VNC Based Remote Desktop Access through Android Devices

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Abstract - *This paper describes the procedure to use the access areas of remote PC with the utilization of an android based mobile phone. It is done by using Virtual Network Computing based engineering. A client will have the capacity to get the access rights and control over the work areas of remote PCs through a VNC viewer that will be given on the client's mobile phone. The client can get to control the remote desktop within the Wi-Fi network extent, independent of different platforms like Windows, Macintosh or Linux. The view of the desktop is compacted before it is transmitted to the mobile phone. The connection between the remote PC and the mobile phone are associated with the IP address of the PC.*

Key Words: *VNC, RFB, Android SDK, IP address, HTTP Proxy, GUI and Handshaking.*

1. INTRODUCTION

Introduction to smart phones to the mobile sector has brought out a great change to the technical field. With open platform availability to the Android OS has also made up developers to think innovative and develop new apps with much functionality. As the word mobile convey the meaning of portability, it not only makes the mobile device portable but also has changed the stationary things to get accessed through portable devices.VNC (Virtual Network Computing) is a technology used for remote desktop sharing, a form of remote access on computer networks. VNC creates the visual desktop display of one computer to be remotely viewed and accessed over a network connection. Remote desktop technology like VNC is being useful on home computer networks, allowing user to access their desktops from anywhere in the house, which enables them to monitor things. It is also used by Information Technology (IT) department's network administrators to remotely troubleshoot employee's computer.VNC works with a client/server model and it uses a network protocol called Remote Frame Buffer (RFB). VNC clients (also called as viewers) shares the controller input (Key gestures, plus mouse movements and clicks or touch activities) with the server. The VNC server gets the local display contents and display them back to the client, additionally it take cares of the remote client input into local input. All these features enable the server to be controlled and accessed with the help of this VNC system.

2. WHY ANDROID PLATFORM?

Android platform is a software stack that has operating system, middle-ware and key applications for all mobile devices. Developers can create android applications using android SDK platform and test those applications with the help of virtual devices which supports the android SDK. Android is an open-source platform where many developers find it as an advantage. With the right development tools, developers can induce their innovative ideas into the android OS or even for the application development. Both Google and Verizon have given the complete rights for the developers to play with the android system and thus they believe that, it will pay way for the development of many innovative apps.

3. ABOUT VNC

Virtual Network Computing (VNC) is a kind of remote-control application which gives the ability to control desktop computer with the help of this application. Keystrokes and mouse clicks are transmitted from remote part to computer, which allows the technical support assistant to handle the desktop, a server or any other network devices without being in the physical location.

VNC takes up a client/server model. A VNC viewer application is installed on the local desktop and it connects to the server component, which also should possess the VNC application in it. The server desktop transmits a duplicate screen into the client's desktop. It also allows some functions to be carried out with the server from the client system.

This paper explains the interconnection of a server desktop which is being connected to a mobile device. The android mobile acts as a remote client over here. An android VNC app is being used here to access the connection with the server desktop.

4. PROBLEM DESCRIPTION

Conventional desktop applications must be redesigned to work on an android OS, hence it losses some functionalities. More demanding applications may require some specific hardware to run, but it may not be available in all circumstances.

The web hosts which have been developed to a much higher extent which can support all kinds of features from word processing to 3D level gaming, which can make any kind of application to compatibly run on devices.

5. PROPOSED SYSTEM

The remote control connection access takes place with the help of IP address, with this type connection the entire control goes to the remote controller side. VNC system

