# A Study on Testing Environment for development service based on D2D networking

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Abstract. D2D is a direct connection between devices for sending or receiving the message or the content. In development for these systems to transmit at the same time by connecting two or more terminals to communicate directly and testing capabilities to verify the results is required. Existing general testing environment that is implemented in a terminal application or implementation of the service, but this study focused on testing a plurality of terminals that can be tested by connecting the extra testing framework will be constructed. This engine was designed to test a simple test script on the script, you can specify individual devices, add an item to be possible to specify the behavior between the devices

Keywords: D2D, test, direct connection, network test

## 1 Introduction

Recently due to the advances of smartphones, there is a growing need for D2D-based communication between individuals. D2D (Device To Device) communication means that it is directly connection between devices using the network modules that they have without going through the router provided by telecommunication operators. For example, Bluetooth (Bluetooth) connection method such as direct communication between the smartphone provides Bluetooth headset and is a good example.

An existing of the direct communication study on the of the Bluetooth as shown in the mainly fixed-type, the peripheral devices and to connect the focuses has been developed. This unit assumes that the connection between long hours and the pairing (pairing) throughout the process by saving the connection information in the direction have been conducted. However, recent NFC (Near Field Communication), as in cases such as the need for a temporary direct connection is a growing trend.

In this study, D2D communication in the home environment by taking advantage of the Wi-Fi chipset, the device between the fast (instant) and try to support the connection [1,2] to support these communication middleware environment for validating the testing environment is presented .

To do this by calling an API that provides the middleware to check the results to develop a test driver program to monitor multiple devices, each device between the sending and receiving offers the ability to see the results should be. These test programs written in C to be mounted on the corresponding terminal directly to a C program to perform tests without having to write is to establish an environment in which

## 2 Network Testing Method

   Existing network test tools focused on network environment to analyze packets flowing on the network or the network the ability to detect errors, and are concentrated in Consistency test for the network, such as TTCN-3 language and tools that support it, but TTCN shown itself to general application developers to learn and practice the difficult and more streamlined approach is needed.

   The actual developers to develop services for the network test that corresponds to the way the test works by writing test code to verify that the level of the eyes can be considered. Application developers can easily use the actual network test tools, there are few.

   Android developers can use realistic test environment using the JUnit unit testing and JUnit itself is easily accessible, but circumstances the offer to perform the test program, as well as scripts that can be used simply because the things that test drivers be developed directly has the burden. On this burden due to the general practice, rather than using a testing environment and tools to develop their own testing programs tend to take advantage of.

## 3 Testing Environment for D2D network

In this study, the functionality provided by middleware support for D2D to test (see Fig. 1) were constructed as.
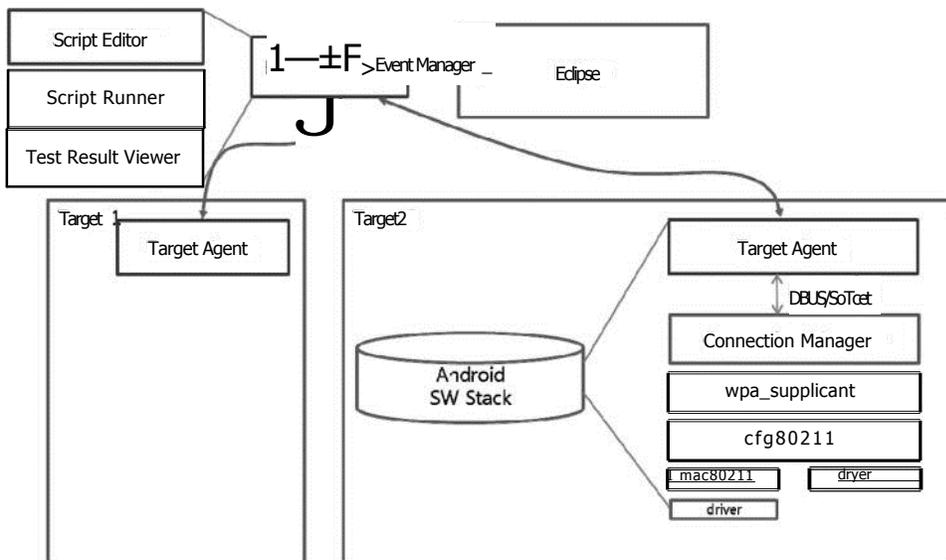


**Fig.** 1 The structure of a testing environment for D2D-based

services Descriptions of each component are as follows:

- Script Editor: a simple structure in which you can edit the script editor.
- Script Runner: is a test script that performs the Launcher.
- Test Result Viewer: Test results showing the ability to perform.
- Target Agent: a test agent, respectively, are mounted on the target when the script runs the command to call the API target mounted on the receiver is responsible for monitoring the results.

Script to specify the target of at least one specifier can contain more than the two could explain the relationship. For example, D2: check_from (DI,      Hello D2), as each device that connects multiple devices by specifying the behavior is described. Grammatical structure of the simple shall be composed as follows.

<device>: <command> (<parameters> ...)

Script launcher in the middle of the test script execution after an error is to stop. Currently defined command is as follows.

   p2p_send (device, string): sending string to the device
      check_from (device, condition, string): checking the string received from the device

In addition, an increase in API to add the necessary commands to go along with the script is going to extend.

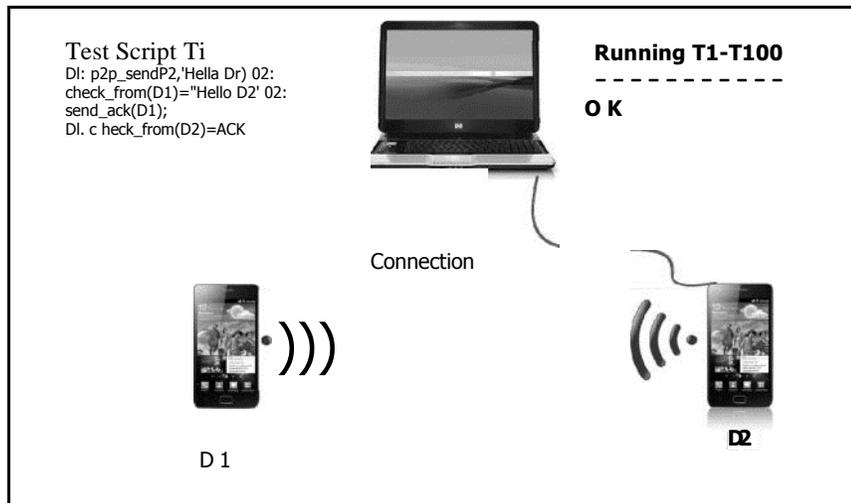Fig. 2 building is an example of this testing environment.



Fig. 2 The configuration of a testing environment

Testing of two terminals connected to a host terminal between two defined test scripts for action should be executed. These terminals can be extended to the n-terminal and

terminal on the script, through the syntax for specifying multiple terminal configuration allows for the testing was performed.

## 4. Conclusion

In this study, a large number of non-terminals of the terminal device that can test the connection between the tests was to establish an environment. Now want to test the connection to the part that enables end-to-end middleware is part of the future application of this test environment for developers to develop applications to monitor their actions to show the results will be developed.

## References

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