

# **A Survey on Mobile Peer-to-Peer Video Streaming Over Wi-Fi Network**

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**ABSTRACT:** In Today's technical era smart phones have become basic necessity in our life. Android technology is the latest and fastest growing O.S that comes in almost all the phones. Because of such a high end technology it is possible for user to get connect to each other by means of Wi-Fi, Bluetooth or any other android application. Now a day's most of the people use the Wi-Fi Technology to get faster internet access. Wi-Fi Technology can speed up the data transfer between the connected devices. It is possible to make many applications using Wi-Fi Technology on android platforms because android is an open source platform. Android is a mobile operating system that is based on a modified version of Linux.

**KEYWORDS:** Android, Wi-Fi, SQLite, Dalvik VM

## **I. INTRODUCTION**

In Today's world mobile has become the most important need for communication. Mobile devices have found use in enterprise and have begun using and demanding features focusing on security and isolation [1]. Hence, to make life easier, the concept of screen sharing has come into picture. Existing screen sharing applications like Team Viewer, Join Me, etc. have become popular in the market due to their innumerable applications in many diverse walks of life. These applications enable users to share their screen from one system to another, usually from PC to PC or phone to PC [2]. Today each and every smartphone has the Wi-Fi service. This gives easy access to internet. The objective of ubiquitous computing and communications is to enable users for accessing any service (such as voice, video or data) through any network, anywhere at any time with any device. Hence, it is expected that users would change their communication devices according to their surrounding environment in a communication session, as to suit their preferences at the present point of time [3]. Wi-Fi (i.e., IEEE 802.11-based wireless local area network) is taking the leading [4] role for the wireless communication due to its cheap integration cost and almost free-of-charge networking availability. Given the wide adoption of Wi-Fi in many kinds of devices, a natural way for the technology to progress is to target device-to-device connectivity, i.e. without requiring the presence of an Access Point (AP), traditionally provided by other technologies [5]. This is the purpose of the Wi-Fi Direct technology that has been recently developed by the Wi-Fi Alliance.

Today Android devices are becoming popular as compared to other devices. This popularity comes with the risk of the privacy of the data. Application often interact directly with personal or system sensitive data retrieved from local sensors embedded in mobile devices such as a GPS signal receiver, an embedded digital camera, a hidden microphone, and an accelerometer [6]. This interactivity sometimes can lead to loss of some personal data or it can lead to a threat. Being inspired by this android trend this paper tries to give information about android application.

Wi-Fi direct is made available by Wi-Fi alliance. Wi-Fi Direct technology, which is however based on a different approach than the 802.11 ad-hoc mode. Instead of having a network of equally capable devices, in Wi-Fi Direct devices negotiate the roles of AP and client to set up an infrastructure-like network. Hence, Wi-Fi Direct can immediately benefit from the technologies defined for infrastructure mode, and can seamlessly integrate all the existent basis of Wi-Fi devices in the market, which will simply see a Wi-Fi Direct device as a traditional AP [5].

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## i. ANDROID OPERATING SYSTEM

Android is the mobile operating System. It was originally developed by a startup of the same name, Android, Inc. In 2005, as part of its strategy to enter the mobile space, Google purchased Android and took over its development work (as well as its development team). Google wanted Android to be open and free; hence, most of the Android code was released under the open-source Apache License, which means that anyone who wants to use Android can do so by downloading the full Android source code. Moreover, vendors (typically hardware manufacturers) can add their own proprietary extensions to Android and customize Android to differentiate their products from others. This simple development model makes Android very attractive and has thus piqued the interest of many vendors. This has been especially true for companies affected by the phenomenon of Apple's iPhone, a hugely successful product that revolutionized the smartphone industry. Such companies include Motorola and Sony Ericsson, which for many years have been developing their own mobile operating systems.

When the iPhone was launched, many of these manufacturers had to scramble to find new ways of revitalizing their products. These manufacturers see Android as a solution — they will continue to design their own hardware and use Android as the operating system that powers it. With a user interface based on direct manipulation Android is designed primarily for touchscreen mobile devices such as smartphones and tablet computers with specialized user interfaces for televisions (Android TV), cars (Android Auto), and wrist watches (Android Wear). The OS uses touch inputs that loosely correspond to real-world actions, like swiping, tapping, pinching, and reverse pinching to manipulate on-screen objects, and a virtual keyboard.

