A
Dissertation On

COMMUNICATION BETWEEN TWO MOBILE DEVICES VIA RESOURCE MANAGER MODULE

Submitted in Partial Fulfilment of the Requirement
For the Award of Degree of

Master of Technology

In

Software Technology

By

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This is to certify that the thesis entitled **"Communication between two mobile devices via resource manager module"** done by me for the Major project for the award of degree of **Master of Technology** Degree in **Software Engineering** in the **Department of Computer Science & Engineering**, Delhi Technological University, New Delhi is an authentic work carried out by me under the guidance of Mr. Vinod Kumar.

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Delhi Technological University, Delhi

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Sunil Rathour
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ABSTRACT

Nowadays Mobile Communication heavily depends upon mobile network. Proposed Solution will provide an opportunity to communicate without sim card/cellular Network. This document provide with an approach to Device to Device (D2D) communication using RF without infringing 3GPP specs. In an unexpected situation like natural calamities (Earthquake, Flood) as we will be able to convey information without using network. Moreover, the cellular network traffic will decrease and become more robust by the use of device-to-device communication. This is really useful in rural areas, hill areas, where we have weak cellular network signal strength.

Out of all the LTE-A communication techniques, Device to Device (D2D) communication carriesconsiderableassurance in enhancing delay,throughput, energy and spectrum efficiency as it uses spatial locality of mobile user equipment's (UEs) to route data traffic between them. As a combination of communication mechanisms, Device to Device communication allows researchers to combinein sync the long-term advancementaccomplishments in earlier disjoint disciplines of ad-hoc networking and centralized networking. In this paper, we have kept a complete survey of

Device to Device research work in order to benefit researchers to have a comprehension of the device to device communication, and summarized some research problems which require further examinations and studies.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF SYMBOL, ABBREVIATIONS

Time Division Duplex (TDD)

General Packet Radio Service (GPRS)

Home Location Register (HLR)

China Communications Standards Association (CCSA)

Telecommunications Technology Association (TTA)

Universal Mobile Telecommunication System (UMTS)

Radio Frequency (RF)

Radio Interface Layer (RIL)

Mobile Management Entity (MME)

Base Station (BS)

Long Term Evaluation (LTE)

Device-to-Device (D2D)

Universal Terrestrial Radio Access (UTRA)

Short Message Service (SMS)

Authentication Layer (AL)

Session Management layer (SML)

Discovery Module (DM)

CHAPTER 1 INTRODUCTION

1.1 General Concepts

Communication between two mobile device is based on Base Station communication via paging signal , On mandate the device should register with network provider subscription . Once the network is down there is no way to communicate between devices .

1.2. Motivation

In a cellular network, every communication should be by a Base Station even if both Mobile Originating and Mobile Terminating device are in range to each other. For low data rate mobile services such as voice call and text messages, where users are not in near proximity for direct communication this architecture is competent. On regards of daily usage of high data rate services (e.g., online streaming, internet surfing) in which they could be in range for direct communication. In such scenarios Device to Device communications can improve the spectral efficiency of the network. The advantages of Device to Device communication are not only restricted to increase efficiency. To further improve efficiency, Device to Device communications can enhance throughput, energy efficiency, and delay. Employing direct communication between nearby mobile devices will improve spectrum utilization, energy efficiency and overall throughput, while allowing new peer-to-peer and location-based applications and services.Device to Device communication enabled Long Term Evaluation (LTE) devices are likely to become competitive for fall back public safety networks that must function when cellular networks are not accessible or fail.

1.3Related Work

Method for starting device to device communication controlled from cellular network elements (Enode B and MME).

Mobile Communication using RF with new Resource Manager Module without interaction with Mobile. Device to device communication possible without using cellular network.

Difference

1. Existing Approach: Mobile communication devices, such as user equipment (UE) using 3GPP-LTE or LTE Advanced, may communicate directly with another user equipment through a system called Device-to-Device (D2D) communication.
2. The establishment of a D2D communication session may involve having one of the UEs trigger the signaling procedures. Typically, when a UE connects to a network, it may send information about its D2D abilities to the eNB. This restriction information may be configured through other means, such as a user's subscription profile that may be contained in a Home Location Register (HLR) or some other network entity. Additionally, a network may be configured with network-specific D2D policies/restrictions. These policies/restrictions may include limitations such as geographical restrictions, roaming restrictions, bandwidth policies, and the like.

Proposed solution: Prior art is for LTE mode only. Proposed solution is applicable on all Radio Access Technologies.

Above solution require change at network side and node side

Proposed solution doesn't require network side interaction

Existing Approach has a dependency on Enode i.e Network Elements

There is no such introduction of new module at device side

High Dependency on Cellular network

1.4. Problem Statements

In Today world, in case of no network, there is no communication from device to device, so in case of emergency when no network scenario, user can't communicate with each other. Proposed method provide a method to communicate with device even in no network scenarios. That can be used in case of emergency situation like natural disaster, natural calamities

1.5. Scope of this thesis

The proposal will not require any network, or communication medium, the solution will communicate in no network, in emergency situation. Proposed method provide a method to communicate with device even in no network scenarios. That can be used in case of emergency situation like natural disaster, natural calamities

CHAPTER 2 LITERATURE REVIEW

2.1. Overview of 3rd GENERATION PARTNERSHIP PROJECT (3GPP)

The 3rd Generation Partnership Project (3GPP) is a collaboration agreement established in December 1998 to bring together a number of telecommunications standards bodies, known as "Organizational Partners," that currently include the Association of Radio Industries and Business (ARIB), the Alliance for Telecommunications Industry Solutions (ATIS), the China Communications Standards Association (CCSA), the European Telecommunications Standards Institute (ETSI), the Telecommunications Technology Association (TTA), and the Telecommunication Technology Committee (TTC). The establishment of 3GPP was formalized in December 1998 by the signing of the "The 3rd Generation Partnership Project Agreement.

3GPP provides globally applicable standards as Technical Specifications and Technical Reports for a 3rd Generation Mobile System based on evolved GSM core networks and radio access technologies that they support (e.g., Universal Terrestrial Radio Access (UTRA) for both Frequency Division Duplex (FDD) and Time Division Duplex (TDD) modes). 3GPP also provides standards for the Maintenance and development of the Global System for Mobile communication (GSM) as Technical Specifications and Technical Reports including evolved radio access technologies (e.g., General Packet Radio Service (GPRS) and Enhanced Data rates for GSM Evolution (EDGE)). 3GPP organization provides technical specification for current standards related to mobile telephony are generally available to public.

3GPP is presently studying the evolution of the 3G Mobile System and considers contributions (views and proposals) directed toward the evolution of the UTRAN UMTS (Universal Mobile Telecommunication System) Terrestrial Radio Access Network. Network (UTRAN). 3GPP workshops have identified a set of high level requirement like reduced cost per bit; increased service provisioning (i.e., more services at lower cost with better quality); flexibility of use of existing and new frequency bands; simplified architecture with open interfaces; and reduced/reasonable terminal power consumption. A study on the UTRA & UTRAN Long Term

Evolution (UTRAN-LTE, also known as 3GPP-LTE and E-UTRA and sometimes simply LTE) was started in December 2004 with the objective to develop a framework for the evolution of the 3GPP radio-access technology towards a high-data-rate, low-latency and packet-optimized radio-access technology. To support flexible transmission bandwidth up to 20 MHz, introduction of new transmission schemes, and advanced multi-antenna technologies this study has considered modification to the radio-interface physical layer (downlink and uplink). 3GPP is also currently developing the LTE Advanced standard as an evolutionary advancement of LTE to provide even higher throughput.

3GPP-LTE is based on a radio-interface incorporating orthogonal frequency division multiplex (OFDM) techniques. OFDM is a digital multi-carrier modulation format that utilizes a large number of closely-spaced orthogonal sub-carriers to carry respective user data channels. In addition, Single-Carrier Frequency Division Multiple Access (SC-FDMA) may be used in uplink transmissions. Each sub-carrier is modulated with a conventional modulation scheme, such as quadrature amplitude modulation (QAM), at a (relatively) low symbol rate when compared to the radio frequency (RF) transmission rate.

Mobile devices with the ability to communicate via cellular technologies, such as LTE and LTE Advanced, have become very widespread in many countries. These devices may include smart phones, tablets, e-readers, mobile hotspots, and the like. Traditionally, such devices communicate to other devices via the core network. For example, data may travel from a mobile device through an evolved Node B (eNB) before being routed to its eventual destination. However, there is an increasing desire to have devices communicate directly to each other, without the use of an eNB.

2.2. Existing Approach

Device to Device Communication present method include communication between two devices from network operator. It contains Cellular network controlling communication.Using Device communication system user can communicate directly with another user equipment (UE) with the aid of mobile communication devices, such as user equipmentusing 3GPP-LTE or LTE advanced.The foundation of a D2D communication session may involve having one of the UEs trigger the signalling procedures.

Typically, when a UE connects to a network, it may send information about its Device to Device abilities to the eNB. This limitation information may be configured through other means, such as a user's subscription profile that may be contained in a Home Location Register (HLR) or some other network entity. These policies/restrictions may include restriction such as geographical restrictions, roaming restrictions, bandwidth policies .The current approach suggest modifications on Network side elements and driven from Network side. The current approach is total depend upon network or cellular network (Network Elements). Currently, if we want to have Device to Device communication both devices should have cellular network.

2.3. Existing Module

Application (Contacts/Messaging/ Dialer):

Application Layer is the UI layer which initiate the flow. Application layer will have Applications like Music player, Call, Dialler, and Contact. Application in which user interact directly comes under application layer For example: To send a message to other party Message application will be getting used and etc. Application Layer interact with user as well as Call lower layer functionality i.e., interact with system and give system response to user for further action.

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Application Layer interact with user as well as Call lower layer functionality i.e., interact with system and give system response to user for further action.

Telephony Framework:

This is the framework layer that interact with UI and RIL Layer. To maintain the state of call and keep updating the UI and RIL layer this framework is used. In our architecture there will be will be 2 phone module inside Telephony Framework one that will initiate normally other that will be a part of our solution and will be active during no network Device to Device Communication.

Radio Interface Layer (RIL)

Bridge between framework & RF layer. The Radio layer consist of two primary components.

1. Radio Daemon

2. Vendor Radio Layer

Radio Daemon

Radio Demon will be initialized during the Zygote Layer. System property will be set in vendor Radio Layer, and calls Initialization function and map to Vendor RIL Each vendor Radio layer has initialization function

Vendor Radio layer

Radio Layer initiates communication with the modem at location (eg: /dev/ttyS0). and return the Radio Stack Structure

CHAPTER 3. PROPOSED WORK

3.1. Technical Overview

1. Proposed Approach will use time sharing and event sharing method and the SIM Card will simultaneously use the RF channel i.e one at a time to use the Radio Frequency.

2. In case of Idle, device will listen to pages and do normal procedure including cell Selection, One of the subscription is in Active state the other subscription will be Power off so that to avoid interference and will not be communicate further till the Ongoing communication end.

