Maximization of Communication Facilities on Network of Personal Computers

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Abstract
Communication is an integral part of man without which it will be practically impossible for man to achieve anything meaningful in life. It is a fact that most 21st century organizations have a network of computers in place, however majority of these organizations have not fully utilize the facilities available to them on their network. In this paper, we present the implementation of VoIP, desktop sharing, virtual team, file sharing, live chat and internal memo transmission on a network of personal computers using Microsoft NetMeeting to reduce the cost associated with internal communication within an organization.

Keywords: maximization, LAN, communication, VoIP, netmeeting

INTRODUCTION
Every innovative success recorded by man since creation could be traced to effective communication, failure in the building of Tower of Babel could be attributed to lack of effective communication (Genesis 11: 7). Therefore, effective communication is essential in any organization, institution or establishments for any meaningful success to be achieved. Communications between computers is a major part of the PC computing industry. Thanks to the World Wide Web (www), no computer user is an island. Either by using a modem or a faster technology, virtually all PCs can be connected to other computers, enabling them to share files, send and receive email, and access the Internet (Mueller, 1999). We are in a period of rapid advance in the collaboration of computer systems to perform a wider range of activity than ever before. Traditional computer communications to support human-driven remote logon, e-mail, file-transfer, and latterly the World-Wide Web are being supplemented by new applications requiring increasingly complex exchanges of information between computer systems and between appliances with embedded computer chips (Larmouth, 1999). Some of these exchanges of information continue to be human-initiated, such as bidding at auctions, money wallet transfers, electronic transactions, voting support, or interactive video/audio. Others are designed for automatic and autonomous computer-to-computer communication in support of such diverse activities as cellular telephones (and other telephony applications), meter reading, pollution recording, air traffic control, control of power distribution, and applications in the home for control of appliances. Computer communication is virtually relevant to all human endeavor and it is as important as computer itself. Efforts to make computers communicate gave birth to computer networking and over the years, networking skills have multiplied and so many standards have been developed with respect to this concept. Information and communication technologies (ICT) discipline is one of the fastest growing areas, with related services and applications having enormous and almost immediate impact on diverse aspects of the modern society, including inter-human relations, economy, education and entertainment (Fortuna and Mohoric, 2009 and Barile and Durso, 2002). A network consists of computers, called nodes or stations. The computers are connected to, or can communicate with, each other in some ways. Nodes run special software for initiating and managing network interactions. With the help of networking software, nodes can share files and resources (Feibel, 1996). Local Area Network (LAN) only establishes communication link between computers within local geographical area. And the types of communication that occur on such link established by LAN are basically services (communication facilities). A network could either be wired or wireless and there are three broad categories of computer networks, distinguished by geographical extent i.e. Local Area Networks (LANs), Metropolitan Area Networks (MANs) and Wide Area Networks (WANs). LANs connect computer equipment in a single building or floor of a building, MANs (MANs) interconnect...
network users over a campus or metropolitan-sized region (Robertazzi, 2000).

**Data Communication**

Data Communications is the transfer of data or information between a source and a receiver. The source transmits the data and the receiver receives it. The actual generation of the information is not part of Data Communications nor is the resulting action of the information at the receiver. Data Communication is interested in the transfer of data, the method of transfer and the preservation of the data during the transfer process. In Local Area Networks, we are interested in "connectivity", connecting computers together to share resources. Even though the computers can have different operating systems, languages, cabling and locations, they can still communicate to one another and share resources. The purpose of Data Communications is to provide the rules and regulations that allow computers with different disk operating systems, languages, cabling and locations to share resources. The rules and regulations are referred to as protocols and standards in Data Communication. The three different modes of communication between two counterparts identified by Bourasi et al. (2006) are interactive, communication mode, batch communication mode and mixed mode.

**RELEVANT WORK**

Coomber and Blair (1998) established that Microsoft NetMeeting has adopted a number of International Telecommunications Union (ITU) standards within its architecture. The key motivation behind the use of such standards is to improve interoperability between NetMeeting and similar systems. The two key standards that impact on the bandwidth usage characteristics are ITU T.120 and ITU H.323. Coomber and Blair’s work on Bandwidth Usage of the Collaborative Tool using Microsoft NetMeeting v2.0 showed that NetMeetings software configuration options can be used to successfully operate the product in the tactical environment at bandwidths as low as 32 kbps. It also provides information on how to setup a data conference to minimize the use of Wide Area Network bandwidth.

Evans article on Microsoft Netmeeting cited several cases of studies on information driven companies who are actively using NetMeeting. The companies include: Dow Chemical, Ford Motors, Northrup-Grumman and San Diego State University (Evans, 2007). Dow Chemical is taking advantage of the collaborative capabilities in Microsoft NetMeeting conferencing software to support virtual teams (Gould, 2006). Ford Motor Company takes advantage of NetMeeting’s powerful tools for effective communication over their corporate Intranet. Northrup-Grumman has improved the quality of communications and collaboration among geographically dispersed team members while savings travel costs and time while San Diego State University uses NetMeeting to provide two-way audio and video conferencing to simulate a traditional classroom setting, with its shared white board, shared applications, and chat window supporting real-time Web-based instruction.