## ii. SQLite

Android uses SQLite a lightweight relational database for data storage. SQL database: Android includes the lightweight SQLite database engine, the same database used in Firefox and the Apple iPhone SQLite1 is a tiny yet powerful database engine created by Dr. Richard Hipp in 2000. It is arguably the most widely deployed SQL database engine in the world. Besides Android, SQLite can be found in the Apple iPhone, Symbian phones, Mozilla Firefox, Skype, PHP, Adobe AIR, Mac OS X, Solaris, and many other places. There are three reasons why it is so popular: It's free. The authors have placed it in the public domain and don't charge for its use. It's small. The current version is about 150KB, well within the memory budget of an Android phone. It requires no setup or administration. There is no server, no configuration file, and no need for a database administrator.

A SQLite database is just a file. You can take that file, move it around, and even copy it to another system (for example, from your phone to your workstation), and it will work fine. Instead of calling Java I/O routines to access this file from your program, you run Structured Query Language (SQL) statements. Through its helper classes and convenience methods, Android hides some of the syntax from you, but you still need to know a bit of SQL to use it.

## iii. DALVIK VIRTUAL MACHINE

Dalvik virtual machine use in android. Dalvik is a virtual machine (VM) designed and written by Dan Bornstein at Google. Your code gets compiled into machine independent instructions called byte codes, which are then executed by the Dalvik VM on the mobile device.

Although the byte code formats are a little different, Dalvik is essentially a Java virtual machine optimized for low memory requirements. It allows multiple VM instances to run at once and takes advantage of the underlying operating system (Linux) for security and process isolation. Bornstein named Dalvik after a fishing village in Iceland where some of his ancestors lived.

The Dalvik VM is Google's implementation of Java, optimized for mobile devices. All the code you write for Android will be written in Java and run within the VM. Dalvik differs from traditional Java in two important ways:

- i. The Dalvik VM runs .dex files, which are converted at compile time from standard .class and .jar files. .dex files are more compact and efficient than class files, an important consideration for the limited memory and battery-powered devices that Android targets.
- ii. The core Java libraries that come with Android are different from both the Java Standard Edition (Java SE) libraries and the Java Mobile Edition (Java ME) libraries.

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### iv. WI-FI TECHNOLOGY

Recently the wireless networks have been widely deployed in communication industries. The wireless communication removes the restriction of wired connections and support fast access to the Internet. Wireless devices alter the need of hardware-software co-design to remove the problems of present Wireless scenario. Nowadays the wireless technology enables the connectivity between two or more computers to communicate using standard network protocols. The Wireless Ethernet Compatibility Alliance (WECA) is the industry organization that certifies 802.11 products that are deemed to meet a base standard of interoperability. The first family of products to be certified by WECA is that based on the 802.11b standard. These products are stamped with the Wi-Fi™ logo and referred to as Wi-Fi devices. 802.11a products will be stamped with the Wi-Fi5™ logo. The Wi-Fi logos certify that the product will work with any other Wi-Fi certified device, regardless of manufacturer. "Wi- Fi" stands for "Wireless Fidelity".



Fig.1: Wi-Fi logo

Almost all the android devices now days have the Wi-Fi as their built in service. This service is best for connection between two devices as compared to other services like Bluetooth. Bluetooth has a short range between 5-30 meters whereas Wi-Fi has a range between 32 meters indoors and 95 meters (300 ft.) outdoors. 802.11n has greater range. 2.5GHz Wi-Fi communication has greater range than 5GHz. Antennas can also increase range.

The Wi-Fi Alliance (WFA) has recently developed the Wi-Fi Direct technology, which is however based on a different approach than the 802.11 ad-hoc mode [7]. Instead of having a network of equally capable devices, in Wi-Fi Direct devices negotiate the roles of AP and client to set up an infrastructure- like network. Hence, Wi-Fi Direct can immediately benefit from the technologies defined for infrastructure mode, and can seamlessly integrate all the existent basis of Wi-Fi devices in the market, which will simply see a Wi-Fi Direct device as a traditional AP.

### v. RSA (RIVEST SHAMIR ADLEMAN)

The Security is an important issue in Wi-Fi technology. So for that RSA () algorithm is used. This algorithm is useful to getting the highsecurity. We endeavored to evolve 'n' prime numbers for security through the networks. Because 'n' prime numbers are not easily decomposed and increased the efficiency through the networks.