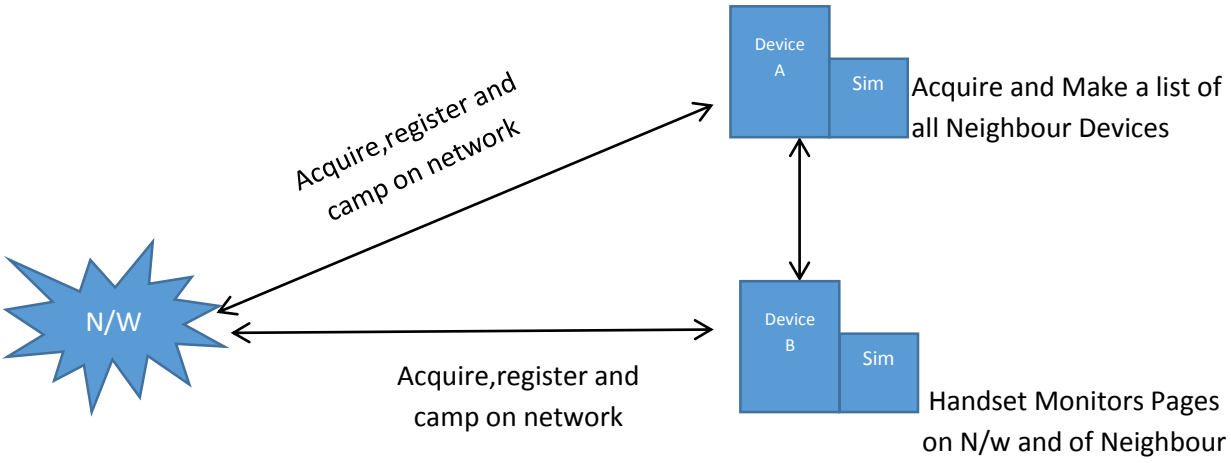
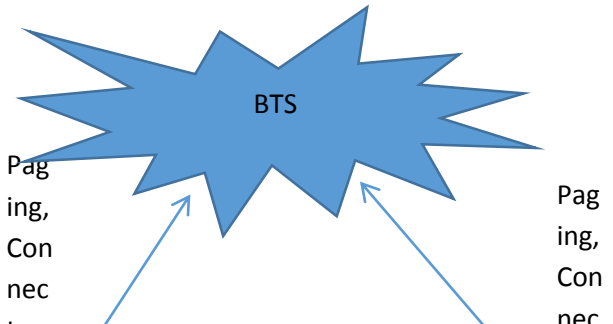
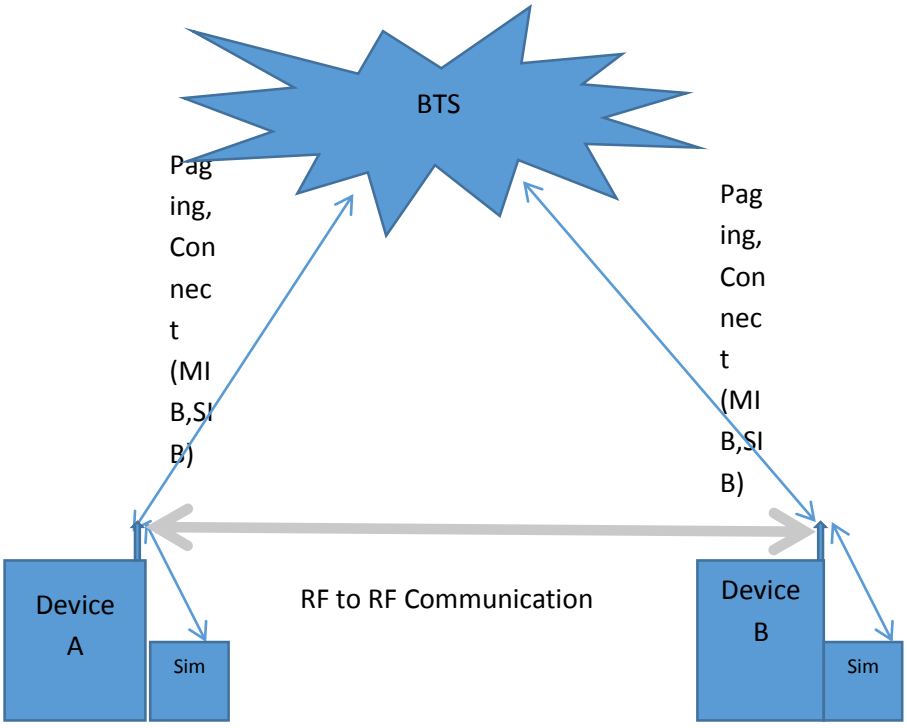


Fig 3.1 Working Procedure

Normal Cellular Communication Flow



Proposed Communication Flow



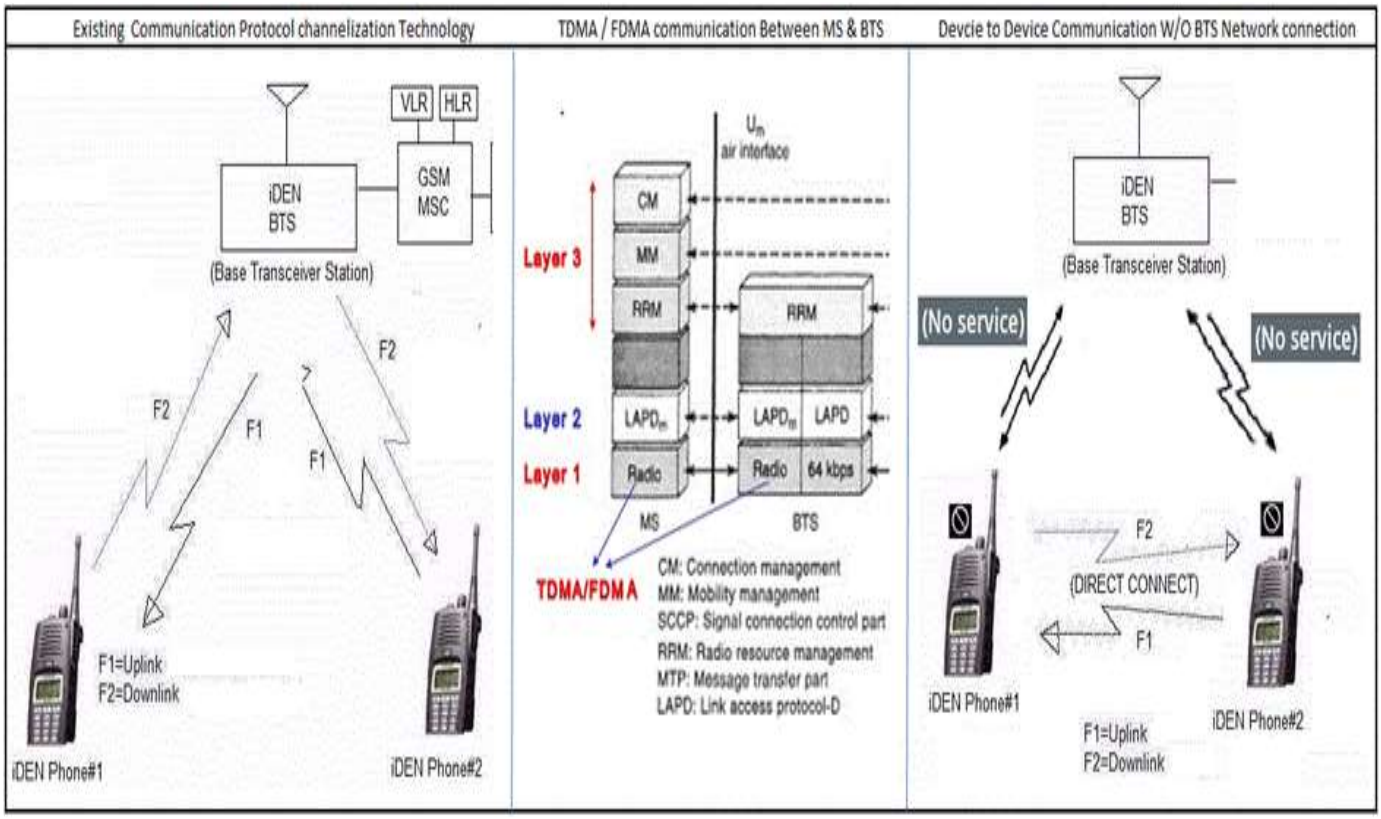
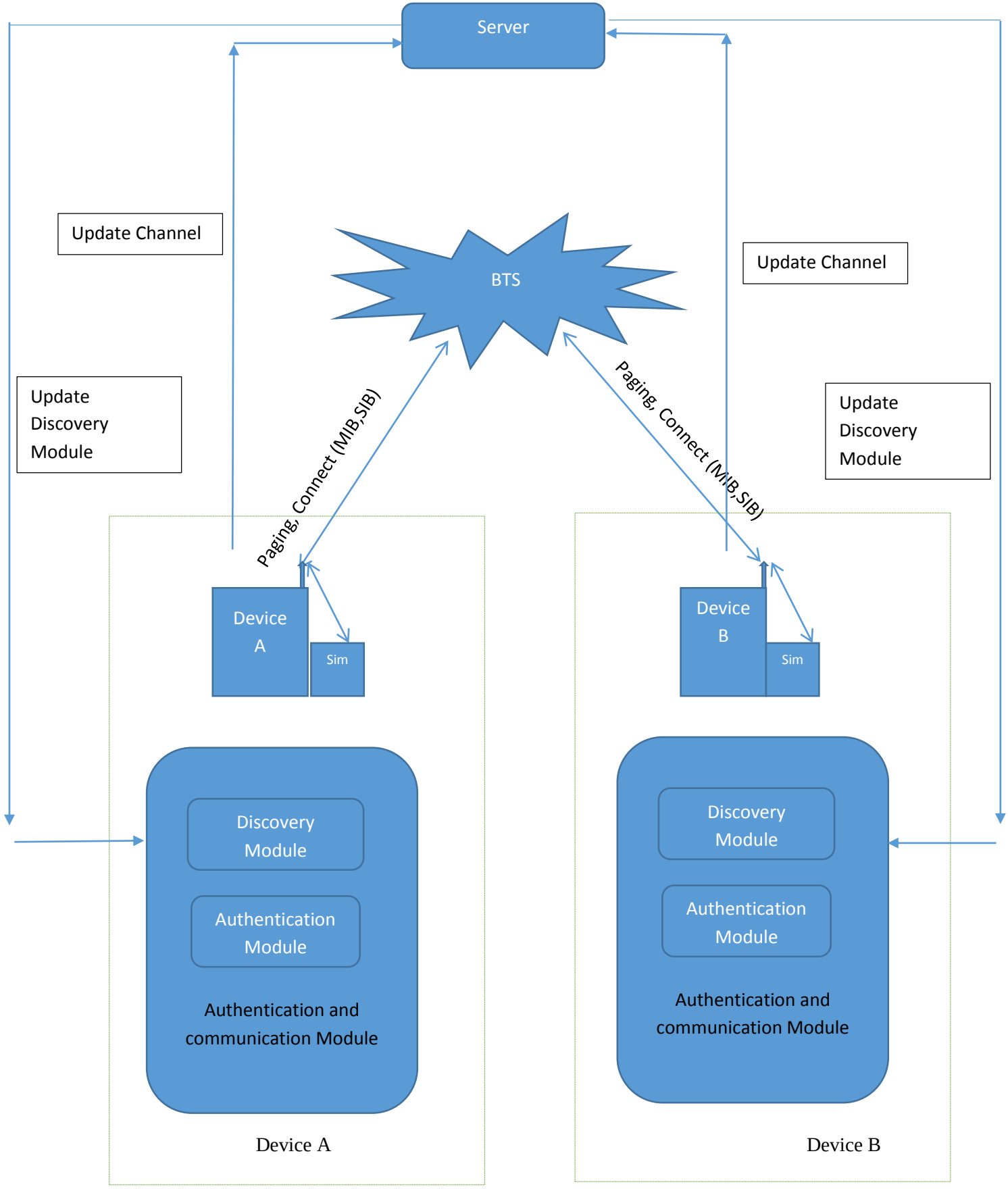


Fig 3.2 Working Proposal


Server
Update Channel
BTS
Update Channel
Update Discovery Module
Paging, Connect (MIB,SIB)
Paging, Connect (MIB,SIB)
Update Discovery Module
Device A
Sim
Device B
Sim
Discovery Module
Authentication Module
Authentication and communication Module
Discovery Module
Authentication Module
Authentication and communication Module
Device A
Device B