**Microsoft Netmeeting**

Netmeeting is a VoIP and video conferencing client included in many of versions of Microsoft Windows. It uses the H.323 protocol, and is interoperable with Open H323-based clients such as GnomeMeeting. Windows Netmeeting is a copyright of Microsoft Corporation developed by DataBeam Corporation. NetMeeting is a complete network conferencing solution that offers standards-based audio, data, and video conferencing functionality. Even without video or audio communication, data exchange can occur in real time over any IP network (LAN) using industry standards for Internet telephony. Data can be conveyed via White Board, Chat, Email or through joint collaboration and editing of any Windows based application document you can imagine. Some of the key communication facilities of NetMeeting are VoLAN (Voice over LAN, LAN Chat, Remote Desktop Sharing, File Transfer / Sharing, Audio/Video Conferencing and Virtual Meeting).

**METHODOLOGY**

Implementing NetMeeting On Lan

Having established through system analysis, that most organizations spent a huge amount of money and/or waste a lot of time on intra-organizational communications like memo distribution, voice communication etc. (Olayinka, 2007). We present the implementation of Microsoft Netmeeting on Campus Area Network in order to enhance information dissemination within the campus and reduce to the barest minimum or even eliminate the cost on intra-organizational communication thereby maximizing communication facilities on the Network. The communication facilities (like VoIP, LAN chat, Desktop sharing, File transfer, Netmeeting etc.) were implemented on an existing IP based network on the university campus by using Microsoft Netmeeting from Microsoft Corporation. It is a free software that is embedded in Windows operating system and is also available on the internet for free download. In order to maximize communication facilities on LAN, the need to have a very good and effective LAN in place cannot be over emphasized. Security and speed of such LAN must be outstanding in order to have effective and efficient communication using Netmeeting. Netmeeting software folder is located in the Program Files directory located in the drive that contains the Windows operating system. The path is usually
“C:\Program Files\NetMeeting” where “C” represents the windows operating system drive. Double click the ‘conf’ icon to launch the Netmeeting setup wizard, which will guide you through the installation process. During the configuration, the wizard will request for your first name, last name, e-mail address, your location and comments. The information should be supplied accordingly. The setup will also request you to test your microphone and speaker for voice communication. These settings could be changed after the initial configuration by launching the program and go to TOOLS — OPTIONS from the Netmeeting’s menu bar. After a successful configuration, Netmeeting can be launched by double clicking its icon on the desktop. The resulting Microsoft Netmeeting interface window is shown in figure 1.

VoLAN Using Netmeeting

NetMeeting provides full voice capabilities. The audio feature supports microphones and speakers. If you are using a microphone and speakers, your voice can be either half-duplex (communication between two computers where data travels only in one direction at a time) or full-duplex (communication between two computers where data travels in both directions simultaneously). Half-duplex voice allows one person to speak at a time. Full-duplex voice allows two people to speak simultaneously. Check with the sound card manufacturer to determine your sound card capabilities. If the organization has a voice gateway feature that automatically adjusts the microphone volume while in a call” option achieves similar results for people whose sound cards do not have the auto-gain feature.

Audio Settings for VoLAN

To achieve a quality audio communication over LAN there is need to adjust the audio setting. This can be via the Tools menu on the menu bar of the Netmeeting and click Options. On the Audio tab, make the desired changes. (If the computer does not have a sound card, the Audio tab is not visible). If the Enable full-duplex audio so I can speak while receiving audio check box appears dimmed, your sound card does not support full-duplex audio. Auto-gain is a sound card and driver feature that automatically adjusts the microphone volume. Auto-gain is not available with all sound cards. The “Automatically adjust microphone volume while in a call” option achieves similar results for people whose sound cards do not have the auto-gain feature.

Full-Duplex Voice can be disabled from Tools menu on the menu bar of the Netmeeting. However, for computer with full-duplex capabilities, NetMeeting automatically uses it. If you experience poor audio, you may want to disable it. If your sound card supports full-duplex mode, but the Enable full-duplex audio so I can speak while receiving audio check box is not available, install or reinstall the full-duplex driver.

Placing a Call on Netmeeting

In the Address bar of the Netmeeting, type either the computer name or IP address of the computer you want to call. It is also possible to type the e-mail address to connect another computer. Then click the Place Call button. This will put a call across to the computer whose name is specified and when this is done and the user at other end accepts the call, voice communication can commence.

LAN Chat on Netmeeting

Another important communication facility deployed on LAN is LAN Chat, it is an interesting feature of Netmeeting. Since only two people can have a voice connection, chat is useful in a group meeting because everyone can participate. Chat is also possible if audio device are not available. When someone sends a Chat message, the message appears in the Chat window.

