

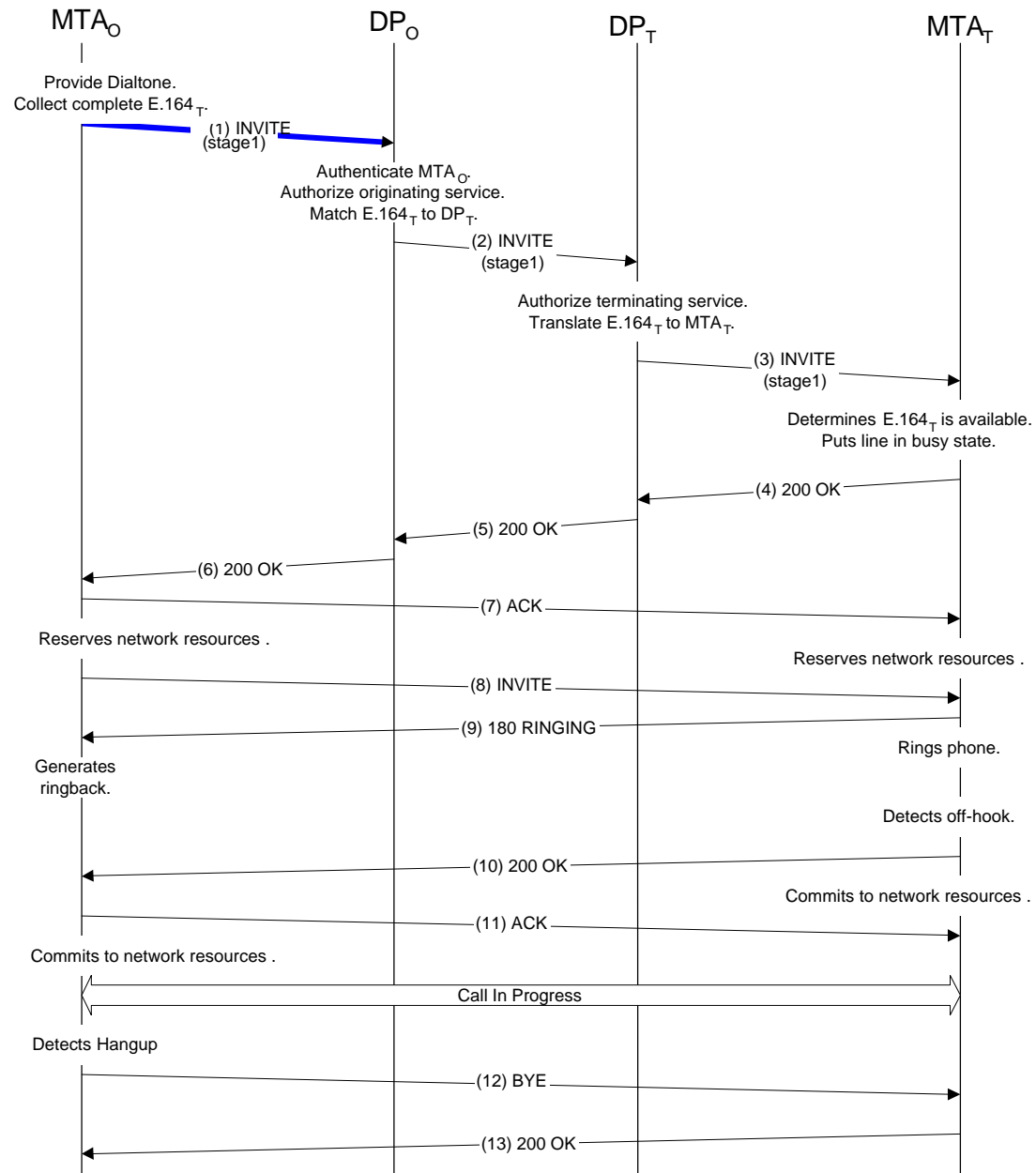
Basic SIP/DCS Call Flow

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**AT&T, CableLabs, 3Com, Cisco, Com21, General Instrument,
Lucent Cable, NetSpeak, Telcordia**

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IETF Presentation



INVITE (stage1):
INVITE sip:555-2222@Host(DP-o);user=phone SIP/2.0
Via: SIP/2.0/UDP Host(mta-o.provider)
Caller: John Doe; 555-1111
Anonymity: Off
Require: DCS
Proxy-Require: DCS
From: "Alien Blaster" <sip:BASE64(SHA-1(555-1111; time=36123E5B; seq=72))>
To: sip:BASE64(SHA-1(555-2222; time=36123E5B; seq=73))
Call-ID: BASE64(SHA-1(555-1111;time=36123E5B;seq=72))
CSeq: 127 INVITE
Stage1:
Contact: sip:Host(mta-o.provider)
Content-Type: application/sdp
Content-length: (...)
v=0
o=- 2987933615 2987933615 IN IP4 A3C47F2146789F0
s=-
c= IN IP4 Host(mta-o.provider)
b=AS:64000
t=907165275 0
a=X-pc-csuite:312F
a=rtpmap:0 PCMU/8000
a=rtpmap:96 G726-32/8000
m=audio 3456 RTP/AVP 0
a=X-pc-codecs:96

**Caller = " Caller" ":" [display-name ";"] Caller-Number
["/" Caller-Type] ["<" addr-spec ">"]**

Caller-Type = token

Caller-Number = local-phone-number | "private" | "not-subscribed" | "not-available"

- Used to support for the caller-ID functionality of the PSTN
- Allows the originating DCS proxy server to determine the phone line for service authorization and billing
- Standard SIP 'from' header not suitable because DP-o needs to modify/remove the value of this header in the event the calling party requests address privacy
- Caller-type identifies any special privileges given to the originator.

Caller: John Doe; 555-1111

Actions taken by originating DCS proxy server:

- authenticates that 'Caller-Number' is associated with the originating MTA
- Verifies the consistency of any additional information provided

Anonymity = " Anonymity" ":" *privacy-tag

**privacy-tag = "Full" | "Caller-Num" | "Caller-Name" |
"IPAddr" | "Off"**

- Allows the calling party to indicate the degree of privacy that should be provided by the DCS proxy server
- The terminating DCS proxy server modifies the 'Dcs-Caller' header accordingly
- "Full" and "IPAddr" requests the use of an anonymization service for both the signaling and packets and the bearer traffic

