=0 0
m=audio 3456 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F18
ACK
A->Proxy

ACK sip:UserB4@there.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
Route: <UserB4@there.com>
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=7137136
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length: 0

F19
ACK
Proxy->B4

ACK sip: UserB4@there.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>;tag=7137136
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length: 0

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Internet Draft Service Examples October 1999

F20 /* RTP streams are established between A and B4*/
/* User B4 Hangs Up with User A. */
BYE
B4->Proxy

BYE sip: UserA@here.com SIP/2.0
Via: SIP/2.0/UDP there.com:5060
Route: <sip:UserA@here.com>
From: TheLittleGuy <sip:UserB@there.com>;tag=7137136
To: TheBigGuy <sip:UserA@here.com>
Call-Id: 12345600@here.com
CSeq: 2 BYE
Content-Length: 0

F21
BYE
Proxy->A

BYE sip: UserA@here.com SIP/2.0
Via: SIP/2.0/UDP ss1.wcom.com:5060
Via: SIP/2.0/UDP there.com:5060
From: TheLittleGuy <sip:UserB@there.com>;tag=7137136
To: TheBigGuy <sip:UserA@here.com>;tag=1234567
Call-Id: 12345600@here.com
CSeq: 2 BYE
Content-Length: 0
2.11 Call Management (Incoming Call Screening)

User B has an incoming call screening list, User A is included on the list of addresses User B will not accept calls from. User A attempts to call user B.

<table>
<thead>
<tr>
<th>User A</th>
<th>Proxy</th>
<th>User B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Invite F1</td>
<td></td>
</tr>
<tr>
<td>&lt;-----------------&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>407 Proxy Authorization F2</td>
<td></td>
</tr>
<tr>
<td>&lt;-----------------&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ACK F3</td>
<td></td>
</tr>
<tr>
<td>&lt;-----------------&gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
INVITE F4

403 Screening Failure (Terminating) F5

ACK F3

F1
Invite
A->Proxy1

INVITE sip:UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com

c=IN IP4 100.101.102.103
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000
s=Session SDP
t=3034423619 0

F2 /* Proxy 1 challenges User A for authentication */
407 Proxy Authorization Required
Proxy 1 -> A

SIP/2.0 407 Proxy Authorization Required
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Proxy-Authenticate: Digest realm="MCI WorldCom SIP",
domain="wcom.com", nonce="ea9c8e88df84f1cecc4341ae6cbe5a359",
opaque="", stale="FALSE", algorithm="MD5"
Content-Length:0

F3
ACK
A -> Proxy 1

ACK sip:UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length:0

F4 /* User A responds by sending an INVITE with authentication
credentials in it. */
Invite
A -> Proxy 1

INVITE sip:UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345601@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Proxy-Authorization: DIGEST username="UserA", realm="MCI
WorldCom SIP", nonce="ea9c8e88df84f1cecc4341ae6cbe5a359",
opaque="", uri="sip:ss1.wcom.com",
response="dfe56131d1958046689cd83306477ecc"

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP

Internet Draft Service Examples October 1999
c=IN IP4 100.101.102.103
t=3034423619 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F5
403 Screening Failure (Terminating)
Proxy 1 -> A

SIP/2.0 403 Screening Failure (Terminating)
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345601@here.com
CSeq: 1 INVITE
Content-Length:0

F6
ACK
A -> Proxy 1

ACK sip:UserB@there.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345601@here.com
CSeq: 1 ACK
Content-Length:0
2.12 Call Management (Outgoing Call Screening)

User A has an outgoing call screening list, User B is included on the list of addresses User A will not be able to place a call to. User A attempts to call user B.

User A                   Proxy                   User B
|                |              |                      |
|    INVITE F1   |              |                      |
|--------------->|              |                      |
|                |              |                      |
| 407 Proxy Authorization F2 |            |                      |
|<-----------------|              |                      |
|                |              |                      |
|     ACK F3     |              |                      |
|--------------->|              |                      |
|                |              |                      |
|    INVITE F4   |              |                      |
|--------------->|              |                      |
|                |              |                      |
| 403 Screening Failure (Originating) F5 |            |                      |
|<-----------------|              |                      |
|                |              |                      |
|     ACK F3     |              |                      |
|--------------->|              |                      |

F1
 Invite
 A->Proxy1

INVITE sip:UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP
c=IN IP4 100.101.102.103
t=3034423619 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000
F2 /* Proxy 1 challenges User A for authentication */
407 Proxy Authorization Required
Proxy 1 -> A

SIP/2.0 407 Proxy Authorization Required
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 INVITE
Proxy-Authenticate: Digest realm="MCI WorldCom SIP",
domain="wcom.com", nonce="ea9c8e88df84f1c4341ae6cbe5a359",
opaque="", stale="FALSE", algorithm="MD5"
Content-Length:0

F3
ACK
A -> Proxy 1

ACK sip:UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345600@here.com
CSeq: 1 ACK
Content-Length:0

F4 /* User A responds be sending an INVITE with authentication
credentials in it. */
Invite
A -> Proxy 1

INVITE sip:UserB@ss1.wcom.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345601@here.com
CSeq: 1 INVITE
Contact: TheBigGuy <sip:UserA@here.com>
Proxy-Authorization: DIGEST username="UserA", realm="MCI
WorldCom SIP", nonce="ea9c8e88df84f1c4341ae6cbe5a359",
opaque="", uri="sip:ss1.wcom.com"
response="dfe56131d1958046689cd83306477ecc"
Content-Type: application/sdp
Content-Length: ...

v=0
o=UserA 2890844526 2890844526 IN IP4 client.here.com
s=Session SDP

c=IN IP4 100.101.102.103
t=3034423619 0
m=audio 49170 RTP/AVP 0
a=rtpmap:0 PCMU/8000

F5
403 Screening Failure (Originating)
Proxy 1 -> A

SIP/2.0 403 Screening Failure (Originating)
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345601@here.com
CSeq: 1 INVITE
Content-Length:0

F6
ACK
A -> Proxy 1

ACK sip:UserB@there.com SIP/2.0
Via: SIP/2.0/UDP here.com:5060
From: TheBigGuy <sip:UserA@here.com>
To: TheLittleGuy <sip:UserB@there.com>
Call-Id: 12345601@here.com
CSeq: 1 ACK
Content-Length:0
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5 References


