SIP Trunking & Peering Operation Guide

For Samsung OfficeServ

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1. Introduction

1.1. Overview

This document is written in order to give guidelines to anybody involved with the SIP (Session Initiation Protocol) functions on OfficeServ systems made by Samsung Electronics. Readers of this document are assumed to have the minimum knowledge in operating OfficeServ systems for example, basic MMC settings, OfficeServ system configuration etc. By using this document, readers can become acquainted with a basic knowledge of SIP, and be able to configure the OfficeServ's SIP trunking and peering functions. As this document is mainly focusing on the SIP functionality on the OfficeServ system, readers who want to have in-depth understanding of SIP in general, should refer to RFC3261.

1.2. SIP (Session Initiation Protocol)

SIP is an application-layer control protocol that can establish, modify, and terminate multimedia sessions (conferences) such as Internet telephony calls. SIP can also invite participants into already existing sessions, such as multicast conferences. Media can be added to (and removed from) an existing session.

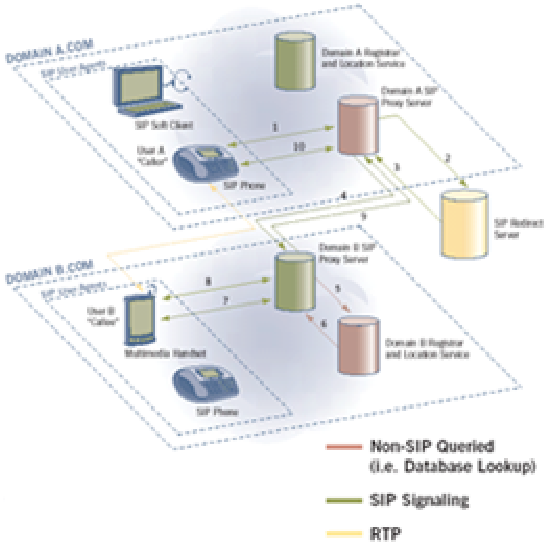

Figure 1. SIP Call Scenario

Standard SIP consists of mainly following 4 elements;

■ User Agent Client (UAC): A user agent client is a logical entity that creates a new request. The role of UAC lasts only for the duration of that transaction. In other words, if a piece of software initiates a request, it acts as a UAC for the duration of that transaction. If it receives a request later, it assumes the role of a user agent server (UAS) for the processing of that transaction.

■ User Agent Server (UAS): A user agent server is a logical entity that generates a response to a SIP request. The response accepts, rejects, or redirects the request. This role lasts only for the duration of that transaction. In other words, if a piece of software responds to a request, it acts as a UAS for the duration of that transaction. If it generates a request later, it assumes the role of a user agent client for the processing of that transaction.

■ Registrar: A registrar is a server that accepts REGISTER requests from UAC and places the information for location services.

■ SIP Server (or Proxy Server): A server is a network element that receives requests in order to service them and sends back responses to those requests. Examples of servers are proxies, user agent servers, redirect servers, and registrars.

1.3. SIP Trunking vs. SIP Peering

OfficeServ system supports both SIP trunking and SIP peering. The main difference is whether to use a SIP server or not. If SIP messages are transmitted via an intermediary SIP server, we call this type of SIP connection, SIP trunking. Meanwhile, if SIP messages are directly transmitted between two end SIP UAs, it is SIP peering.

Table 1. SIP Trunking vs. SIP Peering

	SIP Trunking	SIP Peering
SIP Server Use	Use	No Use
Authentication	REGISTER	OPTIONS
Message Outbound	SIP Server	Peer
DNS	Use	No Use
Related MMC No.	832, 837	832, 833

1.3.1. Locating SIP Server

In SIP trunking mode, OfficeServ can locate an outbound SIP server either by using DNS query or direct IP designation. If a direct IP is designated, OfficeServ sets the address as an outbound SIP Server's IP address. Instead, when an outbound proxy server's domain name is provided with DNS server's IP address, OfficeServ automatically triggers DNS query and fetches the IP addresses of the corresponding domain name from DNS servers. Once outbound server is set, all the SIP outbound messages from OfficeServ will send to the server.

For some SIP carriers that require separate registrar server from outbound SIP server, OfficeServ is able to locate separate registrar server and its mechanism is the same with the case of locating SIP server. If separate registrar is set, OfficeServ sends out all the REGISTER messages to the registrar. Note that other SIP messages are still sent to the outbound server.

DNS query feature is provided in OfficeServ 7100 and 7400 systems but not in OfficeServ 7200 and lower system.

1.3.2. SIP Trunking Functionalities

SIP trunking functionality on the OfficeServ has two categories: Basic and Supplementary.

Table 2. SIP functionality comparison

Basic Functions	Supplementary Functions
• Registration • Basic Call Setup	• Hold/Resume • Music on Hold • Consultation Call • Transfer (Consultation/Blind) • Call Forward (All/Busy/No-Answer) • DND

	• MWI • Conference • Call Waiting • Call Pickup • Call Park

Basic SIP trunking functions in the OfficeServ have been implemented based on SIP standard, and they have been tested with various SIP carriers whose SIP servers were manufactured by many different 3rd party vendors. OfficeServ's SIP supplementary service functions, however, were developed and tested mainly using BroadSoft Inc's Soft Switch (a SIP server), and thus there may be some compatibility problems when interoperating with other SIP servers made by different vendors. Another reason why we can not guarantee compatibility of supplementary functions is that each different SIP UA manufacturer can have each different SIP message handling scheme which does not matches with schemes implemented in OfficeServ system. For this reason, some features that are working fine with a certain SIP server may not work properly when interoperating with other servers.

1.3.3. SIP Peering Functionalities

Unlike SIP trunking which normally depends on SIP server's capability, SIP peering functionalities are mostly depending on each participating SIP UA's capability. In many cases, therefore, supplementary features in SIP peering session are comparatively limited due to different SIP specification implemented in each different SIP UA.

1.3.4. Locating SIP Peer

In SIP peering mode, SIP peer's location should be known to OfficeServ in order to send out its SIP messages by setting IP address of the peer.

1.4. Multiple SIP Carriers

Currently OfficeServ system can interacts with only one SIP carrier at a time, but it has database frame which is able to contain [1]maximum 4 SIP carrier profile data in its MMC837. Each profile database designates each different SIP carrier and by setting the SIP SERVER field of a certain profile to 'ENABLE' OfficeServ sets the corresponding SIP carrier as its default SIP carrier. Remember that only one SIP carrier can be active at a certain time.

As mentioned, MMC837 contains 4 ISP (Internet Service Provider) database profiles as well as SIP and EXT databases. SIP menu specifies all commonly used parameters such as T1 and T2 timers.

1.5. SIP Station

OfficeServ systems support not only SIP trunking/peering features but also SIP station features.

[1] In later version, OfficeServ will be able to support multiple active SIP carriers at a time, which means it can decide which SIP carrier's outbound server to send SIP message to without manually changing a default active SIP carrier to another.

Any standard SIP phone can register to OfficeServ as its station and can be used to provide various supplement call features using SIP. We have tried to adapt the standard SIP call flow and message formats that IETF recommended when implementing SIP station features in order to make the services SIP station independent. But still, as in the case of SIP trunking/peering, because each different manufacturer may have each different call flow or message format, interoperability between OfficeServ and 3rd party vendor products can be an issue in some cases. Currently OfficeServ system guarantees the supplementary SIP service features only for the following SIP terminals, which have been actually gone through rigorous SEC's lab-testing and adapted by OfficeServ.

Table 3. SIP Services Compatibility Table

	Cisco 7960	SMT-i5015	X-Lite	WIP-8000	D-Link DPH-540	Linksys (SPA3102)	Linksys (SPA941)	Thomson IP Phone	GrandStream N/W
Registration	√	√	√	√	√	√	√	√	√
Basic Call Setup	√	√	√	√	√	√	√	√	√
Hold/Resume	√	√	√	√	√	√	√	√	√
Music On Hold	√	√	√	√	√	√	√	√	√
Consultation Call	√	√	√	√	√			√	√
Transfer (Consultation)	√	√	√	√	√			√	√
Transfer (Blind)	√	√	√	√	√			√	√
Call Waiting	√	√	√	√	√			√	√
Call Pickup	√	√	√	√				√	√
Call Forward (All)	√	√	√	√	√			√	√
Call Forward (Busy)	√	√	√	√	√			√	√
Call Forward (No Answer)	√	√	√	√	√			√	√
Conference	√	√	√	√				√	√
Call Park (System Hold)	√	√	√	√				√	√
DND	√	√	√	√				√	√
Call Back	√	√	√	√				√	√
Voice Mail Indication		√			√	√	√		

For more detailed information on OfficeServ's SIP station, please refer to SIP Station Operation Guide.

1.6. License Key Policy

If S/W version of MP (or MCP) in OfficeServ is 4.10 or higher, SIP license key should be set onto the OfficeServ system in order to use SIP features. SIP license key contains the information of SIP channel capabilities such as the number SIP trunk channels or the number SIP station channels. If there were not for a valid license key, OfficeServ can not send or receive any SIP call.

License keys are issued only by a license server that is managed by license server manager. To obtain a valid license key, OfficeServ operator should consult the license key manager and let him know the MAC address of the corresponding OfficeServ system's MCP card. That means that use

of the license key issued for a specific MCP card is restricted only for the card, and can not be used for any other MCP card which has a different MAC address.

As the number of SIP channels is set when creating the license key, you should let the license key manager know the desired number of SIP channels in advance along with the MP's MAC address.

1.7. Overall Configuration

As shown in Figure 1, the SIP interfaces (remarked as dashed lines in each circle) in each OfficeServ domain are for SIP Station Mode, and external SIP interfaces that are connected to external SIP Servers are for SIP Trunk Mode.

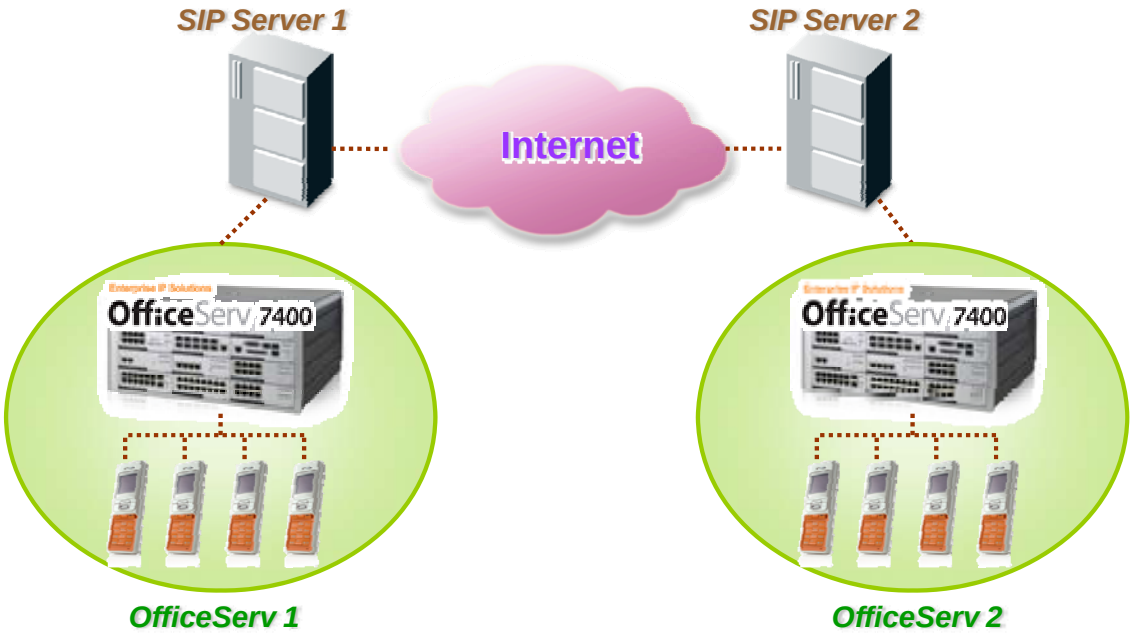

Figure 2. Overall Configuration for SIP Trunking mode and SIP Station mode

2. Registration

From SIP server's perspective, registration process has two meanings. One is to authenticate interacting SIP UAs, and the other is to locating SIP UAs. Though detailed registration processes may vary server to server, every server has to have those two mechanisms to provide VoIP services.

SIP registration can be compared to registering an email address. Let's take an example of sending and receiving an email through an email server. When you want to send an email to your friend, you and your friend should have an email address by which you can send and receive an email. As an email address needs to be registered to an email server, a SIP UAC has to be registered to SIP registrar. Therefore, registering a SIP UAC to a SIP registrar is like registering an email address to an email server. As in the case of email an address, a registered UAC has its own URI–typed address called AOR or 'Address of Record'. (i.e., sungwoo@samsung.com)

Unlike email an address, SIP UAC registration always comes with IP address to which SIP server can route SIP messages. This IP address is specified in the 'Contact' header in a SIP register message. In addition, each SIP registration has an expiration period for which its registration can be held valid. OfficeServ users can configure this expire time and it is set to 3600 seconds by default.

Finding a target UAC is done by the co-working of a SIP Proxy Server and Registrar. Once a SIP proxy has received a message from the sending UAC, it will consult a SIP registrar to discover the location of the target UAC. However, in many cases, the SIP proxy server and SIP registrar are implemented in a single SIP server. Therefore, in this document, we simply use a single term named 'SIP Server' to designate a server that has both registrar functions and proxy functions.

2.1. Registration Flow

A standard SIP registration procedure consists of 'Authentication' and 'Authorization'. Authentication is a UAC's request to a SIP server for its identity verification, and authorization is a SIP server's confirmation on the authentication. Authentication and authorization are handled on a request-by-request basis with a challenge/response mechanism between UAC and SIP server.

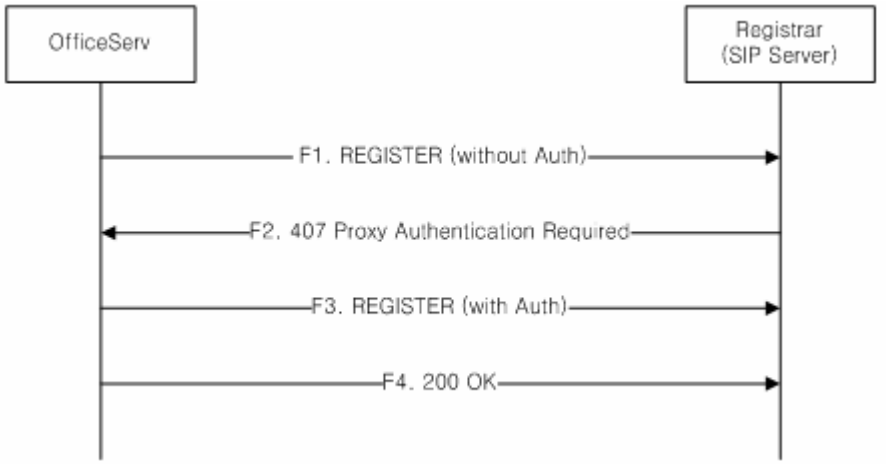

Figure 3. Register Flow

As shown in above call flow, SIP registration process goes through 4 steps.

i. UAC sends a Register message without authentication information.

ii. SIP server gives back 407 response having authorization information.

iii. Upon receiving a 407 response, UAC creates a Register message again which contains valid authentication information.

iv. SIP server authorizes UAC' s registration after confirming the authentication contained in the Register message.

2.2. Authentication and Authorization

Authentication and authorization are, in brief, about creating encryption value and confirming the value between UAC and SIP server. This encryption value can be made from the composition of a username, password and nonce value. While UAC and SIP server publicly share the pair of username and password, a nonce value is created only by SIP server side using internal nonce value generating algorithm, and can be known to UAC when a 401 response message is transmitted from SIP server.

After receiving a 401 response message, the UAC creates an encryption value, using username, password and nonce as encryption seeds, and assign it as a 'response' parameter in the authorization header in the subsequent REGISTER message. If this response parameter value matches with an encryption value created by the SIP server, the SIP server finally authorizes the UAC's registration. As both SIP server and UAC have the same encryption seed of username, password, and nonce, the encryption value contained in the authorization header should be identical to encryption value made by SIP server.

Among many authentication mechanisms for creating and confirming the encryption values, one of the most widely used is [2]MD5 digest algorithm. This algorithm originated from HTTP's web authentication, which is normally used in logon processes of many web sites. The detailed explanation for the MD5 digest algorithm is beyond the scope of this document.

Although authentication and authorization are generally carried on the normal registration flow in SIP, it is not always the case. That is, some SIP Servers may not require UAC's authentication and instead, they may have simpler ways of filtering out invalid registration messages. For example, they may check caller number; SIP Servers allow registrations with designated caller number only. Another example is that SIP Servers check the domain name field in the contact header in registration messages. More often than not, however, SIP Servers follow the recommended standard way of authentication and authorization procedure for security reasons.

2.3. Registration Types

There are two types of Registration. One is Trunk Registration and the other is Residential Registration. The former is much more widely used in industry and thus when we refer Registration, it means Trunk Registration. OfficeServ system supports both of these registration types and which to use is set using 'REG PER USER' option entry in MMC837 in OfficeServ

[2] By default, the OfficeServ system uses MD5 digest algorithm. In a 3GPP compatible environment, however, the OfficeServ system switches to AKA algorithm for authentication if 401 response from the SIP server requires the use of AKA authentication. Which algorithm to use is decided by SIP server

system; 'Disable' means Trunk Registration and 'Enable' means Residential Registration.

2.3.1. Trunk Registration

Trunk Registration means that the OfficeServ system does a single registration, whose credential data is shared by all the SIP connections between OfficeServ and an outbound SIP server.

2.3.2. Residential Registration

Residential Registration lets each individual user terminal attached to the OfficeServ have its own registration to a SIP server. This does not mean that each user terminal creates a registration message and directly sends it to the SIP server because many terminals other than 'Standard SIP terminals' can not make SIP register messages. So, the OfficeServ creates each SIP message using pre-assigned registration information, and does the SIP registration process on behalf of each end terminal.

2.3.3. SIP Trunking without Registration

Some SIP Servers do not require UA's registration at all. This type of server authenticates its interacting SIP UAs with their IP addresses and assigned usernames. That is, before starting interoperating with UA, SIP server administrator normally asks SIP UA's IP address and assigns predefined username, and stores the data somewhere in the server. This way, when any SIP message comes from the corresponding SIP UA, the SIP server checks the couple of source IP address and username and when matches with the data pre-stored in the server, it passes and rejects it otherwise.

Sending REGISTER message to a SIP server that does not require registration is meaningless and rather worsening network traffic, and thus it is always better not to send useless REGISTER message. When **leave USER NAME field in MMC837 blank**, **OfficeServ does not send REGISTER** message though SIP SERVER is enabled.

2.4. DNS Query

```
lo.  m  urc  estinatio  rotocc  Info
33 20 16: 165.21: DNS   Standard query SRV _sip._udp.samsung.com
34 20 16: 165.21: DNS   Standard query response SRV 10 100 80 proxy.samsung.com
35 20 16: 165.21: DNS   Standard query A proxy.samsung.com
36 20 16: 165.21: DNS   Standard query response A 165.213.66.93 A 165.213.66.94 A 165.213.66.95

⊞ Frame 36 (125 bytes on wire, 125 bytes captured)
⊞ Ethernet II, Src: SamsungE_93:d2:41 (00:00:f0:93:d2:41), Dst: HimejiAb_22:33:98 (00:0b:11:22:33:98)
⊞ Internet Protocol, Src: 165.213.66.93 (165.213.66.93), Dst: 165.213.66.132 (165.213.66.132)
⊞ User Datagram Protocol, Src Port: domain (53), Dst Port: 1024 (1024)
⊟ Domain Name System (response)
    Transaction ID: 0x0305
  ⊞ Flags: 0x8500 (Standard query response, No error)
    Questions: 1
    Answer RRs: 3
    Authority RRs: 0
    Additional RRs: 0
  ⊞ Queries
  ⊟ Answers
    ⊞ proxy.samsung.com: type A, class IN, addr 165.213.66.93
    ⊞ proxy.samsung.com: type A, class IN, addr 165.213.66.94
    ⊞ proxy.samsung.com: type A, class IN, addr 165.213.66.95
```

Figure 4. Capture of DNS Query By OfficeServ

OfficeServ is able to determine the location of the outbound SIP Server (registrar or proxy) based on the resolution of SRV and A queries. OfficeServ utilizes DNS servers specified in *DNS SERVER1* & DNS *SERVER2* fields to resolve SIP server names.

Above ethereal capture shows the example of how DNS query for a registrar or an outbound server is made using FQDN of 'samsung.com' from OfficeServ to a DNS server, and 3 IP addresses are fetched; '165.213.66.93', '165.213.66.94', and '165.213.66.95'.

2.5. Registration Example

2.5.1. OfficeServ MMC Settings

MMC837 SIP OPTIONS

ISP1
SIP SERVER: ENABLE
OUT PROXY: samsung.com
DNS SERVER1: 165.213.66.93
USER NAME: 82312794329
AUTH USER: 82312794329
AUTH PSWD: 1234
REG PER USR: DISABLE
TRK REG EXP: 001800

2.5.2. Message Samples

Reg F1

```
REGISTER sip:samsung.com:5060 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1dd38a8-8442d5a5-13c4-50017-48111d3d-
180f5e15-48111d3d
To: <sip:82312794329@samsung.com:5060>
Call-ID: 1dd907c-8442d5a5-13c4-50017-48111d3d-3488e341-48111d3d
CSeq: 1 REGISTER
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-48111d3d-82da38e6-4839db7a
Max-Forwards: 70
Supported: 100rel,replaces
Expires: 1800
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

Reg F2

```
SIP/2.0 407 Proxy Authentication Required
To: <sip:82312794329@samsung.com:5060>
From: <sip:82312794329@samsung.com:5060>;tag=1dd38a8-8442d5a5-13c4-50017-48111d3d-
180f5e15-48111d3d
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-48111d3d-82da38e6-4839db7a
CSeq: 1 REGISTER
Call-ID: 1dd907c-8442d5a5-13c4-50017-48111d3d-3488e341-48111d3d
Proxy-Authenticate: Digest
realm="165.213.66.93",qop="auth",algorithm="MD5",nonce="673d70c8cc47702469cf3aa94277c3df"
Content-Length: 0
```

Reg F3

```
REGISTER sip:samsung.com:5060 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1dd38a8-8442d5a5-13c4-50017-48111d3d-
180f5e15-48111d3d
To: <sip:82312794329@samsung.com:5060>
Call-ID: 1dd907c-8442d5a5-13c4-50017-48111d3d-3488e341-48111d3d
CSeq: 2 REGISTER
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-48111d3d-82da3922-72cae6b8
Max-Forwards: 70
Supported: 100rel,replaces
Expires: 1800
Proxy-Authorization: Digest
username="82312794329",realm="165.213.66.93",nonce="673d70c8cc47702469cf3aa94277c3df
",uri="sip:samsung.com:5060",response="5df531fe6bc866c82797449b4c1fa2ed",algorithm=MD5
,cnonce="82da3922",qop=auth,nc=00000001\r
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

Reg F4

```
SIP/2.0 200 OK
To: <sip:82312794329@samsung.com:5060>;tag=10322
From: <sip:82312794329@samsung.com:5060>;tag=1dd38a8-8442d5a5-13c4-50017-48111d3d-
180f5e15-48111d3d
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-48111d3d-82da3922-
72cae6b8
CSeq: 2 REGISTER
Call-ID: 1dd907c-8442d5a5-13c4-50017-48111d3d-3488e341-48111d3d
Contact: <sip:82312794329@165.213.66.132:5060>;expires=300
Content-Length: 0
```

3. SIP Trunking Services

This Chapter describes the detailed call scenarios involving the SIP service features in OfficeServ 7000 series system. There can be many different scenarios for each service depending on service types and thus, this document does not fully cover all the possible cases but some representative ones are listed for each category.