Anonymity: Off

- originating DCS proxy server verifies that the header is present

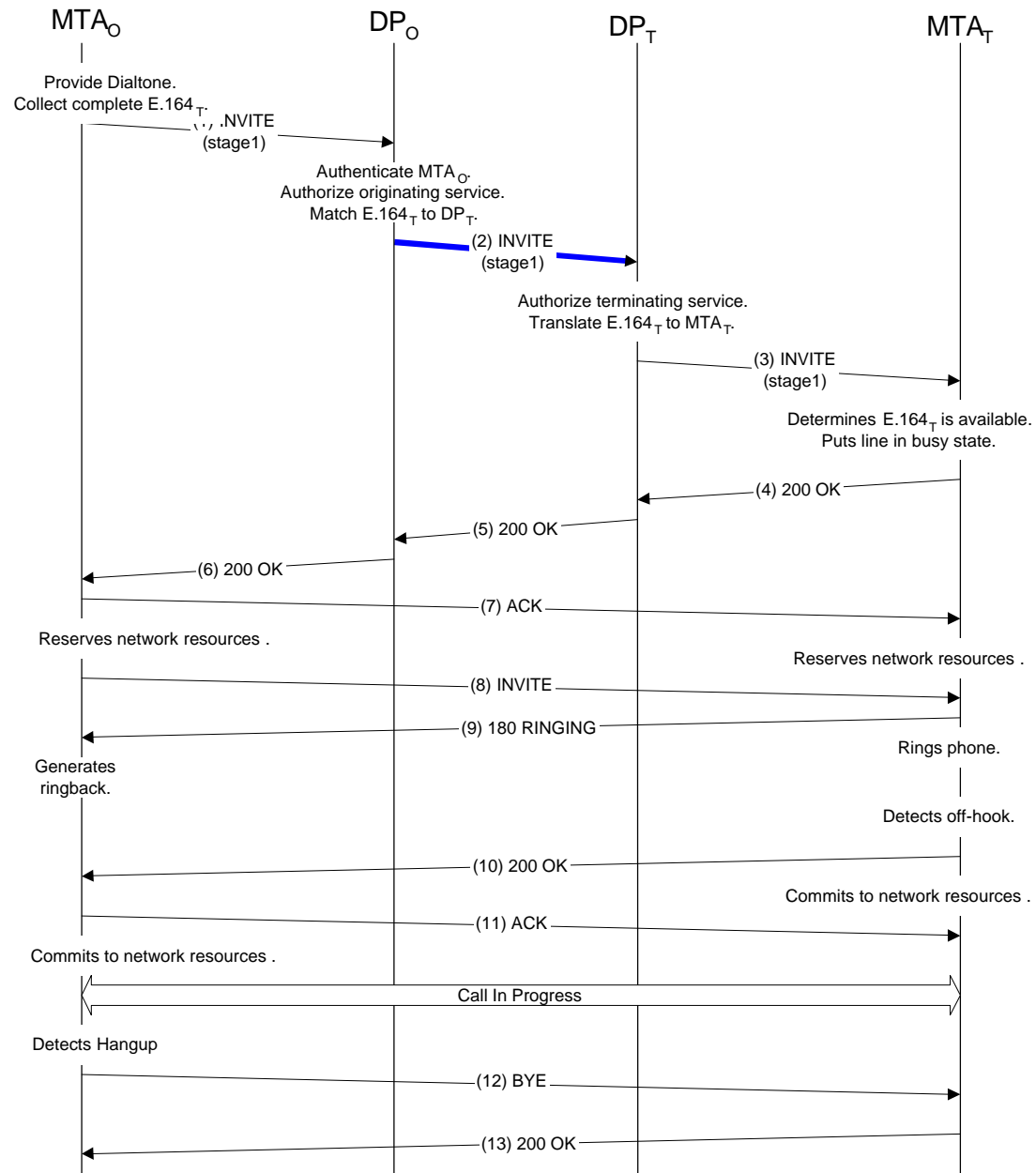
Stage1 = " Stage1 " ":"

- allows the caller to indicate that an INVITE should not alert the user

Stage1:

Actions taken by originating DCS proxy server:

- Insures the header is present for initial INVITE messages
- Passes the header on unmodified



INVITE (stage1):
INVITE sip: +1-212-555-2222,lnp=212-234@Host(DP-t);user=phone SIP/2.0
Via: SIP/2.0/UDP Host(DP-o.provider);branch=1
Via: SIP/2.0/UDP Host(mta-o.provider)
Caller: John Doe; +1-212-555-1111
Anonymity: Off
Gate: Host(cmts-o.provider):3612/17S30124/37FA1948
Billing-Info: Host(rks-o.provider)<5123-0123-4567-8900/212-555-1111/212-555-2222>
Billing-ID: Host(dp-o.provider):36123E5C:0152
Require: DCS
Proxy-Require: DCS
From: "Alien Blaster" <sip:BASE64(SHA-1(555-1111; time=36123E5B;seq=72))>
To: sip:BASE64(SHA-1(555-2222; time=36123E5B; seq=73))
Call-ID: BASE64(SHA-1(555-1111;time=36123E5B;seq=72))
CSeq: 127 INVITE
Contact: sip:Host(mta-o.provider)
Stage1:
Content-Type: application/sdp
Content-length: (...)
v=0
o=- 2987933615 2987933615 IN IP4 A3C47F2146789F0
s=-
c= IN IP4 Host(mta-o.provider)
b=AS:64000
t=907165275 0
a=X-pc-csuites:312F
a=X-pc-secret:clear:WhenInTheCourseOfHumanEvents
a=rtpmap:0 PCMU/8000
a=rtpmap:96 G726-32/8000
m=audio 3456 RTP/AVP 0
a=X-pc-codecs:96

Caller: John Doe; +1-212-555-1111

Actions taken by terminating DCS proxy server:

- Removes the header from the message if the called party does not subscribe to the caller-ID service.
- Modifies 'Caller-Name' and/or 'Caller-Number' as requested by the calling party (via the 'Dcs-Anonymity' header)

Anonymity: Off

Actions taken by terminating DCS proxy server:

- Modifies the value of the 'Dcs-Caller' header based upon the type of privacy requested by the calling party
- Removes the header from the message

Gate = " Gate" ":" [hostport "/"] Gate-ID
[";" Gate-Key ";" Gate-CipherSuite]
Gate-ID = 1*alphanum
Gate-Key = 1*alphanum
Gate-CipherSuite = token

- The Gate extension conveys the identifier of the local gate to a SIP endpoint
- A gate is a packet classifier and policer that ensures that only those IP flows that have been authorized by the DCS proxy are granted access to enhanced QoS in the access and backbone networks
- When used between DCS-Proxies, it conveys the location of the remote gate, identity of the gate, and the security key to be used in gate coordination messages

Gate: Host(cmts-o.provider):3612/17S30124/37FA1948

Actions taken by terminating DCS proxy:

- Passed to Gate Controller for controlling resource allocation

Billing-Info = " Billing-Info " ":" hostport "<" Acct-Data ">"
Acct-Data = 1*unreserved | (1*unreserved ",," Acct-Data)

- identifies a subscriber account number of the payer, and other information necessary for accurate billing of the service
- only used between DCS-Proxies
- The hostport specifies a record keeping server
- Multiple instances of the header may exist in a message – no significance to order
- Acct-data contains the information needed by the Gate Controller to pass on to the CMTS for generation of event message records to the record keeping server

Billing-Info: Host(rks-o.provider)<5123-0123-4567-8900/212-555-1111/212-555-2222>

Actions taken by terminating DCS proxy server:

- Header saved – needed when subsequent transaction response is received
- Removes the header from the message

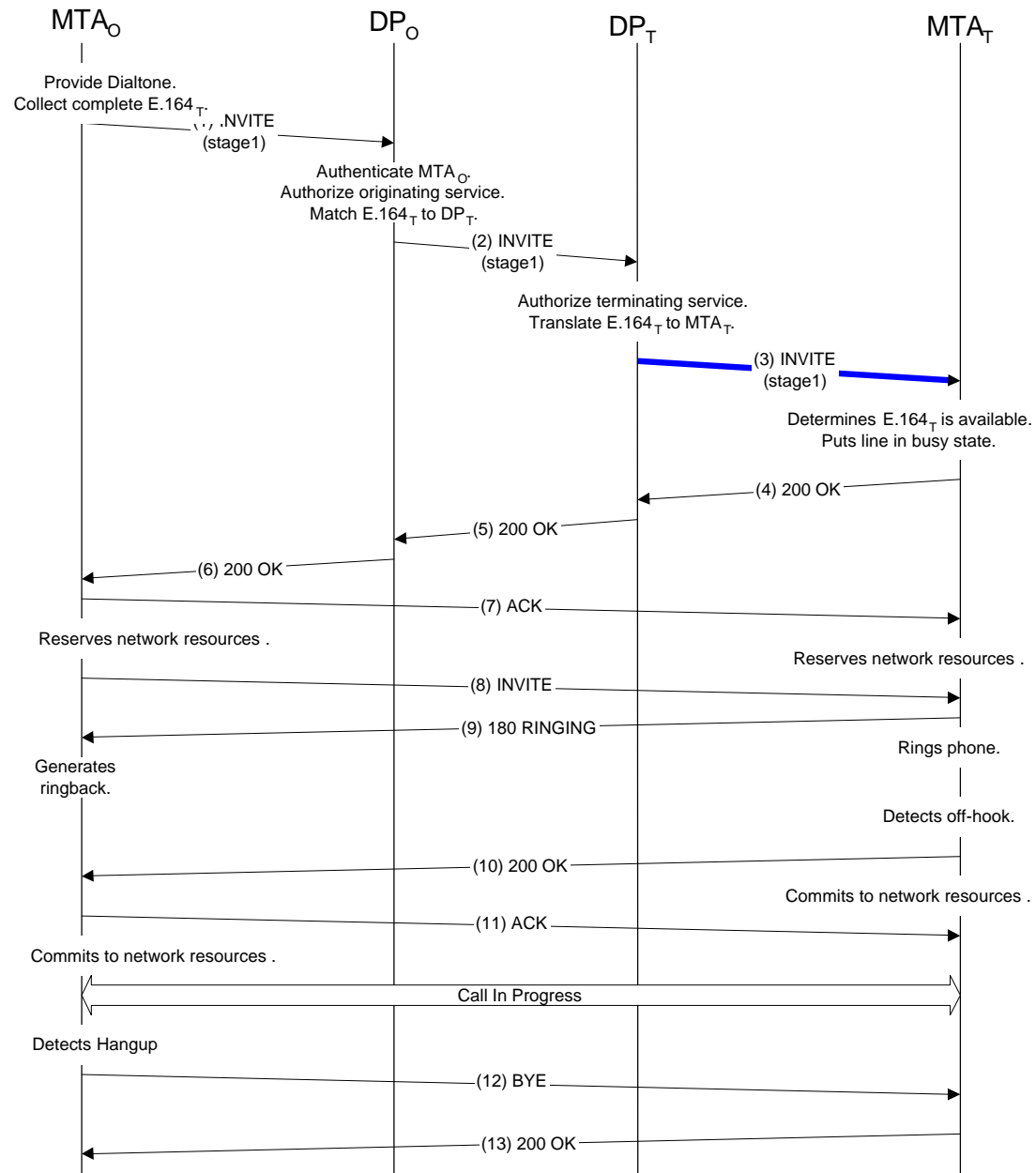
Billing-ID = " Billing-ID" ":" 1*unreserved