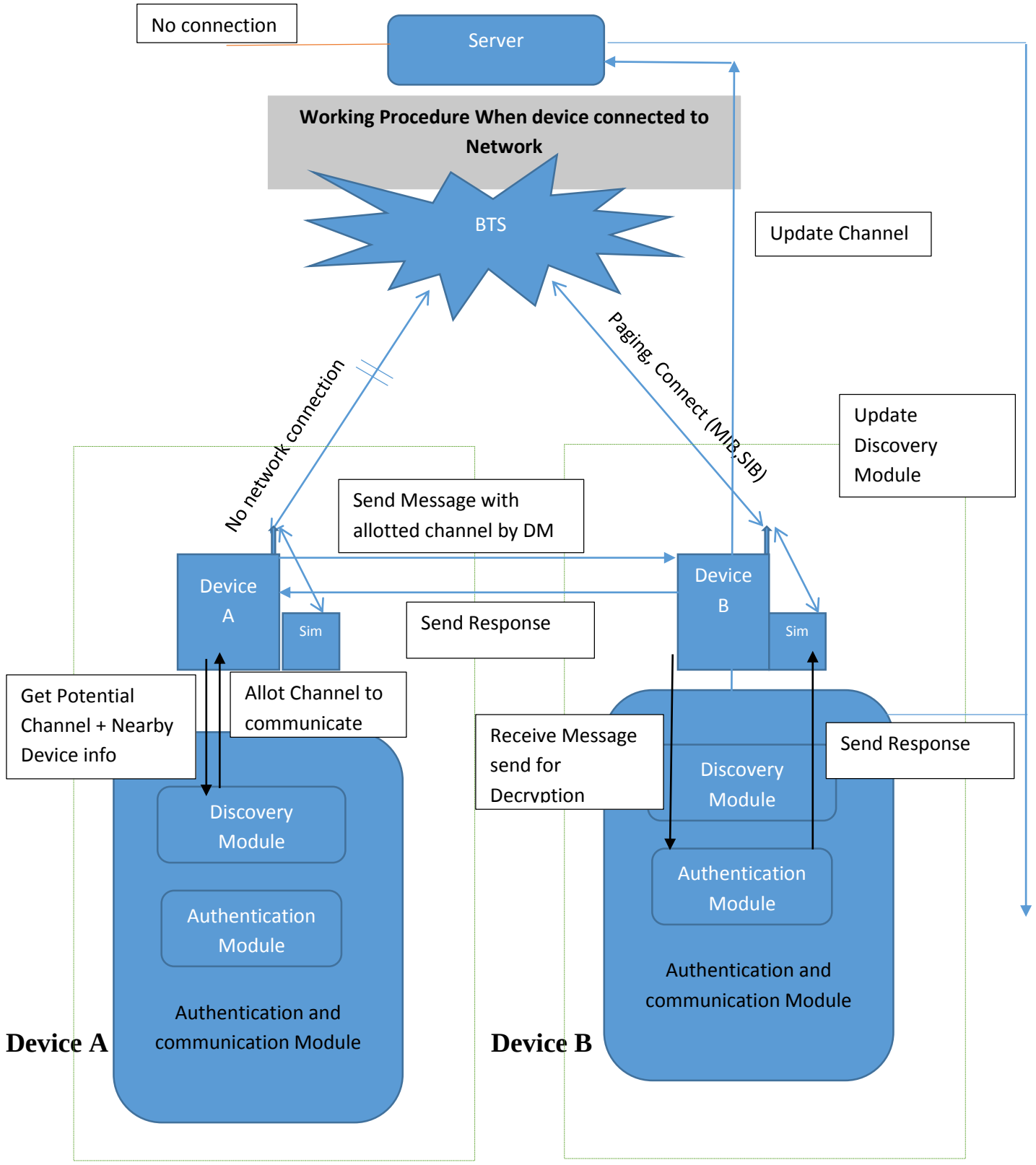


Fig 3.3 Details Flowchart

3.2. Module Architecture for Device to Device Communication

AP Modified structure

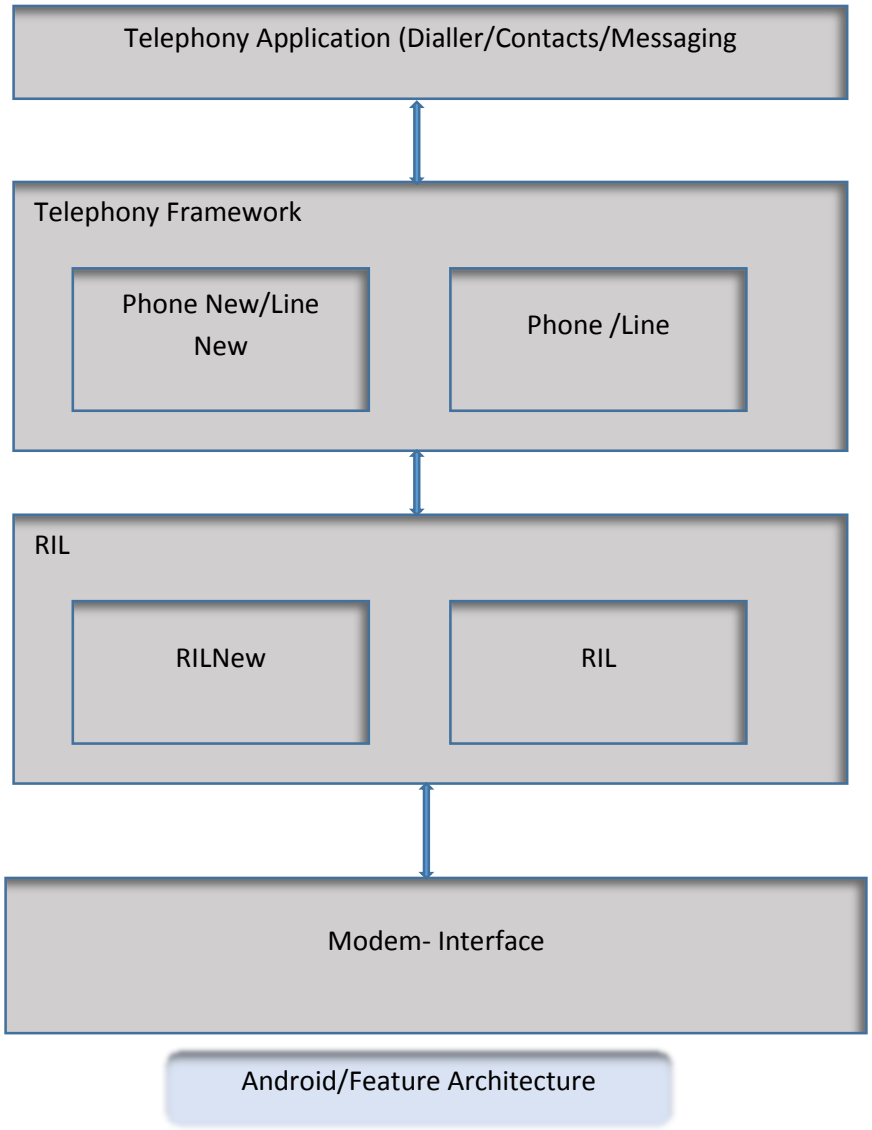


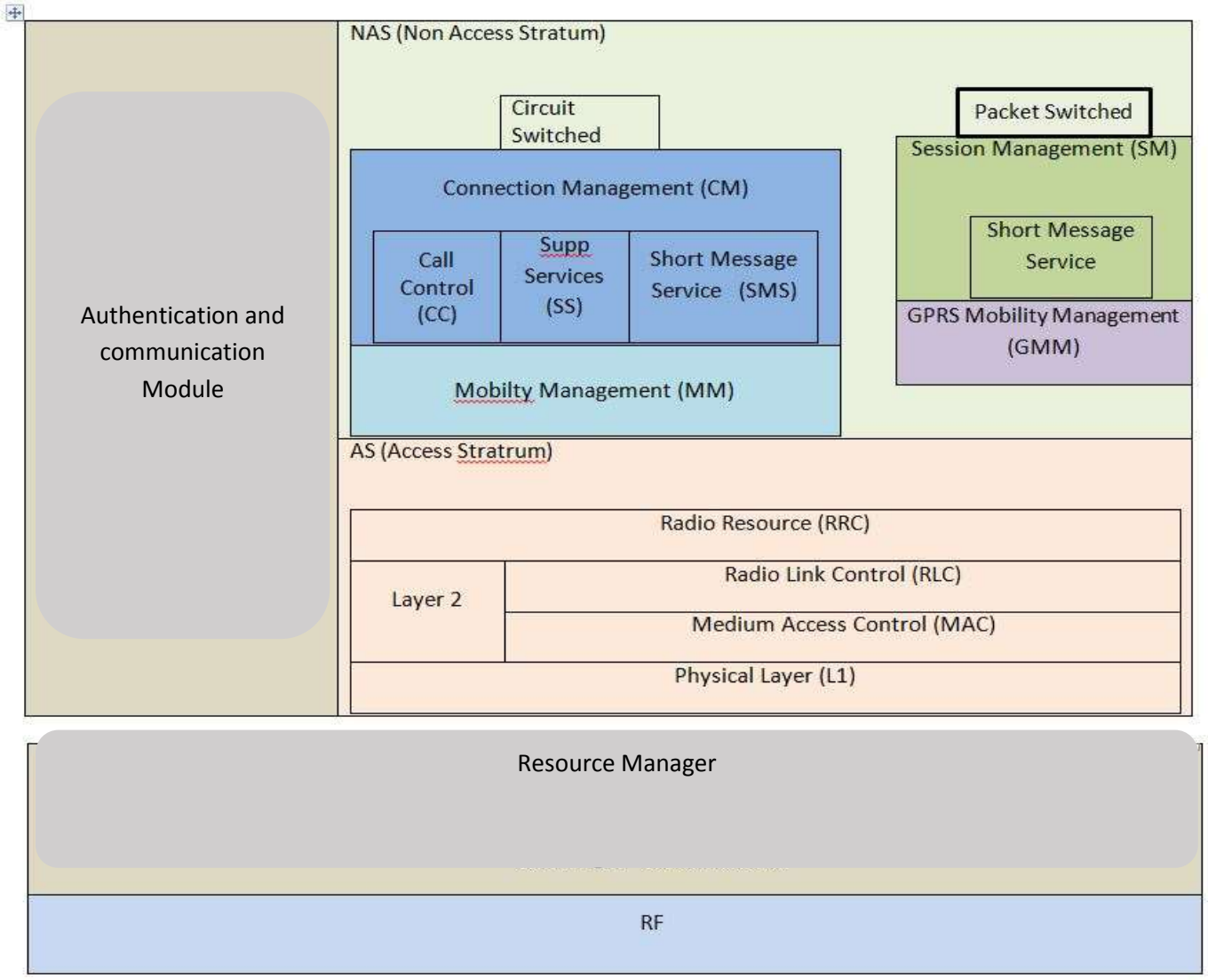
Fig 3.4 Module Description

3.3. Module Details

Radio Interface Layer New (RILNew)

This is the new module that will be work during device to device communication when no network is available, this module will take care communication in no network conditions.

CP Modified structure



UMTS Protocol Architecture

Fig 3.5 Protocol Architecture

Authentication and communication Module and Resource Manager

These are the newly introduced module that will help in device to device communication, Details functionality of these module will be explained below.

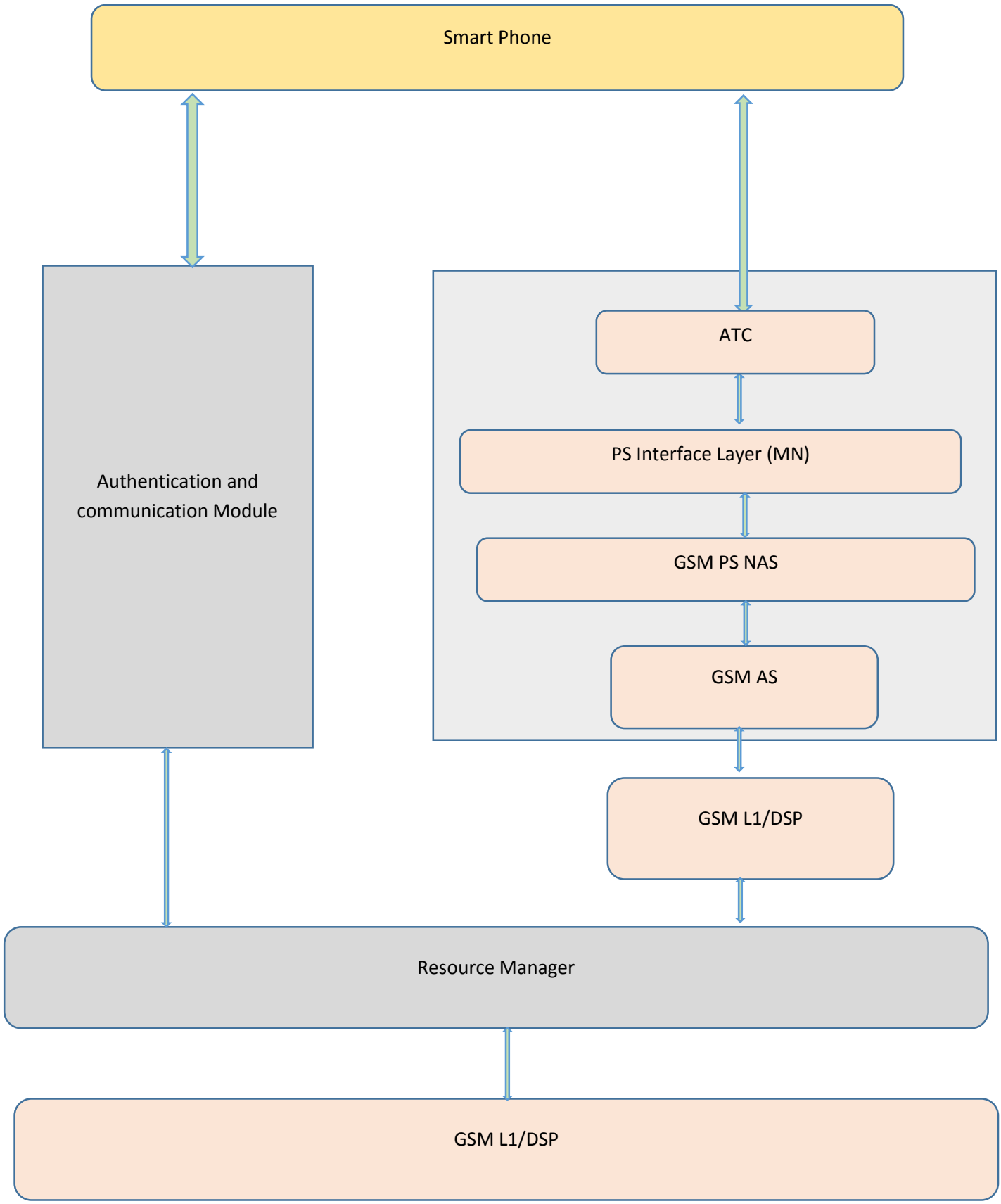


Fig 3.6 GSM Architecture

3.4 New Introduced Module Description Resource Manager (RM)

Description

1. Empower Subscribers to have one more membership (S-Mobile membership) with single baseband/RF
2. Having call/ Message using either subscription.

