A NEW TECHNIQUE OF CALL FORWARDING USING REMOTE MOBILE

Md. Khwaja Muinuddin Chisti[1],M Murali Krishna[2], Koteswaswarao Naik.R[3]
Department of Electronic and Communication Engineering,
GIT, GITAM University,
Visakhapatnam, India

Abstract— **In conventional call forwarding a subscriber can forward his call to another subscriber by configuring his mobile. This paper presents a new approach in which a subscriber can forward his call to another subscriber by configuring his mobile using some available mobile.**

Keywords— *GSM (Global System for Mobile communication), subscriber, SMS (Short Message Service), call forwarding.*

I.   INTRODUCTION

Call forwarding (or call diverting), in telephony, is a feature on the telephone networks that allows an incoming call to a called party, which would be otherwise unavailable, to be redirected to a mobile telephone or other telephone number where the desired called party is situated [1].

Forwarding or Diverting calls can increase one's availability to a caller. Such a feature is provided by an answering machine or voicemail, but some callers do not wish to leave a recorded message, suspecting that the called party will delay in returning their messages. Some businesses find that the human touch can improve contact but traditional wired answering services are expensive, so they have their calls forwarded to a call center, so the client can reach an operator instead of an answering machine or voice mail.

II.   CALL FORWARDING IN GSM/3GSM PHONES

GSM supports four types of call forwarding:

- Forward All Calls: This mode forwards each and every call that comes into your GSM number, unconditionally. This is what most people traditionally think of when you mention call forwarding.
- Forwarding if Busy: This mode forwarding calls that come into your GSM number when your phone is busy. This means that instead of getting a busy signal, the caller is directed to a different phone number.
- Forward if Not Answered: this mode forwards calls that come into your GSM number you fail to answer them. This normally occurs after 15 seconds, but you can change this duration.
- Forward if Out of Reach: This mode forwards calls that come into your GSM number when your phone is either turned off, or out of the service area.

Table 1 illustrates call forwarding in GSM mobiles. By dialing these codes followed by the number of the subscriber you can configure any type of Call Forwarding feature. Codes used with GSM phone [3] listed in Table 2.

Retain in Table 1 means that even if the subscriber turns off the selected call forwarding option, the network retains the last number used. This allows you to turn the forwarding option back on, with the same number as before, by simply entering the "Re-establish" code.
For example:
1. Forward All Calls: To forward all calls to 416-867-5309, you enter: *21*4168675309#
2. Forward if Not Answered: Enter: *61*[Phone Number]*11*[Time]#
For example, to forward to 416-867-5309 after allowing your phone to ring for 25 seconds, you would enter: *61*4168675309*11*25#

TABLE I. CALL FORWARDING IN GSM MOBILES

Forward All Calls	
- Activate	*21*[Phone Number]#
- Cancel & De-register	##21#
- Cancel & Retain	#21#
- Status	*#21#
- Re-establish	*21#
Forward if Busy	
- Activate	*67*[Phone Number]#
- Cancel & De-register	##67#
- Cancel & Retain	#67#
- Status	*#67#
- Re-establish	*67#
Forward if Not Answered	
- Activate	*61*[Phone Number]#
- Cancel & De-register	##61#
- Cancel & Retain	#61#
- Status	*#61#
- Re-establish	*61#
Forward if Out of Reach	
- Activate	*62*[Phone Number]#
- Cancel & De-register	##62#
- Cancel & Retain	#62#
- Status	*#62#
- Re-establish	*62#

TABLE II. CODES USED WITH GSM PHONES

*	Activate
*#	Check status
#	Cancel
##	Cancel and De-register

III. NEW APPROACH IN CALL FORWARDING

The call forwarding to any mobile is done by entering. *type of call forwarding* number to which call is to be forwarded#. This enables the subscriber to turn on the selected call forwarding option and the network retains the number to which the call is to be forwarded. From then onwards when calls come they are forwarded to the number present in the memory. In our approach, we use this existing feature and enable the subscriber to forward his calls to anther subscriber where he can actually answer the call by configuring call forwarding from some available mobile.

This can be explained through an example: consider four people P1, P2, P3, and P4 having four mobile phones M1, M2, M3, and M4 respectively. Here we encounter two situations:

Situation 1: Three phones

Consider that P1 forgot his mobile M1 at home and he is with P2. P1 can initiate call forwarding using P2's mobile M2 by sending an SMS to M1. On receiving the SMS, M1 then sets up call forwarding feature to forward calls to M2 (Fig. 1). When someone (P3) calls M1, the calls are forwarded to Mobile M2 where P1 can actually answer the call (Fig. 2).
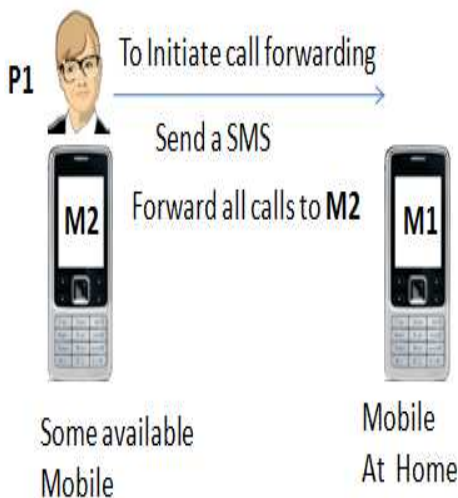