- Contains an identifier that can be used by an event recorder to associate multiple usage records with a billable account
- This header is only used between DCS-Proxies.

Billing-ID: Host(dp-o.provider):36123E5C:0152

Actions taken by terminating DCS proxy:

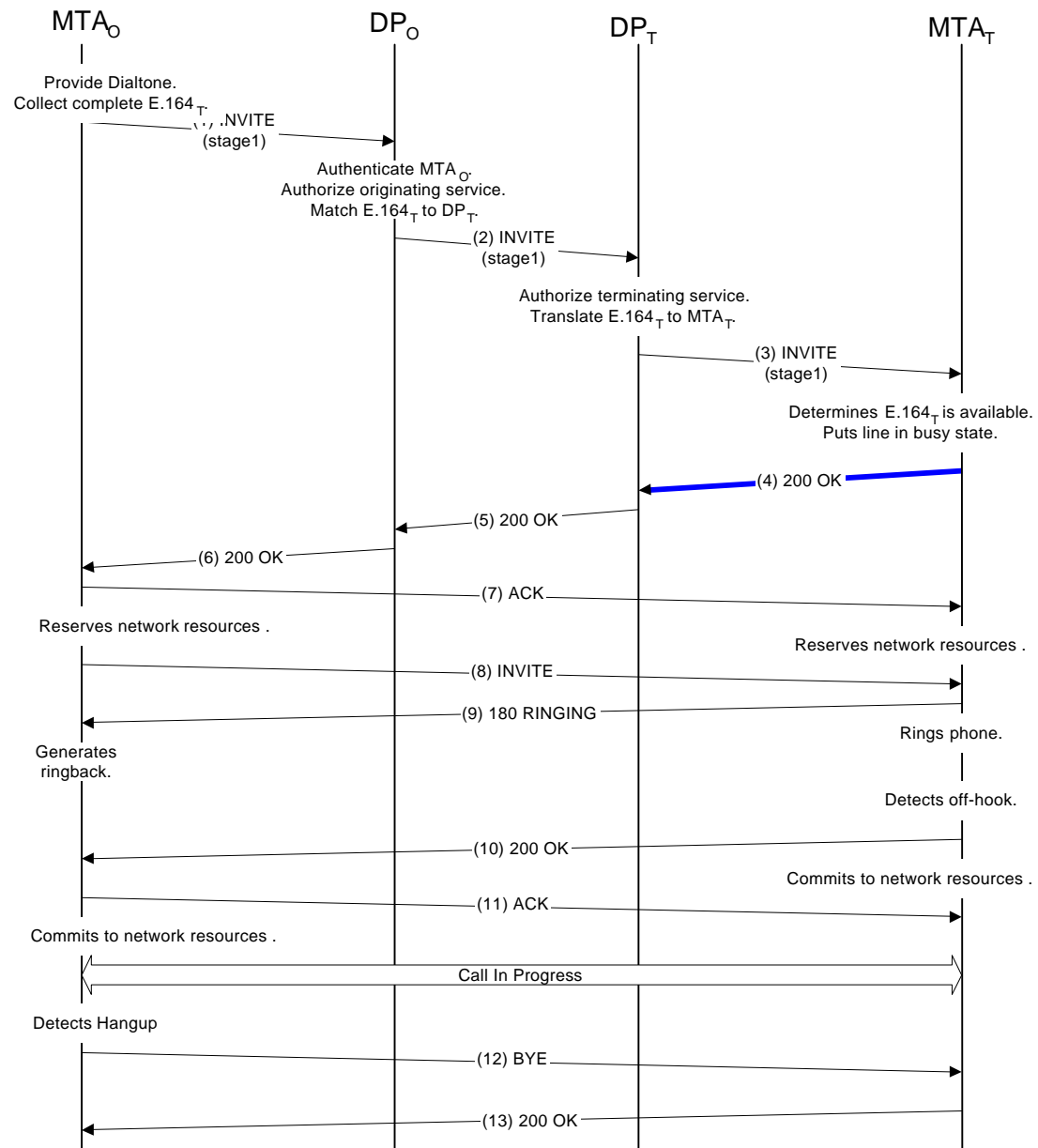
- Header saved
- Removes the header from the message



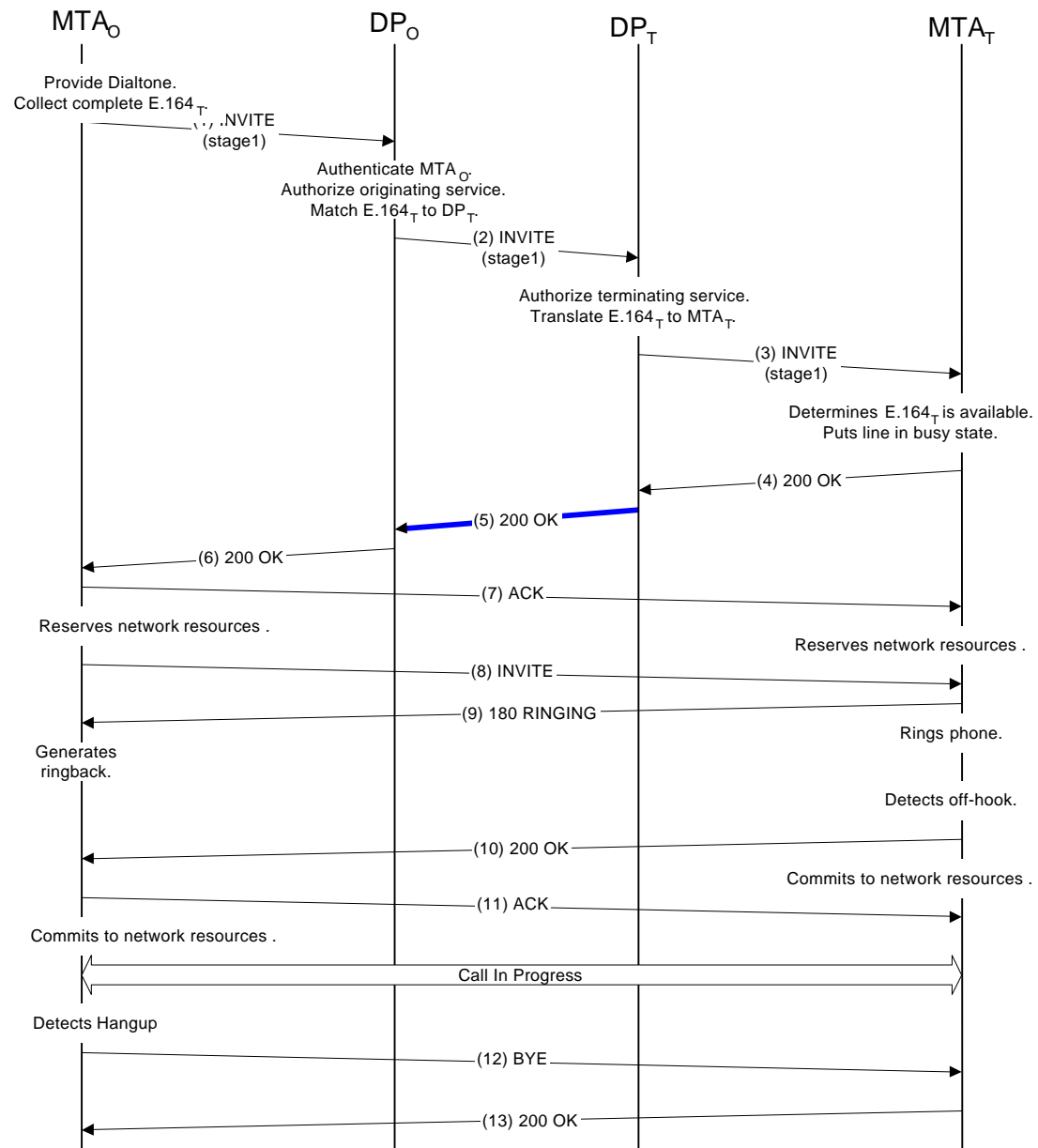
INVITE sip:+1-212-555-2222@Host(mta-t.provider); user=phone SIP/2.0
Via: SIP/2.0/UDP Host(dp-t.provider), a
Caller: John Doe; +1-212-555-1111
Gate: 31S14621
State: {call; +1-212-555-1111; +1-212-555-2222; Host(cmts-t.provider):4321/31S14621;Host(dp-o.provider),Host(mta-o.provider)} κ
Require: DCS
Proxy-Require: DCS
From: "Alien Blaster" <sip:BASE64(SHA-1(555-1111; time=36123E5B;seq=72)) >
To: sip:BASE64(SHA-1(555-2222; time=36123E5B; seq=73))
Call-ID: BASE64(SHA-1(555-1111;time=36123E5B;seq=72))
CSeq: 127 INVITE
Contact: sip:Host(mta-o.provider)
Stage1:
Content-Type: application/sdp
Content-length: (...)
v=0
o=- 2987933615 2987933615 IN IP4 A3C47F2146789F0
s=-
c= IN IP4 Host(mta-o.provider)
b=AS:64000
t=907165275 0
a=X-pc-csuites:312F
a=X-pc-secret:clear:WhenInTheCourseOfHumanEvents
a=rtpmap:0 PCMU/8000
a=rtpmap:96 G726-32/8000
m=audio 3456 RTP/AVP 0
a=X-pc-codecs:96