As mentioned in section 1.3 SIP trunking vs. SIP peering, OfficeServ MUST check its registration status first to start SIP trunking services except for the case that outbound SIP server does not require registration process. How to check the registration status is described in chapter 2 Registration.

3.1. Basic Call Setup

Following call flow shows a typical SIP outbound trunk messages transmitted between OfficeServ system and a SIP server.

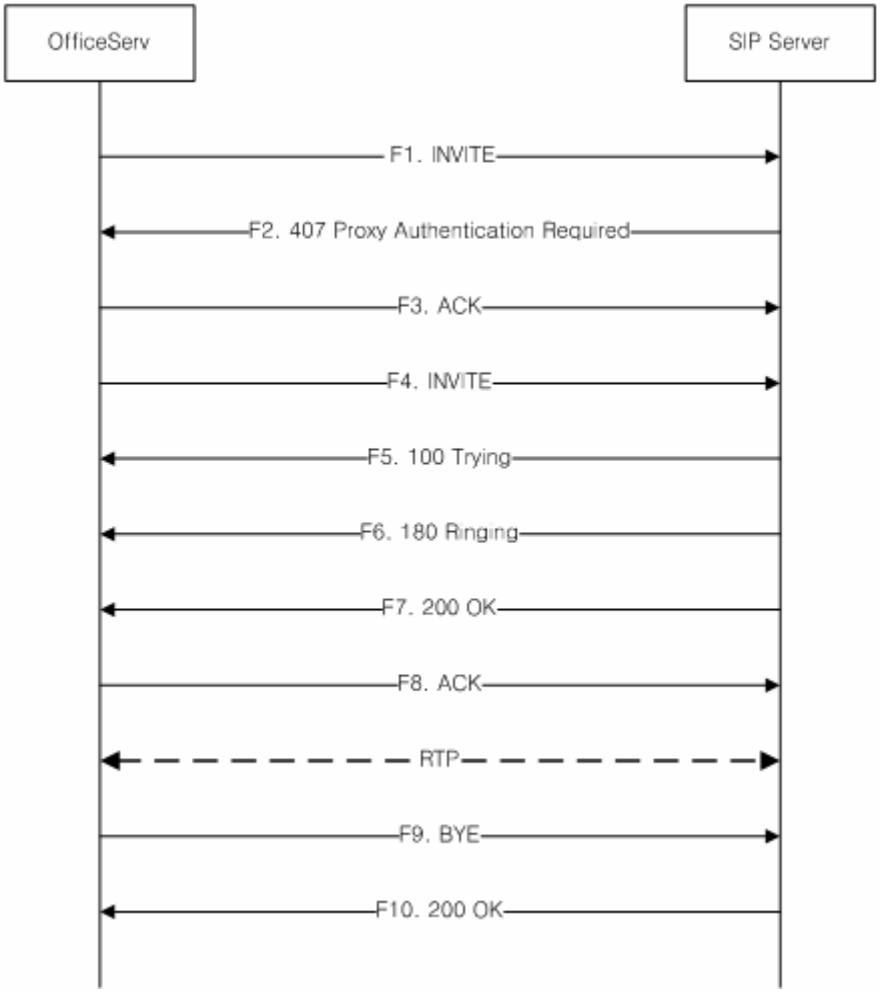

Figure 5. Basic Call Setup

3.1.1.Basic Call MMC Settings

MMC837 SIP OPTIONS

ISP1
SIP SERVER: *ENABLE*
OUT PROXY: *samsung.com*
DNS SERVER1: 165.213.66.93
USER NAME: *82312794329*
AUTH USER: *82312794329*
AUTH PSWD: *1234*
REG PER USR: *DISABLE*
TRK REG EXP: *001800*

Above MMC 837 settings are the same with the settings used in registration. Therefore, if you already completed registration, simply skip this.

MMC832 VOIP OUT DGT

(O:00)
ACCESS DGT: 82 (target destination prefix number)
INSERT DGT:
DGT LENGTH: 2
IP TABLE: 1
IP START: 0
SERVER USE: YES
URI TYPE: SIP

MMC832 table is used to decide the outbound destination of SIP messages from OfficeServ system. In the previous version of MP S/W, as long as SIP SERVER field in MMC837 is 'ENABLE' and registration is complete, OfficeServ sent all the SIP message to the outbound proxy server. But from v4.21, OfficeServ checks MMC832 table as well in order to decide the outbound address. Only when SERVER USE field is set to 'YES', OfficeServ sends the SIP message to the outbound server. Otherwise it sends to a designated IP address specified in MMC833 which is used in SIP peering mode. We discuss the usage of MMC833 in more detail in chapter 4 SIP Peering Services.

In the above example, ACCESS DGT specifies the digit '82' and DGT LENGTH is '2'. This setting filters out any outbound called number that starts with '82'. i.e., 8231203050.

MMC323 SEND CLIP NO

[201] SEND CLIP
1: 82312794329 (same username used for registration)

MMC323 table designates the mapping from an internal line number to a registered SIP username (caller ID).

MMC714 DID DIGIT

DID DIGIT (xxx)
DGT: *82312794329* (same username used for registration)
1: *201*

MMC714 table designates the mapping from registered SIP username (called ID) to an internal line number.

3.1.2.Message Samples

Inv F1

```
INVITE sip:82312793922@samsung.com:5060 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da7d78-8442d5a5-13c4-50017-48112aa8-
33cf5a99-48112aa8
To: <sip:82312793922@samsung.com:5060>
Call-ID: 1dad610-8442d5a5-13c4-50017-48112aa8-2323234b-48112aa8
CSeq: 1 INVITE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-48112aa8-830ea0fe-491d7077
Max-Forwards: 70
Supported: 100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Type: application/sdp
Content-Length: 255

v=0
o=SAMSUNG_SIP_GATEWAY 2198774014 0 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30012 RTP/AVP 18 4 8 101
a=rtpmap:18 G729/8000
a=rtpmap:4 G723/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Inv F2

```
SIP/2.0 407 Proxy Authentication Required
To: <sip:82312793922@samsung.com:5060>
From: <sip:82312794329@samsung.com:5060>;tag=1da7d78-8442d5a5-13c4-50017-48112aa8-
33cf5a99-48112aa8
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-48112aa8-830ea0fe-
491d7077
CSeq: 1 INVITE
Call-ID: 1dad610-8442d5a5-13c4-50017-48112aa8-2323234b-48112aa8
Proxy-Authenticate: Digest
realm="165.213.66.93",qop="auth",algorithm="MD5",nonce="4059336e99bde1e948ee5e5a6a82
45e3"
Content-Length: 0
```

Inv F3

```
ACK sip:82312793922@samsung.com:5060 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da7d78-8442d5a5-13c4-50017-48112aa8-
33cf5a99-48112aa8
To: <sip:82312793922@samsung.com:5060>
Call-ID: 1dad610-8442d5a5-13c4-50017-48112aa8-2323234b-48112aa8
CSeq: 1 ACK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-48112aa8-830ea0fe-491d7077
Max-Forwards: 70
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

Inv F4

```
INVITE sip:82312793922@samsung.com:5060 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da7d78-8442d5a5-13c4-50017-48112aa8-
33cf5a99-48112aa8
To: <sip:82312793922@samsung.com:5060>
Call-ID: 1dad610-8442d5a5-13c4-50017-48112aa8-2323234b-48112aa8
CSeq: 2 INVITE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-48112aa8-830ea130-13c28e0d
Max-Forwards: 70
Supported: 100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Proxy-Authorization: Digest
username="82312794329",realm="165.213.66.93",nonce="4059336e99bde1e948ee5e5a6a8245e
3",uri="sip:82312793922@samsung.com:5060",response="20d0c939567198e48b55c9e53c32b03c
",algorithm=MD5,cnonce="830ea130",qop=auth,n
Content-Type: application/sdp
Content-Length: 255

v=0
o=SAMSUNG_SIP_GATEWAY 2198774014 1 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30012 RTP/AVP 18 4 8 101
a=rtpmap:18 G729/8000
a=rtpmap:4 G723/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Inv F5

```
SIP/2.0 100 Trying
To: <sip:82312793922@samsung.com:5060>
From: <sip:82312794329@samsung.com:5060>;tag=1da7d78-8442d5a5-13c4-50017-48112aa8-
33cf5a99-48112aa8
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-48112aa8-830ea130-
13c28e0d
CSeq: 2 INVITE
Call-ID: 1dad610-8442d5a5-13c4-50017-48112aa8-2323234b-48112aa8
Server: ININ-samsung-k1o0rnf-21117695
Content-Length: 0
```

Inv F6

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-48112aa8-830ea130-
13c28e0d
Contact: <sip:82312793922@165.213.66.93:23554;rinstance=09b0c09f1dd41754>
To: <sip:82312793922@samsung.com:5060>;tag=5f2bc463
From: <sip:82312794329@samsung.com:5060>;tag=1da7d78-8442d5a5-13c4-50017-48112aa8-
33cf5a99-48112aa8
Call-ID: 1dad610-8442d5a5-13c4-50017-48112aa8-2323234b-48112aa8
CSeq: 2 INVITE
User-Agent: X-Lite release 1011s stamp 41150
Content-Length: 0
```

Inv F7

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-48112aa8-830ea130-
13c28e0d
Contact: <sip:82312793922@165.213.66.93:23554;rinstance=09b0c09f1dd41754>
To: <sip:82312793922@samsung.com:5060>;tag=5f2bc463
From: <sip:82312794329@samsung.com:5060>;tag=1da7d78-8442d5a5-13c4-50017-48112aa8-
33cf5a99-48112aa8
Call-ID: 1dad610-8442d5a5-13c4-50017-48112aa8-2323234b-48112aa8
CSeq: 2 INVITE
Allow: INVITE, ACK, CANCEL, OPTIONS, BYE, REFER, NOTIFY, MESSAGE, SUBSCRIBE, INFO
Content-Type: application/sdp
User-Agent: X-Lite release 1011s stamp 41150
Content-Length: 185

v=0
o=- 0 2 IN IP4 165.213.66.93
s=CounterPath X-Lite 3.0
c=IN IP4 165.213.66.93
t=0 0
m=audio 17832 RTP/AVP 8 101
a=fmtp:101 0-15
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Inv F8

```
ACK sip:82312793922@165.213.66.93:23554;rinstance=09b0c09f1dd41754 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da7d78-8442d5a5-13c4-50017-48112aa8-
33cf5a99-48112aa8
To: <sip:82312793922@samsung.com:5060>;tag=5f2bc463
Call-ID: 1dad610-8442d5a5-13c4-50017-48112aa8-2323234b-48112aa8
CSeq: 2 ACK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-48112aab-830ead42-938cbd5
Max-Forwards: 70
Contact: <sip:82312794329@165.213.66.132:5060>
Proxy-Authorization: Digest
username="82312794329",realm="165.213.66.93",nonce="4059336e99bde1e948ee5e5a6a8245e
3",uri="sip:82312793922@samsung.com:5060",response="20d0c939567198e48b55c9e53c32b03c
",algorithm=MD5,cnonce="830ea130",qop=auth,n
Content-Length: 0
```

Inv F9

```
BYE sip:82312793922@165.213.66.93:23554;rinstance=09b0c09f1dd41754 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da7d78-8442d5a5-13c4-50017-48112aa8-
33cf5a99-48112aa8
To: <sip:82312793922@samsung.com:5060>;tag=5f2bc463
Call-ID: 1dad610-8442d5a5-13c4-50017-48112aa8-2323234b-48112aa8
CSeq: 3 BYE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-48112aba-830ee97e-791801c3
Max-Forwards: 70
Supported: 100rel,replaces
Proxy-Authorization: Digest
username="82312794329",realm="165.213.66.93",nonce="4059336e99bde1e948ee5e5a6a8245e
3",uri="sip:82312793922@165.213.66.93:23554;rinstance=09b0c09f1dd41754",response="832b2e6
abc70863441055099cf103367",algorithm=MD
Content-Length: 0
```

Inv F10

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-48112aba-830ee97e-
791801c3
Contact: <sip:82312793922@165.213.66.93:23554;rinstance=09b0c09f1dd41754>
To: <sip:82312793922@samsung.com:5060>;tag=5f2bc463
From: <sip:82312794329@samsung.com:5060>;tag=1da7d78-8442d5a5-13c4-50017-48112aa8-
33cf5a99-48112aa8
Call-ID: 1dad610-8442d5a5-13c4-50017-48112aa8-2323234b-48112aa8
CSeq: 3 BYE
User-Agent: X-Lite release 1011s stamp 41150
Content-Length: 0
```

3.2. Hold & Resume

Hold and Resume are bases of all the other SIP supplementary services. As many SIP services consist of a combination of Hold and Resume functions, it is essential to understand the internal mechanism of them in order to understand the mechanisms of more complicated services.

According to the SIP standard, the Hold/Resume service can be implemented by either an UPDATE method or Re-INVITE method. The basic mechanism that lies in both of the two methods is the same although messages have different names. Currently the OfficeServ supports Re-INVITE message as its default Hold/Resume method. The Re-INVITE is a normal INVITE message except it is sent within an active session. By sending an INVITE message which contains different [3]SDP (Session Description Protocol) during a session, the SIP session mode can be switched to one of sendrecv, sendonly and recvonly according to the session mode attribute value designated in the SDP.

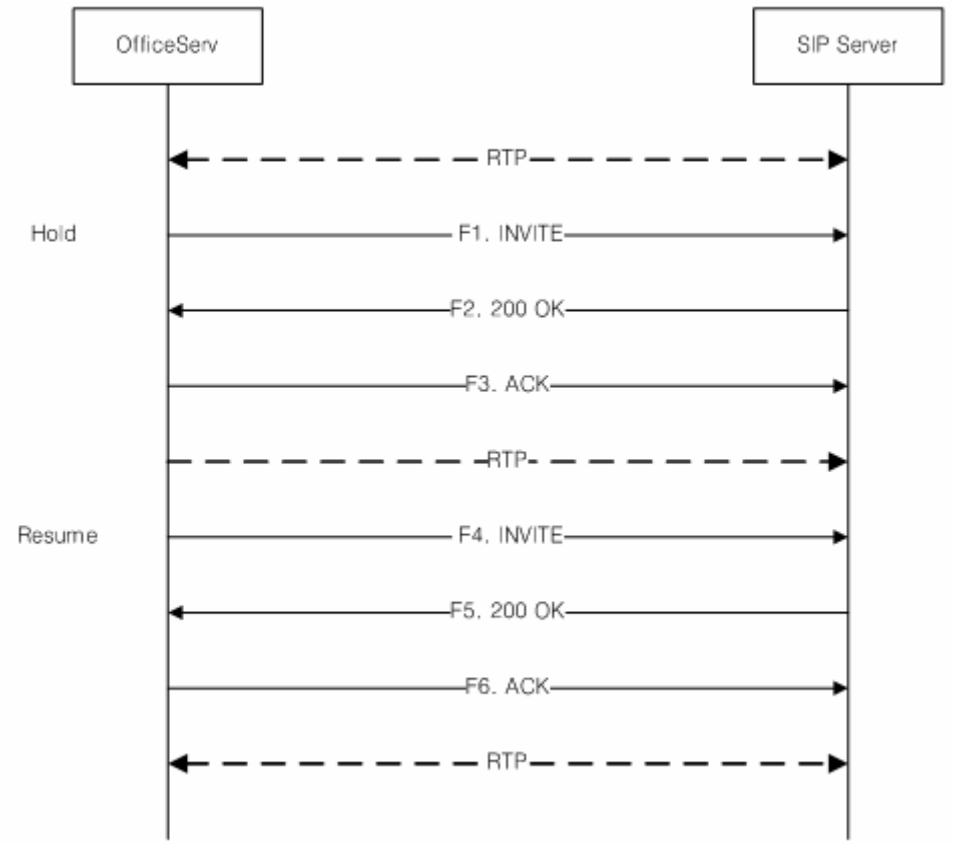

Figure 6. Hold and Resume

[3] SDP specifies the session attributes such as codec types, RTP port, RTP IP address etc. For more detailed information, please refer to RFC2327.

Hold F1

```
INVITE sip:82312793922@165.213.66.93:23554;rinstance=9c39f4fb86603c5e SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da8da0-8442d5a5-13c4-50017-48123208-
33639043-48123208
To: <sip:82312793922@samsung.com:5060>;tag=74757e1e
Call-ID: 1db8a88-8442d5a5-13c4-50017-48123208-5cd79b4d-48123208
CSeq: 3 INVITE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-48123211-8713936c-137dbf65
Max-Forwards: 70
Supported: 100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Proxy-Authorization: Digest
username="82312794329",realm="165.213.66.93",nonce="e6d451a0e7558d12317347ea5f24cd8
0",uri="sip:82312793922@165.213.66.93:23554;rinstance=9c39f4fb86603c5e",response="8e8cc30
372699fb57043ffec820dd2f7",algorithm=MD
Content-Type: application/sdp
Content-Length: 198

v=0
o=SAMSUNG_SIP_GATEWAY 2266198364 2 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 0.0.0.0
t=0 0
m=audio 30000 RTP/AVP 8 101
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendonly
```

Hold F2

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-48123211-8713936c-
137dbf65
Contact: <sip:82312793922@165.213.66.93:23554;rinstance=9c39f4fb86603c5e>
To: <sip:82312793922@samsung.com:5060>;tag=74757e1e
From: <sip:82312794329@samsung.com:5060>;tag=1da8da0-8442d5a5-13c4-50017-48123208-
33639043-48123208
Call-ID: 1db8a88-8442d5a5-13c4-50017-48123208-5cd79b4d-48123208
CSeq: 3 INVITE
Allow: INVITE, ACK, CANCEL, OPTIONS, BYE, REFER, NOTIFY, MESSAGE, SUBSCRIBE, INFO
Content-Type: application/sdp
User-Agent: X-Lite release 1011s stamp 41150
Content-Length: 185

v=0
o=- 4 3 IN IP4 165.213.66.93
s=CounterPath X-Lite 3.0
c=IN IP4 165.213.66.93
t=0 0
m=audio 17674 RTP/AVP 8 101
a=fmtp:101 0-15
a=recvonly
a=rtpmap:101 telephone-event/8000
```

Hold F3

```
ACK sip:82312793922@165.213.66.93:23554;rinstance=9c39f4fb86603c5e SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da8da0-8442d5a5-13c4-50017-48123208-
33639043-48123208
To: <sip:82312793922@samsung.com:5060>;tag=74757e1e
Call-ID: 1db8a88-8442d5a5-13c4-50017-48123208-5cd79b4d-48123208
CSeq: 3 ACK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-48123211-87139416-68c74f0d
Max-Forwards: 70
Contact: <sip:82312794329@165.213.66.132:5060>
Proxy-Authorization: Digest
username="82312794329",realm="165.213.66.93",nonce="e6d451a0e7558d12317347ea5f24cd8
0",uri="sip:82312793922@165.213.66.93:23554;rinstance=9c39f4fb86603c5e",response="8e8cc30
372699fb57043ffec820dd2f7",algorithm=MD
Content-Length: 0
```

Resume F4

```
INVITE sip:82312793922@165.213.66.93:23554;rinstance=9c39f4fb86603c5e SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da8da0-8442d5a5-13c4-50017-48123208-
33639043-48123208
To: <sip:82312793922@samsung.com:5060>;tag=74757e1e
Call-ID: 1db8a88-8442d5a5-13c4-50017-48123208-5cd79b4d-48123208
CSeq: 4 INVITE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-48123214-8713a172-27f7807b
Max-Forwards: 70
Supported: 100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Proxy-Authorization: Digest
username="82312794329",realm="165.213.66.93",nonce="e6d451a0e7558d12317347ea5f24cd8
0",uri="sip:82312793922@165.213.66.93:23554;rinstance=9c39f4fb86603c5e",response="096ab00
5bf073eb35c30e9b9a89f950d",algorithm=MD
Content-Type: application/sdp
Content-Length: 205

v=0
o=SAMSUNG_SIP_GATEWAY 2266198364 3 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30000 RTP/AVP 8 101
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Hold F5

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-48123214-8713a172-
27f7807b
Contact: <sip:82312793922@165.213.66.93:23554;rinstance=9c39f4fb86603c5e>
To: <sip:82312793922@samsung.com:5060>;tag=74757e1e
From: <sip:82312794329@samsung.com:5060>;tag=1da8da0-8442d5a5-13c4-50017-48123208-
33639043-48123208
Call-ID: 1db8a88-8442d5a5-13c4-50017-48123208-5cd79b4d-48123208
CSeq: 4 INVITE
Allow: INVITE, ACK, CANCEL, OPTIONS, BYE, REFER, NOTIFY, MESSAGE, SUBSCRIBE, INFO
Content-Type: application/sdp
User-Agent: X-Lite release 1011s stamp 41150
Content-Length: 185

v=0
o=- 4 4 IN IP4 165.213.66.93
s=CounterPath X-Lite 3.0
c=IN IP4 165.213.66.93
t=0 0
m=audio 17674 RTP/AVP 8 101
a=fmtp:101 0-15
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Hold F6

```
ACK sip:82312793922@165.213.66.93:23554;rinstance=9c39f4fb86603c5e SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da8da0-8442d5a5-13c4-50017-48123208-
33639043-48123208
To: <sip:82312793922@samsung.com:5060>;tag=74757e1e
Call-ID: 1db8a88-8442d5a5-13c4-50017-48123208-5cd79b4d-48123208
CSeq: 4 ACK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-48123215-8713a208-54281d40
Max-Forwards: 70
Contact: <sip:82312794329@165.213.66.132:5060>
Proxy-Authorization: Digest
username="82312794329",realm="165.213.66.93",nonce="e6d451a0e7558d12317347ea5f24cd8
0",uri="sip:82312793922@165.213.66.93:23554;rinstance=9c39f4fb86603c5e",response="096ab00
5bf073eb35c30e9b9a89f950d",algorithm=MD
Content-Length: 0
```

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-48123211-8713936c-
137dbf65
Contact: <sip:82312793922@165.213.66.93:23554;rinstance=9c39f4fb86603c5e>
To: <sip:82312793922@samsung.com:5060>;tag=74757e1e
From: <sip:82312794329@samsung.com:5060>;tag=1da8da0-8442d5a5-13c4-50017-48123208-
33639043-48123208
Call-ID: 1db8a88-8442d5a5-13c4-50017-48123208-5cd79b4d-48123208
CSeq: 3 INVITE
Allow: INVITE, ACK, CANCEL, OPTIONS, BYE, REFER, NOTIFY, MESSAGE, SUBSCRIBE, INFO
Content-Type: application/sdp
User-Agent: X-Lite release 1011s stamp 41150
Content-Length: 185

v=0
o=- 4 3 IN IP4 165.213.66.93
s=CounterPath X-Lite 3.0
c=IN IP4 165.213.66.93
t=0 0
m=audio 17674 RTP/AVP 8 101
a=fmtp:101 0-15
a=recvonly
a=rtpmap:101 telephone-event/8000
```

In a normal dialogue state, the active session mode is sendrecv which allows both way RTP transmissions. When a Re-INVITE message is sent which designates its RTP transmission to sendonly mode, it informs the called party that it wants to only send RTP and will not receive. After receiving the Re-Invite message, the called party knows that the caller wants to put the session into hold mode and stops sending RTP packets, giving a 200 OK response back. The 200 OK response, like the Re-Invite message, contains a SDP and its session mode attribute is set to recvonly. Meanwhile, the caller can either provide music-on-hold or mute the session by sending no RTP at all, shutting down its listening port. Whether to send MOH or not during the hold time is station dependent. To resume the held session, the caller sends a Re-INVITE message again designating the RTP transmission back to sendrecv.