Fig. 1   P1 initiates call forwarding from an available mobile M2
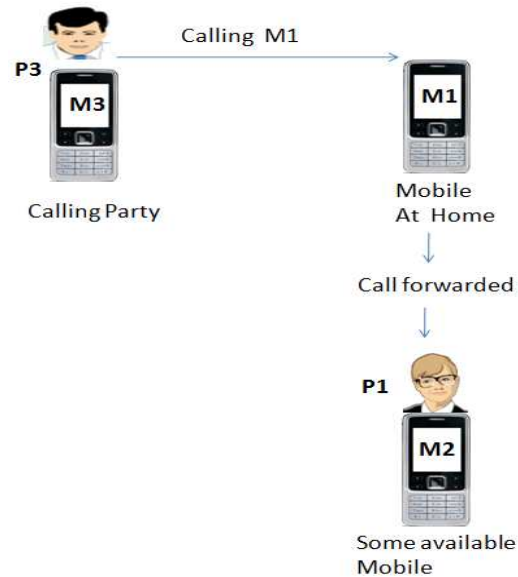

Fig. 2   Calls forwarded to available mobile M2

Situation 2: Four phones

Consider another situation where P1 forgot his mobile at home and he is with P2 and both need to attend a meeting. In this case P1 can initiate call forwarding using P2's mobile M2 to forward calls to mobile M4 where P1's secretary (P4) can answer the calls (Fig. 3). So when P3 calls P1 (M1), calls are forwarded to M4 (Fig. 4).

This idea can be implemented in two steps. The first step is to per-install an application (described in the next section) on M1. The second step is to activate the call forwarding by sending an SMS/CALL or both to M1. From then onwards M1 forwards calls to specified mobile.

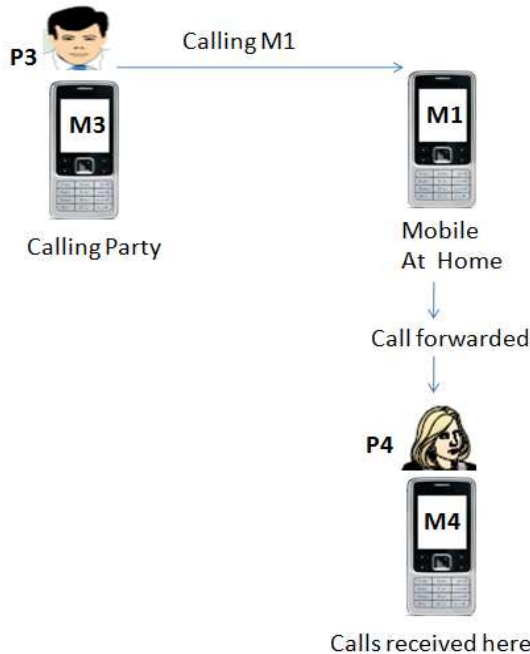Fig. 3   P1 initiates call forwarding from an available mobile M2

Fig. 4 Calls forwarded to available mobile M4

A.   SMS format

To activate call forwarding, the subscriber needs to have some available phone from which he can send an SMS to his mobile (assuming it is not switched off). The sms must be in the format shown in Fig. 5.

Fig. 5 shows how the call forwarding is initialized by P1 using mobile M2. The first block is the command word which specifies the type of call forwarding (Fig. 5) the second block is phone number to which calls are to be forwarded and the third block is the code word of the

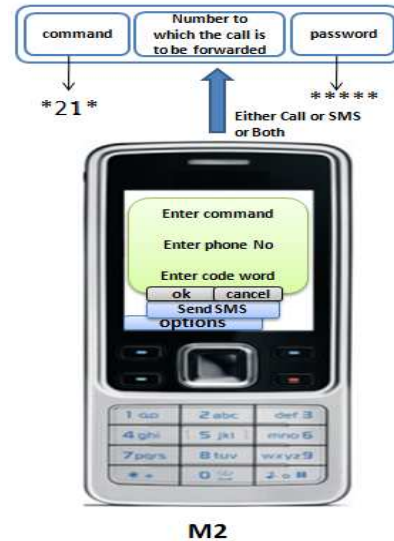subscriber whose calls are to be forwarded.

Fig. 5   SMS Format

B.   Pre-installed Application

The detection of a call forwarding SMS is done by the pre-installed application in the mobile (M1) as shown in Fig 6.
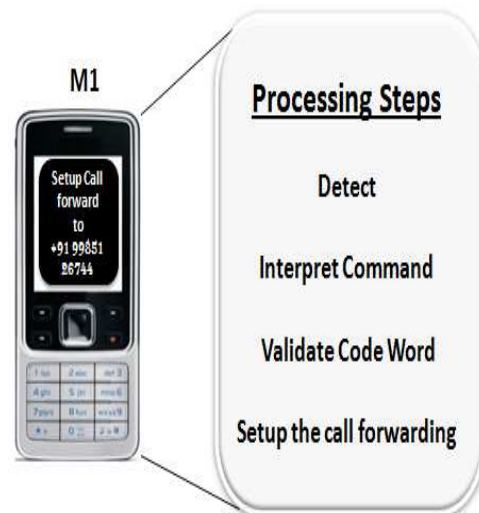

Fig. 6   SMS detection at the mobile M1

This application detects and parses the incoming message and checks for the call forwarding SMS (Fig. 5) sent by actual callee (P1). If it is a call forwarding SMS then it interprets the command (Eg: *21*) and validates the password. If it successfully execute these steps, then it sets up the call forwarding on to the mobile (M1). The setup is done by dialing the sequence of characters (command +

number to which call is to be forwarded).

Eg: dial *21*919985126744# This dialing is done by the pre-installed application. This enables M1 to register with the network to forward the calls (from then onwards) to the mobile number specified in the SMS (Eg: in three phone situation, it is M2).

IV. CONCLUSIONS

In this paper, we have presented a new approach for call forwarding. This approach enables the subscriber to forward his call to another subscriber's mobile phone where he actually can answer the call by configuring call forwarding from some available mobile.

REFERENCES

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