State: {call; +1-212-555-1111; +1-212-555-2222; Host(cmts-t.provider):4321/31S14621;Host(dp-o.provider),Host(mta-o.provider)} κ

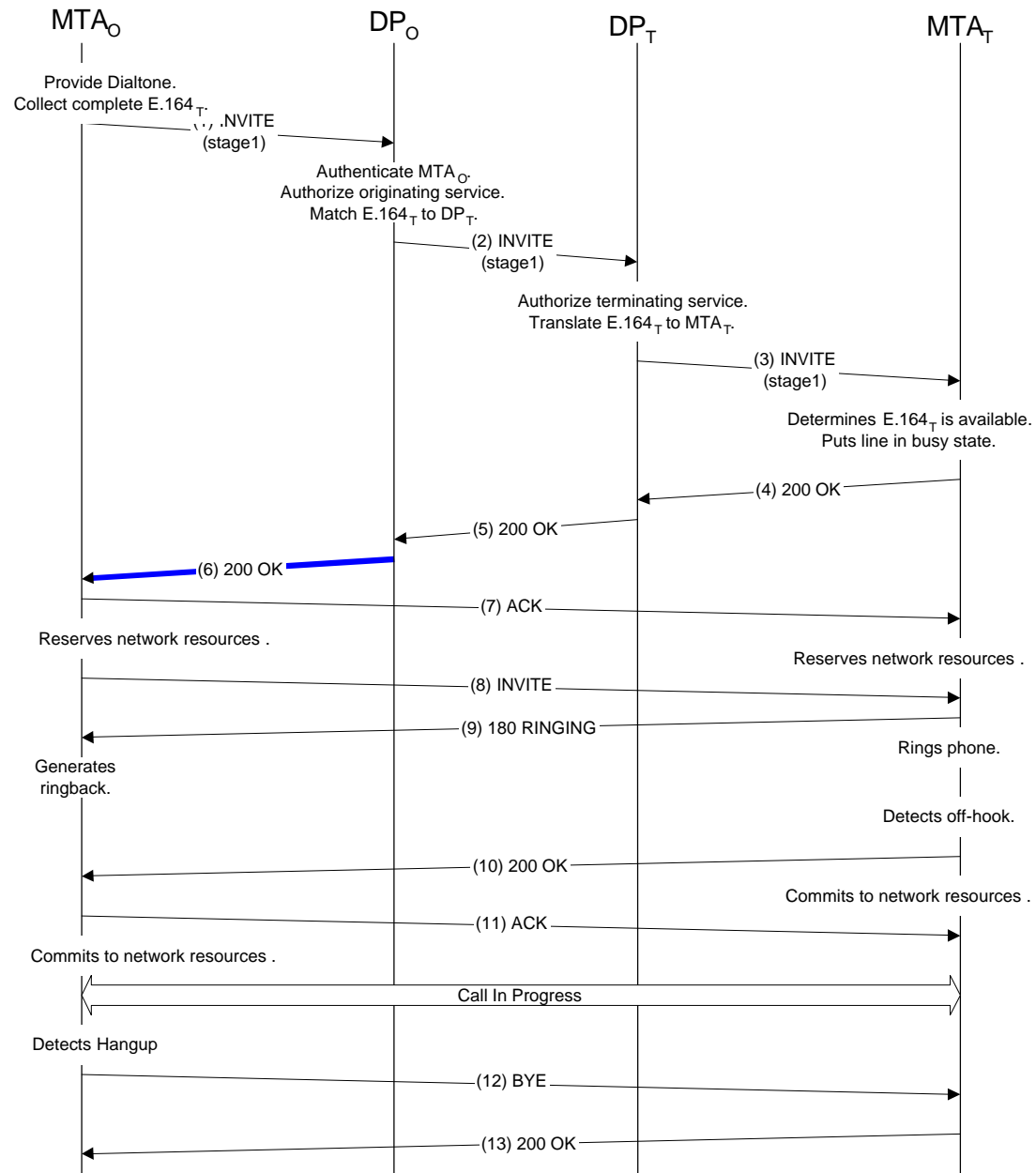
User agent server saves the value of 'State' so that it can be used to invoke services related to this call (e.g. call-trace, call-transfer).



(4) 200-OK:
SIP/2.0 200 OK
Via: SIP/2.0/UDP Host(dp-t.provider), a
From: "Alien Blaster" <sip:BASE64(SHA-1(555-1111; time=36123E5B;seq=72)) >
To: sip:BASE64(SHA-1(555-2222; time=36123E5B; seq=73))
Call-ID: BASE64(SHA-1(555-1111;time=36123E5B;seq=72))
CSeq: 127 INVITE
Contact: sip:Host(mta-t.provider)
Content-Type: application/sdp
Content-length: (...)
v=0
o=- 2987933615 2987933615 IN IP4 A3C47F2146789F0
s=-
c= IN IP4 Host(mta-t.provider)
b=AS:64000
t=907165275 0
a=X-pc-csuites:312F
a=rtpmap:0 PCMU/8000
m=audio 6544 RTP/AVP 0