Remember that only the caller can resume the held session, which means that even if the called party sends a Re-INVITE message specifying sendrecv, the session will remain on hold and caller's mode will not change.

3.2.1.Another way of specifying sendonly mode

Some SIP UAs use another, slightly older way of specifying the sendonly mode in its Re-INVITE message. It sets the connection parameter value in the SDP to all zeros, which tells the message receiver (the called party in this context) not to send any RTP packets because there is no destination IP address to which it can send RTP packets to. The OfficeServ supports this connection-allzero-specified hold method for backward compatibility purpose.

3.3. Transfer

3.3.1. Consultation Transfer

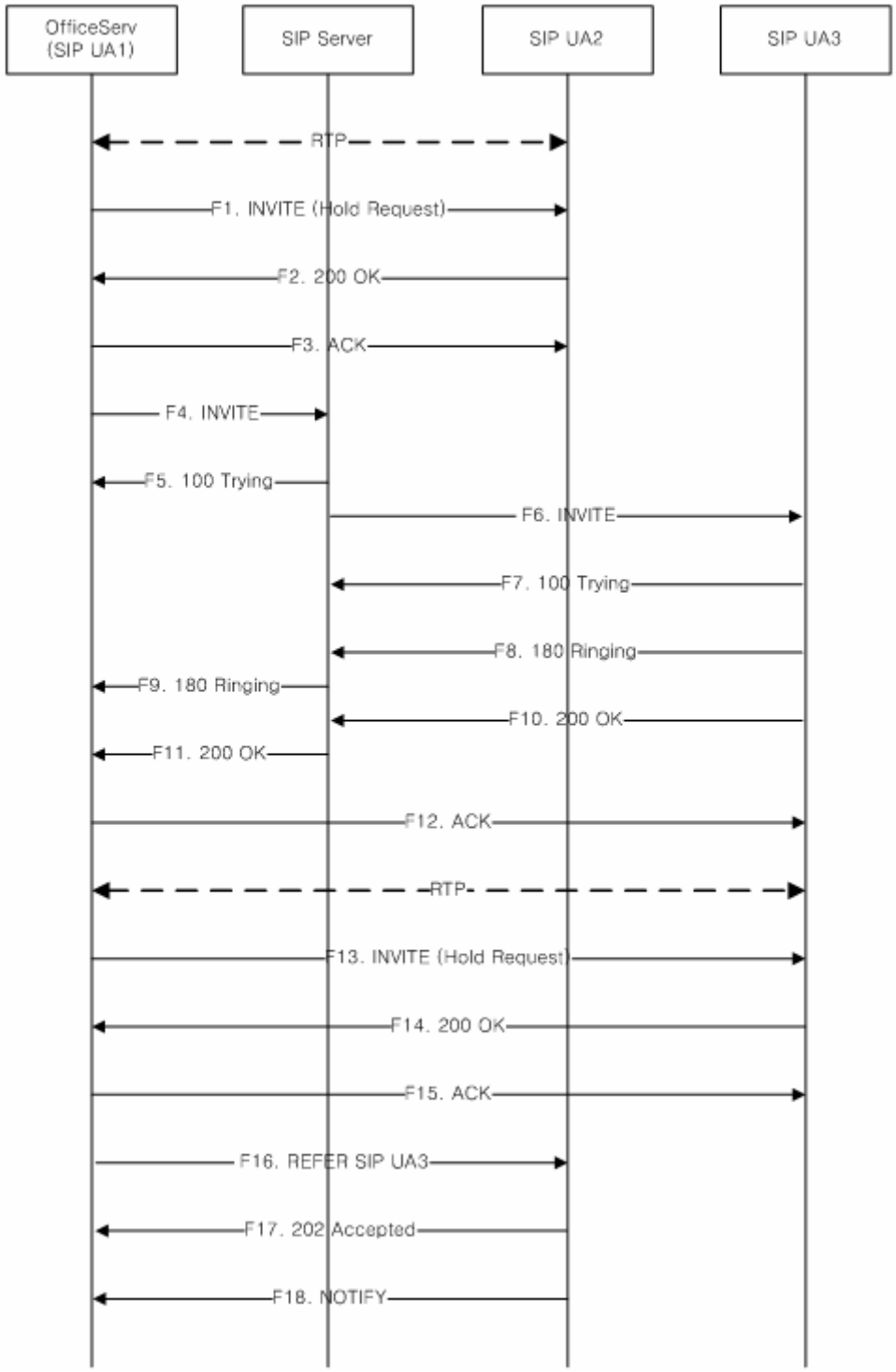

Figure 7. Consultation Transfer #1

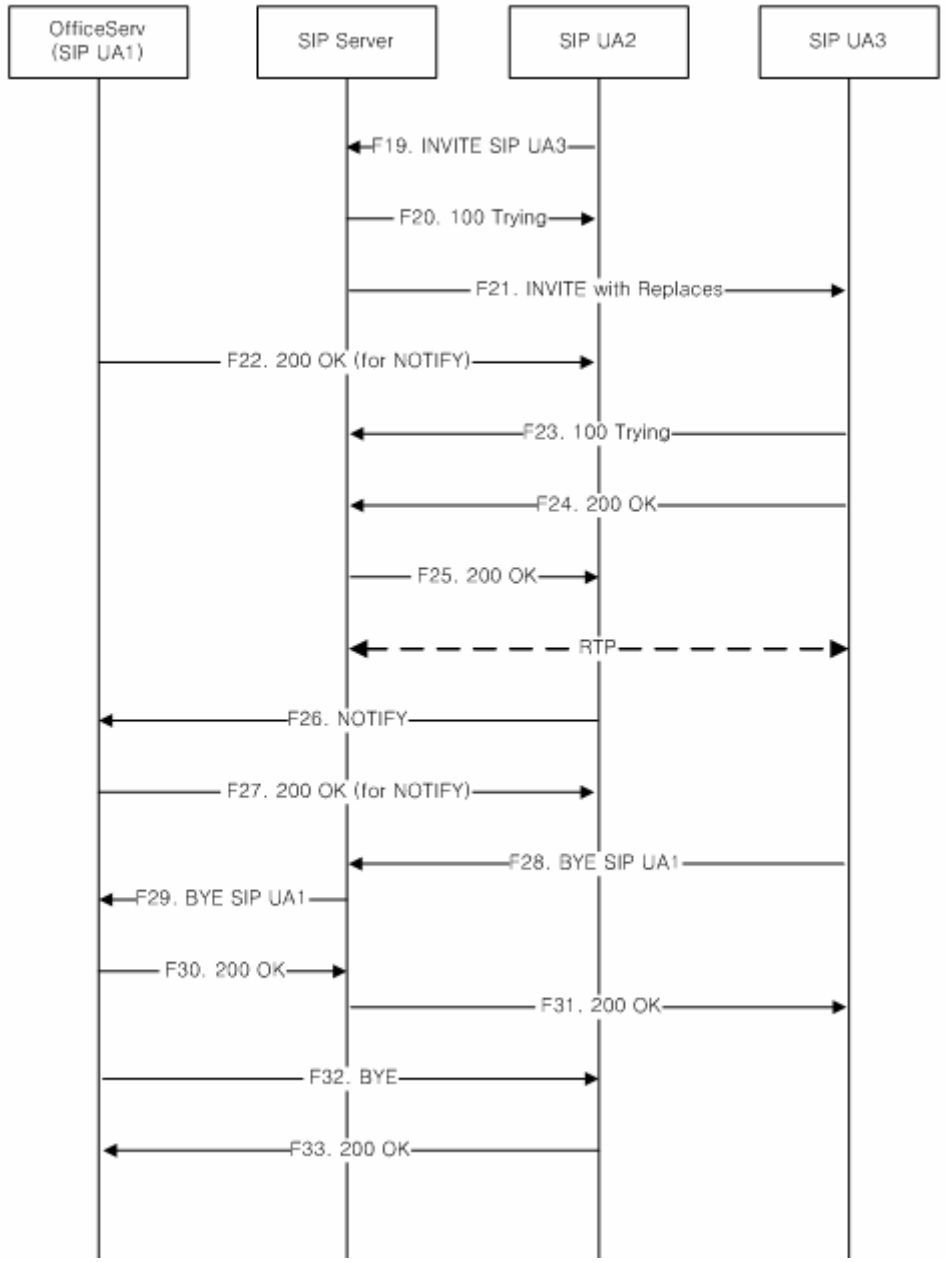

Figure 8. Consultation Transfer #2

Cons_Xfer F1

```
INVITE sip:82312793922@165.213.66.94:35925;rinstance=bbe52bb8ca87498e SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da74a8-8442d5a5-13c4-50017-4812cf15-
53ca178a-4812cf15
To: <sip:82312793922@samsung.com:5060>;tag=5362901f
Call-ID: 1dad2a0-8442d5a5-13c4-50017-4812cf15-5b4c6c24-4812cf15
CSeq: 2 INVITE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-4812cf27-897933c8-761d0576
Max-Forwards: 70
Supported: 100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Type: application/sdp
Content-Length: 198

v=0
o=SAMSUNG_SIP_GATEWAY 2306403644 1 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 0.0.0.0
t=0 0
m=audio 30008 RTP/AVP 8 101
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendonly
```

Cons_Xfer F2

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-4812cf27-897933c8-
761d0576
Contact: <sip:82312793922@165.213.66.94:35925;rinstance=bbe52bb8ca87498e>
To: <sip:82312793922@samsung.com:5060>;tag=5362901f
From: <sip:82312794329@samsung.com:5060>;tag=1da74a8-8442d5a5-13c4-50017-4812cf15-
53ca178a-4812cf15
Call-ID: 1dad2a0-8442d5a5-13c4-50017-4812cf15-5b4c6c24-4812cf15
CSeq: 2 INVITE
Allow: INVITE, ACK, CANCEL, OPTIONS, BYE, REFER, NOTIFY, MESSAGE, SUBSCRIBE, INFO
Content-Type: application/sdp
User-Agent: X-Lite release 1011s stamp 41150
Content-Length: 185

v=0
o=- 8 3 IN IP4 165.213.66.94
s=CounterPath X-Lite 3.0
c=IN IP4 165.213.66.94
t=0 0
m=audio 40356 RTP/AVP 8 101
a=fmtp:101 0-15
a=recvonly
a=rtpmap:101 telephone-event/8000
```

Cons_Xfer F3

```
ACK sip:82312793922@165.213.66.94:35925;rinstance=bbe52bb8ca87498e SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da74a8-8442d5a5-13c4-50017-4812cf15-
53ca178a-4812cf15
To: <sip:82312793922@samsung.com:5060>;tag=5362901f
Call-ID: 1dad2a0-8442d5a5-13c4-50017-4812cf15-5b4c6c24-4812cf15
CSeq: 2 ACK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-4812cf28-89793454-51255512
Max-Forwards: 70
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

Cons_Xfer F4

```
INVITE sip:82312794630@samsung.com:5060 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da7798-8442d5a5-13c4-50017-4812cf2e-
59ae96c3-4812cf2e
To: <sip:82312794630@samsung.com:5060>
Call-ID: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e
CSeq: 1 INVITE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-4812cf2e-89794f0c-1ffada59
Max-Forwards: 70
Supported: 100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Type: application/sdp
Content-Length: 255

v=0
o=SAMSUNG_SIP_GATEWAY 2306428684 0 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30010 RTP/AVP 18 4 8 101
a=rtpmap:18 G729/8000
a=rtpmap:4 G723/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Cons_Xfer F5

```
SIP/2.0 100 Trying
To: <sip:82312794630@samsung.com:5060>
From: <sip:82312794329@samsung.com:5060>;tag=1da7798-8442d5a5-13c4-50017-4812cf2e-
59ae96c3-4812cf2e
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-4812cf2e-89794f0c-1ffada59
CSeq: 1 INVITE
Call-ID: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e
Server: ININ-samsung-k1o0rnf-21119919
Content-Length: 0
```

Cons_Xfer F6

```
INVITE sip:82312794630@165.213.66.56:5060 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da7798-8442d5a5-13c4-50017-4812cf2e-
59ae96c3-4812cf2e
To: <sip:82312794630@samsung.com:5060>
Call-ID: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e
CSeq: 1 INVITE
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk32d96b6ac39e1c59db0fbef76, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-4812cf2e-89794f0c-1ffada59
Max-Forwards: 69
Supported: 100rel, replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Type: application/sdp
Content-Length: 255

v=0
o=SAMSUNG_SIP_GATEWAY 2306428684 0 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30010 RTP/AVP 18 4 8 101
a=rtpmap:18 G729/8000
a=rtpmap:4 G723/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Cons_Xfer F7

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk32d96b6ac39e1c59db0fbef76, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-4812cf2e-89794f0c-1ffada59
From: <sip:82312794329@samsung.com:5060>;tag=1da7798-8442d5a5-13c4-50017-4812cf2e-
59ae96c3-4812cf2e
To: <sip:82312794630@samsung.com:5060>
Call-ID: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e
Date: Tue, 29 Apr 2008 11:19:13 GMT
CSeq: 1 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Content-Length: 0
```

Cons_Xfer F8

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk32d96b6ac39e1c59db0fbef76, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-4812cf2e-89794f0c-1ffada59
From: <sip:82312794329@samsung.com:5060>;tag=1da7798-8442d5a5-13c4-50017-4812cf2e-
59ae96c3-4812cf2e
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d4005749c9b6e0-046b20b9
Call-ID: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e
Date: Tue, 29 Apr 2008 11:19:13 GMT
CSeq: 1 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Content-Length: 0
```

Cons_Xfer F9

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-4812cf2e-89794f0c-1ffada59
From: <sip:82312794329@samsung.com:5060>;tag=1da7798-8442d5a5-13c4-50017-4812cf2e-
59ae96c3-4812cf2e
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d4005749c9b6e0-046b20b9
Call-ID: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e
Date: Tue, 29 Apr 2008 11:19:13 GMT
CSeq: 1 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Allow: ACK, BYE, CANCEL, INVITE, NOTIFY, OPTIONS, REFER, REGISTER, UPDATE
Content-Length: 0
```

Cons_Xfer F10

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk32d96b6ac39e1c59db0fbef76, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-4812cf2e-89794f0c-1ffada59
From: <sip:82312794329@samsung.com:5060>;tag=1da7798-8442d5a5-13c4-50017-4812cf2e-
59ae96c3-4812cf2e
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d4005749c9b6e0-046b20b9
Call-ID: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e
Date: Tue, 29 Apr 2008 11:19:14 GMT
CSeq: 1 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Supported: replaces,join,norefersub
Content-Length: 207
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 19103 0 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 29160 RTP/AVP 8 101
c=IN IP4 165.213.66.56
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv
```

Cons_Xfer F11

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-4812cf2e-89794f0c-1ffada59
From: <sip:82312794329@samsung.com:5060>;tag=1da7798-8442d5a5-13c4-50017-4812cf2e-
59ae96c3-4812cf2e
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d4005749c9b6e0-046b20b9
Call-ID: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e
Date: Tue, 29 Apr 2008 11:19:14 GMT
CSeq: 1 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Allow: ACK, BYE, CANCEL, INVITE, NOTIFY, OPTIONS, REFER, REGISTER, UPDATE
Supported: replaces, join, norefersub
Content-Length: 207
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 19103 0 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 29160 RTP/AVP 8 101
c=IN IP4 165.213.66.56
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv
```

Cons_Xfer F12

```
ACK sip:82312794630@165.213.66.56:5060;transport=udp SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da7798-8442d5a5-13c4-50017-4812cf2e-
59ae96c3-4812cf2e
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d4005749c9b6e0-046b20b9
Call-ID: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e
CSeq: 1 ACK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-4812cf30-89795574-462a8d91
Max-Forwards: 70
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

Cons_Xfer F13

```
INVITE sip:82312794630@165.213.66.56:5060;transport=udp SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da7798-8442d5a5-13c4-50017-4812cf2e-
59ae96c3-4812cf2e
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d4005749c9b6e0-046b20b9
Call-ID: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e
CSeq: 2 INVITE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-4812cf34-897964f6-46aa233f
Max-Forwards: 70
Supported: 100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Type: application/sdp
Content-Length: 198

v=0
o=SAMSUNG_SIP_GATEWAY 2306428684 1 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 0.0.0.0
t=0 0
m=audio 30010 RTP/AVP 8 101
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendonly
```

Cons_Xfer F14

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-4812cf34-897964f6-46aa233f
From: <sip:82312794329@samsung.com:5060>;tag=1da7798-8442d5a5-13c4-50017-4812cf2e-
59ae96c3-4812cf2e
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d4005749c9b6e0-046b20b9
Call-ID: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e
Date: Tue, 29 Apr 2008 11:19:18 GMT
CSeq: 2 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Supported: replaces,join,norefersub
Content-Length: 207
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 19103 1 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 29160 RTP/AVP 8 101
c=IN IP4 165.213.66.56
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=inactive
```

Cons_Xfer F15

```
ACK sip:82312794630@165.213.66.56:5060;transport=udp SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da7798-8442d5a5-13c4-50017-4812cf2e-
59ae96c3-4812cf2e
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d4005749c9b6e0-046b20b9
Call-ID: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e
CSeq: 2 ACK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-4812cf34-89796622-7d83433b
Max-Forwards: 70
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

Cons_Xfer F16

```
REFER sip:82312793922@165.213.66.94:35925;rinstance=bbe52bb8ca87498e SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da74a8-8442d5a5-13c4-50017-4812cf15-
53ca178a-4812cf15
To: <sip:82312793922@samsung.com:5060>;tag=5362901f
Call-ID: 1dad2a0-8442d5a5-13c4-50017-4812cf15-5b4c6c24-4812cf15
CSeq: 3 REFER
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-4812cf34-89796528-2cb90d9b
Refer-To: <sip:82312794630@samsung.com:5060?replaces=1dad458-8442d5a5-13c4-50017-
4812cf2e-22010d5-4812cf2e%3Bto-tag%3D00141ca537d4005749c9b6e0-046b20b9%3Bfrom-
tag%3D1da7798-8442d5a5-13c4-50017-4812cf2e-59ae96c3-4812cf2e>
Referred-By: <sip:82312794329@samsung.com>
Max-Forwards: 70
Supported: 100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

Cons_Xfer F17

```
SIP/2.0 202 Accepted
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-4812cf34-89796528-
2cb90d9b
Contact: <sip:82312793922@165.213.66.94:35925;rinstance=bbe52bb8ca87498e>
To: <sip:82312793922@samsung.com:5060>;tag=5362901f
From: <sip:82312794329@samsung.com:5060>;tag=1da74a8-8442d5a5-13c4-50017-4812cf15-
53ca178a-4812cf15
Call-ID: 1dad2a0-8442d5a5-13c4-50017-4812cf15-5b4c6c24-4812cf15
CSeq: 3 REFER
Expires: 60
User-Agent: X-Lite release 1011s stamp 41150
Content-Length: 0
```

Cons_Xfer F18

```
NOTIFY sip:82312794329@165.213.66.132:5060 SIP/2.0
Via: SIP/2.0/UDP 165.213.66.94:35925;branch=z9hG4bK-d87543-022ef3211751ed2e-1--d87543-
;rport
Max-Forwards: 70
Contact: <sip:82312793922@165.213.66.94:35925;rinstance=bbe52bb8ca87498e>
To: <sip:82312794329@samsung.com:5060>;tag=1da74a8-8442d5a5-13c4-50017-4812cf15-
53ca178a-4812cf15
From: <sip:82312793922@samsung.com:5060>;tag=5362901f
Call-ID: 1dad2a0-8442d5a5-13c4-50017-4812cf15-5b4c6c24-4812cf15
CSeq: 2 NOTIFY
Content-Type: message/sipfrag
User-Agent: X-Lite release 1011s stamp 41150
Subscription-State: active;expires=56
Event: refer
Content-Length: 22
```

Cons_Xfer F19

```
INVITE sip:82312794630@samsung.com:5060 SIP/2.0
Via: SIP/2.0/UDP 165.213.66.94:35925;branch=z9hG4bK-d87543-600a501a2a61d867-1--d87543-
;rport
Max-Forwards: 70
Contact: <sip:82312793922@165.213.66.94:35925>
To: <sip:82312794630@samsung.com:5060>
From: "82312793922"<sip:82312793922@samsung.com>;tag=4c6c4a7f
Call-ID: YThiZjlzYTlmOTdkM2RkZTc3ZDdkNjhmYWI3ZDJlN2E.
CSeq: 1 INVITE
Allow: INVITE, ACK, CANCEL, OPTIONS, BYE, REFER, NOTIFY, MESSAGE, SUBSCRIBE, INFO
Content-Type: application/sdp
User-Agent: X-Lite release 1011s stamp 41150
Referred-By: <sip:82312794329@samsung.com>
Replaces: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e;to-
tag=00141ca537d4005749c9b6e0-046b20b9;from-tag=1da7798-8442d5a5-13c4-50017-
4812cf2e-59ae96c3-4812cf2e
Content-Length: 423

v=0
o=- 4 2 IN IP4 165.213.66.94
s=CounterPath X-Lite 3.0
c=IN IP4 165.213.66.94
t=0 0
m=audio 58466 RTP/AVP 107 119 100 106 0 105 98 8 101
a=alt:1 1 : 4nKLQGQu qvGEv654 165.213.66.94 58466
a=fmtp:101 0-15
a=rtpmap:107 BV32/16000
a=rtpmap:119 BV32-FEC/16000
a=rtpmap:100 SPEEX/16000
a=rtpmap:106 SPEEX-FEC/16000
a=rtpmap:105 SPEEX-FEC/8000
a=rtpmap:98 iLBC/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Cons_Xfer F20

```
SIP/2.0 100 Trying
To: <sip:82312794630@samsung.com:5060>
From: "82312793922" <sip:82312793922@samsung.com>;tag=4c6c4a7f
Via: SIP/2.0/UDP 165.213.66.94:35925;branch=z9hG4bK-d87543-600a501a2a61d867-1--d87543-
;rport=35925
CSeq: 1 INVITE
Call-ID: YThiZjlzYTlmOTdkM2RkZTc3ZDdkNjhmYWI3ZDJlN2E.
Server: ININ-samsung-k1o0rnf-21119919
Content-Length: 0
```

