A STUDY ON VARIOUS TECHNIQUES OF MOBILE CALL DIVERSION AND CALL FORWARDING TECHNIQUES IN DUAL SIM MOBILES

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Abstract— **In Cellular Technology, Call Diversion could be an ancient telecommunication service that permits user to forward or direct the incoming mobile calls to associate degree alternate range, in same mobile device or another. User may intend to better to divert incoming calls on to another device. Once call diversion is enabled, the mobile doesn't ring at the first device of the incoming call, however rather at the locations the call had been entertained to. The Call diversion needs the user to manually on the feature and on the feature of the mobile phone. This approach requires a lot more manual intervention even in dual operating SIM handsets. Although current call diversion manages to supply with a capability to direct the call from the initial mobile device to a another one, that might be a land line or workplace phone or just another mobile set, however needs a subscription from the telecommunication company, the price charges might hike supported the situation of the destination range. The mobile call forwarding is often setup and directed via applications, portals.**

Keywords— Android operating system, Cellular networks, Service Providers, Dual SIM Active Dual Stand By Call Forwarding Algorithms, LTE

1. INTRODUCTION

Call forwarding, or call diversion, could be a telecommunication feature of some cellular exchange systems that redirects a telephone to a different destination, which can be, as an example, a subscriber mobile cellular phone, or another mobile number wherever the specified referred to as party is accessible. Telephony call was forwarded line sometimes ring once cue the client victimization device that the call is being redirected. Additional systematically, the forwarded call and receiver device indicates that its condition by call diversion. Telephony usually will send incoming calls to the other domestic number; however, the owner of the forwarded line should pay some toll free or paid charges for diverted calls.

Telephony is commonly enabled by dialing some code followed by the phone range to that calls ought to be forwarded. Telephony is disabled by dialing. This feature needs a subscription from the network suppliers. Collectively obtainable in some areas is Remote Access to cellular mobile telephony, which enables the management over telephony from phones aside from the sender and receiver subscriber's telephone. VOIP and cable phone systems collectively usually enable mobile telephony to be started and directed via their internet portals. Diverting calls can increase receiver's availability to a caller. The main alternative is a receiving mobile phone or voicemail, but some mobile callers do not wish to leave a recorded message, suspecting that the caller mobile will delay returning their messages.

Call diversion to a specified mobile number of one or more of the following situations:

1.**All calls** once all-Call call forwarding is activated by a phone user; all incoming calls are diverted. The target mobile for diverted calls can be laid out in the router configuration or by the phone user with a soft key or feature access number.

2.**No answer Incoming calls** are diverted once the extension doesn't answer before the threshold timeout expires. The target destination for diverted calls is laid out in the network router configuration.

3. **Busy Incoming calls** are diverted once the extension is engaged and call waiting isn't active. The target mobile for diverted calls is selected within the network router configuration.

4.**Night service —all incoming** Night service and all incoming calls are mechanically diverted throughout night-service hours. The target destination for diverted calls is laid out in the network router configuration.

5.**In progress call** —perpetual call on hold or transfer it as per demand. The incoming calls is additionally forwarded. Directory range will have all four style of conditional call

forwarding outlined at an   equivalent time   with a distinct forwarding   destination outlined for   every variety of call forwarding. If quite one variety of call forwarding is active   at only   once,   the   order   for   evaluating the Various sorts are as follows:

1. Call forward night-service
2. Call forward all
3. Call forward busy and call forward no-answer
4. Ongoing call forward

The rest of the paper has been organized as accordingly: Section 2 describes Signal Strength Section 3 describes some Architecture for call forwarding mechanisms. Section 4 describes Comparative analysis on different algorithms Section 5 concludes the paper.
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2. SIGNAL STRENGTH