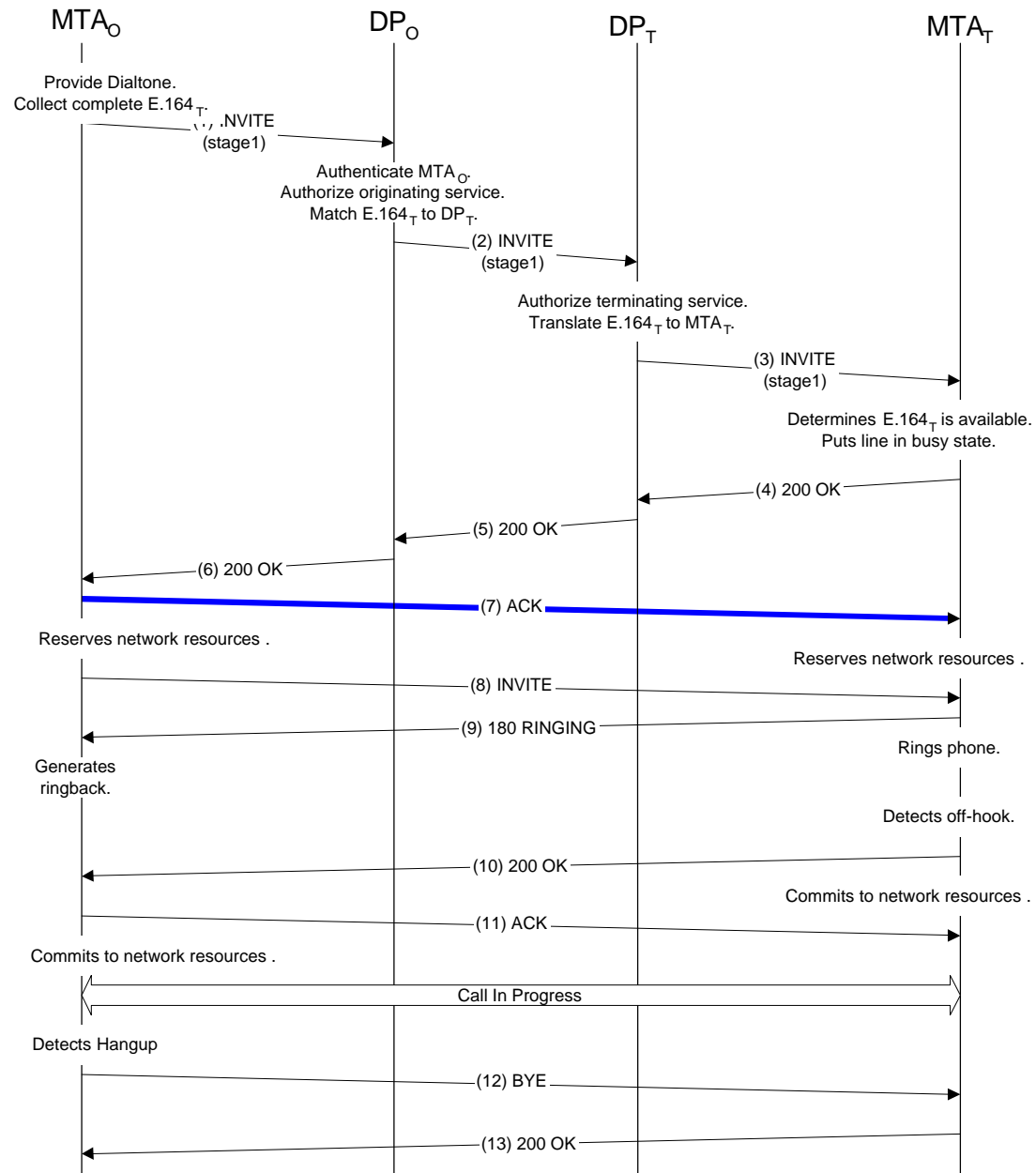
(5) 200-OK:
SIP/2.0 200 OK
Via: SIP/2.0/UDP Host(dp-o.provider);branch=1
Via: SIP/2.0/UDP Host(mta-o.provider)
Record-Route: Host(dp-t.provider), Host(mta-t.provider)
Gate: Host(cmts-t.provider):4321/31S14621/37FA1948
From: "Alien Blaster" <sip:BASE64(SHA-1(555-1111; time=36123E5B;seq=72)) >
To: sip:BASE64(SHA-1(555-2222; time=36123E5B; seq=73))
Call-ID: BASE64(SHA-1(555-1111;time=36123E5B;seq=72))
CSeq: 127 INVITE
Contact: sip:Host(mta-t.provider)
Content-Type: application/sdp
Content-length: (...)
v=0
o=- 2987933615 2987933615 IN IP4 A3C47F2146789F0
s=-
c= IN IP4 Host(mta-t.provider)
b=AS:64000
t=907165275 0
a=X-pc-suites:312F
a=rtpmap:0 PCMU/8000
m=audio 6544 RTP/AVP 0



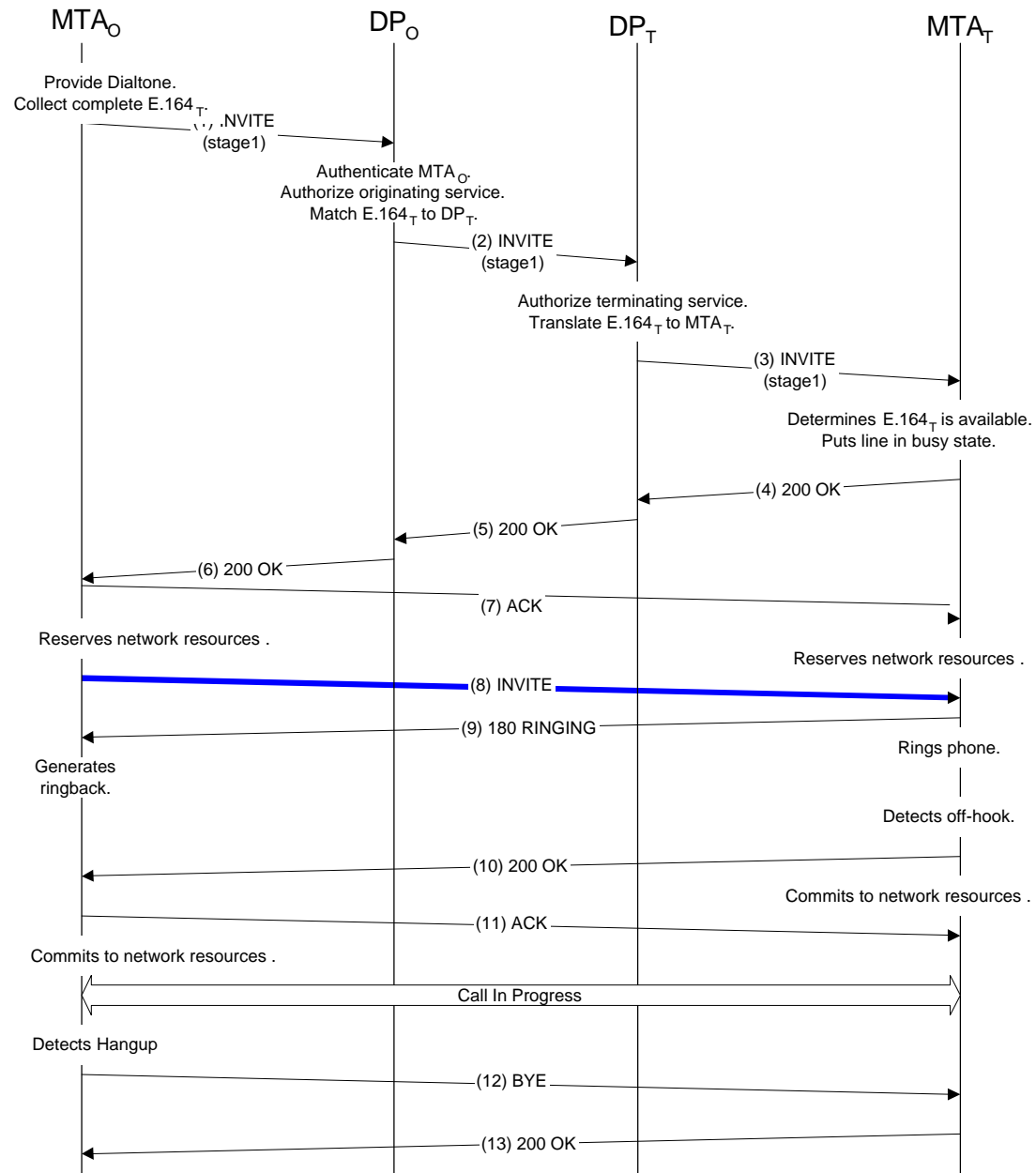
(6) 200-OK:
SIP/2.0 200 OK
Via: Sip/2.0/UDP Host(mta-o.provider)
Dcs-Gate: 17S30124
Dcs-State: {call; +1-212-555-1111; +1-212-555-2222; Host(cmts-o.provider): 3612/17S30124;Host(dp-t.provider),Host(mta-t.provider)}_k
From: "Alien Blaster" <sip:BASE64(SHA-1(555-1111; time=36123E5B;seq=72)) >
To: sip:BASE64(SHA-1(555-2222; time=36123E5B; seq=73))
Call-ID: BASE64(SHA-1(555-1111;time=36123E5B;seq=72))
CSeq: 127 INVITE
Contact: sip:Host(mta-t.provider)
Content-Type: application/sdp
Content-length: (...)
v=0
o=- 2987933615 2987933615 IN IP4 A3C47F2146789F0
s=-
c= IN IP4 Host(mta-o.provider)
b=AS:64000
t=907165275 0
a=X-pc-csuites:312F
a=X-pc-secret:clear:WhenInTheCourseOfHumanEvents
a=rtpmap:0 PCMU/8000
m=audio 6544 RTP/AVP 0