Cons_Xfer F21

```
INVITE sip:82312794630@165.213.66.56:5060 SIP/2.0
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk0d899cacc69019481eed90b4c, SIP/2.0/UDP
165.213.66.94:35925;rport=35925;branch=z9hG4bK-d87543-600a501a2a61d867-1--d87543-
Max-Forwards: 69
Contact: <sip:82312793922@165.213.66.94:35925>
To: <sip:82312794630@samsung.com:5060>
From: "82312793922" <sip:82312793922@samsung.com>;tag=4c6c4a7f
Call-ID: YThiZjlzYTlmOTdkM2RkZTc3ZDdkNjhmYWI3ZDJlN2E.
CSeq: 1 INVITE
Allow: INVITE, ACK, CANCEL, OPTIONS, BYE, REFER, NOTIFY, MESSAGE, SUBSCRIBE, INFO
Content-Type: application/sdp
User-Agent: X-Lite release 1011s stamp 41150
Referred-By: <sip:82312794329@samsung.com>
Replaces: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e;to-
tag=00141ca537d4005749c9b6e0-046b20b9;from-tag=1da7798-8442d5a5-13c4-50017-
4812cf2e-59ae96c3-4812cf2e
Content-Length: 423

v=0
o=- 4 2 IN IP4 165.213.66.94
s=CounterPath X-Lite 3.0
c=IN IP4 165.213.66.94
t=0 0
m=audio 58466 RTP/AVP 107 119 100 106 0 105 98 8 101
a=alt:1 1 : 4nKLQGQu qvGEv654 165.213.66.94 58466
a=fmtp:101 0-15
a=rtpmap:107 BV32/16000
a=rtpmap:119 BV32-FEC/16000
a=rtpmap:100 SPEEX/16000
a=rtpmap:106 SPEEX-FEC/16000
a=rtpmap:105 SPEEX-FEC/8000
a=rtpmap:98 iLBC/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Cons_Xfer F22

```
SIP/2.0 200 OK
From: <sip:82312793922@samsung.com:5060>;tag=5362901f
To: <sip:82312794329@samsung.com:5060>;tag=1da74a8-8442d5a5-13c4-50017-4812cf15-
53ca178a-4812cf15
Call-ID: 1dad2a0-8442d5a5-13c4-50017-4812cf15-5b4c6c24-4812cf15
CSeq: 2 NOTIFY
Via: SIP/2.0/UDP 165.213.66.94:35925;rport=35925;branch=z9hG4bK-d87543-022ef3211751ed2e-
1--d87543-
Supported: 100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

Cons_Xfer F23

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk0d899cacc69019481eed90b4c, SIP/2.0/UDP
165.213.66.94:35925;rport=35925;branch=z9hG4bK-d87543-600a501a2a61d867-1--d87543-
From: "82312793922" <sip:82312793922@samsung.com>;tag=4c6c4a7f
To: <sip:82312794630@samsung.com:5060>
Call-ID: YThiZjlzYTlmOTdkM2RkZTc3ZDdkNjhmYWI3ZDJlN2E.
Date: Tue, 29 Apr 2008 11:19:22 GMT
CSeq: 1 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Content-Length: 0
```

Cons_Xfer F24

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk0d899cacc69019481eed90b4c, SIP/2.0/UDP
165.213.66.94:35925;rport=35925;branch=z9hG4bK-d87543-600a501a2a61d867-1--d87543-
From: "82312793922" <sip:82312793922@samsung.com>;tag=4c6c4a7f
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d400580fa5f094-12127f11
Call-ID: YThiZjlzYTlmOTdkM2RkZTc3ZDdkNjhmYWI3ZDJlN2E.
Date: Tue, 29 Apr 2008 11:19:23 GMT
CSeq: 1 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Supported: replaces,join,norefersub
Content-Length: 206
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 2021 0 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 31716 RTP/AVP 0 101
c=IN IP4 165.213.66.56
a=rtpmap:0 PCMU/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv
```

Cons_Xfer F25

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.94:35925;rport=35925;branch=z9hG4bK-d87543-
600a501a2a61d867-1--d87543-
From: "82312793922" <sip:82312793922@samsung.com>;tag=4c6c4a7f
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d400580fa5f094-12127f11
Call-ID: YThiZjlzYTlmOTdkM2RkZTc3ZDdkNjhmYWI3ZDJlN2E.
Date: Tue, 29 Apr 2008 11:19:23 GMT
CSeq: 1 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Allow: ACK, BYE, CANCEL, INVITE, NOTIFY, OPTIONS, REFER, REGISTER, UPDATE
Supported: replaces, join, norefersub
Content-Length: 206
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 2021 0 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 31716 RTP/AVP 0 101
c=IN IP4 165.213.66.56
a=rtpmap:0 PCMU/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv
```

Cons_Xfer F26

```
NOTIFY sip:82312794329@165.213.66.132:5060 SIP/2.0
Via: SIP/2.0/UDP 165.213.66.94:35925;branch=z9hG4bK-d87543-84315f3df71c2826-1--d87543-
;rport
Max-Forwards: 70
Contact: <sip:82312793922@165.213.66.94:35925;rinstance=bbe52bb8ca87498e>
To: <sip:82312794329@samsung.com:5060>;tag=1da74a8-8442d5a5-13c4-50017-4812cf15-
53ca178a-4812cf15
From: <sip:82312793922@samsung.com:5060>;tag=5362901f
Call-ID: 1dad2a0-8442d5a5-13c4-50017-4812cf15-5b4c6c24-4812cf15
CSeq: 3 NOTIFY
Content-Type: message/sipfrag
User-Agent: X-Lite release 1011s stamp 41150
Subscription-State: terminated;reason=noResource
Event: refer
Content-Length: 18
```

Cons_Xfer F27

```
SIP/2.0 200 OK
From: <sip:82312793922@samsung.com:5060>;tag=5362901f
To: <sip:82312794329@samsung.com:5060>;tag=1da74a8-8442d5a5-13c4-50017-4812cf15-
53ca178a-4812cf15
Call-ID: 1dad2a0-8442d5a5-13c4-50017-4812cf15-5b4c6c24-4812cf15
CSeq: 3 NOTIFY
Via: SIP/2.0/UDP 165.213.66.94:35925;rport=35925;branch=z9hG4bK-d87543-84315f3df71c2826-
1--d87543-
Supported: 100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

Cons_Xfer F28

```
BYE sip:82312794329@165.213.66.132:5060 SIP/2.0
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK77330deb
From: <sip:82312794630@samsung.com:5060>;tag=00141ca537d4005749c9b6e0-046b20b9
To: <sip:82312794329@samsung.com:5060>;tag=1da7798-8442d5a5-13c4-50017-4812cf2e-
59ae96c3-4812cf2e
Call-ID: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e
Max-Forwards: 70
Date: Tue, 29 Apr 2008 11:19:23 GMT
CSeq: 101 BYE
User-Agent: Cisco-CP7960G/8.0
Content-Length: 0
```

Cons_Xfer F29

```
BYE sip:82312794329@165.213.66.132:5060 SIP/2.0
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bkad2bb3d29dd6764738530c3f6, SIP/2.0/UDP
165.213.66.56:5060;branch=z9hG4bK77330deb
From: <sip:82312794630@samsung.com:5060>;tag=00141ca537d4005749c9b6e0-046b20b9
To: <sip:82312794329@samsung.com:5060>;tag=1da7798-8442d5a5-13c4-50017-4812cf2e-
59ae96c3-4812cf2e
Call-ID: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e
Max-Forwards: 69
Date: Tue, 29 Apr 2008 11:19:23 GMT
CSeq: 101 BYE
User-Agent: Cisco-CP7960G/8.0
Content-Length: 0
```

Cons_Xfer F30

```
SIP/2.0 200 OK
From: <sip:82312794630@samsung.com:5060>;tag=00141ca537d4005749c9b6e0-046b20b9
To: <sip:82312794329@samsung.com:5060>;tag=1da7798-8442d5a5-13c4-50017-4812cf2e-
59ae96c3-4812cf2e
Call-ID: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e
CSeq: 101 BYE
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bkad2bb3d29dd6764738530c3f6
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK77330deb
Supported: 100rel,replaces
Content-Length: 0
```

Cons_Xfer F31

```
SIP/2.0 200 OK
From: <sip:82312794630@samsung.com:5060>;tag=00141ca537d4005749c9b6e0-046b20b9
To: <sip:82312794329@samsung.com:5060>;tag=1da7798-8442d5a5-13c4-50017-4812cf2e-
59ae96c3-4812cf2e
Call-ID: 1dad458-8442d5a5-13c4-50017-4812cf2e-22010d5-4812cf2e
CSeq: 101 BYE
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK77330deb
Supported: 100rel, replaces
Content-Length: 0
```

Cons_Xfer F32

```
BYE sip:82312793922@165.213.66.94:35925;rinstance=bbe52bb8ca87498e SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da74a8-8442d5a5-13c4-50017-4812cf15-
53ca178a-4812cf15
To: <sip:82312793922@samsung.com:5060>;tag=5362901f
Call-ID: 1dad2a0-8442d5a5-13c4-50017-4812cf15-5b4c6c24-4812cf15
CSeq: 4 BYE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-4812cf39-89797860-151f6133
Max-Forwards: 70
Supported: 100rel,replaces
Content-Length: 0
```

Cons_Xfer F33

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-4812cf39-89797860-151f6133
Contact: <sip:82312793922@165.213.66.94:35925;rinstance=bbe52bb8ca87498e>
To: <sip:82312793922@samsung.com:5060>;tag=5362901f
From: <sip:82312794329@samsung.com:5060>;tag=1da74a8-8442d5a5-13c4-50017-4812cf15-
53ca178a-4812cf15
Call-ID: 1dad2a0-8442d5a5-13c4-50017-4812cf15-5b4c6c24-4812cf15
CSeq: 4 BYE
User-Agent: X-Lite release 1011s stamp 41150
Content-Length: 0
```

3.3.2.Blind Transfer

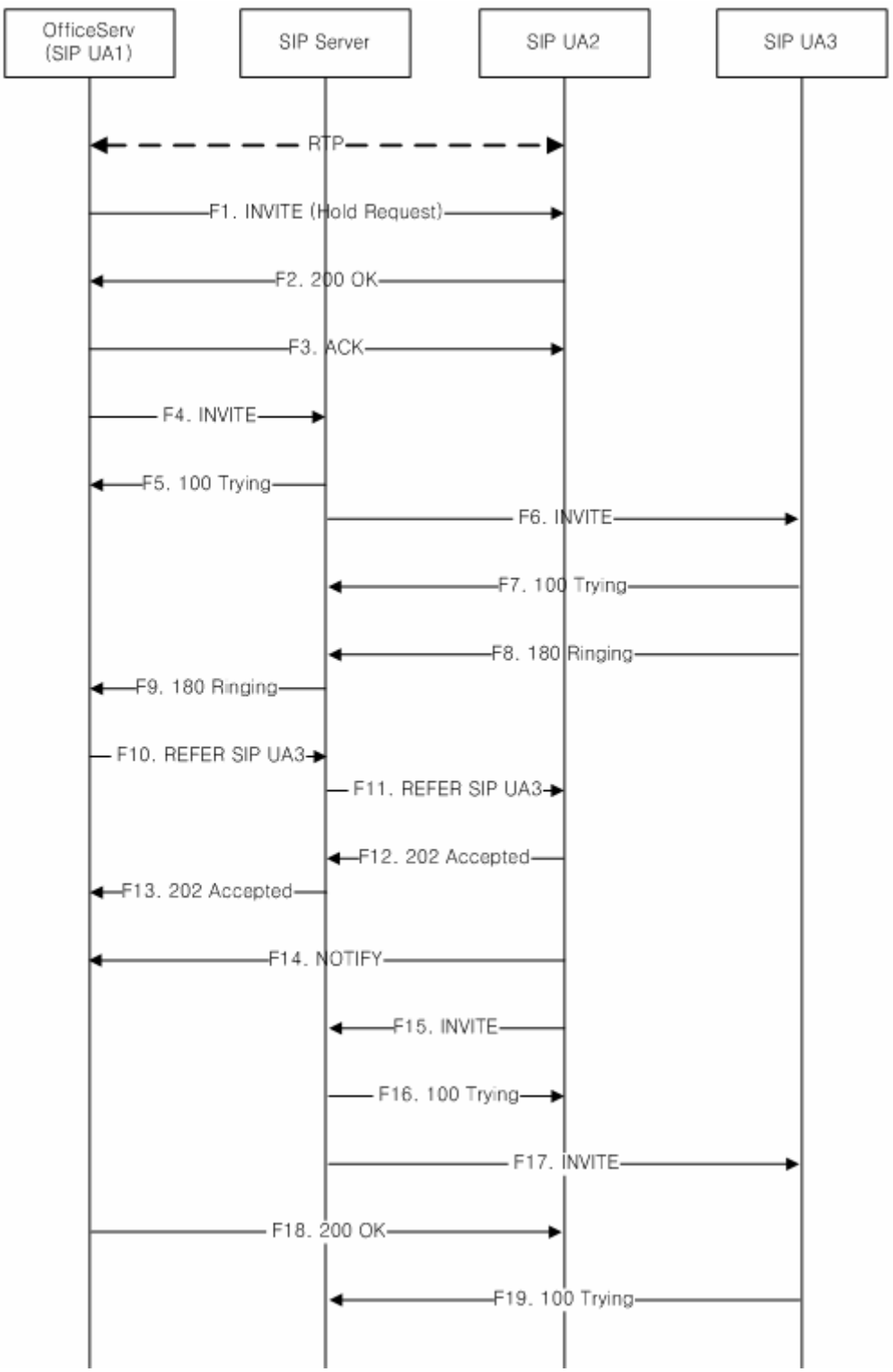

Figure 9. Blind Transfer #1

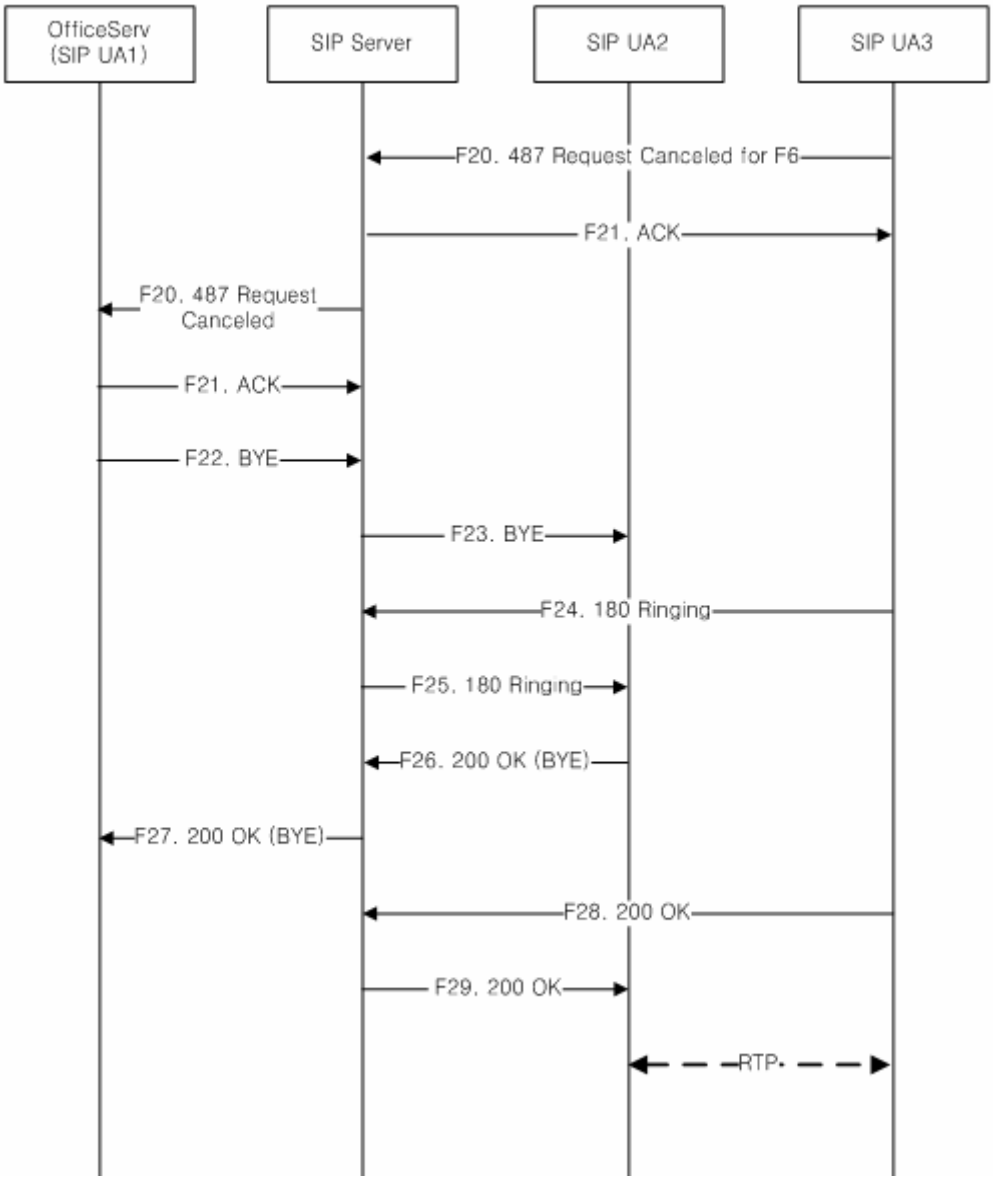

Figure 10. Blind Transfer #2

3.4. Call Forward

Call Forward feature is to redirect a call to an original recipient to the other recipient. According to who is redirector, OfficeServ should behave differently. When redirecting a call, the original recipient should respond with a 302 REDIRECTED response. Therefore, if OfficeServ is the one who redirects the call, it should answer with 302 REDIRECTED against received INVITE message and if it is the opposite case, OfficeServ will receive the 302 response. This chapter shows how OfficeServ reacts on these two different cases.

3.4.1. Call Forward by a SIP Server

Call Forward feature is set on either a SIP server or a recipient. In whichever case, OfficeServ is supposed to receive a 302 response and should re-send the original INVITE message to the forwarded recipient.

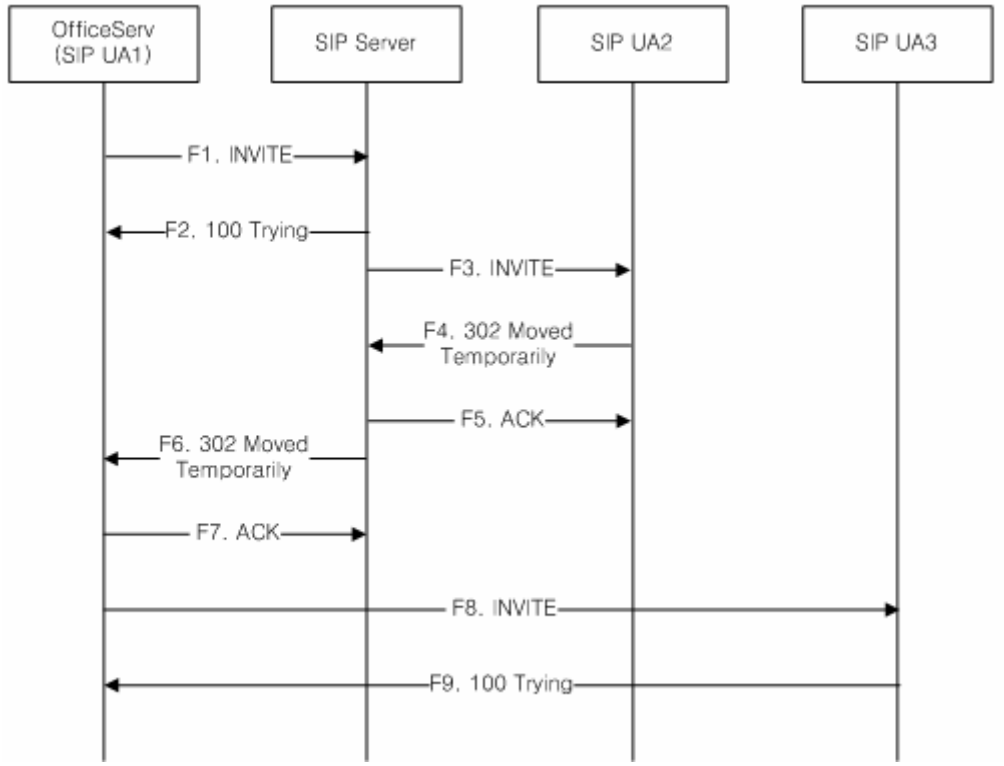

Figure 11. 302 Moved Temporarily Received

302_rcvd F1

```
INVITE sip:82312794630@samsung.com:5060 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da8ab0-8442d5a5-13c4-50017-4813d39b-
1988c5e6-4813d39b
To: <sip:82312794630@samsung.com:5060>
Call-ID: 1dadcf0-8442d5a5-13c4-50017-4813d39b-f9a83c8-4813d39b
CSeq: 1 INVITE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-4813d39b-8d72971c-224f9640
Max-Forwards: 70
Supported: 100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Type: application/sdp
Content-Length: 255

v=0
o=SAMSUNG_SIP_GATEWAY 2373097244 0 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30012 RTP/AVP 18 4 8 101
a=rtpmap:18 G729/8000
a=rtpmap:4 G723/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

302_rcvd F2

```
SIP/2.0 100 Trying
To: <sip:82312794630@samsung.com:5060>
From: <sip:82312794329@samsung.com:5060>;tag=1da8ab0-8442d5a5-13c4-50017-4813d39b-
1988c5e6-4813d39b
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-4813d39b-8d72971c-
224f9640
CSeq: 1 INVITE
Call-ID: 1dadcf0-8442d5a5-13c4-50017-4813d39b-f9a83c8-4813d39b
Server: ININ-samsung-k1o0rnf-21119919
Content-Length: 0
```

302_rcvd F3

```
INVITE sip:82312794630@165.213.66.56:5060 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da8ab0-8442d5a5-13c4-50017-4813d39b-
1988c5e6-4813d39b
To: <sip:82312794630@samsung.com:5060>
Call-ID: 1dadcf0-8442d5a5-13c4-50017-4813d39b-f9a83c8-4813d39b
CSeq: 1 INVITE
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk3815f9ba38f7f9ac638fd3efa, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-4813d39b-8d72971c-224f9640
Max-Forwards: 69
Supported: 100rel, replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Type: application/sdp
Content-Length: 255

v=0
o=SAMSUNG_SIP_GATEWAY 2373097244 0 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30012 RTP/AVP 18 4 8 101
a=rtpmap:18 G729/8000
a=rtpmap:4 G723/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

302_rcvd F4

