

Client Server Network Management System for WLAN (Wi-Fi) with Remote Monitoring

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Abstract— Network Management Systems have played a great important role in information systems. There are different network management systems such as Remote monitoring, Desktop Sharing, Bandwidth management etc. This paper elaborates the above mentioned issues i.e. remote desktop sharing, Bandwidth Management and Remote monitoring which are accumulated in single network management system. *Remote desktop sharing* is a technology that allows remote access and remote collaboration on a person's computer. Remote Desktop Sharing provides the capability to technology consultants, administrator or anyone to have full access and control of home computers, office workstations and servers remotely. Another application in network system is *Bandwidth management*. Bandwidth management is the process of measuring and controlling the communications (traffic, packets) on a network link, to avoid filling the link to capacity or overflowing the link, which would result in network congestion and poor performance of the network. Bandwidth is reserved for each application to ensure the QoS. To ensure the QoS guaranteed services, the SS may reserve more bandwidth than its demand. As a result, the reserved bandwidth may not be fully utilized all the time. In this paper, we propose a scheme, named *Bandwidth management*, to utilize the unused bandwidth without changing the existing bandwidth reservation. The idea of the proposed scheme is to allow other SSs to utilize the unused bandwidth when it is available. Thus, the system throughput can be improved while maintaining the same QoS guaranteed services. Another important feature of this network management system is *Remote desktop monitoring* which can be very useful for efficient management of available bandwidth. This paper specially highlights remote monitoring and control refers to the measurement of disparate devices from a network operations center or control room and the ability to change the operation of these devices from that central office. Remote monitoring allows monitoring operations of one computer through other computer in network. this can be done using TCP/IP protocol. Using this feature server can shutdown client's PC. If server finds out that any client is misusing bandwidth he may warn him by sending alert message if client continues misuse of bandwidth he may shutdown his Computer. This paper intends to increase network management functions by making system capable of utilizing available bandwidth efficiently with help of Remote monitoring functionalities. Bandwidth management feature relies on user-defined bandwidth classes and policy rules to manage the available bandwidth; this avoids wastage of precious available bandwidth. If a user uses this system user can simultaneously monitor client's desktop, share desktop and dynamically handle available bandwidth as per the requirement of client. This system uses Wi-Fi (WLAN) to connect computers in network. This paper is to implement the client/server network management system using Wi-Fi. **And then this paper intends to show data or message structure of client/server and how to work using TCP/IP protocol.**

Keywords-TCP/IP, Wi-Fi, Bandwidth management, Remote

I. INTRODUCTION

This paper intends to manage bandwidth, to track the client's activities using remote monitoring, to share client's desktop and vice versa and design the system using TCP/IP protocol, to show data or message structure of client server network and how to work using TCP/IP protocol. This paper includes use of TCP/IP based client server application. Client/Server network uses a network operation system designed to manage the entire network from a centralized point, which is the server. Clients make requests of the server and the server responds with the information or access to a resource. Client/Server networks have some definite advantages over peer-to-peer networks. It is easier to find files and resources as they are stored on the server. Also have much tighter security. All usernames and passwords are stored in the same database (on the server), and individual users can't use the server as a workstation.

The server holds the database of user accounts, passwords, and access rights. Hardware requirements of this system are Wi-Fi enabled computers, Client side requirements are P IV processor and higher, 512 MB and higher, LAN Card(NIC). Server side requirements are P IV processor and higher, 512 MB and higher, 20 GB HDD and higher, LAN Card, the user will use WLAN with Ethernet NIC.