follows RFB (Remote Frame Buffer) protocol to transmit all information between connected devices. The transmission runs from one port to other in the range of 5900-5906 using TCP/IP protocol. VNC system needs two type of application for a decent work - server software for a desktop under control and client app for a supervisor (controlling) device. Client side is also called as viewer because of its functionality. On the other side, server should also respond to graphic screen update request by sending back a desktop view to the connected client. The client uses a cellular device see and manipulates the server system. To make a call on the same phone, the client should stop this interconnection first. The server and the client must be connected to the same network or wifi for a proper and easy interconnection of the devices.
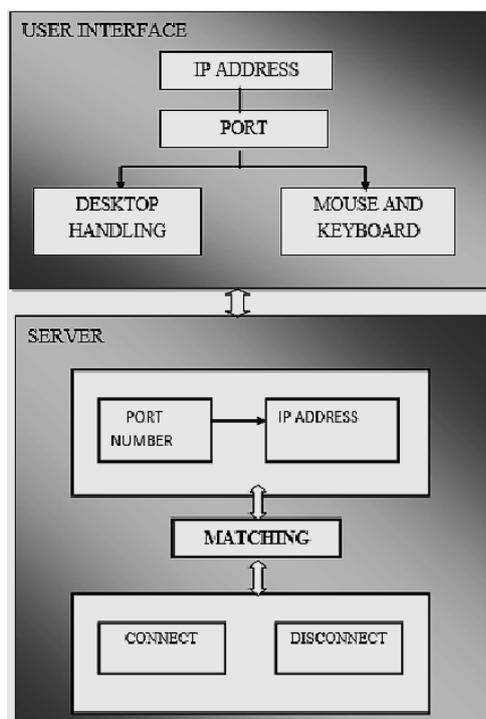

Figure 1: Architectural Representation of a Connection

5.1 Advantages of Proposed System

- It enables user to access remote desktop computer anywhere within the network.
- Provides control to client and allows all mouse action in server side machine.
- Manipulation on the server side can be done in an easy way.
- Will have smooth screen update all because of RFB protocol.

6. DESIGN OVERVIEW

The desktop (server) which is been interconnected with the mobile in a wireless manner has few modules involved with it.

6.1 Server Connection Module

Authentication is done with the help of username and password on the cellular phone from the app. If the validation is done correctly, the app asks for the IP address of the desktop for remote access. If the IP address is incorrect the app delivers an error message, when a correct IP address is entered, the app makes the connection possible via the http proxy of the desktop. Since we use wireless network for the user to remotely access the desktop, the user must possess an intranet compatible mobile phone which is well-suited for all java programs to run.

6.2 Desktop Accessing Module

This module explains the contents of accessing the remote desktop through an android device. It has the following sub modules:

6.2.1 Test Inputting

It allows the user to input text into any document type files or text areas. Using the android keyboard the user can give inputs to the interface.

6.2.2 Viewing

It explains about the viewing process. When the user tries to click some object, those objects can be enlarged as a full document view.

6.2.3 Sharing

It explains that multiple mobiles can share or access a single remote desktop.

6.3 Desktop Viewing Module

The desktop screen view is fragmented into 8 to 16 parts to comprise with the display area of the mobile with the help of Remote Frame Buffer (RFB) protocol. From the server side, the VNC application gives the desktop screen as bitmap images to the client with the help of RFB. The SVNC proxy converts the desktop display image (which is in the form of bitmap) and then transfers the converted image to the SVNC viewer as a requested type of view by the user. With the help of refresh method, the desktop view can be refreshed continuously from the mobile.

It is has many sub-modules in it.

6.3.1 Panning and Zooming

The user from the client side can view the display horizontally and vertically. The display can be widened (zoom out) to browse its contents and likewise the display can be narrowed to get a detailed view of the specific content.

6.3.2 Over Viewing and Twin Viewing

The over viewing mode is used to browse the entire area of the display and to choose a specific area within that display. The aspect ratio is changed to fit the screen of the mobile when this mode is turned on.

Sometimes if two display contents needed to be displayed at the same time, then this functionality can be obtained by twin viewing mode. This twin view mode plays a vital role in VNC client viewer.

7. RFB PROTOCOL

The RFB is being abbreviated as Remote Frame Buffer. It is a simple protocol which is used for remote access to graphical user interface. It is applicable to all windowing systems and windows applications as it works at the frame buffer level. Main protocol used in VNC for remote access to GUI is RFB protocol. The remote end (i.e.) the place where the user sits and displays or access the server end is said to be the RFB client or Viewer. Likewise the server end (i.e.) the windowing system or the desktop is said to be the RFB Server.