```
SIP/2.0 302 Moved Temporarily
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk3815f9ba38f7f9ac638fd3efa, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-4813d39b-8d72971c-224f9640
From: <sip:82312794329@samsung.com:5060>;tag=1da8ab0-8442d5a5-13c4-50017-4813d39b-
1988c5e6-4813d39b
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d401f860ff7663-010e59e4
Call-ID: 1dadcf0-8442d5a5-13c4-50017-4813d39b-f9a83c8-4813d39b
Date: Wed, 30 Apr 2008 05:50:42 GMT
CSeq: 1 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312793922@165.213.66.94:5060>
Diversion: "82312794630"
<sip:82312794630@165.213.66.56>;reason=unconditional;privacy=off;screen=yes
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Content-Length: 0
```

302_rcvd F5

```
ACK sip:82312794630@165.213.66.56:5060 SIP/2.0
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d401f860ff7663-010e59e4
From: <sip:82312794329@samsung.com:5060>;tag=1da8ab0-8442d5a5-13c4-50017-4813d39b-
1988c5e6-4813d39b
Call-ID: 1dadcf0-8442d5a5-13c4-50017-4813d39b-f9a83c8-4813d39b
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk3815f9ba38f7f9ac638fd3efa
CSeq: 1 ACK
Content-Length: 0
```

302_rcvd F6

```
SIP/2.0 302 Moved Temporarily
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-4813d39b-8d72971c-
224f9640
From: <sip:82312794329@samsung.com:5060>;tag=1da8ab0-8442d5a5-13c4-50017-4813d39b-
1988c5e6-4813d39b
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d401f860ff7663-010e59e4
Call-ID: 1dadcf0-8442d5a5-13c4-50017-4813d39b-f9a83c8-4813d39b
Date: Wed, 30 Apr 2008 05:50:42 GMT
CSeq: 1 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312793922@165.213.66.94:5060>
Diversion: "82312794630"
<sip:82312794630@165.213.66.56>;reason=unconditional;privacy=off;screen=yes
Allow: ACK, BYE, CANCEL, INVITE, NOTIFY, OPTIONS, REFER, REGISTER, UPDATE
Content-Length: 0
```

302_rcvd F7

```
ACK sip:82312794630@samsung.com:5060 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da8ab0-8442d5a5-13c4-50017-4813d39b-
1988c5e6-4813d39b
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d401f860ff7663-010e59e4
Call-ID: 1dadcf0-8442d5a5-13c4-50017-4813d39b-f9a83c8-4813d39b
CSeq: 1 ACK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-4813d39b-8d72971c-224f9640
Max-Forwards: 70
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

302_rcvd F8

```
INVITE sip:82312793922@165.213.66.94:5060 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1da8ab0-8442d5a5-13c4-50017-4813d39b-
1988c5e6-4813d39b
To: <sip:82312794630@samsung.com:5060>
Call-ID: 1dadcf0-8442d5a5-13c4-50017-4813d39b-f9a83c8-4813d39b
CSeq: 2 INVITE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-4813d39c-8d729bfe-218bc766
Max-Forwards: 70
Supported: 100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Type: application/sdp
Content-Length: 255

v=0
o=SAMSUNG_SIP_GATEWAY 2373097244 0 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30012 RTP/AVP 18 4 8 101
a=rtpmap:18 G729/8000
a=rtpmap:4 G723/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

302_rcvd F9

```
SIP/2.0 100 Trying
To: <sip:82312794630@samsung.com:5060>
From: <sip:82312794329@samsung.com:5060>;tag=1da8ab0-8442d5a5-13c4-50017-4813d39b-
1988c5e6-4813d39b
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-4813d39c-8d729bfe-
218bc766
CSeq: 2 INVITE
Call-ID: 1dadcf0-8442d5a5-13c4-50017-4813d39b-f9a83c8-4813d39b
Server: ININ-retail_-12796967
Content-Length: 0
```

3.4.2.Call Forward by OfficeServ

If OfficeServ is the one who sets the call forward, it can have two different options in doing it; either sending 302 Response back to the caller or forwarding the received INVITE to a designated destination. The former is that OfficeServ, as in the case of 3.4.1, asks the original caller to redirect the call to designated destination, and the latter is OfficeServ itself redirects the call by sending an INVITE to the 3rd destination. This is how to set call forward in OfficeServ using MMC102. Let's assume that OfficeServ has been assigned a primary number of '82312794329' and when it receives an INVITE message, whose called number in TO header is the primary number, it sends the call to a station 201.

MMC714 SEND CLIP NO

```
DID DIGIT (xxx)
        DGT: 82312794329 (same username used for registration)
        1: 201
```

MMC102 CALL FORWARD

```
[201] FORWARD
        1. FWD ALL: 80582312793922
```

When a call is received to station 201, the call is forwarded to the designated number in FWD ALL field. In example, staring digit '805' is SIP trunk group number, and thus we can see that incoming call is to be forwarded to a number of '82312793922' using SIP trunk line.

3.4.2.1. Sending 302 Response

MMC837 SIP OPTIONS

```
ISP1
        SIP SERVER: ENABLE
        OUT PROXY: samsung.com
        DNS SERVER1: 165.213.66.93
        USER NAME: 82312794329
        AUTH USER: 82312794329
        AUTH PSWD: 1234
        REG PER USR: DISABLE
        TRK REG EXP: 001800
        302 RESP: ENABLE
```

Above MMC 837 settings are the same with the settings used in registration except for the last item. In order to respond with '[4]302 Moved Temporarily', OfficeServ needs to set '302 RESP' field to ENABLE.

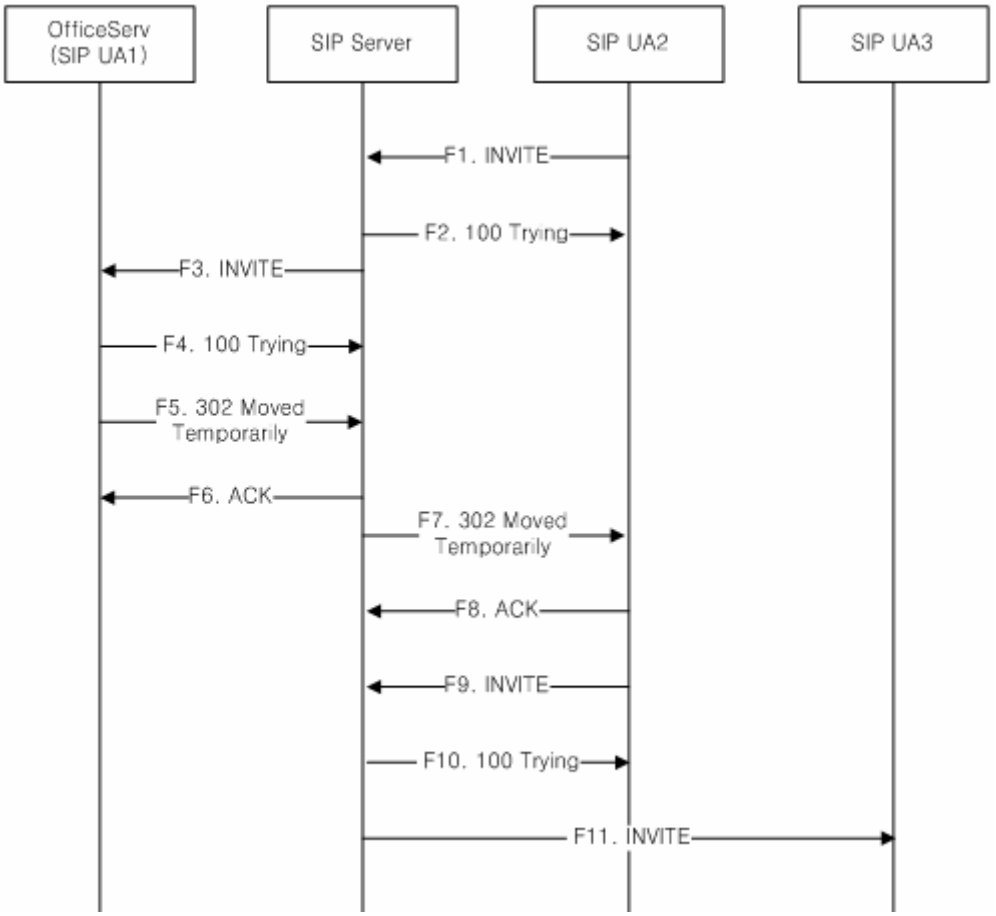

Figure 12. 302 Moved Temporarily Sent

[4] Note that sending a 302 Moved Temporarily response is possible only when set ALL CALL FORWARD.

302_send F1

```
INVITE sip:82312794329@samsung.com SIP/2.0
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK2e3be9dc
From: "82312794630" <sip:82312794630@samsung.com>;tag=00141ca537d4040a3e4a561a-
3e735954
To: <sip:82312794329@samsung.com>
Call-ID: 00141ca5-37d40014-35683d54-165be706@165.213.66.56
Max-Forwards: 70
Date: Thu, 01 May 2008 05:35:33 GMT
CSeq: 101 INVITE
User-Agent: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Expires: 180
Accept: application/sdp
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Supported: replaces,join,norefersub
Content-Length: 278
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 15464 0 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 18056 RTP/AVP 0 8 18 101
c=IN IP4 165.213.66.56
a=rtpmap:0 PCMU/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:18 G729/8000
a=fmtp:18 annexb=no
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv
```

302_ send F2

```
SIP/2.0 100 Trying
To: <sip:82312794329@samsung.com>
From: "82312794630" <sip:82312794630@samsung.com>;tag=00141ca537d4040a3e4a561a-
3e735954
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK2e3be9dc
CSeq: 101 INVITE
Call-ID: 00141ca5-37d40014-35683d54-165be706@165.213.66.56
Server: ININ-samsung-k1o0rnf-21119919
Content-Length: 0
```

302_send F3

```
INVITE sip:82312794329@165.213.66.132:5060 SIP/2.0
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk2d926da1868c1e3f081574098, SIP/2.0/UDP
165.213.66.56:5060;branch=z9hG4bK2e3be9dc
From: "82312794630" <sip:82312794630@samsung.com>;tag=00141ca537d4040a3e4a561a-
3e735954
To: <sip:82312794329@samsung.com>
Call-ID: 00141ca5-37d40014-35683d54-165be706@165.213.66.56
Max-Forwards: 69
Date: Thu, 01 May 2008 05:35:33 GMT
CSeq: 101 INVITE
User-Agent: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Expires: 180
Accept: application/sdp
Allow: ACK, BYE, CANCEL, INVITE, NOTIFY, OPTIONS, REFER, REGISTER, UPDATE
Supported: replaces, join, norefersub
Content-Length: 278
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 15464 0 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 18056 RTP/AVP 0 8 18 101
c=IN IP4 165.213.66.56
a=rtpmap:0 PCMU/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:18 G729/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:18 annexb=no
a=fmtp:101 0-15
a=sendrecv
```

302_ send F4

```
SIP/2.0 100 Trying
From: "82312794630"<sip:82312794630@samsung.com>;tag=00141ca537d4040a3e4a561a-
3e735954
To: <sip:82312794329@samsung.com>
Call-ID: 00141ca5-37d40014-35683d54-165be706@165.213.66.56
CSeq: 101 INVITE
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk2d926da1868c1e3f081574098
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK2e3be9dc
Supported: 100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

302_ send F5

```
SIP/2.0 302 Moved Temporarily
From: "82312794630"<sip:82312794630@samsung.com>;tag=00141ca537d4040a3e4a561a-3e735954
To: <sip:82312794329@samsung.com>;tag=1da9c50-8442d5a5-13c4-50017-48152188-22ffc852-48152188
Call-ID: 00141ca5-37d40014-35683d54-165be706@165.213.66.56
CSeq: 101 INVITE
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk2d926da1868c1e3f081574098
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK2e3be9dc
Supported: 100rel,replaces
Contact: <sip:82312793922@samsung.com>
Content-Length: 0
```

302_ send F6

```
ACK sip:82312794329@165.213.66.132:5060 SIP/2.0
To: <sip:82312794329@samsung.com>;tag=1da9c50-8442d5a5-13c4-50017-48152188-22ffc852-48152188
From: "82312794630" <sip:82312794630@samsung.com>;tag=00141ca537d4040a3e4a561a-3e735954
Call-ID: 00141ca5-37d40014-35683d54-165be706@165.213.66.56
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk2d926da1868c1e3f081574098
CSeq: 101 ACK
Content-Length: 0
```

302_ send F7

```
SIP/2.0 302 Moved Temporarily
From: "82312794630" <sip:82312794630@samsung.com>;tag=00141ca537d4040a3e4a561a-3e735954
To: <sip:82312794329@samsung.com>;tag=1da9c50-8442d5a5-13c4-50017-48152188-22ffc852-48152188
Call-ID: 00141ca5-37d40014-35683d54-165be706@165.213.66.56
CSeq: 101 INVITE
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK2e3be9dc
Supported: 100rel, replaces
Contact: <sip:82312793922@samsung.com>
Content-Length: 0
```

302_ send F8

```
ACK sip:82312794329@samsung.com SIP/2.0
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK2e3be9dc
From: "82312794630" <sip:82312794630@samsung.com>;tag=00141ca537d4040a3e4a561a-3e735954
To: <sip:82312794329@samsung.com>;tag=1da9c50-8442d5a5-13c4-50017-48152188-22ffc852-48152188
Call-ID: 00141ca5-37d40014-35683d54-165be706@165.213.66.56
Date: Thu, 01 May 2008 05:35:34 GMT
CSeq: 101 ACK
Content-Length: 0
```

302_send F9

```
INVITE sip:82312793922@samsung.com:5060 SIP/2.0
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK592e280d
From: "82312794630" <sip:82312794630@samsung.com>;tag=00141ca537d4040b3b27c831-
24b59245
To: <sip:82312794329@samsung.com>
Call-ID: 00141ca5-37d40014-35683d54-165be706@165.213.66.56
Max-Forwards: 70
Date: Thu, 01 May 2008 05:35:34 GMT
CSeq: 102 INVITE
User-Agent: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Expires: 180
Accept: application/sdp
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Supported: replaces,join,norefersub
Content-Length: 278
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 15464 0 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 18056 RTP/AVP 0 8 18 101
c=IN IP4 165.213.66.56
a=rtpmap:0 PCMU/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:18 G729/8000
a=fmtp:18 annexb=no
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv
```

302_ send F10

```
SIP/2.0 100 Trying
To: <sip:82312794329@samsung.com>
From: "82312794630" <sip:82312794630@samsung.com>;tag=00141ca537d4040b3b27c831-
24b59245
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK592e280d
CSeq: 102 INVITE
Call-ID: 00141ca5-37d40014-35683d54-165be706@165.213.66.56
Server: ININ-samsung-k1o0rnf-21119919
Content-Length: 0
```

302_send F9

```
INVITE sip:82312793922@samsung.com:5060 SIP/2.0
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk9558339ebf9a4939e16ce8d16, SIP/2.0/UDP
165.213.66.56:5060;branch=z9hG4bK592e280d
From: "82312794630" <sip:82312794630@samsung.com>;tag=00141ca537d4040b3b27c831-
24b59245
To: <sip:82312794329@samsung.com>
Call-ID: 00141ca5-37d40014-35683d54-165be706@165.213.66.56
Max-Forwards: 69
Date: Thu, 01 May 2008 05:35:34 GMT
CSeq: 102 INVITE
User-Agent: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Expires: 180
Accept: application/sdp
Allow: ACK, BYE, CANCEL, INVITE, NOTIFY, OPTIONS, REFER, REGISTER, UPDATE
Supported: replaces, join, norefersub
Content-Length: 278
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 15464 0 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 18056 RTP/AVP 0 8 18 101
c=IN IP4 165.213.66.56
a=rtpmap:0 PCMU/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:18 G729/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:18 annexb=no
a=fmtp:101 0-15
a=sendrecv
```

3.4.2.2. Forwarding Received INVITE

Forwarding a received INVITE message to a designated number is another way of doing Call Forward. There is only one difference in MMC837 setting from the case of sending 302 response: setting '302 RESP' to DISABLE.

MMC837 SIP OPTIONS

```
ISP1
        SIP SERVER: ENABLE
        OUT PROXY: samsung.com
        DNS SERVER1: 165.213.66.93
        USER NAME: 82312794329
        AUTH USER: 82312794329
        AUTH PSWD: 1234
        REG PER USR: DISABLE
        TRK REG EXP: 001800
        302 RESP: DISABLE
```

As seen in sample messages, OfficeServ does not forward the received INVITE as it is, rather it

sends its own INVITE message to the designated destination. That is, in this way, one SIP session is made between the original caller and OfficeServ, and the second SIP session is additionally made between OfficeServ and the 3rd destination. Each SIP session consumes each MGI resource in OfficeServ and the RTP packets should go through 4 steps of encoding and decoding procedure, which degrades voice quality significantly. Thus this INVITE message forwarding is not a good way to do call forward.

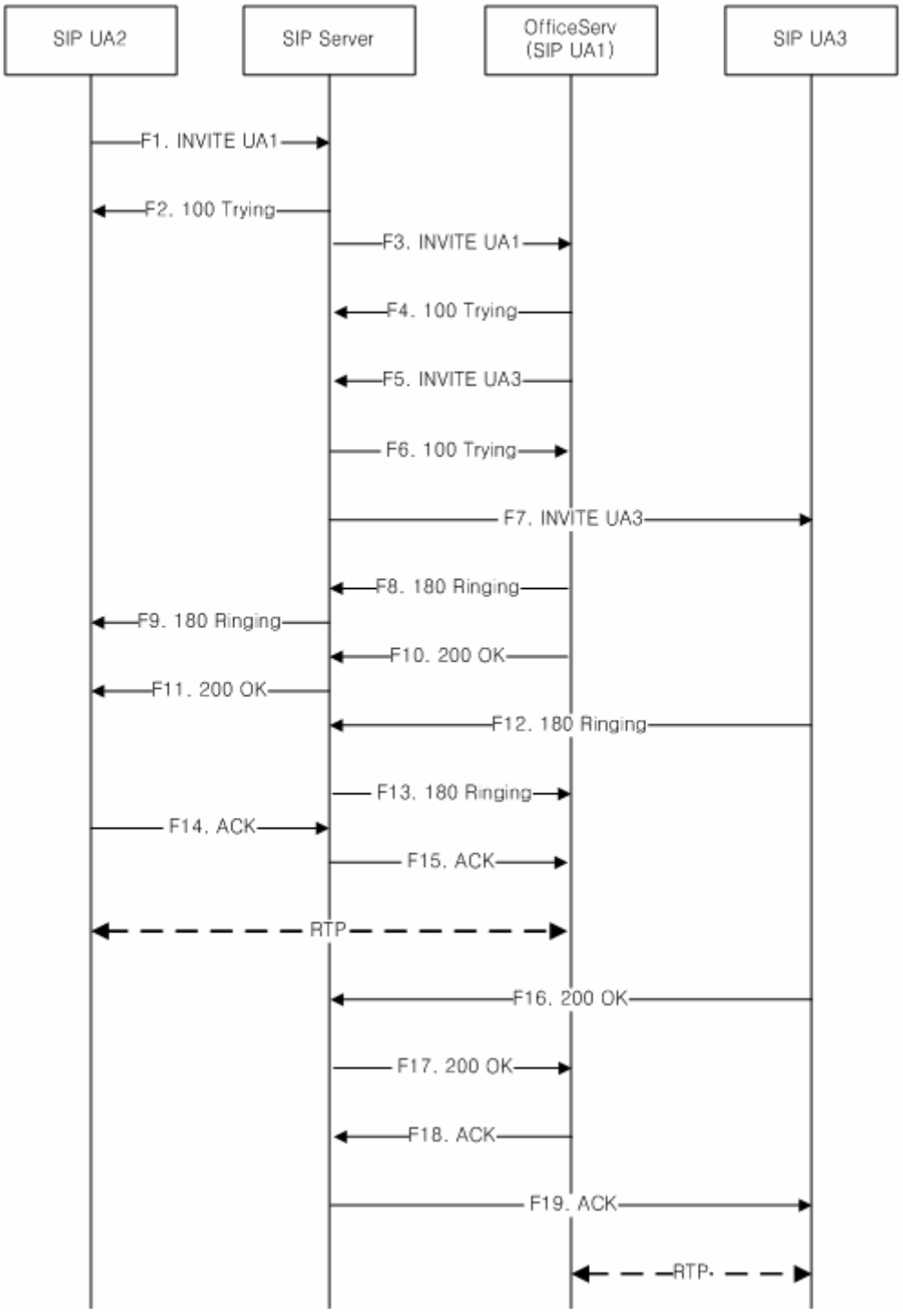

Figure 13. Forwarding Received INVITE

Fwd_inv F1

```
INVITE sip:82312794329@samsung.com SIP/2.0
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK378c08e1
From: "82312794630" <sip:82312794630@samsung.com>;tag=00141ca537d4102504950a1c-
5b2da26a
To: <sip:82312794329@samsung.com>
Call-ID: 00141ca5-37d40018-76a485c7-3a0c34e8@165.213.66.56
Max-Forwards: 70
Date: Fri, 02 May 2008 11:22:33 GMT
CSeq: 101 INVITE
User-Agent: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Expires: 180
Accept: application/sdp
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Supported: replaces,join,norefersub
Content-Length: 278
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 11869 0 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 32260 RTP/AVP 0 8 18 101
c=IN IP4 165.213.66.56
a=rtpmap:0 PCMU/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:18 G729/8000
a=fmtp:18 annexb=no
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv
```

Fwd_inv F2

```
SIP/2.0 100 Trying
To: <sip:82312794329@samsung.com>
From: "82312794630" <sip:82312794630@samsung.com>;tag=00141ca537d4102504950a1c-
5b2da26a
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK378c08e1
CSeq: 101 INVITE
Call-ID: 00141ca5-37d40018-76a485c7-3a0c34e8@165.213.66.56
Server: ININ-samsung-k1o0rnf-21113719
Content-Length: 0
```

Fwd_inv F3

```
INVITE sip:82312794329@165.213.66.132:5060 SIP/2.0
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk21691eeeb42916368ff6422ac, SIP/2.0/UDP
165.213.66.56:5060;branch=z9hG4bK378c08e1
From: "82312794630" <sip:82312794630@samsung.com>;tag=00141ca537d4102504950a1c-
5b2da26a
To: <sip:82312794329@samsung.com>
Call-ID: 00141ca5-37d40018-76a485c7-3a0c34e8@165.213.66.56
Max-Forwards: 69
Date: Fri, 02 May 2008 11:22:33 GMT
CSeq: 101 INVITE
User-Agent: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Expires: 180
Accept: application/sdp
Allow: ACK, BYE, CANCEL, INVITE, NOTIFY, OPTIONS, REFER, REGISTER, UPDATE
Supported: replaces, join, norefersub
Content-Length: 278
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 11869 0 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 32260 RTP/AVP 0 8 18 101
c=IN IP4 165.213.66.56
a=rtpmap:0 PCMU/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:18 G729/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:18 annexb=no
a=fmtp:101 0-15
a=sendrecv
```