Chat Message Sending

Launch Netmeeting and click the Chat button to open Chat. In Message, type the message you want to send, to send the message to everyone, in the Send To, click Everyone In Chat or To send a message to just one person, in Send To, click the person's name and Click the Send Message button to send the Chat message or press ENTER to send the Chat message. Fonts used in Chat can be changed by clicking the Chat button to open Chat, on the View menu, click Options will open the OPTIONS dialog box and Under Fonts, click the appropriate button, and make the desired changes.

Information display can be changed in the OPTIONS dialog box by making desired changes under Information display. It is also possible to change the message format in OPTIONS dialog box.

Remote Desktop Sharing On Netmeeting

Remote desktop sharing is a facility on Netmeeting that allows users on the network to share their entire system. This gives full access and control to the user. To remotely connect to a desktop, Launch the Netmeeting, on the Tools menu, click Remote Desktop Sharing, and follow the instructions on Remote Desktop Sharing Wizard screen. Close the Netmeeting and right click the NetMeeting Remote Desktop Sharing icon that appears in the status area, and then click ‘Activate Remote Desktop Sharing’. If you have run the Remote Desktop Sharing Wizard previously, the Remote Desktop Sharing Settings dialog box opens. You can disable Remote Desktop Sharing, change the password, and run the wizard again. It is also possible to activate Remote Desktop Sharing on the ‘Call’ menu by clicking ‘Exit and Activate Remote Desktop Sharing’.

After setting up Remote Desktop Sharing, two icons appear in the status bar the desktop, (i.e. NetMeeting icon and NetMeeting Remote Desktop Sharing icon).
When NetMeeting is closed, the NetMeeting Remote Desktop Sharing icon remains in the status bar. The IP address of the remote computer must be known in order to remotely log in to it.

**Connecting and Disconnecting Remote Desktop**

To remotely access a computer from another location, click the ‘Place Call’ button. ‘Place A Call’ dialog box (as shown in Appendix C 1) is launched. In the space provided for ‘To’, type the computer name or IP address of the remote computer. If the ‘Require security for this call’ check box is not selected, click it to turn on security because Remote Desktop Sharing calls must be secure calls. Enter the Remote Desktop Sharing password. And click ‘Call’ to connect the remote computer. To end Remote Desktop Sharing, Go to ‘Start’ on the desktop of the computer being accessed, and then click ‘Log Off’ or ‘Shut Down’. Desktop Sharing is the same as sharing the computer.

**Program Sharing**

Shared programs allow meeting participants to view and work on files simultaneously. For example, you may have a Microsoft Word document that several people need to work on. You can open the document on your computer, share it, and then everyone can provide their comments directly in the document. Only the person who has opened the document is required to have the application program on their computer. Other participants can work on the document without having the application program on their systems. Only one person can be in control of a shared program at a time. If controllable appears in the title bar of the shared program window, the person who shared the program has control and is allowing others to work in the program. If the mouse pointer has a box with initials, then another meeting participant has control of the program. All meeting participants can share programs during a meeting. The shared programs of each participant appear in separate shared program windows on the other participants' desktops.

In order to sharing a program, go to the ‘Share Program’ button on the Netmeeting window, this will invoke the ‘Share Program dialog box’ as shown in figure 2. In the ‘Sharing dialog box’ go to the ‘Share Program’ button, click the name of the program you want to share and click ‘Share’. The shared program control can be forwarded on the Control menu of the shared program window, click Forward Control, and then click a name on the list. This is only possible on NetMeeting 3.0 or later. Program sharing can be terminated by clicking the Share Program button and Sharing dialog box, click Unshare to stop sharing one program or Unshare All to stop sharing all programs.

**DISCUSSION**

We have shown how Netmeeting can be used as a tool to maximize the potentials of a network of computer. There is need to properly installed the same version of Netmeeting on all systems within the organizational network by IT experts, who will ensure that a common Netmeeting server is installed for all users for effective intra-organizational communication. Our implementation using Netmeeting for LAN communication offered a great deal of advantages over the traditional methods of intra – organizational communication which normally attracts additional cost. Use of Netmeeting ensures efficient voice and data communication, speedy dissemination of information within an organization (without the use of external storage devices like flash drives) and elimination of intra – organizational call cost.
CONCLUSION
This paper has presented the implementation of some communication facilities on an existing network of computers. Effective communication is essential in any organization, hence maximization of communication facilities on LAN is timely because with the implementation of these communication facilities, the cost of communication in any organization will reduce drastically and communication will be made better in terms of efficiency, effectiveness and reliability. For people who want to be more productive in how they conduct business or take a glimpse on the future of business communication, then NetMeeting should be explored because it offers a great deal of solution to communication issues.

REFERENCES