RFB is a "Thin Client Protocol" which meets a very few requirements of the client. By this method the client can use a wide range of hardware for interconnection and this simplifies the implementation process. When the server disconnects from the server and reconnects to the same server, the UI(User Interface) is being preserved with the help of this protocol. Not only one user can alone access the desktop, different users can use the desktop with different username and password.
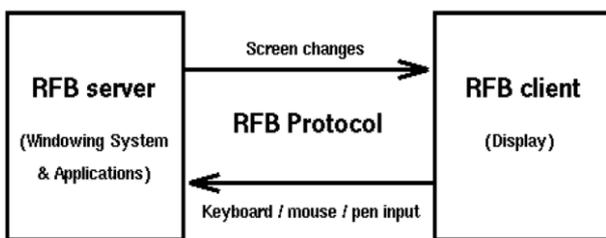

Figure 2: System Application Overview

8. RFB PROTOCOL IMPLEMENTATION

In RFB protocol, there are three stages of implementation.

- Handshaking phase is the first phase. Here the protocol version is checked and the type of security to be used is mentioned in this phase.

- Initialisation phase is the second phase, where the ClientInit and ServerInit messages are exchanged between the client and server.

- The normal protocol interaction is the final stage.

Handshaking begins from the Server which sends a message with the details of the Protocol Version. The RFB protocol has several versions. This lets the client to know the highest version of the protocol server that is to be supported. The client replies for the message sent by the server with the protocol version which is actually to be used. The client server shouldn't reply with the protocol version higher than the quoted version type by the server.
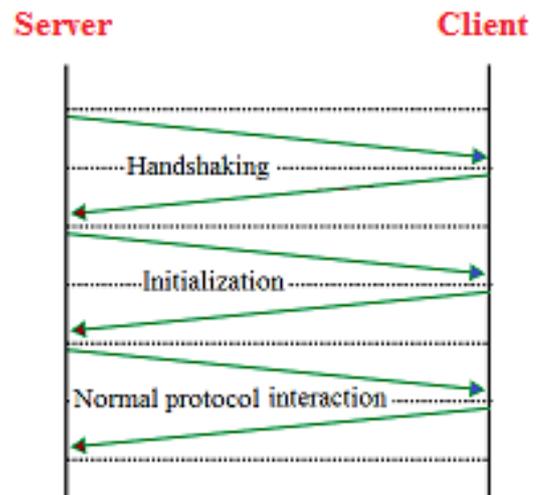

Figure 3: The RFB Protocol Procedure of VNC

9. APPLICATIONS

For remote assistance, administration, remote desktop sharing and IT help desk VNC stands as a priority number one. When VNC is being connected between server and a client, they can share messages with each other which mark as an advantage. VNC also allows sharing files in both the directions from the server to the client and from the client to the server. Customer care finds the use of VNC to be an utilizable system in their field.

10. EXPERIMENTAL RESULTS

The experimental outcome shows the result of the VNC system in the form of input and output. It shows the generated result after giving the specific input to the system.

Figure 4: VNC Client GUI

Figure 5: Desktop Access

Figure 6: Panning Desktop

Figure 7: Zooming

Table 1: Inputs and their corresponding outputs

Input	Output
User Input: Username and Password	User is logged into the desktop.
Moving the cursor	Responding to the movement the cursor is also moved in the desktop also.
User can click	Respective function is executed.
User can zoom	The certain region is being zoomed accordingly.
User can use shortcuts	Based on the shortcut particular function is being executed.

11. CONCLUSION

This application has been developed to maintain the desktop remotely over Wi-Fi internet connection within a certain area. It's been used by the system administrators for monitoring the desktop remotely. The next step of this VNC access through mobile devices will be improved to an extent of controlling the desktop from any place of any distance through internet with the help of mobile phones. Mobile phones are being used by the users in the client end because every individual possess a mobile phone in the recent times. Due to the development of mobile functionality, many functions are being collaborated with the mobile operating system. This feature of implementing VNC via hand held devices helps user to do certain tasks remotely and easily.

12. REFERENCES

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