Fwd_inv F4

```
SIP/2.0 100 Trying
From: "82312794630"<sip:82312794630@samsung.com>;tag=00141ca537d4102504950a1c-
5b2da26a
To: <sip:82312794329@samsung.com>
Call-ID: 00141ca5-37d40018-76a485c7-3a0c34e8@165.213.66.56
CSeq: 101 INVITE
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk21691eeeb42916368ff6422ac
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK378c08e1
Supported: 100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

Fwd_inv F5

```
INVITE sip:82312793922@samsung.com:5060 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1dd4350-8442d5a5-13c4-50017-4816c456-
41f71b1e-4816c456
To: <sip:82312793922@samsung.com:5060>
Call-ID: 1e006c8-8442d5a5-13c4-50017-4816c456-2b7f7580-4816c456
CSeq: 1 INVITE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-4816c456-98eef248-1890ef18
Max-Forwards: 70
Supported: 100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Type: application/sdp
Content-Length: 255

v=0
o=SAMSUNG_SIP_GATEWAY 2565796424 0 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30010 RTP/AVP 18 4 8 101
a=rtpmap:18 G729/8000
a=rtpmap:4 G723/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Fwd_inv F6

```
SIP/2.0 100 Trying
To: <sip:82312793922@samsung.com:5060>
From: <sip:82312794329@samsung.com:5060>;tag=1dd4350-8442d5a5-13c4-50017-4816c456-
41f71b1e-4816c456
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-4816c456-98eef248-
1890ef18
CSeq: 1 INVITE
Call-ID: 1e006c8-8442d5a5-13c4-50017-4816c456-2b7f7580-4816c456
Server: ININ-samsung-k1o0rnf-21113719
Content-Length: 0
```

Fwd_inv F7

```
INVITE sip:82312793922@165.213.66.94:9298;rinstance=aa040136f1a83a06 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1dd4350-8442d5a5-13c4-50017-4816c456-
41f71b1e-4816c456
To: <sip:82312793922@samsung.com:5060>
Call-ID: 1e006c8-8442d5a5-13c4-50017-4816c456-2b7f7580-4816c456
CSeq: 1 INVITE
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk85d108316089ac74bc804eecc, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-4816c456-98eef248-1890ef18
Max-Forwards: 69
Supported: 100rel, replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Type: application/sdp
Content-Length: 255

v=0
o=SAMSUNG_SIP_GATEWAY 2565796424 0 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30010 RTP/AVP 18 4 8 101
a=rtpmap:18 G729/8000
a=rtpmap:4 G723/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Fwd_inv F8

```
SIP/2.0 180 Ringing
From: "82312794630"<sip:82312794630@samsung.com>;tag=00141ca537d4102504950a1c-
5b2da26a
To: <sip:82312794329@samsung.com>;tag=1dd41d8-8442d5a5-13c4-50017-4816c456-
64e583c1-4816c456
Call-ID: 00141ca5-37d40018-76a485c7-3a0c34e8@165.213.66.56
CSeq: 101 INVITE
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk21691eeeb42916368ff6422ac
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK378c08e1
Supported: 100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

Fwd_inv F9

```
SIP/2.0 180 Ringing
From: "82312794630" <sip:82312794630@samsung.com>;tag=00141ca537d4102504950a1c-
5b2da26a
To: <sip:82312794329@samsung.com>;tag=1dd41d8-8442d5a5-13c4-50017-4816c456-
64e583c1-4816c456
Call-ID: 00141ca5-37d40018-76a485c7-3a0c34e8@165.213.66.56
CSeq: 101 INVITE
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK378c08e1
Supported: 100rel, replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

Fwd_inv F10

```
SIP/2.0 200 OK
From: "82312794630"<sip:82312794630@samsung.com>;tag=00141ca537d4102504950a1c-
5b2da26a
To: <sip:82312794329@samsung.com>;tag=1dd41d8-8442d5a5-13c4-50017-4816c456-
64e583c1-4816c456
Call-ID: 00141ca5-37d40018-76a485c7-3a0c34e8@165.213.66.56
CSeq: 101 INVITE
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk21691eeeb42916368ff6422ac
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK378c08e1
Supported: 100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Type: application/sdp
Content-Length: 205

v=0
o=SAMSUNG_SIP_GATEWAY 2565796504 0 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30008 RTP/AVP 8 101
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Fwd_inv F11

```
SIP/2.0 200 OK
From: "82312794630" <sip:82312794630@samsung.com>;tag=00141ca537d4102504950a1c-
5b2da26a
To: <sip:82312794329@samsung.com>;tag=1dd41d8-8442d5a5-13c4-50017-4816c456-
64e583c1-4816c456
Call-ID: 00141ca5-37d40018-76a485c7-3a0c34e8@165.213.66.56
CSeq: 101 INVITE
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK378c08e1
Supported: 100rel, replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Type: application/sdp
Content-Length: 205

v=0
o=SAMSUNG_SIP_GATEWAY 2565796504 0 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30008 RTP/AVP 8 101
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Fwd_inv F12

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk85d108316089ac74bc804eecc
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-4816c456-98eef248-1890ef18
Contact: <sip:82312793922@165.213.66.94:9298;rinstance=aa040136f1a83a06>
To: <sip:82312793922@samsung.com:5060>;tag=1e3cf677
From: <sip:82312794329@samsung.com:5060>;tag=1dd4350-8442d5a5-13c4-50017-4816c456-41f71b1e-4816c456
Call-ID: 1e006c8-8442d5a5-13c4-50017-4816c456-2b7f7580-4816c456
CSeq: 1 INVITE
User-Agent: X-Lite release 1011s stamp 41150
Content-Length: 0

Fwd_inv F13

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-4816c456-98eef248-1890ef18
Contact: <sip:82312793922@165.213.66.94:9298;rinstance=aa040136f1a83a06>
To: <sip:82312793922@samsung.com:5060>;tag=1e3cf677
From: <sip:82312794329@samsung.com:5060>;tag=1dd4350-8442d5a5-13c4-50017-4816c456-41f71b1e-4816c456
Call-ID: 1e006c8-8442d5a5-13c4-50017-4816c456-2b7f7580-4816c456
CSeq: 1 INVITE
User-Agent: X-Lite release 1011s stamp 41150
Content-Length: 0

Fwd_inv F14

ACK sip:82312794329@165.213.66.132:5060 SIP/2.0
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK4cd44590
From: "82312794630" <sip:82312794630@samsung.com>;tag=00141ca537d4102504950a1c-5b2da26a
To: <sip:82312794329@samsung.com>;tag=1dd41d8-8442d5a5-13c4-50017-4816c456-64e583c1-4816c456
Call-ID: 00141ca5-37d40018-76a485c7-3a0c34e8@165.213.66.56
Max-Forwards: 70
Date: Fri, 02 May 2008 11:22:35 GMT
CSeq: 101 ACK
User-Agent: Cisco-CP7960G/8.0
Content-Length: 0

Fwd_inv F15

ACK sip:82312794329@165.213.66.132:5060 SIP/2.0
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk5c55e719a63eb221e19a75945, SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK4cd44590
From: "82312794630" <sip:82312794630@samsung.com>;tag=00141ca537d4102504950a1c-5b2da26a
To: <sip:82312794329@samsung.com>;tag=1dd41d8-8442d5a5-13c4-50017-4816c456-64e583c1-4816c456
Call-ID: 00141ca5-37d40018-76a485c7-3a0c34e8@165.213.66.56
Max-Forwards: 69
Date: Fri, 02 May 2008 11:22:35 GMT
CSeq: 101 ACK
User-Agent: Cisco-CP7960G/8.0
Content-Length: 0

Fwd_inv F16

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk85d108316089ac74bc804eecc
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-4816c456-98eef248-
1890ef18
Contact: <sip:82312793922@165.213.66.94:9298;rinstance=aa040136f1a83a06>
To: <sip:82312793922@samsung.com:5060>;tag=1e3cf677
From: <sip:82312794329@samsung.com:5060>;tag=1dd4350-8442d5a5-13c4-50017-4816c456-
41f71b1e-4816c456
Call-ID: 1e006c8-8442d5a5-13c4-50017-4816c456-2b7f7580-4816c456
CSeq: 1 INVITE
Allow: INVITE, ACK, CANCEL, OPTIONS, BYE, REFER, NOTIFY, MESSAGE, SUBSCRIBE, INFO
Content-Type: application/sdp
User-Agent: X-Lite release 1011s stamp 41150
Content-Length: 185

v=0
o=- 5 2 IN IP4 165.213.66.94
s=CounterPath X-Lite 3.0
c=IN IP4 165.213.66.94
t=0 0
m=audio 35568 RTP/AVP 8 101
a=fmtp:101 0-15
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Fwd_inv F17

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-4816c456-98eef248-
1890ef18
Contact: <sip:82312793922@165.213.66.94:9298;rinstance=aa040136f1a83a06>
To: <sip:82312793922@samsung.com:5060>;tag=1e3cf677
From: <sip:82312794329@samsung.com:5060>;tag=1dd4350-8442d5a5-13c4-50017-4816c456-
41f71b1e-4816c456
Call-ID: 1e006c8-8442d5a5-13c4-50017-4816c456-2b7f7580-4816c456
CSeq: 1 INVITE
Allow: INVITE, ACK, CANCEL, OPTIONS, BYE, REFER, NOTIFY, MESSAGE, SUBSCRIBE, INFO
Content-Type: application/sdp
User-Agent: X-Lite release 1011s stamp 41150
Content-Length: 185

v=0
o=- 5 2 IN IP4 165.213.66.94
s=CounterPath X-Lite 3.0
c=IN IP4 165.213.66.94
t=0 0
m=audio 35568 RTP/AVP 8 101
a=fmtp:101 0-15
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Fwd_inv F18

```
ACK sip:82312793922@165.213.66.94:9298;rinstance=aa040136f1a83a06 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1dd4350-8442d5a5-13c4-50017-4816c456-
41f71b1e-4816c456
To: <sip:82312793922@samsung.com:5060>;tag=1e3cf677
Call-ID: 1e006c8-8442d5a5-13c4-50017-4816c456-2b7f7580-4816c456
CSeq: 1 ACK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-4816c45e-98ef1264-4c05d5be
Max-Forwards: 70
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

Fwd_inv F19

```
ACK sip:82312793922@165.213.66.94:9298;rinstance=aa040136f1a83a06 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1dd4350-8442d5a5-13c4-50017-4816c456-
41f71b1e-4816c456
To: <sip:82312793922@samsung.com:5060>;tag=1e3cf677
Call-ID: 1e006c8-8442d5a5-13c4-50017-4816c456-2b7f7580-4816c456
CSeq: 1 ACK
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk7fc6ab028c30a30ea83dec70e, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-4816c45e-98ef1264-4c05d5be
Max-Forwards: 69
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

3.5. Alphanumeric Username

SIP UA may use alphabets as well as digits in its SIP-URI. In order to use alphanumeric username in SIP trunking mode, OfficeServ first has to register its alphanumeric username to a registrar. Once successfully registered, OfficeServ can send and receive SIP messages using the alphanumeric username contained in FROM/TO headers. From registrar's perspective, whichever is used for registration, there is no difference between handling an alphabetic username and handling a digit-only username.

3.5.1. Registering Alphanumeric Username

MMC837 SIP OPTIONS

ISP1
SIP SERVER: *ENABLE*
OUT PROXY: *samsung.com*
DNS SERVER1: *165.213.66.93*
USER NAME: *sungwoo1769*
AUTH USER: *82312794329*
AUTH PSWD: *1234*
REG PER USR: *DISABLE*
TRK REG EXP: *001800*
302 RESP: *ENABLE*

As shown above, username field in MMC837 is set to an alphanumeric value of 'sungwoo1769', and OfficeServ registers to a registrar as 'sungwoo1769'.

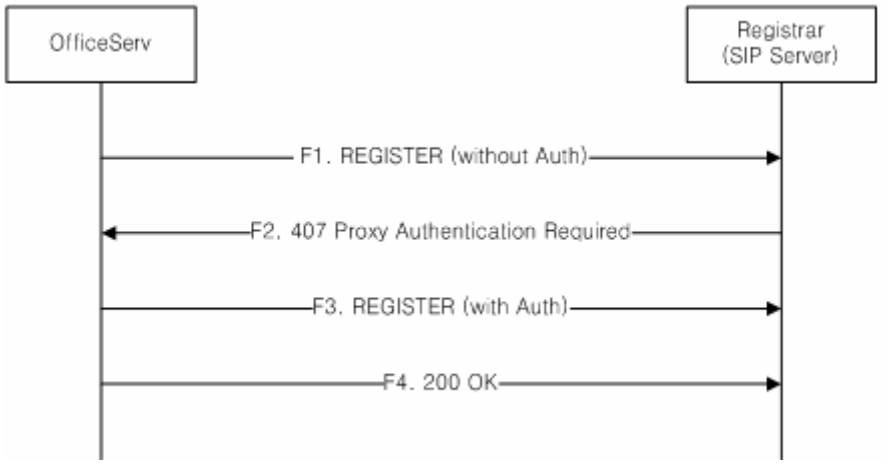

Figure 14. Register using Alphanumeric Username

Alpha_reg F1

```
REGISTER sip:samsung.com:5060 SIP/2.0
From: <sip:sungwoo1769@samsung.com:5060>;tag=1da1388-8442d5a5-13c4-50017-481bf8b3-303fd0b7-481bf8b3
To: <sip:sungwoo1769@samsung.com:5060>
Call-ID: 1dc2504-8442d5a5-13c4-50017-481bf8b1-5e78c88b-481bf8b1
CSeq: 1 REGISTER
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-481bf8b3-ad437d9a-23140674
Max-Forwards: 70
Supported: 100rel,replaces
Expires: 1800
Contact: <sip:sungwoo1769@165.213.66.132:5060>
Content-Length: 0
```

Alpha_reg F2

```
SIP/2.0 407 Proxy Authentication Required
To: <sip:sungwoo1769@samsung.com:5060>
From: <sip:sungwoo1769@samsung.com:5060>;tag=1da1388-8442d5a5-13c4-50017-481bf8b3-303fd0b7-481bf8b3
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-481bf8b3-ad437d9a-23140674
CSeq: 1 REGISTER
Call-ID: 1dc2504-8442d5a5-13c4-50017-481bf8b1-5e78c88b-481bf8b1
Proxy-Authenticate: Digest
realm="165.213.66.93",qop="auth",algorithm="MD5",nonce="79393552c6f14bd7b7943cd86f1e5da7"
Content-Length: 0
```

Alpha_reg F3

```
REGISTER sip:samsung.com:5060 SIP/2.0
From: <sip:sungwoo1769@samsung.com:5060>;tag=1da1388-8442d5a5-13c4-50017-481bf8b3-303fd0b7-481bf8b3
To: <sip:sungwoo1769@samsung.com:5060>
Call-ID: 1dc2504-8442d5a5-13c4-50017-481bf8b1-5e78c88b-481bf8b1
CSeq: 2 REGISTER
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-481bf8b3-ad437dd6-2475c752
Max-Forwards: 70
Supported: 100rel,replaces
Expires: 1800
Proxy-Authorization: Digest
username="82312794329",realm="165.213.66.93",nonce="79393552c6f14bd7b7943cd86f1e5da7
",uri="sip:samsung.com:5060",response="8f4607037930a33cd6c782b386b7c606",algorithm=MD5
,cnonce="ad437dd6",qop=auth,nc=00000001\r
Contact: <sip:sungwoo1769@165.213.66.132:5060>
Content-Length: 0
```

Alpha_reg F4

```
SIP/2.0 200 OK
To: <sip:sungwoo1769@samsung.com:5060>;tag=26827
From: <sip:sungwoo1769@samsung.com:5060>;tag=1da1388-8442d5a5-13c4-50017-481bf8b3-303fd0b7-481bf8b3
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-481bf8b3-ad437dd6-2475c752
CSeq: 2 REGISTER
Call-ID: 1dc2504-8442d5a5-13c4-50017-481bf8b1-5e78c88b-481bf8b1
Contact: <sip:sungwoo1769@165.213.66.132:5060>;expires=300
Content-Length: 0
```

3.5.2. Outgoing Alphanumeric Username

When sending out an INVITE message to alphanumeric destination, we have to consider following two points;

- How to call alphanumeric destination from legacy station in OfficeServ system?
- How to match a specific station with a registered alphanumeric username?

DID and DOD numbers can be set using MMC323 Send CLIP table and MMC714 DID Digit table. (If not familiar with how to use these table, please refer to 3.1.1. Basic Call MMC Settings.) When using digit-only caller and called number, there will be no problem. If OfficeServ has to use alphanumeric values, however, for the caller and called info, we need some intermediary storage to convert alphanumeric values into generic digit-only values.

MMC839 contains mapping information which is used to convert digit number to alphanumeric called username. As we cannot dial alphanumeric called name from a legacy station in OfficeServ we dial this intermediary digit instead, and let OfficeServ convert the digit into a designated alphanumeric called name.

MMC839 SIP USER

```
SP1-001
        USERNAME:
        AUTH UID:
        AUTH PWD:
        TEL NO:
OPP0001
        SITE URL: miyoung4692
        TEL NO: 4692
        CLI NAME: sungwoo1769
```

In above example, OfficeServ will convert a station-dialed digit '4692' (TEL NO) to designated called name of 'miyoung4692' (SITE URL), which is finally put into To Header. CLI NAME field specifies the value which should be put into FROM header. Note that value in CLI NAME field should be the same value that is registered to registrar.

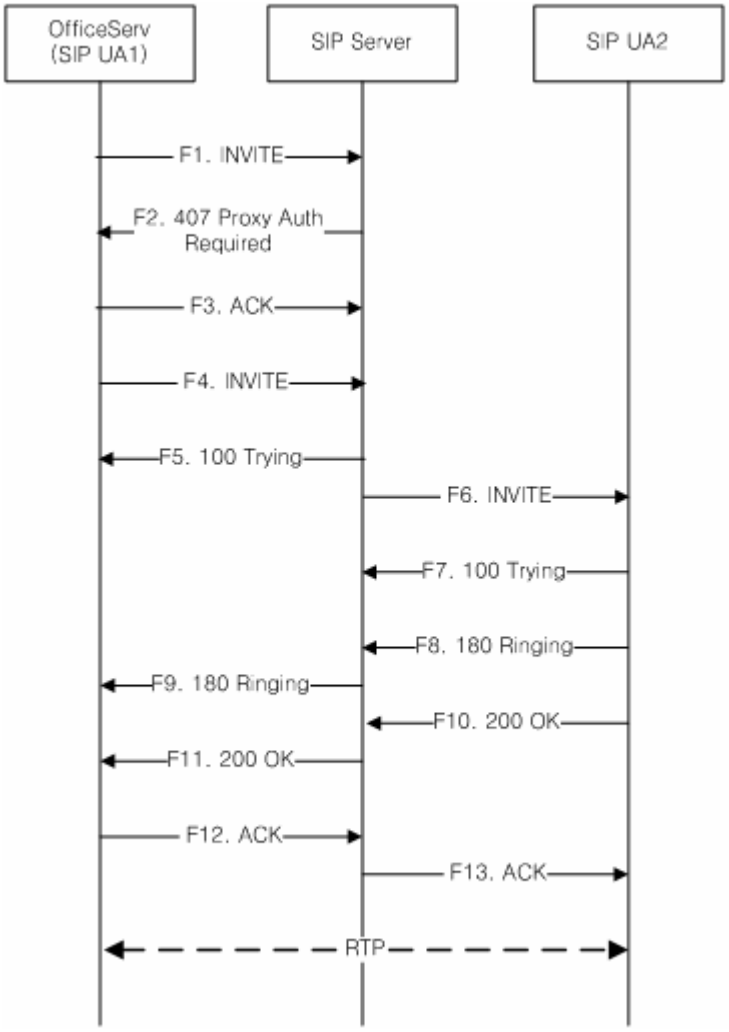

Figure 15. Basic Outbound Call using Alphanumeric Username

Alpha_Outbound F1

```
INVITE sip:miyoung4692@samsung.com:5060 SIP/2.0
From: <sip:sungwoo1769@samsung.com:5060>;tag=1daa550-8442d5a5-13c4-50017-481bf69f-
14e8e4d4-481bf69f
To: <sip:miyoung4692@samsung.com:5060>
Call-ID: 1dad198-8442d5a5-13c4-50017-481bf69f-2664efd6-481bf69f
CSeq: 1 INVITE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-481bf69f-ad3b5fe8-4dbd4596
Max-Forwards: 70
Supported: 100rel,replaces
Contact: <sip:201@165.213.66.132:5060>
Content-Type: application/sdp
Content-Length: 255

v=0
o=SAMSUNG_SIP_GATEWAY 2906349544 0 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30002 RTP/AVP 18 4 8 101
a=rtpmap:18 G729/8000
a=rtpmap:4 G723/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Alpha_Outbound F2

```
SIP/2.0 407 Proxy Authentication Required
To: <sip:miyoung4692@samsung.com:5060>
From: <sip:sungwoo1769@samsung.com:5060>;tag=1daa550-8442d5a5-13c4-50017-481bf69f-
14e8e4d4-481bf69f
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-481bf69f-ad3b5fe8-
4dbd4596
CSeq: 1 INVITE
Call-ID: 1dad198-8442d5a5-13c4-50017-481bf69f-2664efd6-481bf69f
Proxy-Authenticate: Digest
realm="165.213.66.93",qop="auth",algorithm="MD5",nonce="50f4a13551178946b5da191d88895
63a"
Content-Length: 0
```

Alpha_Outbound F3

```
ACK sip:miyoung4692@samsung.com:5060 SIP/2.0
From: <sip:sungwoo1769@samsung.com:5060>;tag=1daa550-8442d5a5-13c4-50017-481bf69f-
14e8e4d4-481bf69f
To: <sip:miyoung4692@samsung.com:5060>
Call-ID: 1dad198-8442d5a5-13c4-50017-481bf69f-2664efd6-481bf69f
CSeq: 1 ACK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-481bf69f-ad3b5fe8-4dbd4596
Max-Forwards: 70
Contact: <sip:201@165.213.66.132:5060>
Content-Length: 0
```

Alpha_Outbound F4

```
INVITE sip:miyoung4692@samsung.com:5060 SIP/2.0
From: <sip:sungwoo1769@samsung.com:5060>;tag=1daa550-8442d5a5-13c4-50017-481bf69f-
14e8e4d4-481bf69f
To: <sip:miyoung4692@samsung.com:5060>
Call-ID: 1dad198-8442d5a5-13c4-50017-481bf69f-2664efd6-481bf69f
CSeq: 2 INVITE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-481bf69f-ad3b601a-7dd4161c
Max-Forwards: 70
Supported: 100rel,replaces
Contact: <sip:201@165.213.66.132:5060>
Proxy-Authorization: Digest
username="82312794329",realm="165.213.66.93",nonce="50f4a13551178946b5da191d8889563a
",uri="sip:miyoung4692@samsung.com:5060",response="cbe5b4057c50a1a7afdfed1b779a9207
",algorithm=MD5,cnonce="ad3b601a",qop=auth,n
Content-Type: application/sdp
Content-Length: 255

v=0
o=SAMSUNG_SIP_GATEWAY 2906349544 1 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30002 RTP/AVP 18 4 8 101
a=rtpmap:18 G729/8000
a=rtpmap:4 G723/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Alpha_Outbound F5