The quality of the call depends on the strength of the cellular signal of the area. The mobile phone displays current signal strength as a series of vertical or horizontal bars on the left-hand side of its display screen - the more number of bars, the better the signal in the cellular area. If the signal strength is poor, we can try moving the mobile phone slightly to improve reception. If we are using the mobile phone in a building, you may find that reception of signal is better near a window. Signal strength-based call forwarding for wireless phones: A mobile station monitors received signal strength from a base transceiver station, either directly or by monitoring or some other measure of received signal quality, such as the ratio Ec/Io in a CDMA network. When the signal strength drops below a threshold, the mobile station is programmed to automatically send a feature code to the wireless network to activate unconditional call forwarding to a   previously programmed directory number. When the mobile station re-enters the service network, i.e., the signal strength improves to an acceptable level or goes above the threshold, the mobile station automatically sends a feature code   to   turn   off   the unconditional   call   forwarding. Thereafter, incoming phone calls are directed to the mobile station. signal strength from a base transceiver station in a cellular system, for instance, a subscriber's profile may indicate how the service provider should handle or respond to attempts to connect cellular calls to or from a given subscriber. For example, the subscriber's profile may indicate that the subscriber is not allowed to place calls to certain mobile phones, and so the service provider may block any attempt by the subscriber to place calls to those mobile areas. As another example, the subscriber's profile may indicate that some or all calls to the subscriber should be forwarded to another number or to voice mail under certain conditions, and so the service provider may accordingly forward an incoming call under those conditions First, confirm that you have the correct template for your paper size. Maintaining the Integrity of the Specifications
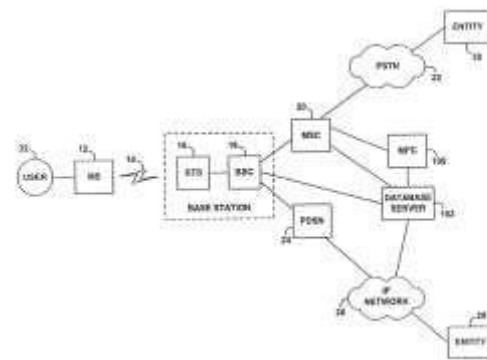
Fig 1. Flow of Mobile Call Establishment

Fig 1: Explains the flow of call establishment mentioned long term Evolution (LTE) exhaustive in the view of technological design,   use,   specifications,   speed, etc., however we'd   like to   recollect its forerunner.   New technologies,   LTE enclosed, wouldn't be   the speedy large it's nowadays while   not learning   from those technologies United   Nations   agency lived   before   it. GSM[13] is one in all them. To with success perceive our future, we   tend   to should perceive our past. So, GSM (Global System for Mobile Communications, originally Groupe Special Mobile), could be a customary set developed by the ecu Telecommunications Standards Institute (ETSI) to explain protocols for second generation (2G) digital cellular networks employed by wireless phones. originally,   the GSM customary was   developed to   switch the primary generation (1G) analog cellular networks, and was represented a digital, circuit switched network optimized for full duplex voice telecommunication. Over time, GSM's capabilities dilated to   the   cellular   mobile knowledge communications, initial by   circuit   switched transport,   then   packet   knowledge transport   via   GPRS (General   Packet   Radio   Services)   and   EDGE (Enhanced knowledge rates for GSM Evolution or EGPRS). Further enhancements to GSM were created once the 3GPP developed third generation (3G) UMTS standards followed by fourth generation (4G) LTE Advanced   and the radio network consists of an outsized variety of BTSs. every BTS is   given associate identity.   These BTSs are classified consistent   with location space, conjointly given associate identity. every MS C/VLR (Mobile   Services change Centre/Visitor Location Register) serves the   BTSs in associate variety of location areas. The GSM phones reports to the network (VLR) once it moves from a BTS in one llocation space to a BTS in another device location space. GSM network apprehend wherever the subscribers are , The VLR continually is aware of during

which location space the GSM subscriber is found in at any given moment. consequently, the HLR continually is aware of that MSC/VLR the GSM subscriber is at additionally. Then, the GSM subscriber's signalling tells the network that HLR the particular GSM subscriber belongs to. GSM transportable. The call is routed through mobile network to the highest master's degree to the known as GSM subscriber. Next, entranceway master's degree checks with HLR, asking "Where is that the GSM subscriber?" at that time, the decision is established to the particular MSC/VLR (Visiting MSC) either directly or