II. METHODOLOGY

A network management system is used to design, organize, analyze and administer computer and telecommunication networks, in order to maintain a desired level of service at all times. Network management refers to the maintenance and administration of large-scale computer networks and telecommunications networks at the top level. Network management is the execution of the set of functions required for controlling, planning, allocating, deploying,

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coordinating, and monitoring the resources of a network, including performing functions such as initial network planning, frequency allocation, predetermined traffic routing to support load balancing, cryptographic key distribution authorization, bandwidth management etc. Network management systems include following functional areas. These are bandwidth management, desktop sharing and remote monitoring. The primary purpose of bandwidth management is to keep track of the bandwidth allocation to clients over entire network and maintain QoS, the connection status of the devices that make up the WLAN and the transition of connection status. And bandwidth management is to monitor network bandwidth so that the available bandwidth is efficiently distributed and managed. Remote desktop sharing leads sharing desktop of client or server so that one can view current status of other's computer. They can view installation steps, or building plans using this application. Server can monitor client's desktop operations such as shutting down client's PC. This can be done by server to wastage of bandwidth or any other reason. This system secured as only server control access to network resources according to local guidelines so that the network cannot be sabotaged (intentionally or unintentionally) and sensitive information cannot be accessed by those without appropriate authorization.

A. WLAN

Wi-Fi (also spelled *Wi-Fi*) is a popular technology that allows an electronic device to exchange data wirelessly (using radio waves) over a computer network, including high-speed Internet connections. The Wi-Fi is defined as any "wireless local area network (WLAN) products that are based on the Institute of Electrical and Electronics Engineers' (IEEE) 802.11 standards". A device that can use Wi-Fi (such as a personal computer, video-game console, smart phone, tablet, or digital audio player) can connect to a network resource such as the Internet via a wireless network access point. Such an access point (or hotspot) has a range of about 20 meters (65 feet) indoors and a greater range outdoors. Hotspot coverage can comprise an area as small as a single room with walls that block radio waves or as large as many square miles — this is achieved by using multiple overlapping access points. Wi-Fi allows cheaper deployment of local area networks (LANs). Also spaces where cables cannot be run, such as outdoor areas and historical buildings, can host wireless LANs. Wi-Fi Protected Access encryption (WPA2) is considered secure. New protocols quality-of-service makes Wi-Fi more suitable for latency-sensitive applications (such as voice and video). Power saving mechanisms (WMM Power Save) extends battery life.

Why wireless LAN (Wi-Fi) ?

With no wires or cables to route, a wireless monitoring system is inherently more flexible than a traditional network. You are not locked into a fixed network topology or system setup, leaving open the possibility for additions,

upgrades, extensions, and so on. This convenience means there is less overhead associated with setting up a measurement, and less overhead means more opportunity for taking additional measurements for added insight into your system. Wireless also extends the portability of your data acquisition. Field measurements can be time-consuming and costly. With wireless sensors, setup time is significantly reduced.

III. OVERVIEW OF CLIENT SERVER NETWORK MANAGEMENT SYSTEM

The client server network communication system is implemented by using .Net framework and C# language for application interface and use to detect the network feature and use SQL to store the important data of the system. And this system use Wi-Fi to connect various computers in network. This system uses TCP/IP protocol for network transaction. Client sends request for desktop sharing and sever responds to client's request and desktop sharing initiates. Similarly in remote monitoring request-Response method is used. Network communication system means different things to different people. In some cases, it involves a solitary network consultant monitoring network activity with an outdated protocol analyzer. In other cases, network system involves a distributed database, auto polling of network devices, and high-end workstations generating real-time graphical views of network topology changes and traffic. In general, network communication system is a service that employs a variety of tools, applications, and devices to assist human network managers in monitoring and maintaining networks.