```
SIP/2.0 100 Trying
To: <sip:miyoung4692@samsung.com:5060>
From: <sip:sungwoo1769@samsung.com:5060>;tag=1daa550-8442d5a5-13c4-50017-481bf69f-
14e8e4d4-481bf69f
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-481bf69f-ad3b601a-
7dd4161c
CSeq: 2 INVITE
Call-ID: 1dad198-8442d5a5-13c4-50017-481bf69f-2664efd6-481bf69f
Server: ININ-samsung-k1o0rnf-20847703
Content-Length: 0
```

Alpha_Outbound F6

```
INVITE sip:miyoung4692@165.213.66.56:5060 SIP/2.0
From: <sip:sungwoo1769@samsung.com:5060>;tag=1daa550-8442d5a5-13c4-50017-481bf69f-
14e8e4d4-481bf69f
To: <sip:miyoung4692@samsung.com:5060>
Call-ID: 1dad198-8442d5a5-13c4-50017-481bf69f-2664efd6-481bf69f
CSeq: 2 INVITE
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk30593106abba9703b6b6b4448, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-481bf69f-ad3b601a-7dd4161c
Max-Forwards: 69
Supported: 100rel, replaces
Contact: <sip:201@165.213.66.132:5060>
Proxy-Authorization: Digest
username="82312794329",realm="165.213.66.93",nonce="50f4a13551178946b5da191d8889563a
",uri="sip:miyoung4692@samsung.com:5060",response="cbe5b4057c50a1a7afdfed1b779a9207
",algorithm=MD5,cnonce="ad3b601a",qop=auth,n
Content-Type: application/sdp
Content-Length: 255

v=0
o=SAMSUNG_SIP_GATEWAY 2906349544 1 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30002 RTP/AVP 18 4 8 101
a=rtpmap:18 G729/8000
a=rtpmap:4 G723/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Alpha_Outbound F7

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk30593106abba9703b6b6b4448, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-481bf69f-ad3b601a-7dd4161c
From: <sip:sungwoo1769@samsung.com:5060>;tag=1daa550-8442d5a5-13c4-50017-481bf69f-
14e8e4d4-481bf69f
To: <sip:miyoung4692@samsung.com:5060>
Call-ID: 1dad198-8442d5a5-13c4-50017-481bf69f-2664efd6-481bf69f
Date: Tue, 06 May 2008 09:57:48 GMT
CSeq: 2 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:miyoung4692@165.213.66.56:5060;transport=udp>
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Content-Length: 0
```

Alpha_Outbound F8

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk30593106abba9703b6b6b4448, SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-481bf69f-ad3b601a-7dd4161c
From: <sip:sungwoo1769@samsung.com:5060>;tag=1daa550-8442d5a5-13c4-50017-481bf69f-14e8e4d4-481bf69f
To: <sip:miyoung4692@samsung.com:5060>;tag=00141ca537d4180737ec0e9b-76545d39
Call-ID: 1dad198-8442d5a5-13c4-50017-481bf69f-2664efd6-481bf69f
Date: Tue, 06 May 2008 09:57:49 GMT
CSeq: 2 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:miyoung4692@165.213.66.56:5060;transport=udp>
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Content-Length: 0

Alpha_Outbound F9

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-481bf69f-ad3b601a-7dd4161c
From: <sip:sungwoo1769@samsung.com:5060>;tag=1daa550-8442d5a5-13c4-50017-481bf69f-14e8e4d4-481bf69f
To: <sip:miyoung4692@samsung.com:5060>;tag=00141ca537d4180737ec0e9b-76545d39
Call-ID: 1dad198-8442d5a5-13c4-50017-481bf69f-2664efd6-481bf69f
Date: Tue, 06 May 2008 09:57:49 GMT
CSeq: 2 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:miyoung4692@165.213.66.56:5060;transport=udp>
Allow: ACK, BYE, CANCEL, INVITE, NOTIFY, OPTIONS, REFER, REGISTER, UPDATE
Content-Length: 0

Alpha_Outbound F10

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk30593106abba9703b6b6b4448, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-481bf69f-ad3b601a-7dd4161c
From: <sip:sungwoo1769@samsung.com:5060>;tag=1daa550-8442d5a5-13c4-50017-481bf69f-
14e8e4d4-481bf69f
To: <sip:miyoung4692@samsung.com:5060>;tag=00141ca537d4180737ec0e9b-76545d39
Call-ID: 1dad198-8442d5a5-13c4-50017-481bf69f-2664efd6-481bf69f
Date: Tue, 06 May 2008 09:58:03 GMT
CSeq: 2 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:miyoung4692@165.213.66.56:5060;transport=udp>
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Supported: replaces,join,norefersub
Content-Length: 206
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 9402 0 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 29762 RTP/AVP 8 101
c=IN IP4 165.213.66.56
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv
```

Alpha_Outbound F11

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-481bf69f-ad3b601a-
7dd4161c
From: <sip:sungwoo1769@samsung.com:5060>;tag=1daa550-8442d5a5-13c4-50017-481bf69f-
14e8e4d4-481bf69f
To: <sip:miyoung4692@samsung.com:5060>;tag=00141ca537d4180737ec0e9b-76545d39
Call-ID: 1dad198-8442d5a5-13c4-50017-481bf69f-2664efd6-481bf69f
Date: Tue, 06 May 2008 09:58:03 GMT
CSeq: 2 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:miyoung4692@165.213.66.56:5060;transport=udp>
Allow: ACK, BYE, CANCEL, INVITE, NOTIFY, OPTIONS, REFER, REGISTER, UPDATE
Supported: replaces, join, norefersub
Content-Length: 206
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 9402 0 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 29762 RTP/AVP 8 101
c=IN IP4 165.213.66.56
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv
```

Alpha_Outbound F12

```
ACK sip:miyoung4692@165.213.66.56:5060;transport=udp SIP/2.0
From: <sip:sungwoo1769@samsung.com:5060>;tag=1daa550-8442d5a5-13c4-50017-481bf69f-
14e8e4d4-481bf69f
To: <sip:miyoung4692@samsung.com:5060>;tag=00141ca537d4180737ec0e9b-76545d39
Call-ID: 1dad198-8442d5a5-13c4-50017-481bf69f-2664efd6-481bf69f
CSeq: 2 ACK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-481bf6ad-ad3b94f4-56dc0270
Max-Forwards: 70
Contact: <sip:201@165.213.66.132:5060>
Proxy-Authorization: Digest
username="82312794329",realm="165.213.66.93",nonce="50f4a13551178946b5da191d8889563a
",uri="sip:miyoung4692@samsung.com:5060",response="cbe5b4057c50a1a7afdfed1b779a9207
",algorithm=MD5,cnonce="ad3b601a",qop=auth,n
Content-Length: 0
```

Alpha_Outbound F13

```
ACK sip:miyoung4692@165.213.66.56:5060 SIP/2.0
From: <sip:sungwoo1769@samsung.com:5060>;tag=1daa550-8442d5a5-13c4-50017-481bf69f-
14e8e4d4-481bf69f
To: <sip:miyoung4692@samsung.com:5060>;tag=00141ca537d4180737ec0e9b-76545d39
Call-ID: 1dad198-8442d5a5-13c4-50017-481bf69f-2664efd6-481bf69f
CSeq: 2 ACK
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bkf826b940a89e2bf9c9ccb63b8, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-481bf6ad-ad3b94f4-56dc0270
Max-Forwards: 69
Contact: <sip:201@165.213.66.132:5060>
Proxy-Authorization: Digest
username="82312794329",realm="165.213.66.93",nonce="50f4a13551178946b5da191d8889563a
",uri="sip:miyoung4692@samsung.com:5060",response="cbe5b4057c50a1a7afdfed1b779a9207
",algorithm=MD5,cnonce="ad3b601a",qop=auth,n
Content-Length: 0
```

3.5.3.Incoming Alphanumeric Username

As mentioned before, receiving an INVITE message which contains digit-only called number in its To Header and mapping it to digit-only station number can be done by setting MMC714 table alone. When OfficeServ, however, is receiving an INVITE message which contains alphanumeric called number, it has to have additional table which maps the alphanumeric value to digit-only station number in order to decide which station to receive the call because generic MMC714 table only accepts digit value. As in the case of outgoing alphanumeric username, OfficeServ has this alphanumeric-to-digit conversion mechanism in MMC839 table.

MMC839 SIP USER

```
SP1-001
        USERNAME: sungwoo1769
        AUTH UID:
        AUTH PWD:
        TEL NO: 201
OPP0001
        SITE URL: miyoung4692
        TEL NO: 4692
        CLI NAME: sungwoo1769
```

In above example, OfficeServ converts the alphanumeric value (sungwoo1769) in USERNAME field into digit value (201) specified in TEL NO field. The TEL NO value can be some other value which is different from actual station number because this number will be mapped to a value in generic MMC714 DID table, which originally has a role of mapping the called number to station number. To eliminate confusion, however, I recommend using station number directly in MMC839 and set the same value in MMC714 DID table as well.

Following is the MMC714 table setting example. (Set by Default)

MMC714 DID DIGIT

DID DIGIT (001)
DGT: *2***
1: *B*
2: *B*

As we can see in the example, the alphanumeric value (sungwoo1769) is converted into a digit number (201) in MMC839 and the digit value is mapped to station DID number in MMC714.

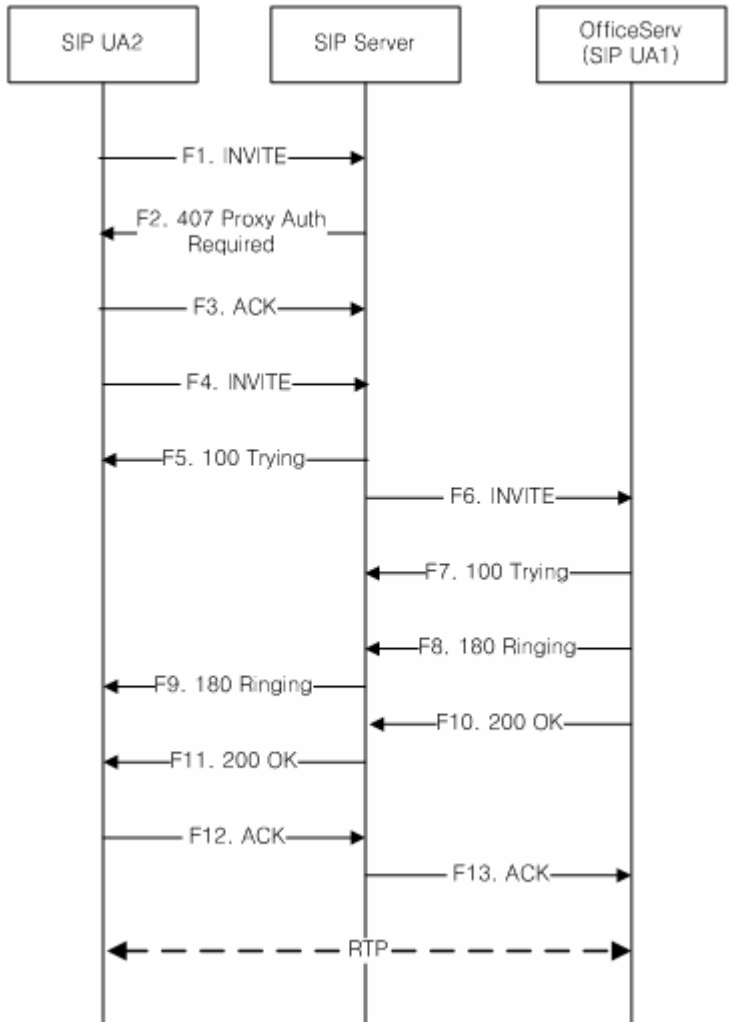

Figure 16. Basic Inbound Call using Alphanumeric Username

Alpha_Inbound F1

```
INVITE sip:sungwoo1769@samsung.com SIP/2.0
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK4cca955e
From: "miyoung4692" <sip:miyoung4692@samsung.com>;tag=00141ca537d419223d1941c5-
446f68e0
To: <sip:sungwoo1769@samsung.com>
Call-ID: 00141ca5-37d4001c-4e49091c-778516b0@165.213.66.56
Max-Forwards: 70
Date: Tue, 06 May 2008 23:31:12 GMT
CSeq: 101 INVITE
User-Agent: Cisco-CP7960G/8.0
Contact: <sip:miyoung4692@165.213.66.56:5060;transport=udp>
Expires: 180
Accept: application/sdp
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Supported: replaces,join,norefersub
Content-Length: 277
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 2307 0 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 16884 RTP/AVP 0 8 18 101
c=IN IP4 165.213.66.56
a=rtpmap:0 PCMU/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:18 G729/8000
a=fmtp:18 annexb=no
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv
```

Alpha_ Inbound F2

```
SIP/2.0 407 Proxy Authentication Required
To: <sip:sungwoo1769@samsung.com>
From: "miyoung4692" <sip:miyoung4692@samsung.com>;tag=00141ca537d419223d1941c5-
446f68e0
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK4cca955e
CSeq: 101 INVITE
Call-ID: 00141ca5-37d4001c-4e49091c-778516b0@165.213.66.56
Proxy-Authenticate: Digest
realm="165.213.66.93",qop="auth",algorithm="MD5",nonce="f4dbd55bb4c39efaca9a82f27e5d
c61f"
Content-Length: 0
```

Alpha_ Inbound F3

```
ACK sip:sungwoo1769@samsung.com SIP/2.0
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK4cca955e
From: "miyoung4692" <sip:miyoung4692@samsung.com>;tag=00141ca537d419223d1941c5-
446f68e0
To: <sip:sungwoo1769@samsung.com>
Call-ID: 00141ca5-37d4001c-4e49091c-778516b0@165.213.66.56
Date: Tue, 06 May 2008 23:31:12 GMT
CSeq: 101 ACK
Content-Length: 0
```

Alpha_Inbound F4

```
INVITE sip:sungwoo1769@samsung.com SIP/2.0
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK70bea949
From: "miyoung4692" <sip:miyoung4692@samsung.com>;tag=00141ca537d419223d1941c5-
446f68e0
To: <sip:sungwoo1769@samsung.com>
Call-ID: 00141ca5-37d4001c-4e49091c-778516b0@165.213.66.56
Max-Forwards: 70
Date: Tue, 06 May 2008 23:31:12 GMT
CSeq: 102 INVITE
User-Agent: Cisco-CP7960G/8.0
Contact: <sip:miyoung4692@165.213.66.56:5060;transport=udp>
Proxy-Authorization: Digest
username="82312794630",realm="165.213.66.93",uri="sip:sungwoo1769@samsung.com",respons
e="20b39d6bd8d06efb2e7000c21a1dd36d",nonce="f4dbd55bb4c39efaca9a82f27e5dc61f",cn
once="7f9905e7",qop="auth",nc=00000001,algori
Expires: 180
Accept: application/sdp
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Supported: replaces,join,norefersub
Content-Length: 277
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 2307 0 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 16884 RTP/AVP 0 8 18 101
c=IN IP4 165.213.66.56
a=rtpmap:0 PCMU/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:18 G729/8000
a=fmtp:18 annexb=no
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv
```

Alpha_ Inbound F5

```
SIP/2.0 100 Trying
To: <sip:sungwoo1769@samsung.com>
From: "miyoung4692" <sip:miyoung4692@samsung.com>;tag=00141ca537d419223d1941c5-
446f68e0
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK70bea949
CSeq: 102 INVITE
Call-ID: 00141ca5-37d4001c-4e49091c-778516b0@165.213.66.56
Server: ININ-samsung-k1o0rnf-20847703
Content-Length: 0
```

Alpha_Inbound F6

```
INVITE sip:sungwoo1769@165.213.66.132:5060 SIP/2.0
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bkdd303660bac68ac5b4ab29589, SIP/2.0/UDP
165.213.66.56:5060;branch=z9hG4bK70bea949
From: "miyoung4692" <sip:miyoung4692@samsung.com>;tag=00141ca537d419223d1941c5-
446f68e0
To: <sip:sungwoo1769@samsung.com>
Call-ID: 00141ca5-37d4001c-4e49091c-778516b0@165.213.66.56
Max-Forwards: 69
Date: Tue, 06 May 2008 23:31:12 GMT
CSeq: 102 INVITE
User-Agent: Cisco-CP7960G/8.0
Contact: <sip:miyoung4692@165.213.66.56:5060;transport=udp>
Proxy-Authorization: Digest
username="82312794630",realm="165.213.66.93",uri="sip:sungwoo1769@samsung.com",respons
e="20b39d6bd8d06efb2e7000c21a1dd36d",nonce="f4dbd55bb4c39efaca9a82f27e5dc61f",cn
once="7f9905e7",qop="auth",nc=00000001,algori
Expires: 180
Accept: application/sdp
Allow: ACK, BYE, CANCEL, INVITE, NOTIFY, OPTIONS, REFER, REGISTER, UPDATE
Supported: replaces, join, norefersub
Content-Length: 277
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 2307 0 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 16884 RTP/AVP 0 8 18 101
c=IN IP4 165.213.66.56
a=rtpmap:0 PCMU/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:18 G729/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:18 annexb=no
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv
```

Alpha_ Inbound F7

```
SIP/2.0 100 Trying
From: "miyoung4692"<sip:miyoung4692@samsung.com>;tag=00141ca537d419223d1941c5-
446f68e0
To: <sip:sungwoo1769@samsung.com>
Call-ID: 00141ca5-37d4001c-4e49091c-778516b0@165.213.66.56
CSeq: 102 INVITE
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bkdd303660bac68ac5b4ab29589
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK70bea949
Supported: 100rel,replaces
Contact: <sip:sungwoo1769@165.213.66.132:5060>
Content-Length: 0
```

Alpha_ Inbound F8

```
SIP/2.0 180 Ringing
From: "miyoung4692"<sip:miyoung4692@samsung.com>;tag=00141ca537d419223d1941c5-
446f68e0
To: <sip:sungwoo1769@samsung.com>;tag=1da5a08-8442d5a5-13c4-50017-481cb53f-61851fc-
481cb53f
Call-ID: 00141ca5-37d4001c-4e49091c-778516b0@165.213.66.56
CSeq: 102 INVITE
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bkdd303660bac68ac5b4ab29589
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK70bea949
Supported: 100rel,replaces
Contact: <sip:sungwoo1769@165.213.66.132:5060>
Content-Length: 0
```

Alpha_ Inbound F9

```
SIP/2.0 180 Ringing
From: "miyoung4692" <sip:miyoung4692@samsung.com>;tag=00141ca537d419223d1941c5-
446f68e0
To: <sip:sungwoo1769@samsung.com>;tag=1da5a08-8442d5a5-13c4-50017-481cb53f-61851fc-
481cb53f
Call-ID: 00141ca5-37d4001c-4e49091c-778516b0@165.213.66.56
CSeq: 102 INVITE
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK70bea949
Supported: 100rel, replaces
Contact: <sip:sungwoo1769@165.213.66.132:5060>
Content-Length: 0
```

Alpha_Inbound F10

```
SIP/2.0 200 OK
From: "miyoung4692"<sip:miyoung4692@samsung.com>;tag=00141ca537d419223d1941c5-
446f68e0
To: <sip:sungwoo1769@samsung.com>;tag=1da5a08-8442d5a5-13c4-50017-481cb53f-61851fc-
481cb53f
Call-ID: 00141ca5-37d4001c-4e49091c-778516b0@165.213.66.56
CSeq: 102 INVITE
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bkdd303660bac68ac5b4ab29589
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK70bea949
Supported: 100rel,replaces
Contact: <sip:sungwoo1769@165.213.66.132:5060>
Content-Type: application/sdp
Content-Length: 205

v=0
o=SAMSUNG_SIP_GATEWAY 2955152194 0 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30010 RTP/AVP 8 101
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Alpha_Inbound F11

```
SIP/2.0 200 OK
From: "miyoung4692" <sip:miyoung4692@samsung.com>;tag=00141ca537d419223d1941c5-
446f68e0
To: <sip:sungwoo1769@samsung.com>;tag=1da5a08-8442d5a5-13c4-50017-481cb53f-61851fc-
481cb53f
Call-ID: 00141ca5-37d4001c-4e49091c-778516b0@165.213.66.56
CSeq: 102 INVITE
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK70bea949
Supported: 100rel, replaces
Contact: <sip:sungwoo1769@165.213.66.132:5060>
Content-Type: application/sdp
Content-Length: 205

v=0
o=SAMSUNG_SIP_GATEWAY 2955152194 0 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30010 RTP/AVP 8 101
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Alpha_ Inbound F9

```
ACK sip:sungwoo1769@165.213.66.132:5060 SIP/2.0
Via: SIP/2.0/UDP 165.213.66.56:5060;branch=z9hG4bK186572f3
From: "miyoung4692" <sip:miyoung4692@samsung.com>;tag=00141ca537d419223d1941c5-
446f68e0
To: <sip:sungwoo1769@samsung.com>;tag=1da5a08-8442d5a5-13c4-50017-481cb53f-61851fc-
481cb53f
Call-ID: 00141ca5-37d4001c-4e49091c-778516b0@165.213.66.56
Max-Forwards: 70
Date: Tue, 06 May 2008 23:31:15 GMT
CSeq: 102 ACK
User-Agent: Cisco-CP7960G/8.0
Proxy-Authorization: Digest
username="82312794630",realm="165.213.66.93",uri="sip:sungwoo1769@samsung.com",respons
e="20b39d6bd8d06efb2e7000c21a1dd36d",nonce="f4dbd55bb4c39efaca9a82f27e5dc61f",cn
once="7f9905e7",qop="auth",nc=00000001,algori
Content-Length: 0
```

Alpha_ Inbound F9