High-Level Feature

Mobile connectivity via Resource Manager Module

1. Subscriber can originate and receive pages/calls on either subscription
2. WCDMA/GSM/GPRS and CDMA (1x/DO) accessible on SIM
   (Including Inter-RAT); the mobile will be restricted to communicate inside some specific range.
3. When one membership is in information exchange the other membership can get voice incoming call.

AP side:

In existing architecture, we have Telephony Application (Dialler/Contact/Messaging), RIL and Phone Module. In purposed Solution we will have 2 more modules: RIL New, Phone New. New S-RIL module and S-Phone will interact with new authentication and communication Module and will give user more services like communication through RF without using cellular Network.

Resource Manager (RM):

SRM is the software module that arbitrates and schedules RF resources (antennas and RF chains) Between Authentication and communication Module protocol and existing protocol stack

Module.

It can immediately acquire and reserve a lock for a client that requires immediate access to their Source, and it can also schedule or reserve future resource locks for clients who know in advance of their need for a resource.

SRM schedules resources based on:

- **Priority of the client and request reason**
- **Request duration**

It detects conflicts between two clients requiring a resource at the same time and resolves the Conflicts by denying or granting the specific RF resources to the client. Client with higher Priority will be allocated resource based on event like call, message, network registration, and Location update etc.

To manage and assign RF Resources for each RF resource request, SRM needs following

Information.

1. Client – Which client is requesting time on an RF resource

2. Resource – The RF resource that the client is requesting.

3. Reason – The reason why the client needs the RF resource like call or message.

4. Time and duration – When the resource is needed, if the request is for the future, and theduration that the client needs an RF resource.

And based on above information SRM determines the appropriate response.

Resource Manager Clients (RMClients):

RM clients are the technologies that request time on an RF resource:

- GSM
  - SRM _GSM
- UMTS
  - RM _UMTS
- LTE
  - RM _LTE
- SRF
  - RM_SRF

Resources:

Resources are the RF resources requested by the SRM client:

Reason

Each request has an associated priority, e.g., a request for an RF resource for diversity to check signal strength would be a lower priority than requests for origination or a response to a page (call).

The priority value used by SRM is a result of both the client value and the reason value.

Some Reasons:

- RM_ACCESS – Performs general access attempt
- RM _ACCESS_URGENT – Performs asked to release the lock immediately
- RM _BROADCAST_ACCESS – Performs access attempt while in broadcast
- RM _LOCATION_FIX – Determines the mobile location
- RM _TRAFFIC – In a traffic call
- RM _DEMOD_PAGE – Monitors paging channel
- RM _DEMOD_BROADCAST – Monitors broadcast page/data

Note that not all reasons are valid for all clients.

Time and Duration

Client need RF resource after a particular time or it may need the resource as soon as possible, such as for Call.The client will also know when it would be able to give up theresource. Together, time and duration allow SRM to detect overlaps in RF requests.

RM Authentication:

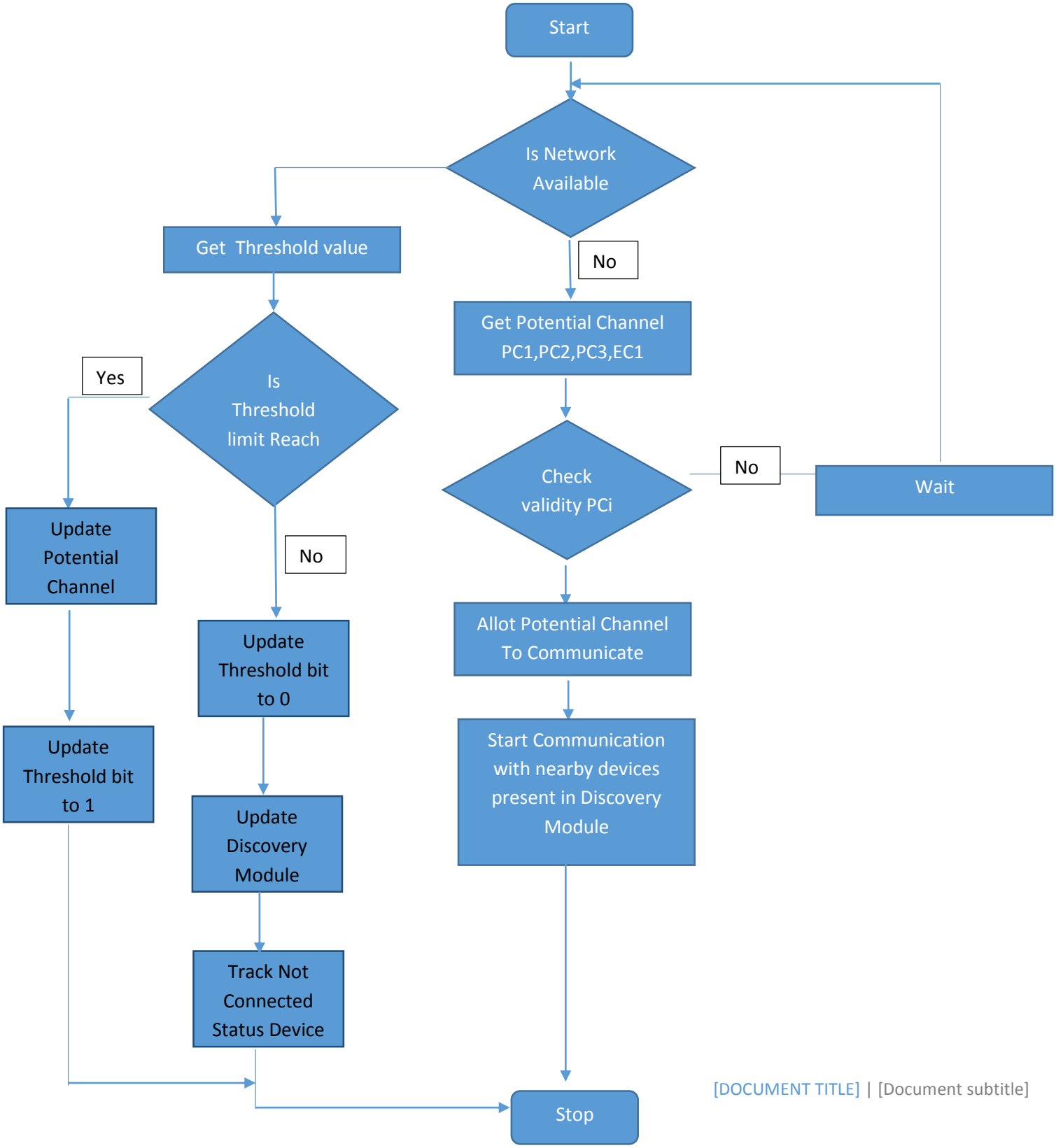
This function will return the result based on the request given by the client as mentioned above

Below are the return values:

- Denied
- Granted

CHAPTER 4. IMPLEMENTATION, RESULT, USECASE

4.1 Block Diagram for Device to Device Communication



4.2 Flow Chart forDevice to Device Communication

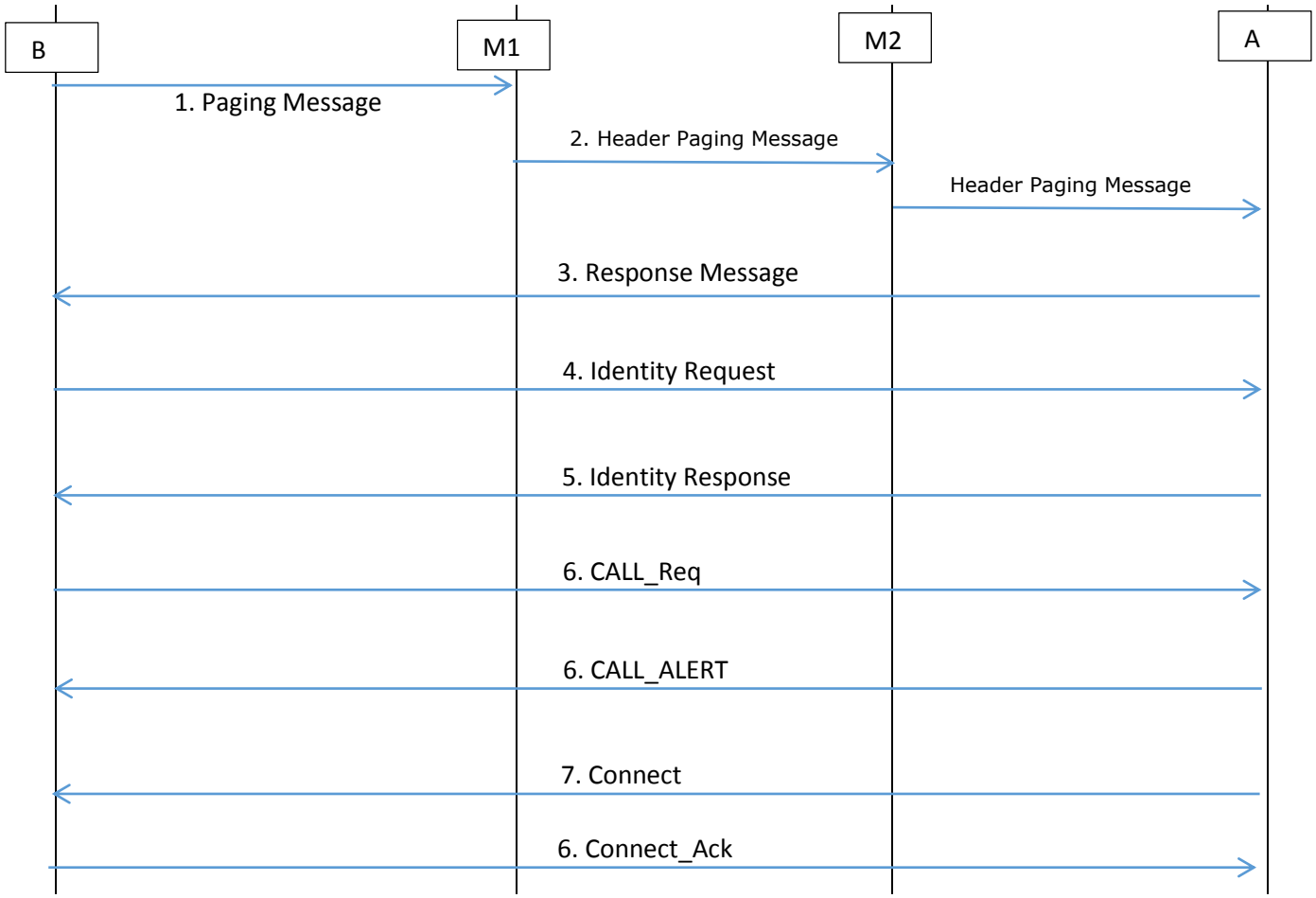


Fig 4.1 MO Call Flow

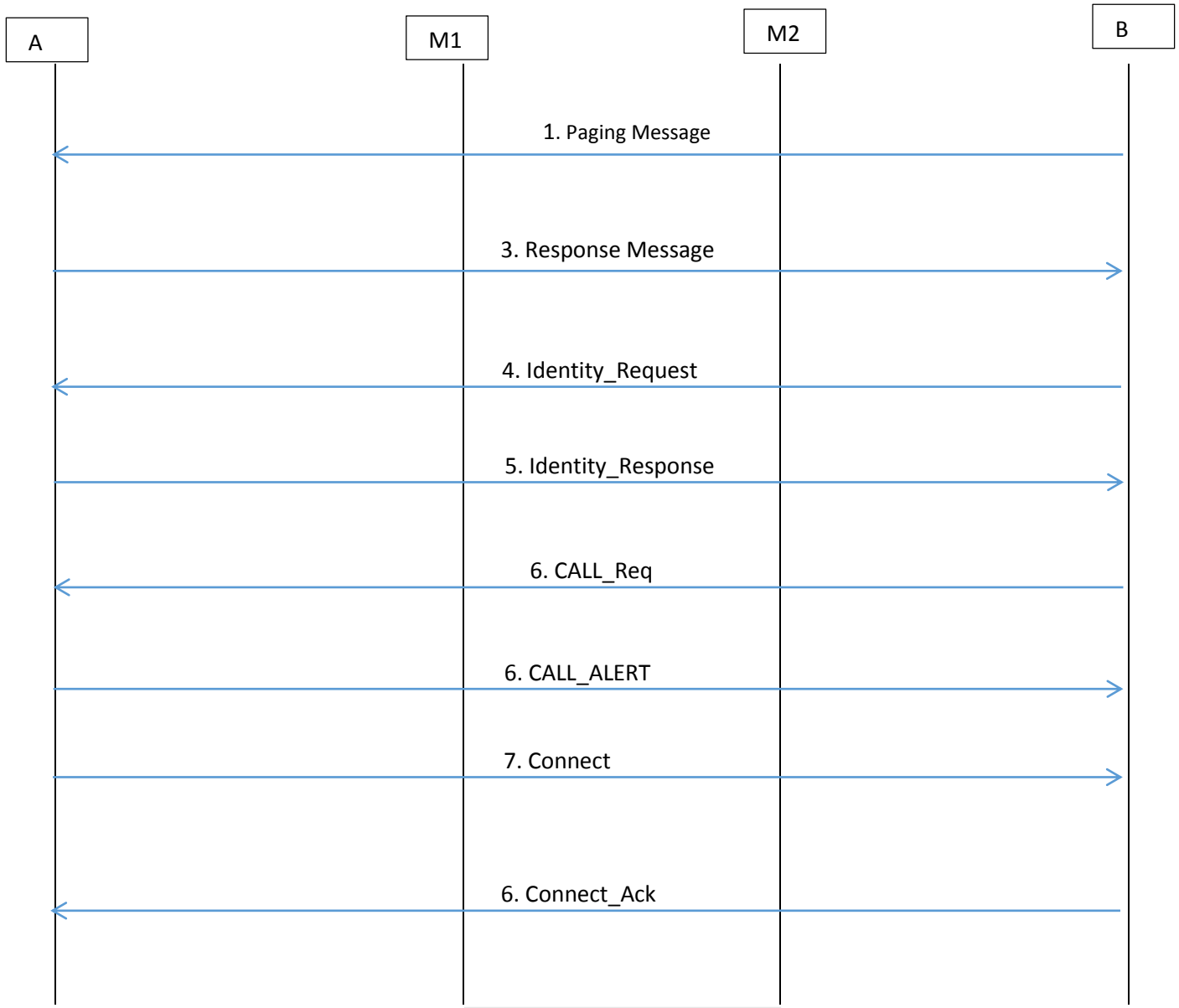


Fig4.2 MT Call Flow

A: MO call Device

B: MT call Device

M1: Intermediate Device

M2: Intermediate Device

4.3 Packet Description

1. **Paging Message:**

a	B	C	D	e

a) Destination Address
b) Destination Address (2) Note: Paging message may have multiple Source Address
c) Source Address
d) Network State (Emergency or No network)
e) Priority Bit

2. Header will be added through M1 → To find most accurate path.

H1	B	B	C	d	E	f

In similar way H2 header will be added by M2 device

H1	H2	A	B	c	D	e	f

Note: B will look for nearest accessible device for help if no destination address defined.

3. Response Message:

→A will calculate the optimal path to send respond to B after A receive the paging message from B.

A will respond to paging message according to optimal path.

P1	P2….pn	C	

P) P1 to Pn will be the optimal path to be followed.

c) Frequencies to be use for further communication.

Note: Response message will be sent from other set of response set of frequencies.

4. Identity Request:

a	b	C

a. Source Address
b. Destination Address (p1, p2 …. If path is there)
c. Random Number.

5. Identity Respond:

a	b	C

a. Source Address
b. Destination Address (p1, p2 …. If path is there)
c. Random Number Respond.

6. Service_Type

a. Call_Start
b. Message
c. Internet Demand

a	b	C	D

a. Source Address
b. Destination Address (p1,p2 …. If path is there)
c. Service type
d. If message : message data will be sent

7. Call_Alert

A	b	C

a. Source Address
b. Destination Address (p1,p2 …. If path is there)
c. If Service type is call, call alert message will be received.

8. Connect

a	b	C

a. Source Address
b. Destination Address (p1,p2 …. If path is there)
c. Once user pick the call connected bit will be received.

1. Connect_Ack

a	b	C

a. Source Address
b. Destination Address.
c. Connect Ack will be sent

4.4 *Implementation*

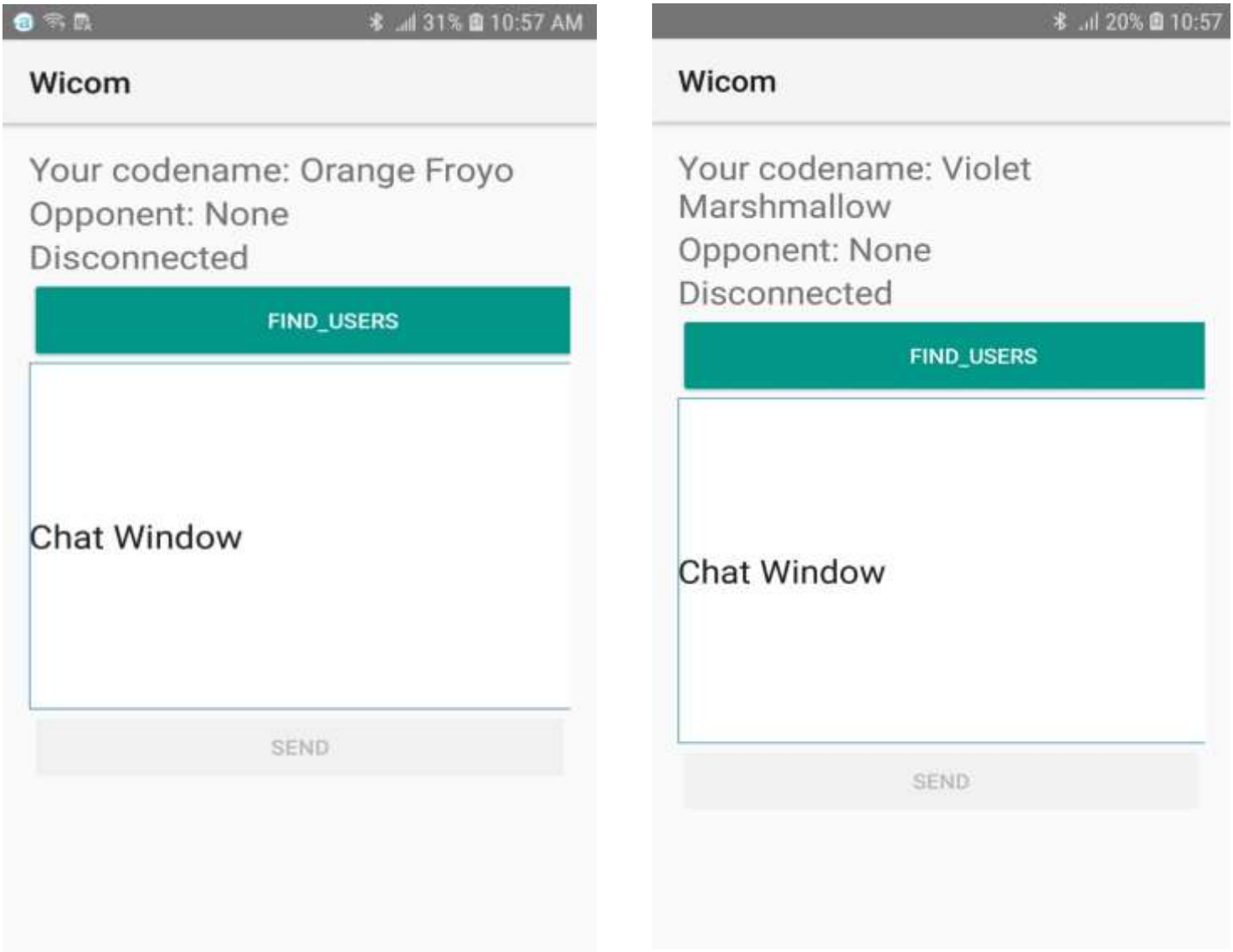


Fig 4.3 Implementation

- DISCONNECTED STATE
- CODENAME DISPLAYED(USERNAME)
- NO OPPONENT IS CONNECTED(NONE)
- FIND_USERS BUTTON TO START ESTABLISHING CONNECTION
- SEND BUTTON IS DISABLED AS NO USER IS CONNECTED

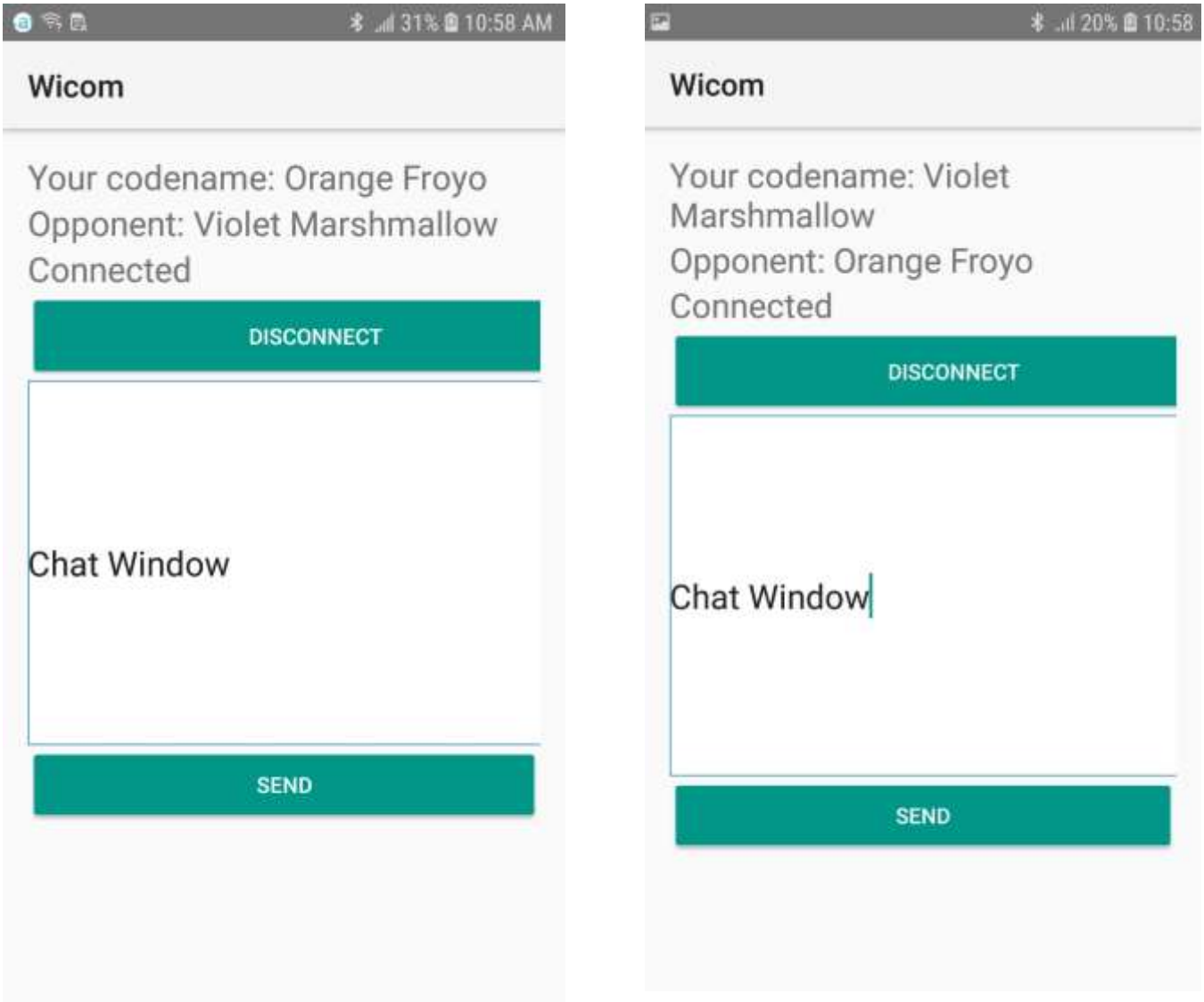


Fig 4.4 Connected State Implementation

- CONNECTED STATE
- CODENAME DISPLAYED(USERNAME)
- OPPONENT NAME DISPLAYED(DEVICE CONNECTED)
- DISCONNECT BUTTON TO STOP CONNECTION
- MESSAGE TO BE SENT CAN BE TYPED IN CHAT WINDOW
- SEND BUTTON IS ENABLED AND MESSAGE CAN BE SENT TO THE CONNECTED DEVICE

Current Status

1. The initial connection phase takes some time.
2. Connection can be successfully established between two devices.
3. User authentication is not required to establish connection.
4. Once connected, the message can be sent and the messages are received as a toast of duration 3.5 seconds.
5. Tested between two devices Samsung S7 and Samsung J7.

