MANTECH Publications

Journal of Android iOS Development and Testing

Volume 6, Issue 1, January-April 2021

P2P connections with Wi-Fi Direct

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Abstract

In the times of technological boom in the economy, Wi-Fi direct is an underdog technology that enables devices to connect with ease without the need of a centralized access point via a router to organize the traffic & relay data packers across the network . It allows two devices to establish a direct Wi-Fi connection with no need for an intermediary WAP or router, or Internet connection. It comes in handy in transfer of files and data sharing. Wi-Fi Direct is single-hop communication, rather than multi hop communication like wireless ad hoc networks. Especially when optimized using NetSpot, the easiest native wireless site survey software for Mac and Windows. His super simple technology can make many tasks that would otherwise be complicated simple and efficient, requiring less time and technical expertise.

Keywords*: - WAP, Wi-Fi Direct, Bluetooth, Single hop.*

INTRODUCTION

Over the past decade, the role of technology has expanded immensely and seeped into all parts of human life. The connectivity of any location signals the development and ease of living. Technology is becoming more versatile and uses connectivity as the trailblazer of innovation. There is wifi-enabled devices at all levels and sizes in today's age. The requirement for advanced gadgets is a never ending market, the most common element being the need to connect one device to another. Tis has to happen with fast data transferability with options to transfer larger multimedia files from one device to another.

The need for faster speeds and better data transition with lesser chances of failure and easy to use technology opens doors to options beyond conventional Bluetooth.

An advanced technology in place should provide easy and simple connection for tasks of less complicated manner such as transferring of files between smartphones or prompting print to jet printers and so on.

Figure 1 Access Point

As per data records, WiFi Direct is supported by more devices than it is easily understood, seeping in the most basic functionality devices. The Digital Living Network Alliance has included WiFi Direct in its 'interoperability guidelines' in November 2011. Additionally, Google has been supporting the standard with its central use in versions of Android operating system since Android 4.0 Ice Cream Sandwich has been operative in the market.

Samsung has been taking advantage of the WiFi Direct support in Android since Android 2.3 on the Galaxy S2, while the users of Apple devices have been enjoying WiFi Direct since iOS 7 in the form of Air Drop. Even BlackBerry had supported the standard before the company faded into irrelevance.

Wi-Fi Direct makes decentralized networking remotely super accessible to people with no advanced knowledge of technology infrastructure. It makes discovering another device easy and secured using Wi-Fi protected Setup & Wifi protected Access, aka WPA.

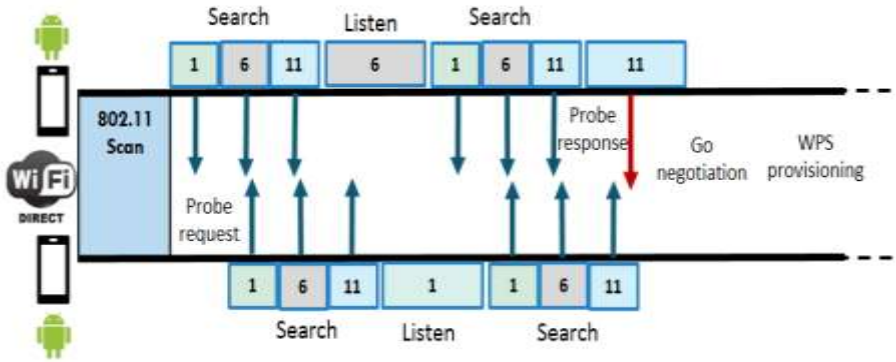

Figure 2-Wi-Fi Direct Network

ESSENTIAL WORKING OF WIFI DIRECT

Wi-Fi Direct works in two steps largely as explained below for basic functions:

- **Device Discovery:** Any given device first broadcasts a probe request message asking for MAC ID from all nearby devices. This stage is similar to the scanning phase in regular Wi-Fi. All devices that hear this message respond with a unicast message to the sender. Devices alternate between sending out and listening for probe requests, and subsequently their responses.

- **Service Discovery:** Now the sender sends a unicast service request message to each device. The receiving device responds with unicast message with service details.

Figure 3- Wi-Fi Direct via Apps

In terms of the states or phases of Wi-Fi Direct, devices go through scan phase where all present channels are scanned. Then a find phase is one which includes service discovery from the device, accelerating to formation phase which is a group then formed and includes WPS provisioning on the network, and operational phase. Whereas discovery happens on Social channels 1, 6 and 11 in the 2.4GHz band strength, the operation can be in either 2.4 or 5GHz bands.

Wi-Fi Direct on Android

Wi-Fi Direct (P2P) allows devices with the appropriate hardware to connect directly to each other via Wi-Fi without an intermediate access point. Using these APIs, you can discover and connect to other devices when each device supports Wi-Fi P2P, then communicate over a speedy connection across distances much longer than a Bluetooth connection. This is useful for applications that share data among users, such as a multiplayer game or a photo-sharing application.