3. ARCHITECTURES FOR CALL FORWARDING

3.1 Automatic event triggered call forwarding mechanism for mobile phone [1] Call forwarding is a traditional cellular telecom service that allows a user to forward or divert incoming calls to another number it may be cellular mobile device or landline. This service requires the customer to manually on and off the feature and therefore may not be very convenient. There is a sophisticated automatic call- forwarding algorithm (CFA) for mobile phones. The application software must be installed in a Smartphone, call forwarding is automatically on (e.g., when the phone is under a charging condition or is turned off) or disabled (e.g., when the phone is low battery level or is turned on). The performance of the CFA was investigated by analysis, simulation, and performance measurement. This study indicates that CFA is very feasible for commercial or business use

3.2 Routing for diverting calls [2] Integrated cellular and ad hoc relaying systems (ICAR)[2] There a new wireless cellular system architecture based on the combination of traditional cellular and modern ad hoc relaying technologies. The ICAR system can balance traffic loads of the cellular mobile phones, increase the device capability capacity cost effectively, reduce transmission power for mobile hosts and extend system coverage by using adhoc relaying stations (ARS) to relay traffic from one cellular network to another dynamically. Thus, the adhoc relaying stations are imported to forwarding a call from a congested cellular cluster (hot spot) to a non-congested cellular cluster, a fast-efficient relaying routing protocol that can reflect the cell's status is needed in ICAR networks. The advantage is time delay of the call establishment is within acceptable range that can basically meet the performance and accuracy of ICAR application.

3.3 Handover between fixed and mobile networks for dual mode [3]. A modern telecommunications system and method for performing a call forwarding between the fine-tuned land lines wired networks and mobile networks during a call placed called and caller a dual mode device, without any noise or interruption in the voice or data connection. Ergo, for calls initiated in the fine-tuned network, once the calling

through the fastened or international phone network. Finally, the request for a mobile decision is transmitted over all BTSs within the actual location space of the known as GSM subscriber. Mobile acknowledges its own identity, and also the decision begins. Call from a GSM Phone to a GSM Phone How will it work for GSM, business from mobile device to mobile device? Well, All India Radio the radio path and also the base station network a decision request for a GSM subscriber is shipped from a transportable to MSC/VLR).

subscriber leaves the network coverage area for the fine-tuned mode of the dual mode device, the call preserves as normal by transferring the call to the receiver mobile network. Similarly, for calls initiated in the mobile network, once the subscriber moves back into the fixed or land line mode coverage area, the call can be transferred to the secure network in order to provide a lower signal rate to the subscriber, without any service intervention.

3.4 A novel smart forwarding scheme in LTE-advanced networks [4,14] Long Term Evolution (LTE) and IEEE 802.16 WiMAX. LTE complies with 3GPP standards whereas 802.16 WiMAX is regulated by the Institute of Electrical and Electronics Engineers (IEEE). Albeit WiMAX is, the system is an independent incipient system that is incompatible with the current 3G system. On the other hand, LTE conforms to 3GPP that is fortified by telecommunication manufacturers and other operators and is, moreover, rearward compatible with 3G/UMTS mobile radio cellular systems. The LTE designations define how to utilize infrastructure (UI) connects and communicates with evolved Node B (eNB) base stations. The enhanced version, LTE-Advanced, integrates a developing entity called the relay node (RN) to widen accommodation coverage, albeit this change has resulted in a more intricate architecture. Mobility management and call forwarding are important components in wireless mobile networks. This method is efficient and handover architecture in LTE-Advanced networks and proposes a creative forwarding to handover performance. Simulation studies show that the Astute call

Forwarding scheme employs a better operational transmission path that efficaciously reduces handover latency and signals overhead.

3.5 A new technique of call forwarding using remote mobile [5] in ancient call forwarding, a caller can forward their calls to another mobile subscriber in another device by configuring their mobile. An incipient approach in which a both mobile subscribers can forward their calls to another mobile subscriber by configuring their mobile utilizing the available mobile handset.