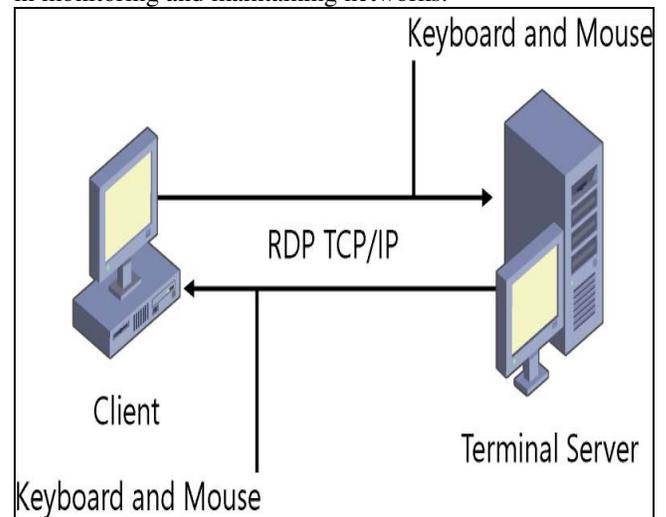


Fig.1 Client server network system

1. Bandwidth management:

In order to provide QoS guaranteed services, it is required to reserve the necessary bandwidth before any data transmissions. Each client is provided with fixed amount of bandwidth thus, the amount of reserved bandwidth transmitted at a time may be more than the amount of transmitted data and may not be fully utilized all the time. Although the amount of reserved bandwidth is adjustable via making bandwidth requests (BRs), the adjusted bandwidth is

applied as early as to the next coming frame. The unused bandwidth in the current frame has no chance to be utilized. Moreover, it is very challenging to adjust the amount of reserved bandwidth precisely. This may have risk of degrading the QoS requirements of applications due to the insufficient amount of reserved bandwidth. To improve the bandwidth utilization while maintaining the same QoS guaranteed services, our research objective is twofold: 1) the existing bandwidth reservation is not changed to maintain the same QoS guaranteed services. 2) our research work focuses on increasing the bandwidth utilization by utilizing the unused bandwidth. We propose a scheme, named *Bandwidth management*, which utilizes the unused bandwidth while keeping the same QoS guaranteed services without introducing extra delay. The general concept behind our scheme is to allow other computers (clients) to utilize the unused bandwidth left by the current data transmitting clients. Consequently, the unused bandwidth in the *current* frame can be utilized. It is different from the bandwidth adjustment in which the adjusted bandwidth is enforced as early as in the next coming frame. Moreover, the unused bandwidth is likely to be released temporarily (i.e., only in the current frame) and the existing bandwidth reservation does not change. Therefore, our scheme improves the overall throughput while providing the same QoS guaranteed services.

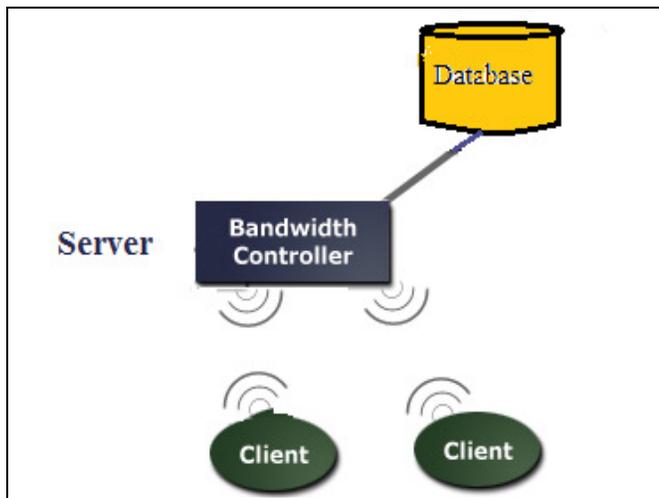


Fig.2 Bandwidth management

2. Remote desktop sharing

Remote desktop technology makes it possible to view another computer’s desktop on your computer. Once this functionality is started server can track every activity carried out by client on his local machine. Remote desktop sharing allows remote access and remote collaboration on other’s computer. This uses Remote Desktop Protocol, *Remote Desktop Protocol (RDP)* is a proprietary protocol developed by Microsoft, which provides a user with a graphical interface to connect to another computer over a network connection. The user employs RDP client software for this purpose, while the other computer must run RDP server software. RDP servers are built into Windows operating systems; an RDP server for Linux also

exists. By default, the server listens on TCP port 3389. If by using this module client’s desktop is being shared this can be useful for server to keep track of client’s work and client can even share any of project plan, presentation etc. client will not have to personally visit administrator or any other client thus saves effort and time which are most precious thing. Clients can even share their respective desktops with server as well as other clients also. If server’s desktop is being shared he can share his plan diagrams, installation steps, meeting reports etc to all clients or only to whom server intends to share. This again saves time and makes working easier and effective.