Wi-Fi Easy Connect

This section deals with how a user can make use of Wi-Fi easy connect via android technology. on android 10 (API level 29) and higher devices one can use easy connect to provision Wi-Fi credentials to an existing active peer device. this happens as a replacement of WPS which was deprecated in android. apps can integrate easy connect into their

setup and provisioning flow by using the action process Wi-Fi easy connect URI intent as described below. This intent requires a URI. The calling app can retrieve the URI through various methods, including scanning a QR code from a sticker or display, or through scanning Bluetooth or NFC advertisements.

Once the URI is available, you can provision the peer device's wi-fi credentials with the action process wifi easy connect URI intent as described below. this allows the user to select a wi-fi network to share and securely transfer the credentials. Easy connect does not require location or wi-fi permissions.

Setting up URI Intent: Show setting page to process a Wi-Fi Easy Connect (aka DPP) URI and start configuration. This intent should be used when you want to use this Setting up a URI Intent: Show setting page to process a Wi-Fi Easy Connect (aka DPP) URI and start configuration. This intent should be used when you want to use this device to take on the configurator role for an IoT/other device. When provided with a valid DPP URI string, Settings will open a Wi-Fi selection screen for the user to indicate which network they would like to configure the device specified in the DPP URI string and carry them through the rest of the flow for provisioning the device.

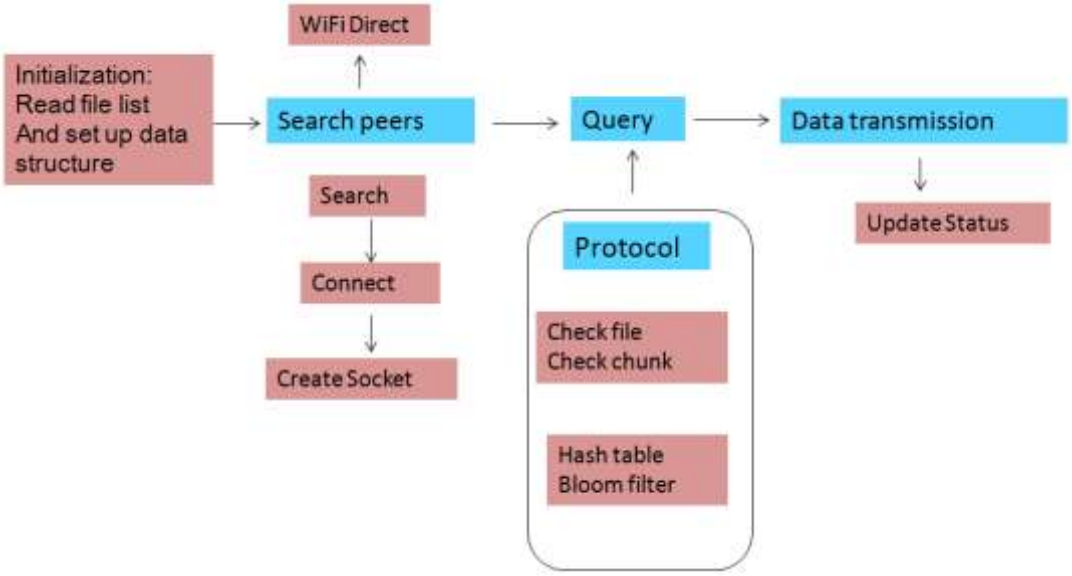

Figure 4 Android File Sharing

CONLUSION

The advancement in wireless technology allows us to further improve communications via tools such as Wi-Fi Direct. The work has become easier using devices ans much more efficient along with seeker and chirpier technology tat communicates back to the user. The functions of Wi-Fi direct are simple but impactful resulting in furthering AI into the lives of humans.

Android devices are common and with functions making file and media transfer faster, the use of such devices becomes mobile and impactful.

REFERENCES

I. Hoffman, Chris. 2016. "What Is Wi-Fi Direct, and How Does It Work?" How-To Geek, September 21. Updated 2017-07-05. Accessed 2018-03-05.
II. HSC. 2013. "Wi-Fi Direct - Overview and Features." Hughes Systique Corporation, May 6. Accessed 2018-03-05.
III. Kaushal D. 2016. "Android WiFi direct service discovery." Talentica Blog, December 1. Accessed 2018-03-08.
IV. Poularakis, Konstantinos, Qiaofeng Qin, Erich Nahum, Miguel Rio, and Leandros Tassiulas. 2017. "Bringing SDN to the Mobile Edge." arXiv, v1, June 19. Accessed 2020-08-22.
V. Purcell, Kevin. 2010. "Wi-Fi Direct Certification: What Is It and Why Should You Care?" Notebooks.com, October 26. Accessed 2018-03-05.
VI. RF Wireless World. 2018. "What is wifi direct | applications, advantages of wifi direct." RF Wireless World. Accessed 2018-03-08.