3.6   Concept of multiple sim cards in single usim

[6] now a days every person wants to carry more than one SIM card to relish different accommodations provided by a telecom operator. So, the user has to carry multiple SIM cell phones. But in general, there are lots of quandaries to these kinds of cell phones. To overcome this issue there is a proposal. This single USIM has the capability of handling multiple network access. Has been proposed, here they are providing single SIM in lieu of multiple where a different operator can store different network keys to access their respective network at different situations. An advantage to

environments and different scenarios, wherever the user includes a selection among different mobile networks and different access points. In our approach, the choice isn't only supported the signal quality, however to boot on the data regarding the context of mobile devices and access points. Since context data and context process evolves quickly, we tend to propose a versatile, integrated approach for context management[12], which might adapt in many ways that. The design encompasses programmable platforms and distributed context management parts in network nodes and mobile devices, in addition as a service preparation theme for network services. This important design is in a position to actively deploy in different relinquishing networks. It manages dynamic context data and sanctions mobile devices to be forever connected to the access network. This design is valid during a paradigm implementation and performance results are mentioned.

3.8   Distributed call admission management in mobile/wireless networks [8]

Call Admission Management(CAM) is a main component within the provision of bonded quality of service in wireless networks. The actual planning of call admission management (CAM) algorithms for mobile cellular networks is particularly difficult given the circumscribed with extremely variable resources, and therefore the quality of users encountered in such networks this (CAM) paper concludes on the state of current analysis and points out a number of key problems that require to be addressed within the context of call admission management for future extended cellular networks.

3.9   Configuring call Transfer   and   Forwarding

[9] Call forwarding diverts calls to a nominative range of 1 or a lot of of the subsequent conditions• All calls— when all-call telephone is activated by a phone user, all incoming calls are diverted. The target destination for diverted calls will be laid out in the router configuration or by the phone user with a soft key or feature access code. The foremost recently entered destination

utilizing these USIM is that use of multiple SIM can be evaded. For this, they have to make transmutations in mobile software as well as the internal architecture of SIM card had been used. The concept proves itself worth mentioning contribution towards wireless, Cellular and tele communication.

3.7   Context aware relinquishing algorithms for mobile positioning systems [7] Context-aware computing will play a major role to improve the services of mobile networking systems. To fixate on optimizing relinquishing choices in different is recognized by Cisco Unified CME, notwithstanding however it had been entered and placed the call with signaling and calling region.

No answer—Incoming calls are diverted once the extension doesn't answer before the timeout expires. The target destination mobile device for diverted calls is laid out in the router configuration.
Busy—Incoming calls are diverted once the extension is busy and telephony isn't active. The target destination for diverted and forwarded calls are established and calls are laid out in the router configuration.

Night service —All incoming calls are mechanically diverted throughout night-service hours. The target destination for diverted calls is laid out in the router configuration. A directory range will have all four forms of telephony outlined at an equivalent time with a special forwarding destination outlined for every variety of call forwarding.

3.10   One Number Service Using Mobile Assisted Call Forwarding Facilities [10] call diversion is an automation feature in a mobile phone provides automated on and off of conventional carrier system calls forwarding. The mobile phone provides for storing multiple call forwarding mobile phone numbers, selecting a call forwarding telephone number based upon location information, automatically activating call forwarding to the selected telephone number during a wireless telephone power down sequence, and automatically deactivating the call forwarding during a mobile phone power up sequence. Programming is also provided for configuring and enabling the conditional call forwarding feature. In another embodiment, the mobile phone automatically prompts the user for on of call forwarding each time the user powers down the mobile phone. The process also provides the user with an ability to select from a list of stored call forwarding telephone numbers to use, as well as providing the user with an ability to manually input a new mobile number. In this embodiment, the location information is used only to provide a suggested forwarding mobile

number, rather than automatically activating call forwarding without user input during the power down sequence. If user input is not received during a defined time period in response to the prompt, the mobile phone automatically ON the call forwarding only if an automatic call forwarding time-out default option is enabled. The user is also automatically prompted each time the user powers up the wireless telephone to deactivate call forwarding if call forwarding is activated, and real-time idle mode automated call forwarding activation and deactivation service are also provided.