State: {call; +1-212-555-1111; +1-212-555-2222; Host(cmts-o.provider): 3612/17S30124;Host(dp-t.provider),Host(mta-t.provider)}_K

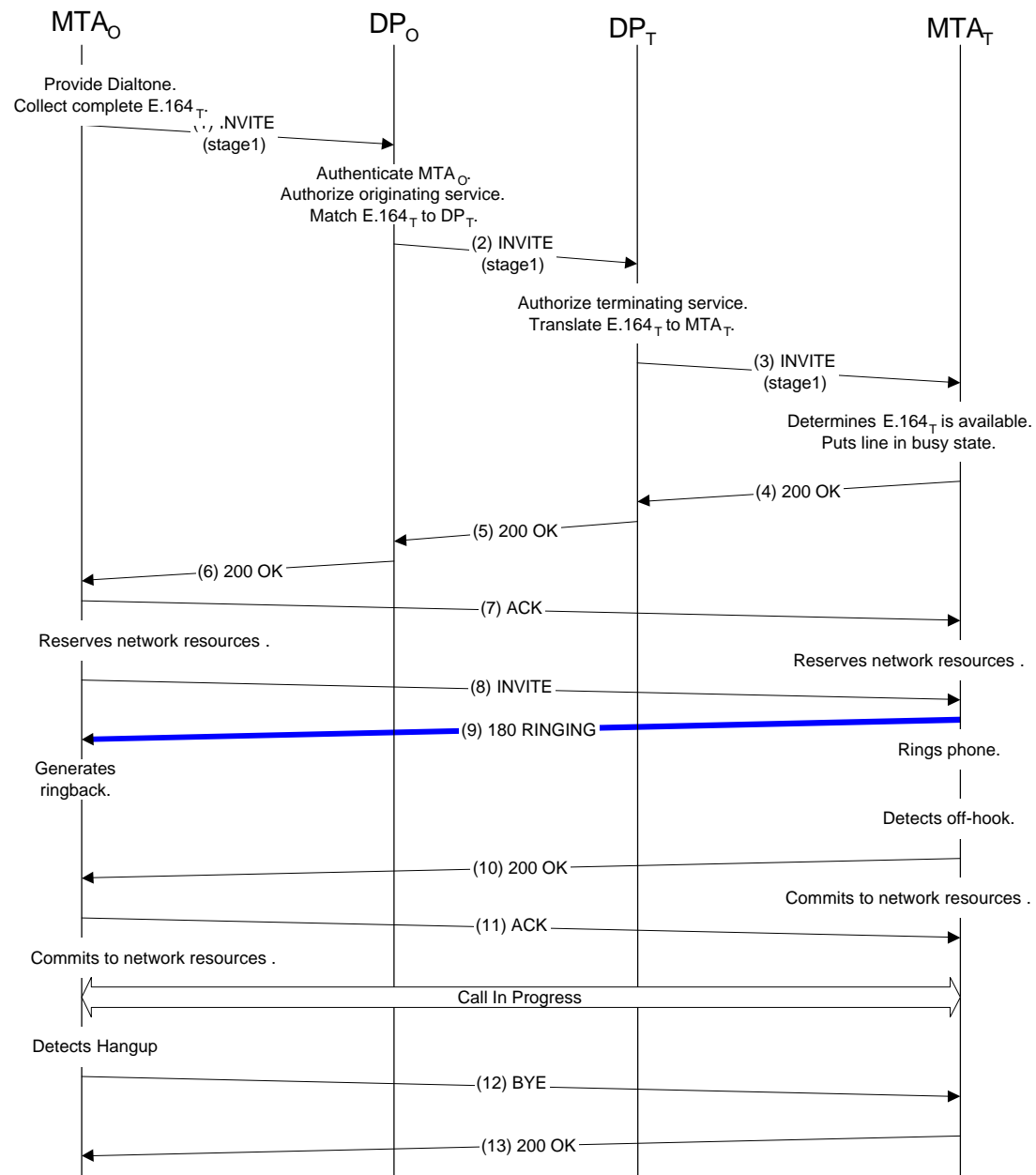
The calling party saves 'State' just as the called party.



(7) ACK:
ACK sip:Host(mta-t.provider) SIP/2.0
Via: SIP/2.0/UDP Host(mta-o.provider)
From: "Alien Blaster" <sip:BASE64(SHA-1(555-1111; time=36123E5B;seq=72)) >
To: sip:BASE64(SHA-1(555-2222; time=36123E5B; seq=73))
Call-ID: BASE64(SHA-1(555-1111;time=36123E5B;seq=72))
CSeq: 127 ACK
v=0
o=- 2987933615 2987933615 IN IP4 A3C47F2146789F0
s=-
c= IN IP4 Host(mta-o.provider)
b=AS:64000
t=907165275 0
a=X-pc-csuites:312F
a=X-pc-secret:clear:WhenInTheCourseOfHumanEvents
a=rtpmap:0 PCMU/8000
m=audio 3456 RTP/AVP 0



(8) INVITE:
INVITE sip:Host(mta-t.provider) SIP/2.0
Via: SIP/2.0/UDP Host(mta-o.provider)
From: "Alien Blaster" <sip:BASE64(SHA-1(555-1111; time=36123E5B;seq=72)) >
To: sip:BASE64(SHA-1(555-2222; time=36123E5B; seq=73))
Call-ID: BASE64(SHA-1(555-1111;time=36123E5B;seq=72))
CSeq: 128 INVITE
Content-Type: application/sdp
Content-length: (...)
v=0
o=- 2987933615 2987933615 IN IP4 A3C47F2146789F0
s=-
c= IN IP4 Host(mta-o.provider)
b=AS:64000
t=907165275 0
a=X-pc-suites:312F
a=X-pc-secret:clear:WhenInTheCourseOfHumanEvents
a=rtpmap:0 PCMU/8000



(9) 180 RINGING:

SIP/2.0 180 Ringing

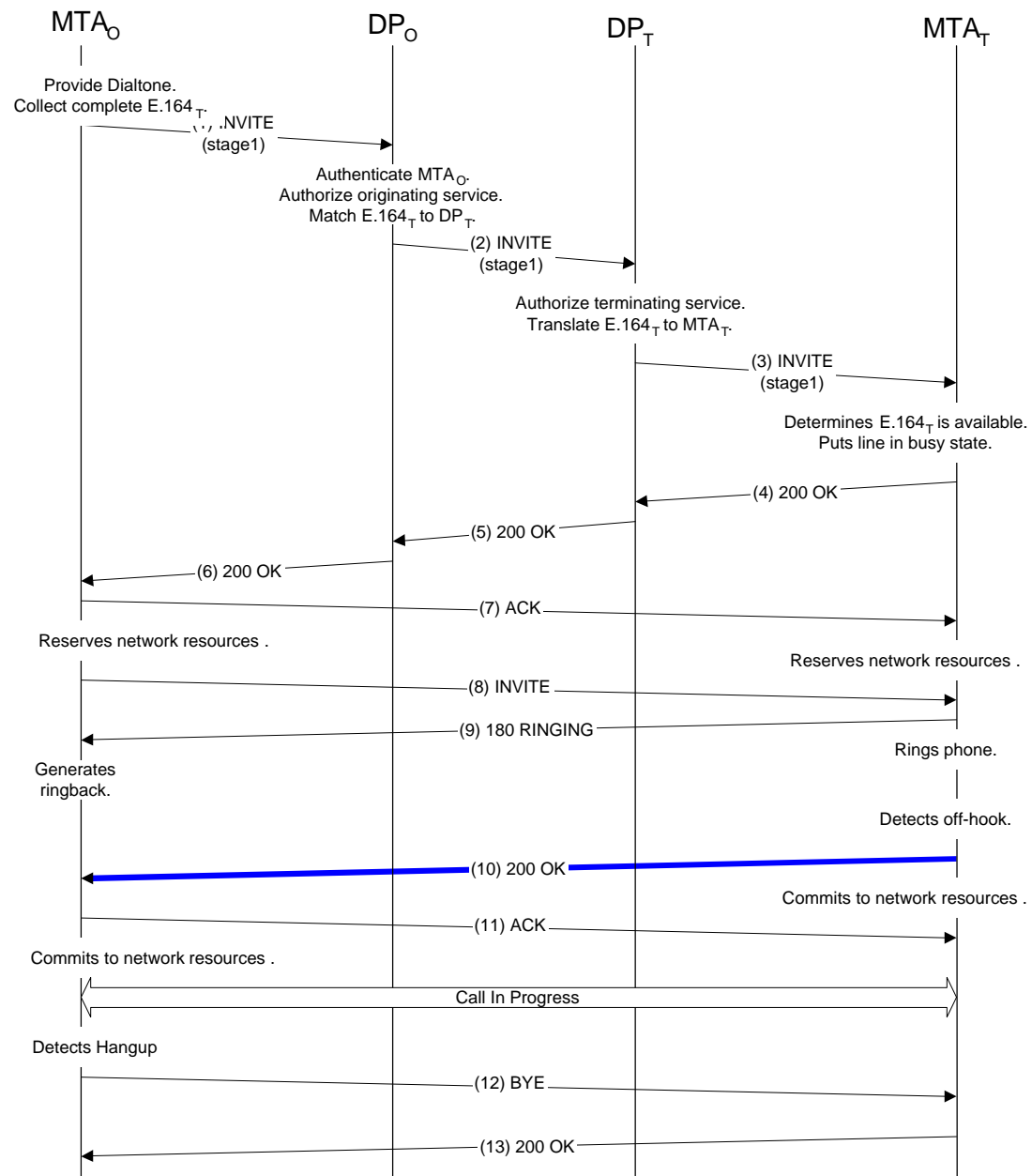
Via: SIP/2.0/UDP Host(mta-o.provider)

From: "Alien Blaster" <sip:BASE64(SHA-1(555-1111;
time=36123E5B;seq=72)) >

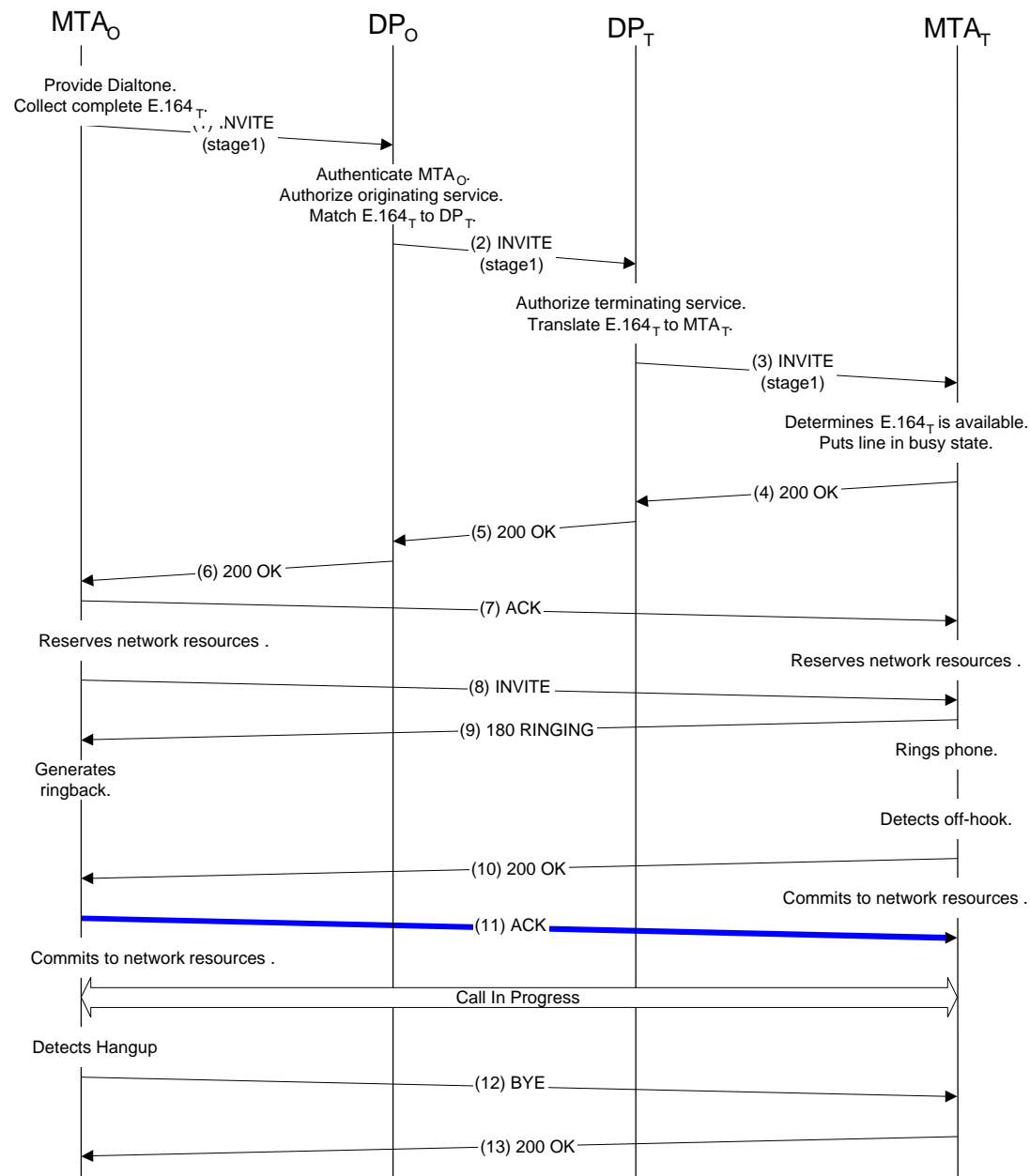
To: sip:BASE64(SHA-1(555-2222; time=36123E5B; seq=73))

Call-ID: BASE64(SHA-1(555-1111;time=36123E5B;seq=72))