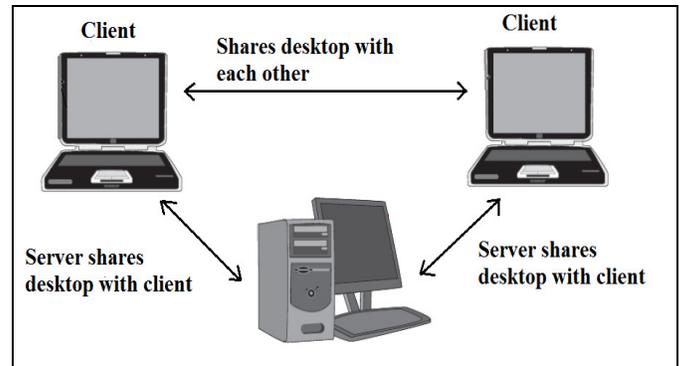


Fig.3 Remote desktop sharing

3. Remote monitoring

Remote Monitoring (RMON) is a standard specification that facilitates the monitoring of network operational activities through the use of remote devices known as monitors or probes. Using this functionality server can monitor client’s desktop functions. As mentioned above the available bandwidth is dynamically distributed according to need of each client. If one client has more bandwidth than his need it can be deallocated from that client and can be allocated to the needed client. But if client misuses given bandwidth server can easily trap him with help of Remote desktop sharing module. When server comes to know about misuse of bandwidth he may send an alert message to that particular client but if client continues misuse of bandwidth he may shutdown client’s PC remotely. Thus bandwidth is not wasted.

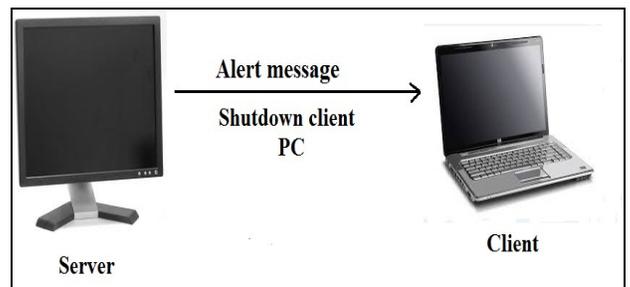


Fig.4 Remote Monitoring

In above figure shows that server sends alert message to client, if client continues misuse of bandwidth server shutdowns client’s PC.

IV. CONCLUSION

In this client server network implementation system, the server can listen all of the requests of the clients and response to the clients. This system also provides facility for efficient management of bandwidth. If a client is provided with certain amount of bandwidth but he can work with less bandwidth than provided to him then server can deallocate bandwidth from that client and allocate that bandwidth to required client which is in network. This functionality is provided at server side only as bandwidth allocation is centralized network management system. Server assigns bandwidth to each client which will be stored in database. Bandwidth is the primary measure of computer network speed so it is always necessary to use it prominently and this networking system based on TCP/IP provides the same. This system also allows client desktop sharing or server desktop sharing, when this application is started current status of client's desktop is viewed by server and thereafter every activity carried out at clients desktop can be tracked by server. Similar operation can be performed at server side that is client can view server desktop can view every activity carried out by server once this application is started. For using this application client or server will just have to start the application thereafter the one can view other's desktop and vice versa. Another useful facility of this network management system is remote monitoring which monitors client's PC operation that is server can shutdown client's PC. This application is useful when client is working with allocated bandwidth but is not using that bandwidth for necessary purpose, at that time server sends warning to client, if client continues misuse of bandwidth then server can shutdown client's PC. Server uses remote desktop sharing utility to keep track of client's work and takes necessary actions. Using this system has one drawback that is server cannot use same application for more than one client. That is if server is chatting with one client he cannot simultaneously chat with other client or if he is remotely sharing his desktop, remotely monitoring on one client then cannot perform similar action with other clients but can use different modules at a time. Server can chat with one client, he can remotely share desktop with other client and can remotely monitor on third client and so on simultaneously.

This drawback can be solved by further studying. Researchers can study this paper and can overcome this drawback.

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