```
ACK sip:sungwoo1769@165.213.66.132:5060 SIP/2.0
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bkd070bf63bde8d9a295b33b3c2, SIP/2.0/UDP
165.213.66.56:5060;branch=z9hG4bK186572f3
From: "miyoung4692" <sip:miyoung4692@samsung.com>;tag=00141ca537d419223d1941c5-
446f68e0
To: <sip:sungwoo1769@samsung.com>;tag=1da5a08-8442d5a5-13c4-50017-481cb53f-61851fc-
481cb53f
Call-ID: 00141ca5-37d4001c-4e49091c-778516b0@165.213.66.56
Max-Forwards: 69
Date: Tue, 06 May 2008 23:31:15 GMT
CSeq: 102 ACK
User-Agent: Cisco-CP7960G/8.0
Proxy-Authorization: Digest
username="82312794630",realm="165.213.66.93",uri="sip:sungwoo1769@samsung.com",respons
e="20b39d6bd8d06efb2e7000c21a1dd36d",nonce="f4dbd55bb4c39efaca9a82f27e5dc61f",cn
once="7f9905e7",qop="auth",nc=00000001,algori
Content-Length: 0
```

3.5.4.Multiple Alphanumeric Usernames

Previous sections so far has described how to set OfficeServ's MMC databases in order to support an alphanumeric username. Then, it is high time to talk about how to make OfficeServ support multiple alphanumeric usernames.

> Actually I could have started explaining this from the beginning of alphanumeric username section because in real life OfficeServ is likely to have to support multiple alphanumeric usernames than to support a single alphanumeric username. But, if there were not for preliminary explanation made in previous chapters, readers of this document would be baffled or annoyed finding themselves still trying to understand what on earth is going on. I hope you have read thoroughly the sections from 3.5.1 to 3.5.3 and be ready to keep going. If not clearly understood yet, please go get some nice coffee and take a break, then go through the previous sections again. I know it may not be easy to understand the OfficeServ's internal mechanism of supporting alphanumeric username, especially for those who are not familiar with SIP and OfficeServ's MMC settings because even I and my officemate Ms. Jinsoo Eo, who programmed this part, sometimes forget how to setup alphanumeric support.

If understood previous sections, it is relatively easy to set multiple alphanumeric usernames in MMC database. Let's assume that OfficeServ has been assigned one primary alphanumeric username (sungwoo1769) and one secondary alphanumeric username (tigerwoods). In this scenario, a registrar server requires authentication credential based on the primary alphanumeric username for both primary and secondary usernames. And OfficeServ system has two legacy stations (201 and 202) whose number will be mapped to each of the alphanumeric SIP username. Following shows how to setup MMC databases.

MMC839 SIP USER

SP1-001
- USERNAME: *sungwoo1769*
- AUTH UID:
- AUTH PWD:
- TEL NO: *201*

SP1-002
- USERNAME: *tigerwoods*
- AUTH UID:
- AUTH PWD:
- TEL NO: *202*

OPP0001
- SITE URL: *miyoung4692*
- TEL NO: *4692*
- CLI NAME: *sungwoo1769*

SP-1 means 'Service Provider #1' and currently OfficeServ supports only one SIP Carrier at a time, therefore it should always be SP-1. From whichever station we make an outbound call dialing '4692', OfficeServ will put 'miyoung4692' in To Header and 'sungwoo1769' in From Header of the outgoing INVITE message.

As to call receiving case, OfficeServ first checks value in To Header of a incoming INVITE message and converts the alphanumeric value to a digit value specified in TEL NO field, which finally decides a station to receive the call.

3.6. SIP Trunking Related MMC837 Options

This section describes miscellaneous MMC837 database options which are related to SIP trunking message formats or call flows. As different SIP servers in different SIP carriers may require each different message specification or call flows, OfficeServ operator should adjust following MMC837 options in accordance with the server's request.

3.6.1.Proxy Name field

Values in this field will override the URL part in FROM and TO header of OfficeServ's SIP messages. If some SIP carrier may want to receive SIP messages whose TO and FROM headers contain a value that is different from its outbound server domain name. In this case, we need to put the designated value into this PROXY NAME field. Unless designated, its value will remain as NULL and a value specified in OUT PROXY field will be used.

MMC837 SIP OPTIONS

ISP1
SIP SERVER: *ENABLE*
OUT PROXY: *samsung.com*
PROXY NAME: *sec.samsung.com*
DNS SERVER1: *165.213.66.93*
USER NAME: *sungwoo1769*
AUTH USER: *82312794329*
AUTH PSWD: *1234*
REG PER USR: *DISABLE*
TRK REG EXP: *001800*

Note that changing a value in PROXY NAME field simply changes the URL part of SIP messages and does not affect the messages' outbound address nor DNS query result for outbound server.

When PROXY NAME is set to sec.samsung.com

```
INVITE sip:miyoung4692@sec.samsung.com:5060 SIP/2.0
From: <sip:sungwoo1769@sec.samsung.com:5060>;tag=1da1f48-8442d5a5-13c4-50017-
481e0956-7c9fbda1-481e0956
To: <sip:miyoung4692@sec.samsung.com:5060>
Call-ID: 1da7dc0-8442d5a5-13c4-50017-481e0956-3f15e5d3-481e0956
CSeq: 2 INVITE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-481e0956-b5547a48-294c66f5
Max-Forwards: 70
Supported: 100rel,replaces
Contact: <sip:201@165.213.66.132:5060>
```

When PROXY NAME is set to NULL

```
INVITE sip:miyoung4692@samsung.com:5060 SIP/2.0
From: <sip:sungwoo1769@samsung.com:5060>;tag=1da1f48-8442d5a5-13c4-50017-481e0956-
7c9fbda1-481e0956
To: <sip:miyoung4692@samsung.com:5060>
Call-ID: 1da7dc0-8442d5a5-13c4-50017-481e0956-3f15e5d3-481e0956
CSeq: 2 INVITE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-481e0956-b5547a48-294c66f5
Max-Forwards: 70
Supported: 100rel,replaces
Contact: <sip:201@165.213.66.132:5060>
```

3.6.2.Session TMR

If this SESSION TMR option is set to 'UPDATE' or 'REINVITE', OfficeServ system puts a 'Session Expires' header into its outbound INVITE messages. Session Timer is used to refresh an active SIP session by sending a SIP request message to the other peer. The SIP request messages can be either UPDATE or re-INVITE, and the request messages are sent at each time period whose interval is specified in SESSION EXP field. If the refresher never gets the answer (200 OK) for the refresh request, it sends a BYE message to disconnect the SIP session. For more detailed, please refer to RFC4028.

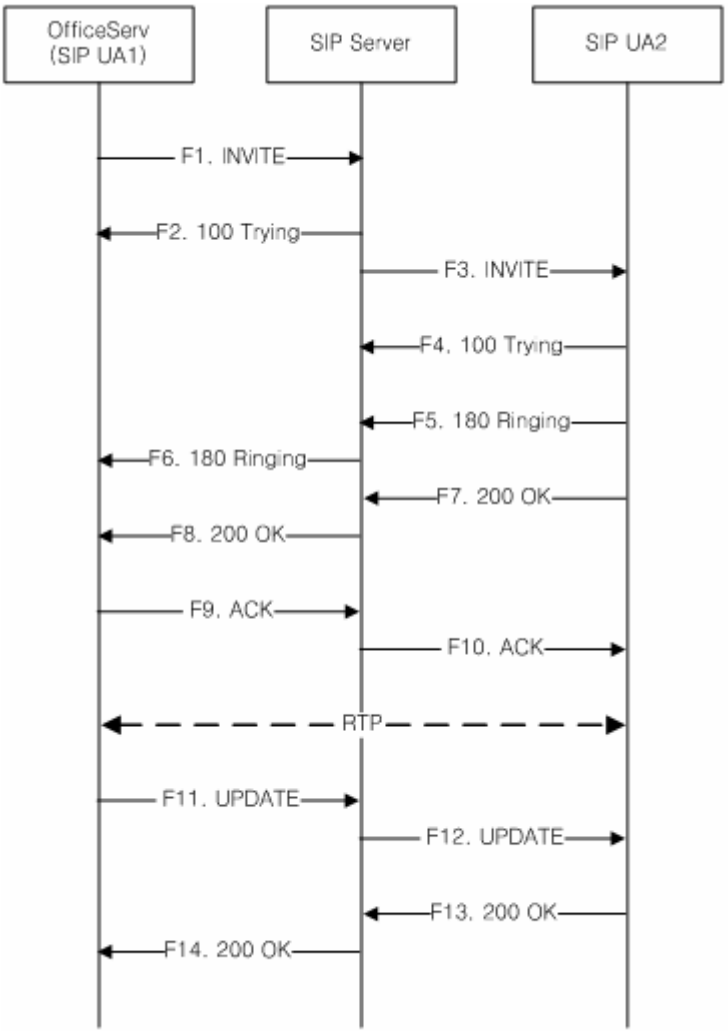

Figure 17. Session Refreshed by OfficeServ

In following example, as SESSION TMR is set to UPDATE and SESSION EXP is set to 90 (sec), OfficeServ system sends UPDATE message at every 45 seconds which is the half of the value in Session Expires header.

MMC837 SIP OPTIONS

ISP1
SIP SERVER: *ENABLE*
OUT PROXY: *samsung.com*
DNS SERVER1: *165.213.66.93*
USER NAME: *82312794329*
AUTH USER: *82312794329*
AUTH PSWD: *1234*
REG PER USR: *DISABLE*
SESSION TMR: *DUPATE*
SESSION EXP: *000090*
TRK REG EXP: *001800*

Session_exp F1

```
INVITE sip:82312794630@samsung.com:5060 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1d8d8e0-8442d5a5-13c4-50017-481ea4a6-
1dd3f936-481ea4a6
To: <sip:82312794630@samsung.com:5060>
Call-ID: 1d931f8-8442d5a5-13c4-50017-481ea4a6-10022218-481ea4a6
CSeq: 1 INVITE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-481ea4a6-b7b32bb8-5fd6cf50
Max-Forwards: 70
Supported: timer,100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Session-Expires: 90;refresher=uac
Min-SE: 45
Content-Type: application/sdp
Content-Length: 255

v=0
o=SAMSUNG_SIP_GATEWAY 3081972664 0 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30002 RTP/AVP 18 4 8 101
a=rtpmap:18 G729/8000
a=rtpmap:4 G723/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Session_exp F2

```
SIP/2.0 100 Trying
To: <sip:82312794630@samsung.com:5060>
From: <sip:82312794329@samsung.com:5060>;tag=1d8d8e0-8442d5a5-13c4-50017-481ea4a6-
1dd3f936-481ea4a6
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-481ea4a6-b7b32bb8-
5fd6cf50
CSeq: 1 INVITE
Call-ID: 1d931f8-8442d5a5-13c4-50017-481ea4a6-10022218-481ea4a6
Server: ININ-samsung-k1o0rnf-20847703
Content-Length: 0
```

Session_exp F3

```
INVITE sip:82312794630@165.213.66.56:5060 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1d8d8e0-8442d5a5-13c4-50017-481ea4a6-
1dd3f936-481ea4a6
To: <sip:82312794630@samsung.com:5060>
Call-ID: 1d931f8-8442d5a5-13c4-50017-481ea4a6-10022218-481ea4a6
CSeq: 1 INVITE
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bke1adb56ad8083a9d7275eaf32, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-481ea4a6-b7b32bb8-5fd6cf50
Max-Forwards: 69
Supported: timer, 100rel, replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Session-Expires: 90;refresher=uac
Min-SE: 45
Content-Type: application/sdp
Content-Length: 255

v=0
o=SAMSUNG_SIP_GATEWAY 3081972664 0 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30002 RTP/AVP 18 4 8 101
a=rtpmap:18 G729/8000
a=rtpmap:4 G723/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Session_exp F4

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bke1adb56ad8083a9d7275eaf32, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-481ea4a6-b7b32bb8-5fd6cf50
From: <sip:82312794329@samsung.com:5060>;tag=1d8d8e0-8442d5a5-13c4-50017-481ea4a6-
1dd3f936-481ea4a6
To: <sip:82312794630@samsung.com:5060>
Call-ID: 1d931f8-8442d5a5-13c4-50017-481ea4a6-10022218-481ea4a6
Date: Thu, 08 May 2008 10:45:18 GMT
CSeq: 1 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Content-Length: 0
```

Session_exp F5

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bke1adb56ad8083a9d7275eaf32, SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-481ea4a6-b7b32bb8-5fd6cf50
From: <sip:82312794329@samsung.com:5060>;tag=1d8d8e0-8442d5a5-13c4-50017-481ea4a6-1dd3f936-481ea4a6
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d41c0d7959f2e9-622db6fd
Call-ID: 1d931f8-8442d5a5-13c4-50017-481ea4a6-10022218-481ea4a6
Date: Thu, 08 May 2008 10:45:18 GMT
CSeq: 1 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Content-Length: 0

Session_exp F6

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-481ea4a6-b7b32bb8-5fd6cf50
From: <sip:82312794329@samsung.com:5060>;tag=1d8d8e0-8442d5a5-13c4-50017-481ea4a6-1dd3f936-481ea4a6
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d41c0d7959f2e9-622db6fd
Call-ID: 1d931f8-8442d5a5-13c4-50017-481ea4a6-10022218-481ea4a6
Date: Thu, 08 May 2008 10:45:18 GMT
CSeq: 1 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Allow: ACK, BYE, CANCEL, INVITE, NOTIFY, OPTIONS, REFER, REGISTER, UPDATE
Content-Length: 0

Session_exp F7

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bke1adb56ad8083a9d7275eaf32, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-481ea4a6-b7b32bb8-5fd6cf50
From: <sip:82312794329@samsung.com:5060>;tag=1d8d8e0-8442d5a5-13c4-50017-481ea4a6-
1dd3f936-481ea4a6
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d41c0d7959f2e9-622db6fd
Call-ID: 1d931f8-8442d5a5-13c4-50017-481ea4a6-10022218-481ea4a6
Date: Thu, 08 May 2008 10:45:19 GMT
CSeq: 1 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Supported: replaces,join,norefersub
Content-Length: 207
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 21377 0 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 29472 RTP/AVP 8 101
c=IN IP4 165.213.66.56
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv
```

Session_exp F8

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-481ea4a6-b7b32bb8-
5fd6cf50
From: <sip:82312794329@samsung.com:5060>;tag=1d8d8e0-8442d5a5-13c4-50017-481ea4a6-
1dd3f936-481ea4a6
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d41c0d7959f2e9-622db6fd
Call-ID: 1d931f8-8442d5a5-13c4-50017-481ea4a6-10022218-481ea4a6
Date: Thu, 08 May 2008 10:45:19 GMT
CSeq: 1 INVITE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Allow: ACK, BYE, CANCEL, INVITE, NOTIFY, OPTIONS, REFER, REGISTER, UPDATE
Supported: replaces, join, norefersub
Content-Length: 207
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 21377 0 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 29472 RTP/AVP 8 101
c=IN IP4 165.213.66.56
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv
```

Session_exp F9

```
ACK sip:82312794630@165.213.66.56:5060;transport=udp SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1d8d8e0-8442d5a5-13c4-50017-481ea4a6-
1dd3f936-481ea4a6
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d41c0d7959f2e9-622db6fd
Call-ID: 1d931f8-8442d5a5-13c4-50017-481ea4a6-10022218-481ea4a6
CSeq: 1 ACK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-481ea4a8-b7b332e8-112f2434
Max-Forwards: 70
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

Session_exp F10

```
ACK sip:82312794630@165.213.66.56:5060 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1d8d8e0-8442d5a5-13c4-50017-481ea4a6-
1dd3f936-481ea4a6
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d41c0d7959f2e9-622db6fd
Call-ID: 1d931f8-8442d5a5-13c4-50017-481ea4a6-10022218-481ea4a6
CSeq: 1 ACK
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk57281bfc7a05dfda822819e38, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-481ea4a8-b7b332e8-112f2434
Max-Forwards: 69
Contact: <sip:82312794329@165.213.66.132:5060>
Content-Length: 0
```

Session_exp F11

```
UPDATE sip:82312794630@165.213.66.56:5060;transport=udp SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1d8d8e0-8442d5a5-13c4-50017-481ea4a6-
1dd3f936-481ea4a6
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d41c0d7959f2e9-622db6fd
Call-ID: 1d931f8-8442d5a5-13c4-50017-481ea4a6-10022218-481ea4a6
CSeq: 2 UPDATE
Via: SIP/2.0/UDP 165.213.66.132:5060;rport;branch=z9hG4bK-481ea4d5-b7b3e2d8-1a850112
Max-Forwards: 70
Supported: timer,100rel,replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Session-Expires: 1800;refresher=uac
Min-SE: 100
Content-Type: application/sdp
Content-Length: 205

v=0
o=SAMSUNG_SIP_GATEWAY 3081972664 1 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30002 RTP/AVP 8 101
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Session_exp F12

```
UPDATE sip:82312794630@165.213.66.56:5060 SIP/2.0
From: <sip:82312794329@samsung.com:5060>;tag=1d8d8e0-8442d5a5-13c4-50017-481ea4a6-
1dd3f936-481ea4a6
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d41c0d7959f2e9-622db6fd
Call-ID: 1d931f8-8442d5a5-13c4-50017-481ea4a6-10022218-481ea4a6
CSeq: 2 UPDATE
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk878219c19d30a08d79327a2e9, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-481ea4d5-b7b3e2d8-1a850112
Max-Forwards: 69
Supported: timer, 100rel, replaces
Contact: <sip:82312794329@165.213.66.132:5060>
Session-Expires: 1800;refresher=uac
Min-SE: 100
Content-Type: application/sdp
Content-Length: 205

v=0
o=SAMSUNG_SIP_GATEWAY 3081972664 1 IN IP4 165.213.66.132
s=SIP_CALL
c=IN IP4 165.213.66.132
t=0 0
m=audio 30002 RTP/AVP 8 101
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=sendrecv
```

Session_exp F13

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.93;branch=z9hG4bk878219c19d30a08d79327a2e9, SIP/2.0/UDP
165.213.66.132:5060;rport=5060;branch=z9hG4bK-481ea4d5-b7b3e2d8-1a850112
From: <sip:82312794329@samsung.com:5060>;tag=1d8d8e0-8442d5a5-13c4-50017-481ea4a6-
1dd3f936-481ea4a6
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d41c0d7959f2e9-622db6fd
Call-ID: 1d931f8-8442d5a5-13c4-50017-481ea4a6-10022218-481ea4a6
Date: Thu, 08 May 2008 10:46:05 GMT
CSeq: 2 UPDATE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Allow: ACK,BYE,CANCEL,INVITE,NOTIFY,OPTIONS,REFER,REGISTER,UPDATE
Content-Length: 207
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 21377 1 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 29472 RTP/AVP 8 101
c=IN IP4 165.213.66.56
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv
```

Session_exp F14

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP 165.213.66.132:5060;rport=5060;branch=z9hG4bK-481ea4d5-b7b3e2d8-
1a850112
From: <sip:82312794329@samsung.com:5060>;tag=1d8d8e0-8442d5a5-13c4-50017-481ea4a6-
1dd3f936-481ea4a6
To: <sip:82312794630@samsung.com:5060>;tag=00141ca537d41c0d7959f2e9-622db6fd
Call-ID: 1d931f8-8442d5a5-13c4-50017-481ea4a6-10022218-481ea4a6
Date: Thu, 08 May 2008 10:46:05 GMT
CSeq: 2 UPDATE
Server: Cisco-CP7960G/8.0
Contact: <sip:82312794630@165.213.66.56:5060;transport=udp>
Allow: ACK, BYE, CANCEL, INVITE, NOTIFY, OPTIONS, REFER, REGISTER, UPDATE
Content-Length: 207
Content-Type: application/sdp
Content-Disposition: session;handling=optional

v=0
o=Cisco-SIPUA 21377 1 IN IP4 165.213.66.56
s=SIP Call
t=0 0
m=audio 29472 RTP/AVP 8 101
c=IN IP4 165.213.66.56
a=rtpmap:8 PCMA/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
a=sendrecv
```

4. SIP Peering Services

SIP peering is relatively simple compared to SIP trunking in that it does not have to concern about registration nor outbound SIP server's behavior. On the other hand, SIP peering's functionalities are more depending on SIP UAs that are being involved in a SIP session and thus it has relatively limited functionalities.

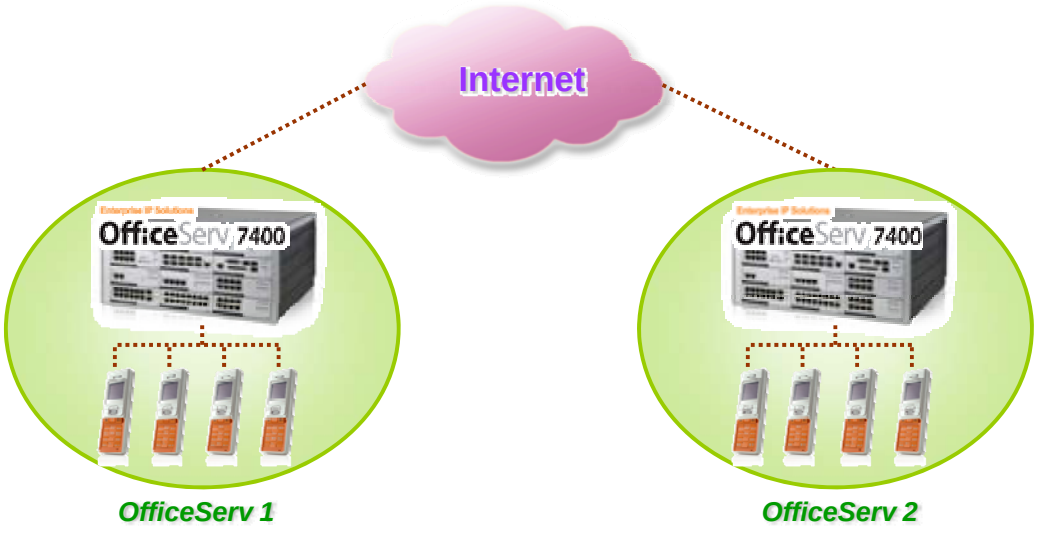

Figure 18. Overall Configuration for SIP Peering mode and SIP Station mode

SIP peer in this context means SIP UA and SIP peering does not need any intermediary SIP server in between two SIP peers. In SIP peering, all the SIP messages are out-bounded toward each other, therefore understanding outbound address setting is essential.

4.1. Basic Call Setup

As mentioned above, to make an outbound call, OfficeServ first needs to know where to send the INVITE message. Once destination is set, OfficeServ can send INVITE message and make a SIP session with the other peer.

MMC832 and MMC833 table contains dialed number-outbound IP address mapping mechanism. Let's look at following MMC example.

MMC832 VOIP OUT DGT

(O:00)
ACCESS DGT: *2* (target destination prefix number)
INSERT DGT:
DGT LENGTH: *1*
IP TABLE: *0*
IP START: *0*
SERVER USE: *NO*
URI TYPE: *SIP*

SERVER USE field is set to 'NO' and this makes OfficeServ set outgoing INVITE message's outbound address to an IP address specified in MMC833 (IP TABLE:0 and IP START index: 0). Note that if the SERVER USE field is set and OfficeServ is legitimately registered to a registrar, it will set the outbound address to an address specified in MMC837 OUT PROXY.

MMC833 VOIP IP ADDR

```
TB (00) ENTRY (00): 165.213.66.91 (target destination ip address)
TB (00) ENTRY (01):
TB (00) ENTRY (02):
.
.
.
TB (01) ENTRY (00):
TB (01) ENTRY (01):
```

MMC833 table contains IP address list which will be specified as an outbound IP address of outgoing message by MMC832 setting. In the above example, MMC832 specifies IP TABLE '0' and IP START '0' which is mapped to TB '0' and ENTRY '00' in MMC833 and finally designates an IP address '165.213.66.91' as an outbound IP address.