3.11 Using Two Sim Cards with Same Msisdn Number [11] A method and equipment for using multiple SIM cards with the same MSISDN number in a mobile

ongoing call while location updating is being performed using an identity module (SIM) earlier registered as passive, the location updating is rejected or delayed until the ongoing call has been ended

Table 1 Explains the different methods of call forwarding and comparison of CFA, ICAR, Handover between fixed and mobile networks for dual mode and LTE advanced systems. Each and every technique is having its own pros cons also used in various conditions.

Analysis on different methods for call forwarding

S.No	METHODS	ANALYSIS
1	Ref no 2	CFA is very feasible for commercial and business use
2	Ref no 3	fast-efficient relaying routing protocol that can reflect the call's status is needed in ICAR networks
3	Ref no 4	Secure network in order to provide a moderate rate of signal to the subscriber, without any service intervention.
4	Ref no 5	This scheme employs a better operational transmission path that efficaciously reduces handover latency and signals overhead.

Table 1. List of Methods

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4. CONCLUSION AND FUTURE WORK

Call Forwarding takes place within the present handset, which must have double SIMs. We capitalize the difference

communication system. To at least one subscriber identifier are allocated at least two identity modules (SIM), of which the only one at a time can be registered as active. In connection with location updating, it is checked whether the location updating relates to a subscriber identifier to which at least two identity modules (SIM) have been allocated. If yes, it is checked whether the identity module (SIM) concerned is at that particular moment registered as passive and if yes, it is activated 3and the identity module (SIM) earlier registered as active is deactivated. If the identity module (SIM) earlier registered as active is involved in an

in bandwidths of tele come networks for more effectual phone call, the telecommunication companies may provide noticeably stronger network at some domain and time interval, whereas bit more impuissant at other. Such that, while the current call in going on and the network drops, it shall be forwarded to the next sim, making the connection untroubled – advancing the call further. The main objective of smart call forwarding is to provide the user with a liability to automatically switch between duple SIMs of a phone when there transpires an issue in call connectivity. The only requirement is the availability of information about both the registered numbers. In the case of double SIM handsets, when the call drops and fails to connect to the first network (which was initially dialed by the caller) Smart Call Forwarding switches and redirects the incoming call to the second SIM on the receiver's handset. The requisite for applying this is just availability of both the contacts in the database of the caller.

REFERENCES

[1]. S.BHAGYA REKHA ,"AN EXAMINATION OF SWITCHOVER OF CALLS OF MISSIVE CONVEYANCE IN A DUAL OPERATING ANDROID MOBILE DEVICE", INTERNATIONAL JOURNAL OF MANAGEMENT, TECHNOLOGY AND ENGINEERING" VOLUME 8, ISSUE VIII, AUGUST/2018 ,ISSN NO : 2249-7455.

[2]. YI-BING LIN,REN-HUANG LIOU,YUAN-KAI CHEN AND ZHENG-HAN WU, "AUTOMATIC EVENT-TRIGGERED CALL-FORWARDING MECHANISM FOR MOBILE PHONES", WIRELESS COMMUNICATIONS AND MOBILE COMPUTING VOLUME 13, ISSUE 12, PP 1111–1119, 25 AUGUST 2013

[3]. HONG PENG HANGZHOU JIONG ZHU, COLL. OF INF. ENG ZHE JIANG UNIV. OF TECHNOL, "ROUTING FOR DIVERTING CALLS IN ICAR SYSTEM", 2006 INTERNATIONAL CONFERENCE ON WIRELESS COMMUNICATIONS, NETWORKING AND MOBILE COMPUTING,10 APRIL

2007.

[4]. RALPH OSTLING ," HANDOVER BETWEEN FIXED AND MOBILE NETWORKS FOR DUAL MODE" US6327470 B1

[5]. CHEN JENGYUENG , YANG CHUNCHUAN, MAI YITING, "A NOVEL SMART FORWARDING SCHEME IN LTE- ADVANCED NETWORKS",CHINA COMMUNICATIONS . NATIONAL SCIENCE COUNCIL, TAIWAN, VOL.12.NO.3,MARCH 2015.