API Used

- **Nearby Connections API**

  Nearby Connections is a peer-to-peer networking API that allows apps to easily discover, connect to, and exchange data with nearby devices in real-time, regardless of network connectivity. The API is located in the com.google.android.gms.nearby.connection package.

- **Strategy used in the API is p2p_cluster**

  P2P_CLUSTER is a peer-to-peer strategy that supports an M-to-N, or cluster-shaped, Connection topology. In other words, this enables connecting amorphous clusters of devices within radio range (~100m), where each device can both initiate outgoing connections to M other devices and accept incoming connections from N other devices.

Permissions Required

<!-- Required for Nearby Connections -->

<uses-permission android:name="android.permission.BLUETOOTH" />

<uses-permission android:name="android.permission.BLUETOOTH_ADMIN" />

<uses-permission android:name="android.permission.ACCESS_WIFI_STATE" />

<uses-permission android:name="android.permission.CHANGE_WIFI_STATE" />

<uses-permission android:name="android.permission.ACCESS_COARSE_LOCATION" />

Activity Flowchart

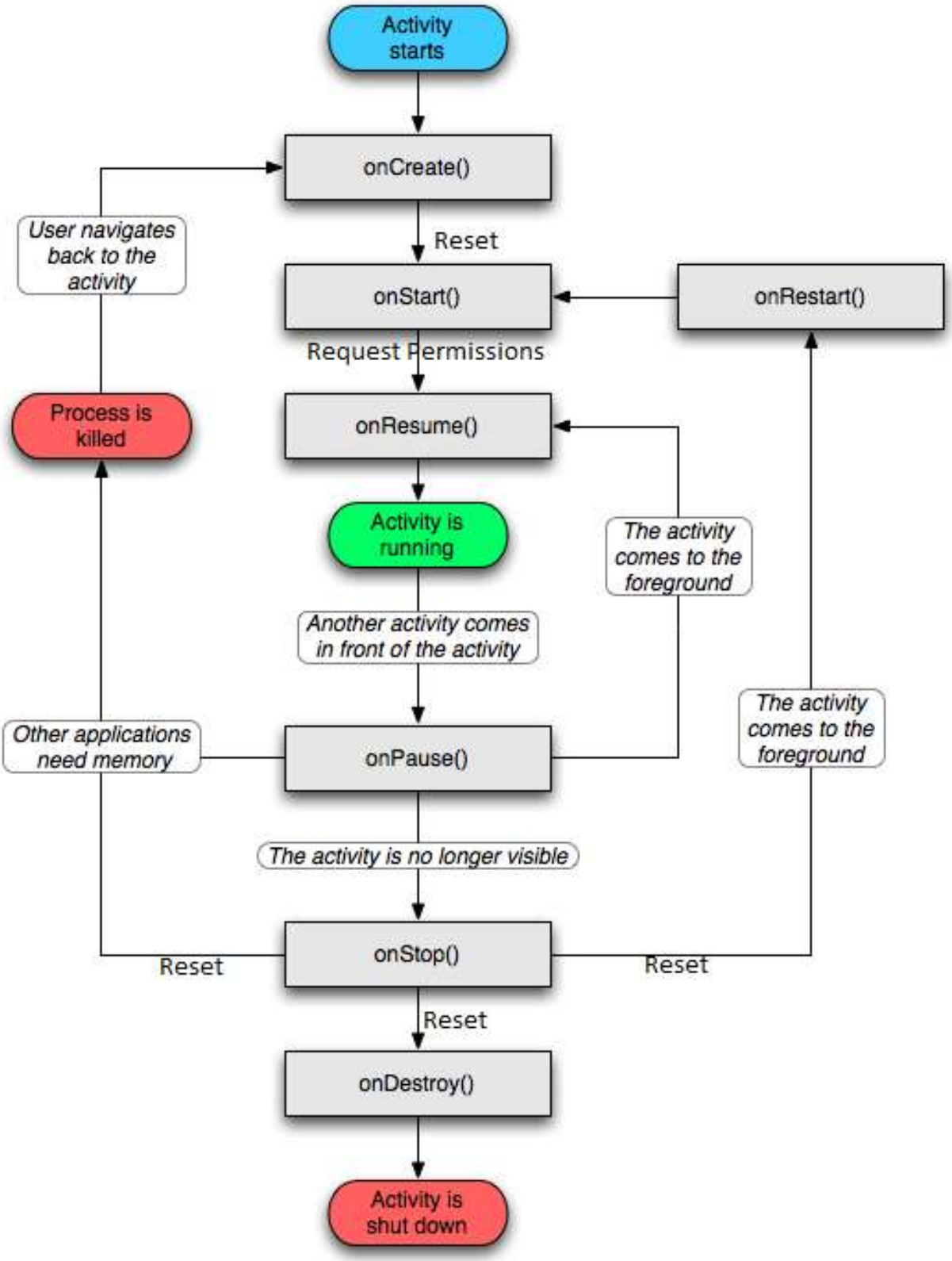
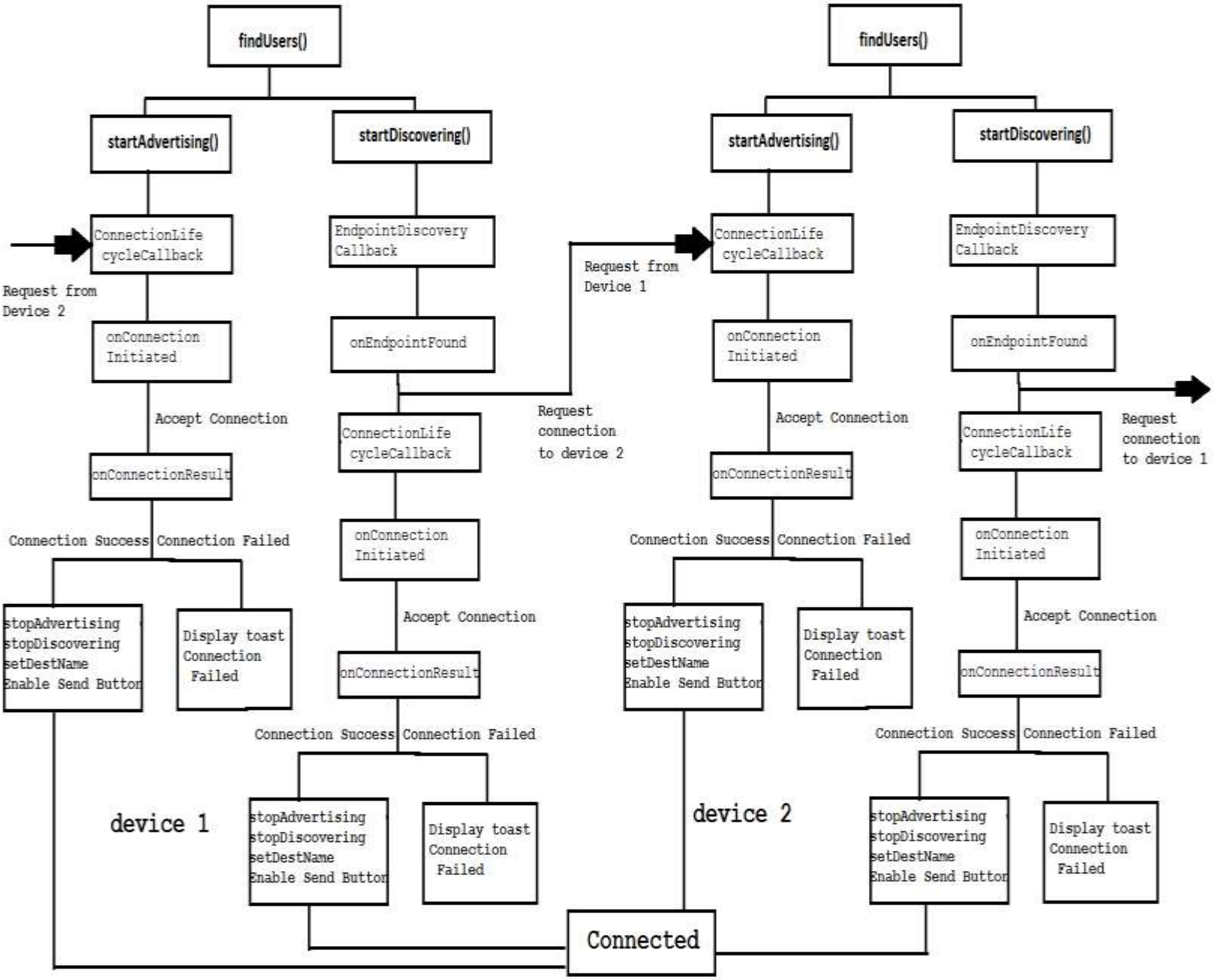


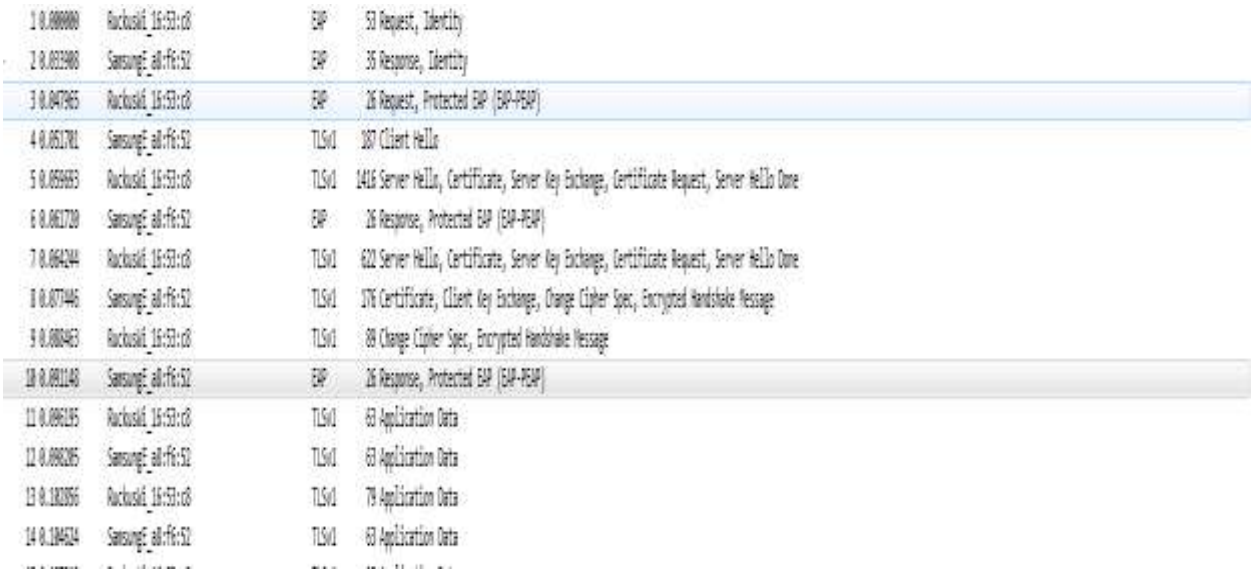
Fig 4.4 Activity Flowchart

API Flow


findUsers()
startAdvertising()
startDiscovering()
ConnectionLife cycleCallback
EndpointDiscovery Callback
Request from Device 2
onConnection Initiated
onEndpointFound
Accept Connection
Request from Device 1
Request connection to device 2
onConnectionResult
ConnectionLife cycleCallback
Connection Success
Connection Failed
onConnection Initiated
stopAdvertising stopDiscovering setDestName Enable Send Button
Display toast Connection Failed
Accept Connection
onConnectionResult
Connection Success
Connection Failed
device 1
stopAdvertising stopDiscovering setDestName Enable Send Button
Display toast Connection Failed
device 2
findUsers()
startAdvertising()
startDiscovering()
ConnectionLife cycleCallback
EndpointDiscovery Callback
onConnection Initiated
onEndpointFound
Accept Connection
Request connection to device 1
onConnectionResult
ConnectionLife cycleCallback
Connection Success
Connection Failed
onConnection Initiated
stopAdvertising stopDiscovering setDestName Enable Send Button
Display toast Connection Failed
Accept Connection
onConnectionResult
Connection Success
Connection Failed
stopAdvertising stopDiscovering setDestName Enable Send Button
Display toast Connection Failed
Connected