RSA algorithm:

- Select two different prime numbers p and q For security aim, the integer's p and q must be prime numbers.
- Calculate  $n=p*q$  n will be used as the module for public key and private key.
- Calculate  $f(n)=(q-1)(p-1)$ , Where f is a function of Euler's
- Select an integer e such that  $1 < e < f(n)$  and  $GCD(e, f(n))=1$ ; e and f(n) are co-prime.
- Determine d: d is multiplicative inverse of e mod (f(n)) ( $e * d \text{ mod } f(n) = 1$ ) d is the private key

**Encryption:** A transfer the data m with the public key (e, n) to B receives the data m with the private key (d, n) Such that  $0 < m < n$

$$C = m^e \text{ mod } n$$

A will be used the public key and transfer the data plain text to cipher text.

**Decryption:** B will be gotten the data or message m through the cipher text to plain text. B is used private key d.

$$m = c^d \text{ mod } n$$

**Example:**

Below is given an example of RSA algorithm in which we will be used four prime numbers and get public key and private key.

Select four prime numbers.

$$P=2, q=3, r=5, s=17$$

1. Calculate  $n=p*q*r*s$   $n=2*3*5*17$   
 2. Calculate  $f(n)=(p-1)(q-1)(r-1)(s-1)$   
 $f(510) = (2-1) (3-1) (5-1)(17-1)$   
 $=128$   
 $f(n)=128$   
 3. Select any number  $1 < e < 128$   
 $F(n)$  must not be divisible by  $e$   
 Let  $e=3$   
 Select  $d$ , multiplicative of  $e \pmod{f(n)}$   
 $d=43$   
 the public key is  $(n = 510, e = 3)$  private key is  $(n = 510, d = 43)$  Given message  $m = 11$ .

**Encryption:**

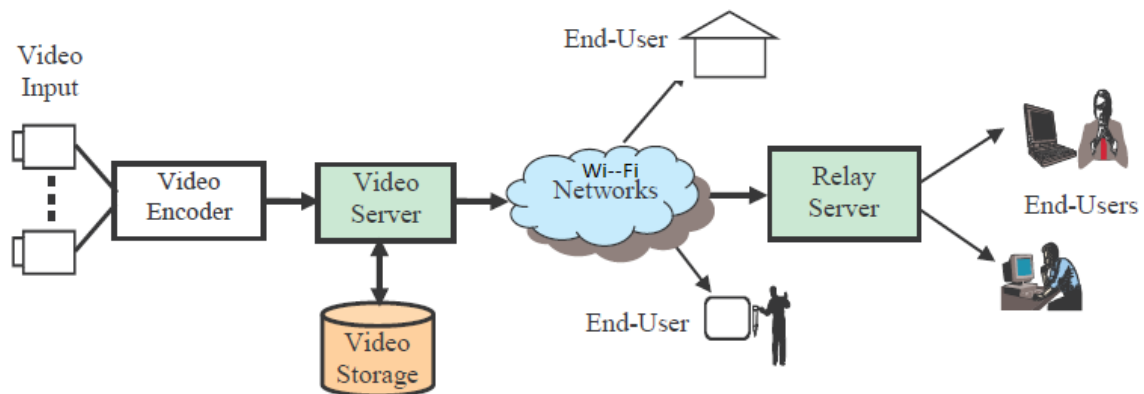
$C = 311 \pmod{510} = 311$   
 $C=311$

**Decryption:**

$M = 31143 \pmod{510} = 11$   
 B got the original message (11) which is sent by A.

## vi. VIDEO STREAMING

Video streaming addresses the problem of transferring video data as a continuous stream. With streaming, the end-user can start displaying the video data or multimedia data before the entire file has been transmitted. To achieve this, the bandwidth efficiency and flexibility between video servers and equipment of end-users are very important.



**Fig.2: Video Streaming**

A typical video streaming system is shown in Figure 1, which consists of an encoder, a distribution server with video storage, a relay server and end-users that receive the video data. The distribution server stores the encoded video data and begins to distribute the data at the client's demand. Users can watch the video whenever and wherever by accessing the server over the networks. Encoding and distribution is carried out in real time in the case of live distribution and may not be performed in real time for on-demand type of applications.