[6]. MD. KHWAJA MUINUDDIN CHISTI ,M MURALI KRISHNA , KOTESWASWARAO NAIK, DEPARTMENT OF ELECTRONIC AND COMMUNICATION ENGINEERING, GIT, GITAM UNIVERSITY,"A NEW TECHNIQUE OF CALL FORWARDING USING REMOTE MOBILE" INTERNATIONAL JOURNAL OF ENGINEERING RESEARCH AND APPLICATIONS (IJERA) ISSN: 2248-9622 WWW.IJERA.COM VOL. 1, ISSUE 2, PP.226-229 WWW.IJERA.COM

[7]. MOHAMMAD SHAFIQUDDIN, AAFREEN JAHAN ,NAZIYA FARHAT "CONCEPT OF MULTIPLE SIM CARD IN SINGLE USIM " IOSR JOURNAL OF ELECTRICAL AND ELECTRONICS

"ENABLING CALL TRANSFER AND FORWARDING AT SYSTEM-LEVEL" SECTION ON PAGE 779 MAR 15, 2013.

[11]. JERRY RICHARD CARR, ROBERT C WITTER, CLIFTON J BARBER, MICHAEL A. WISE, ANTHONY B,WALDROUP,"ONE NUMBER SERVICE USING MOBILE ASSISTED CALL FORWARDING FACILITIES" , UNITED STATES PATENT US6091948 A GRANT US 08/808,390 18 JUL 2000.

[12]. UUSITALO, MARKKU (LEMP{UMLAUT OVER (AA)}LÄ, FI)2002 USING TWO SIM CARDS WITH SAME MSISDN NUMBER UNITED STATES NOKIA TELECOMMUNICATIONS OY (ESPOO, FI)6366777

[13]. SANGISETTI BHAGYA REKHA, "A STUDY ON INVESTIGATING WI-FI BASED FINGERPRINT INDOOR LOCALIZATION OF TRIVIAL DEVICES", INTERNATIONAL JOURNAL OF CONTROL THEORY AND

APPLICATIONS SERIALS JOURNALS INTERNATIONAL SCIENCE PRESS, VOLUME 10, NUMBER 10, ISSN 09745572 MARCH 2017.

[14]. T. NIKHILSURESH, G. VIVEK, J. MANIKANTHREDDY, MRS. S. BHAGYA REKHA, "PARAM: PERSONAL ACTIVITY RECOGNITION AND APPLICATION MONITOR" INTERNATIONAL JOURNAL & MAGAZINE OF ENGINEERING, TECHNOLOGY, MANAGEMENT AND RESEARCH, ISSN 23484845, VOLUME 4, ISSUE 3, APRIL 2017.

[15].S. BHAGYA REKHA ,M. VENKATESWARA RAO," METHODICAL ACTIVITY RECOGNITION AND MONITORING OF A PERSON THROUGH SMART PHONE AND WIRELESS SENSORS"2017 IEEE INTERNATIONAL CONFERENCE ON POWER, CONTROL, SIGNALS AND INSTRUMENTATION ENGINEERING (ICPCSI) YEAR:2017

ENGINEERING (IOSR-JEEE) E-ISSN: 2278-1676, P- ISSN: 2320-3331 PP 09-11 WWW.IOSRJOURNALS.ORG

[8]. SAZID Z. KHAN, THILEK SILVADORAI, TAN CHEN-WEI, SURESWARAN RAMADASS, TONI ANWAR, "CONTEXT AWARE HANDOVER ALGORITHMS FOR MOBILE POSITIONING SYSTEMS" COMPUTER SCIENCE JOURNAL AGH UNIVERSITY OF SCIENCE AND TECHNOLOGY VOL 15, NO 2 2014-03-14.

[9]. MOHAMED HOSSAM AHMED "CALL ADMISSION CONTROL IN WIRELESS NETWORKS: A COMPREHENSIVE SURVEY" IEEE COMMUNICATIONS SURVEYS & TUTORIALS (VOLUME: 7, ISSUE: 1, FIRST QTR. 2005)

[10]. CISCO UNIFIED COMMUNICATIONS MANAGER EXPRESS SYSTEM ADMINISTRATOR GUIDE "CONFIGURING CALL TRANSFER AND FORWARDING" FOR CONFIGURATION INFORMATION, SEE THE