CHAPTER 5 RESULTS, CONCLUSION AND FUTURE WORK

5.1 Results



1 0.000000	Ruckusld_16:53:c8	EAP	53 Request, Identity
2 0.033908	SamsungE_a8:fe:52	EAP	35 Response, Identity
3 0.047965	Ruckusld_16:53:c8	EAP	26 Request, Protected EAP (EAP-PEAP)
4 0.051701	SamsungE_a8:fe:52	TLSv1	187 Client Hello
5 0.059693	Ruckusld_16:53:c8	TLSv1	1416 Server Hello, Certificate, Server Key Exchange, Certificate Request, Server Hello Done
6 0.061720	SamsungE_a8:fe:52	EAP	26 Response, Protected EAP (EAP-PEAP)
7 0.064244	Ruckusld_16:53:c8	TLSv1	622 Server Hello, Certificate, Server Key Exchange, Certificate Request, Server Hello Done
8 0.077446	SamsungE_a8:fe:52	TLSv1	376 Certificate, Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
9 0.080483	Ruckusld_16:53:c8	TLSv1	88 Change Cipher Spec, Encrypted Handshake Message
10 0.091148	SamsungE_a8:fe:52	EAP	26 Response, Protected EAP (EAP-PEAP)
11 0.096195	Ruckusld_16:53:c8	TLSv1	63 Application Data
12 0.098285	SamsungE_a8:fe:52	TLSv1	63 Application Data
13 0.102056	Ruckusld_16:53:c8	TLSv1	79 Application Data
14 0.104524	SamsungE_a8:fe:52	TLSv1	63 Application Data

Above are the test results

DUT send the request for connections

Reference device receive the request

Authentication take place

Reference device send the response

Data transfer take place

5.2 Conclusion and Future work

Proposed solution provide communication in no network area with any dependency on network, user can use proposed solution in case of emergency situation, in case of Panic, when the network in down.

Proposed method will also provide an authentication to user in order to avoid misuse of the proposed functionality

Same can be proposed to network to apply the mechanism at their end

Future Work

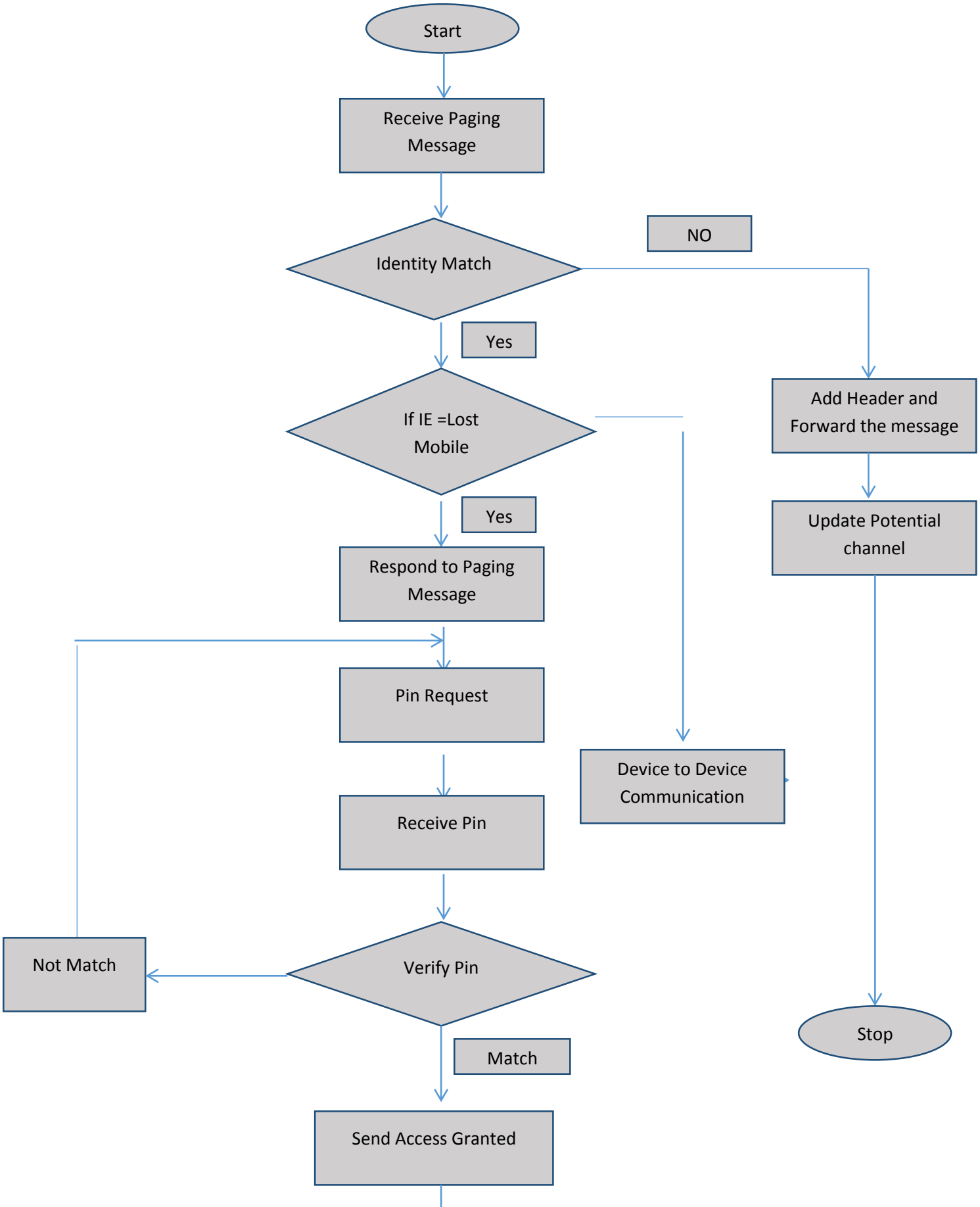
Lost Phone Tracking:

Problem: There are numerous current arrangement/strategies to track lost mobile or to ensure information. Be that as it may, every single existing technique require correspondence medium like cellular network or mobile information to do.

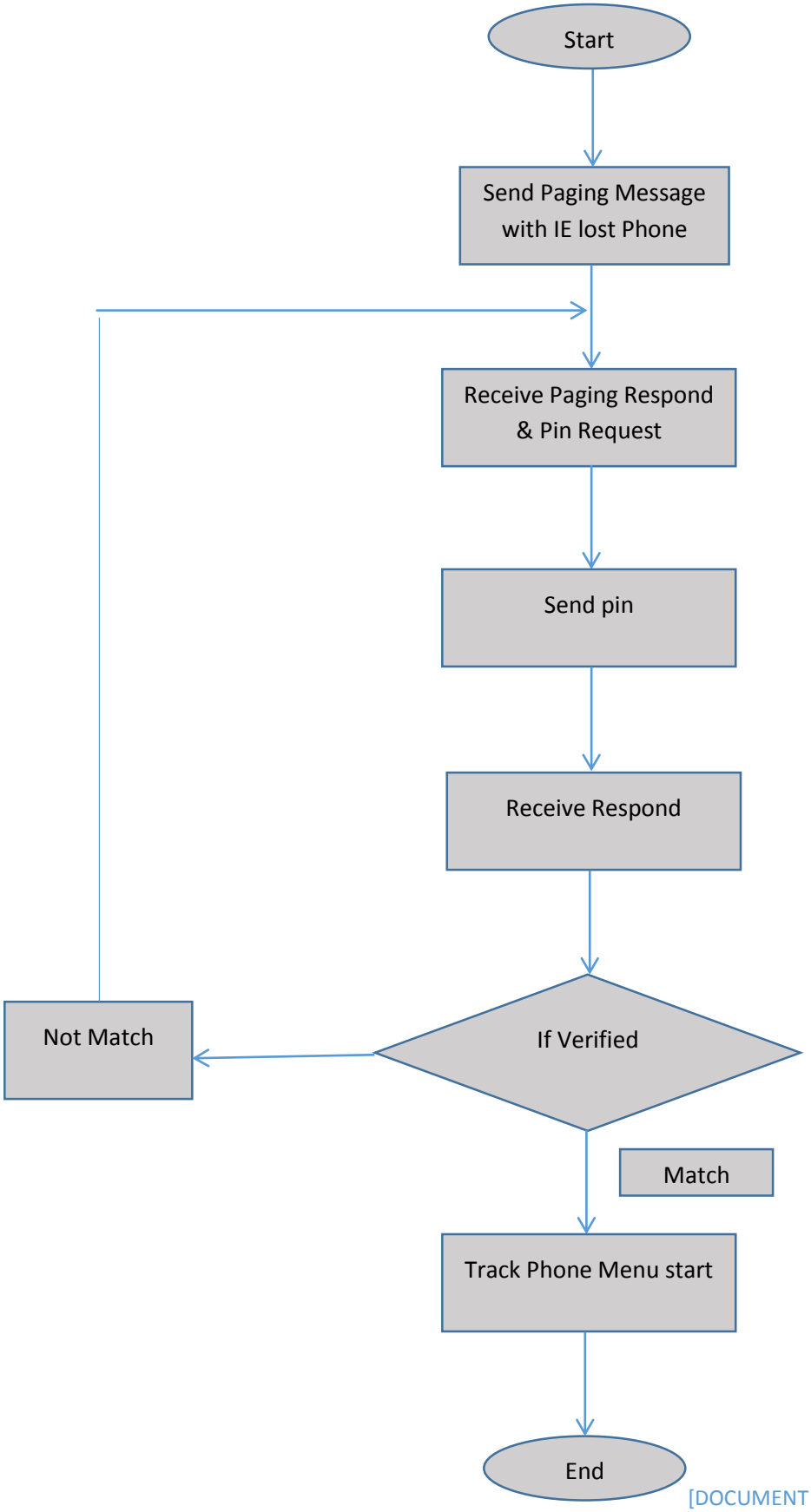
In the majority of cases robbery expel the sim card in the wake of taking the telephone, So that no medium would be there to track it.

Solution: We will give a strategy to track mobile/access mobile from other mobile regardless of whether there is no network (sim card).

BLOCK DIAGRAM (Lost Device)



BLOCK DIAGRAM (Remote Device)



Track Phone Menu start

1	**Lock the Phone**
2	Play Ring-Tone
3	Mode Change
4	Click Pictures
5	Recorder
6	Share Location
7	Check apps
8	Erase Data

Detail Explanation:

How about we assume Device A has lost and we need to track it utilizing Device B

- B will sent paging message for A including goal field of A which is as of now put away in disclosure module.
- A will send Pin ask for check subsequent to getting paging demand with IE (Lost Phone).
- B will attempt to include pin. B can include wrong pin for 3 times. On the off chance that it constantly include wrong pin for 3 times, B will be obstructed by A for further communication.
- On getting Right pin, keypad of A will be stop and B can get to device A.

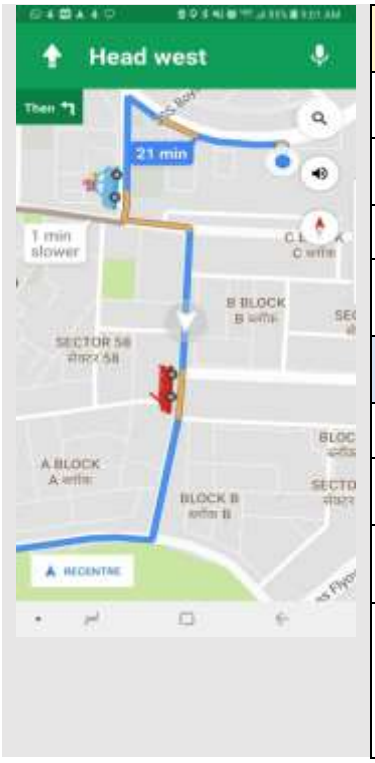
Following other client with organize condition while voyaging:

Problem: Keeping in mind the end goal to have fruitful correspondence when at least two man are going on same area there is no real way to check the area of other client with organize condition.