## II. LITERATURE REVIEW

The author Mihai Carabas, Lucian Mogos, anu, Razvan Deaconescu, Laura Gheorghe, Nicolae T, apus has presented an approach for providing lightweight and fast display virtualization for mobile devices this allows multiple operating systems to share the same physical display screen. They have created the prototype implementation using a dual guest

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android setup which uses the Para virtualization framework, this paper have advantages such as new approach to display virtualization, the ability of multiple mobile operating systems (such as Android), running on the same device, to share the display screen. It has a small codebase that may be easily ported to different mobile platforms. But it fails to explain about the lack of GPU virtualization lack of a distinct driver domain [1]. In authors have discussed about how the mobile phones have undergone the various changes.

Android phone has the touchscreen capability which can be used to display and manipulate the information. Authors have discussed about sharing the mobile screen of one user to another user i.e. Screen Sharing through their paper. This topic have disadvantage like application creates a connection between two users through which they can share their mobile phone screens. The sharing of information is done at an optimal rate which ensures that the system does not get overloaded while maintaining the quality of communication .but it could not cover. No Security mechanism is explained.Higher android version expected [2].

The author KhongNeng Choong et.al have discussed about the Seamless Presentation Technique (SP) which is server-less sharing system that will work on Wi-Fi environment. Although this system will work on android only as the future work can be to implement it on various O.S. Platforms. The advantages of this paper are as follows. SP was designed and implemented purely as software solution to support multi-delivery models.SP uses application agnostic approach to capture, encode and transmit desktop screen across the wireless network to the corresponding SP receiving application. But this paper could not cover topics like SP runs only on Windows platform while Display Cast runs on both Mac and Windows. Not investigated on stream based on both computing and communication resources in the context, thereby delivering a smarter mirroring system. [3].

On demand video streaming services are available in market now days. The authors have extended their previous work on MOVi(Mobile Opportunistic Video-on-demand) and they have proposed an improve scheduling algorithm which incorporates H-hop blocking and opportunistic download skipping schemes. Wi-Fi direct technology which allows direct device to device communication [4]. Daniel Camps-mur et .al have discussed the overview of the technical features of Wi-Fi direct technology. They have analyzed various features of the Wi-Fi direct through there experimentation that quantifies group formation delays in real life scenarios. They have well explained about Wi-Fi Direct devices are required to implement Wi-Fi Protected Setup (WPS) to support a secure connection with minimal user intervention. In particular, WPS allows establishing a secure connection by, e.g., introducing a PIN in the P2P Client, or pushing a button in the two P2P Devices. In order to support energy savings for the AP, Wi-Fi Direct defines two new power saving mechanisms: the Opportunistic Power Save protocol and the Notice of Absence (NoA) protocol. But this paper carry disadvantages such as In order to foster vendor differentiation, the Wi-Fi Direct specification does not define any mechanism to compute the CTWindow in the Opportunistic Power Save protocol or the schedule ofabsence periods in the Notice of Absence protocol [5].Using a Smartphone such as android there is always a risk of leakage of data and privacy assessment. Author Nai-Wei Lo, Kuo-Hui Yeh, and Chuan-Yen Fan has presented a user privacy analysis framework. LRPdroid has been proposed for an Android platform to offer a user privacy management model. In LRPdroid framework they have defined various models to achieve user privacy management. This paper has advantages like 1. a user privacy analysis framework called LRPdroid has been proposed for an Android platform to offer a user privacy management model.

A system prototype based on the LRPdroid framework was developed to evaluate the feasibility and practicability of LRPdroid.but it could not explain about developing privacy protection solutions on top of the LRPdroid framework is also an interesting research topic since the current model only supports privacy violation prediction and detection [6].

Authors Huifang Sun, Anthony Vetro, Jun Xinprotocol have discussed about the different video standards such as MPEG- 2 and and H.264/AVC . They have discussed about the typical video streaming system.[7].

### III. CONCLUSION AND FUTURE SCOPE

In this paper we have discussed about the Android as a mobile operating system and Wi-Fi Technology that is mostly used Android devices. This technology can be used to build the applications that will run on android phones. Android devices have the capability to share the information through the Wi-Fi network. Many applications can be built using Wi-Fi and Wi-Fi direct technology on android. We have provided the basic overview of these two technologies that help to build the applications in android.

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