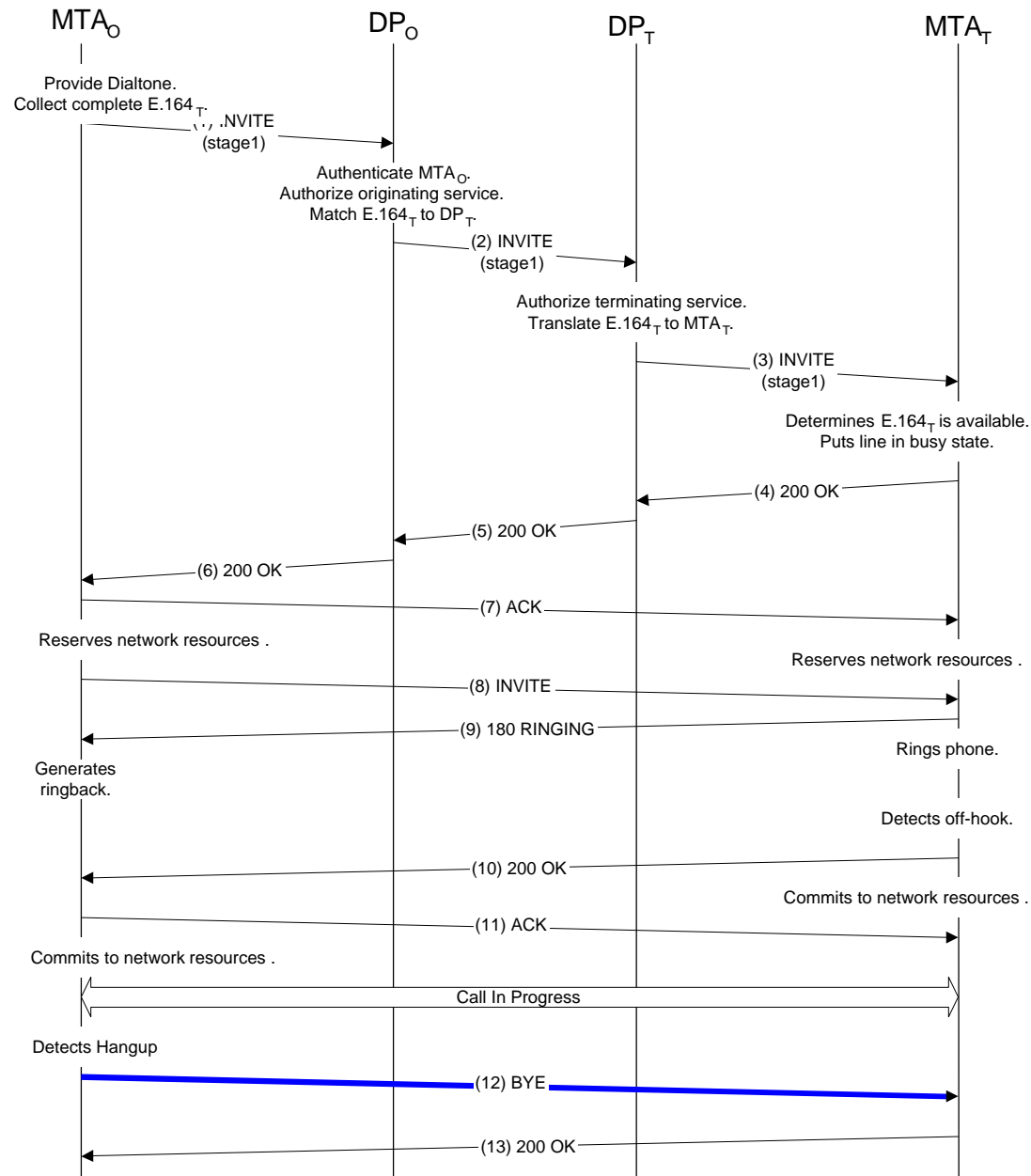
CSeq: 128 INVITE



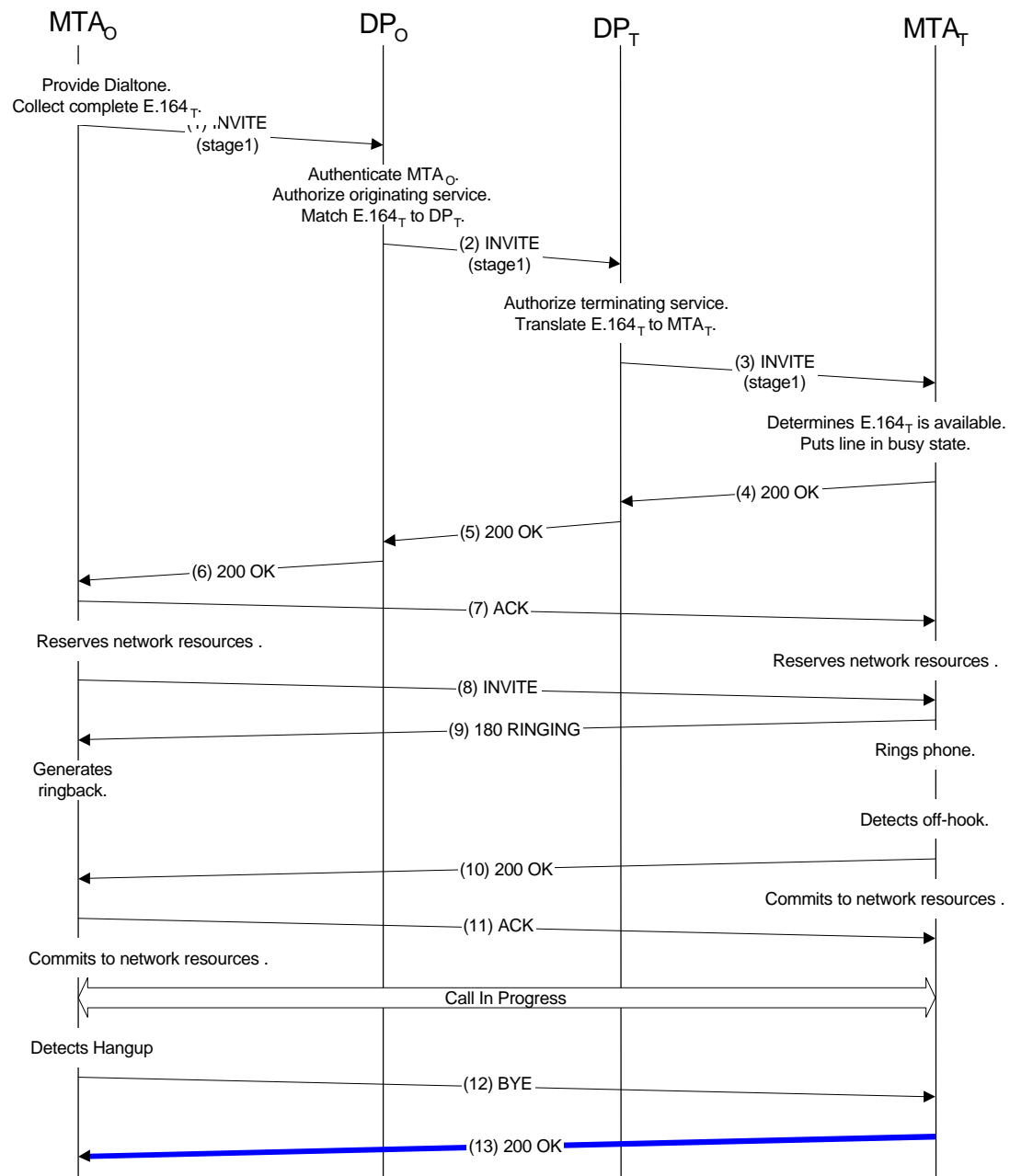
(10) 200-OK:
SIP/2.0 200 OK
Via: SIP/2.0/UDP Host(mta-o.provider)
From: "Alien Blaster" <sip:BASE64(SHA-1(555-1111; time=36123E5B;seq=72)) >
To: sip:BASE64(SHA-1(555-2222; time=36123E5B; seq=73))
Call-ID: BASE64(SHA-1(555-1111;time=36123E5B;seq=72))
CSeq: 128 INVITE



(11) ACK:
ACK sip:Host(mta-t.provider) SIP/2.0
Via: SIP/2.0/UDP Host(mta-o.provider)
From: "Alien Blaster" <sip:BASE64(SHA-1(555-1111; time=36123E5B;seq=72)) >
To: sip:BASE64(SHA-1(555-2222; time=36123E5B; seq=73))
Call-ID: BASE64(SHA-1(555-1111;time=36123E5B;seq=72))
Cseq: 128 ACK



(12) BYE:
BYE sip:Host(mta-t.provider) SIP/2.0
Via: SIP/2.0/UDP Host(mta-o.provider)
From: "Alien Blaster" <sip:BASE64(SHA-1(555-1111; time=36123E5B;seq=72)) >
To: sip:BASE64(SHA-1(555-2222; time=36123E5B; seq=73))
Call-ID: BASE64(SHA-1(555-1111;time=36123E5B;seq=72))
Cseq: 129 BYE



(13) 200-OK:
SIP/2.0 200 OK
Via: SIP/2.0/UDP Host(mta-o.provider)
From: "Alien Blaster" <sip:BASE64(SHA-1(555-1111; time=36123E5B;seq=72)) >
To: sip:BASE64(SHA-1(555-2222; time=36123E5B; seq=73))
Call-ID: BASE64(SHA-1(555-1111;time=36123E5B;seq=72))
Cseq: 129 BYE