Solution: Our answer will tell client the area of other client in google maps that will incorporate system condition too, which will assist client to convey in choosing with and without arrange.

- : No Network
- : Network is here

3- Informing other client if there should be an occurrence of crisis while voyaging



Nearby Users (Friends)
Ankit
Sunil
Others
Gaurav

Notification

Problem: There is no real way to convey and connect with the missing individual in the event of crisis or system catastrophe when there is no system.

Solution: Our Solution Device to Device correspondence will give client a technique to convey in no system case and amid crisis.

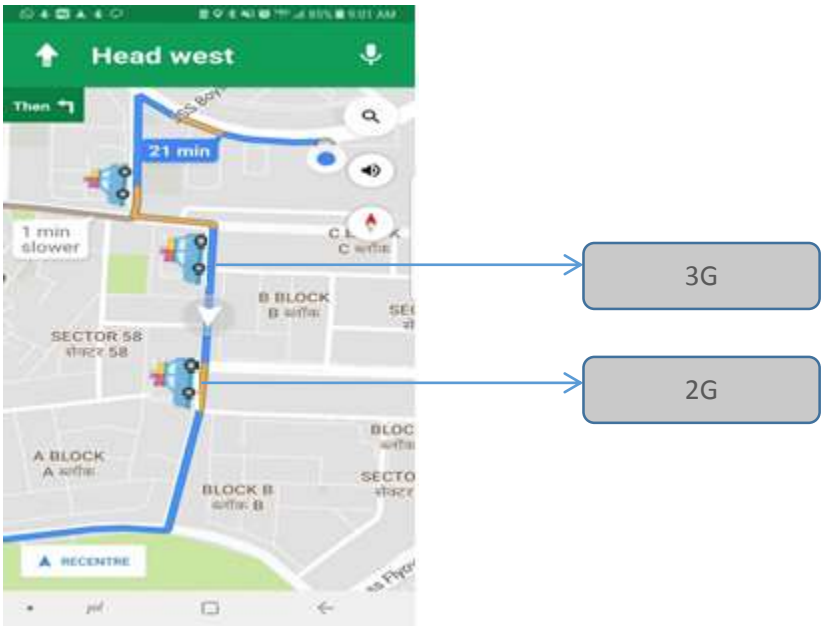
Notification of Panic Situations:

If there should arise an occurrence of any threat/Panic; Notification can be sent to all.

There is no real way to inform adjacent clients about frenzy circumstances.

In fast way different clients/companions can be notified.

Consequently recognizing of systems administration RAT with change in area:



Problem: At the point when client setting out from one place to other there are no of times gadget scan for 2G,3G and spent lot of time I camping.

Solution: Our answer will have predefined outdoors data that will spare outdoors time.

Communication in Emergency Mode, Disaster, when no system accessible:

Problem: If there should be an occurrence of crisis when or organize catastrophe when there is no system, there is no real way to impart and connect with the missing individual.

Solution: Our Solution Device to Device correspondence will give client a strategy to convey in no system case and amid crisis.

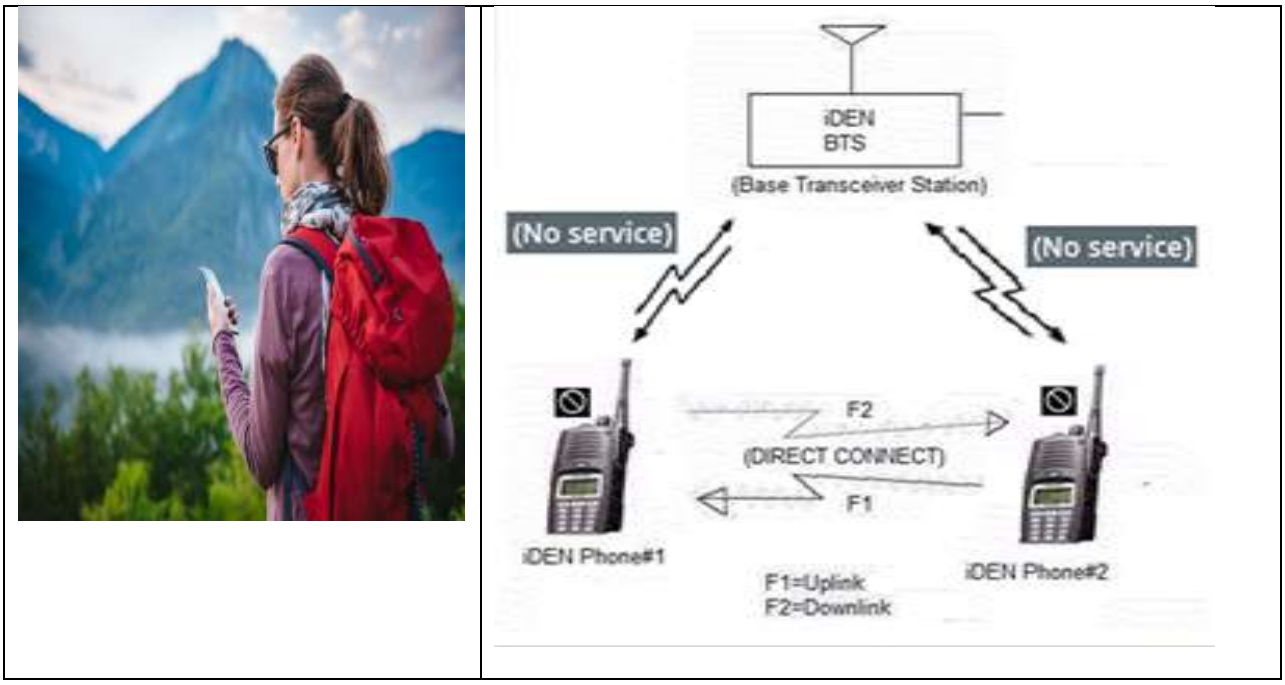
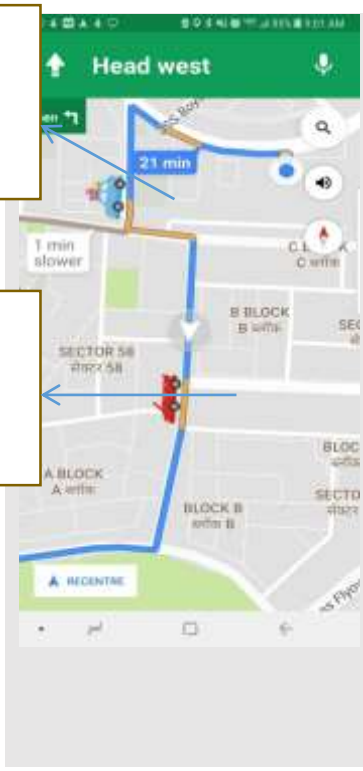


Fig 5.1 Proposed Communication Flow

Network amid Travel in light of accessible mode.

Case 1

Case 2



Nearby Users (Friends)
Ankit
Sunil
Others
Gaurav

Correspondence can be started from delineate on accessible mode,

Case 1: Network is available

a) **Video Call**
b) **Lost Phone**
c) **Call**
d) **Messages**

Case 2: Network not available

a) **Device to Device call**
b) **Emergency call**

Diagram of how the connection established in case of no network situation:

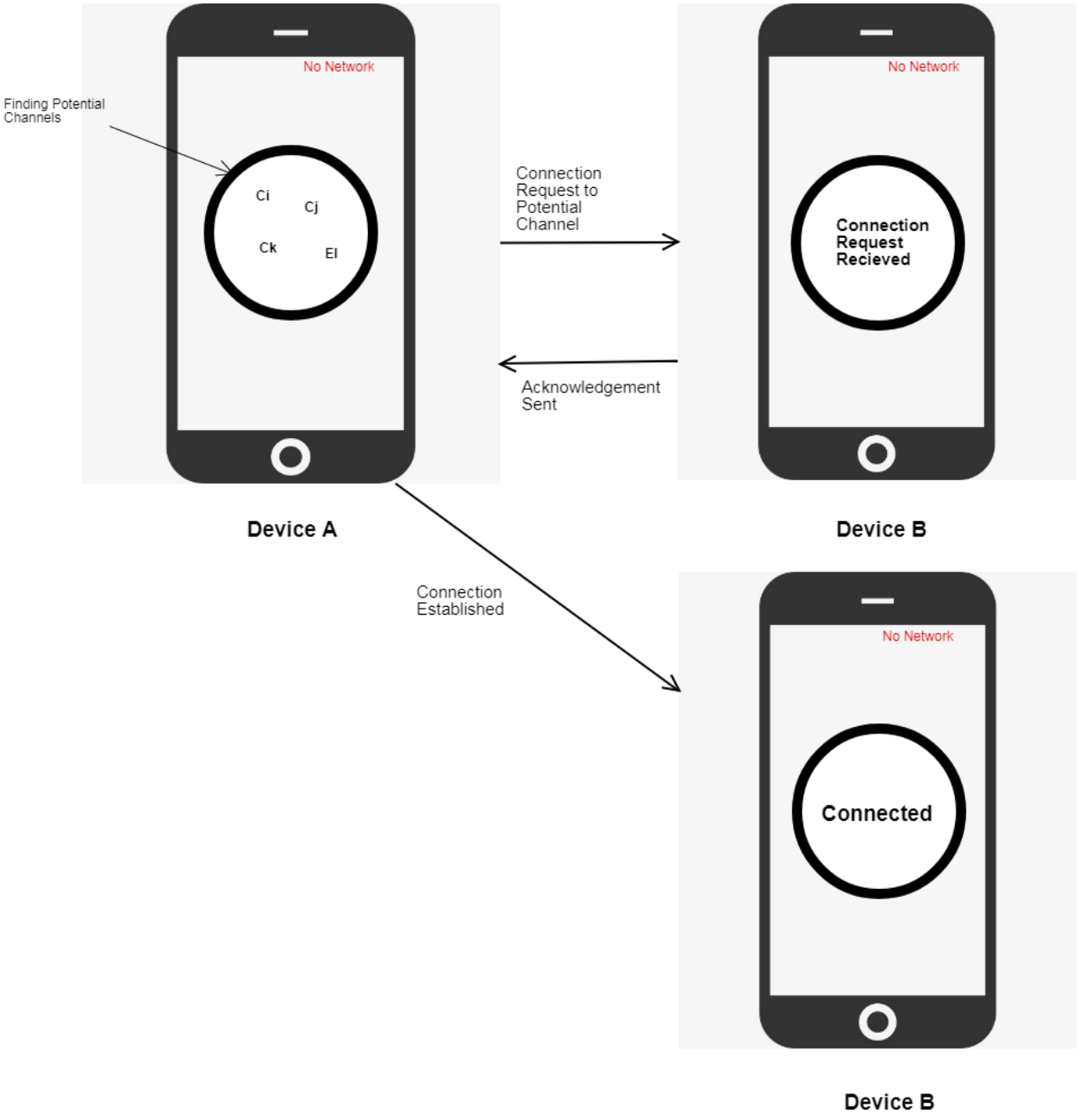
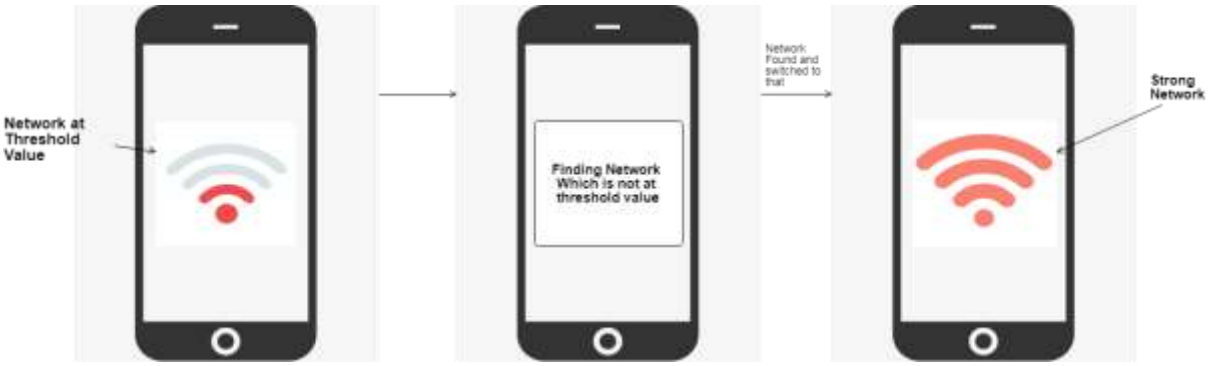


Diagram of changing network according to threshold value:



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