Mittuniversitetet
MID SWEDEN UNIVERSITY

Assignment 2

Part I: Multimedia applications over the network

Theory:

Multimedia applications are always appealing to the users and with the emergence of more powerful computers it was possible to play movies or other kinds of multimedia on the computer. However, when it comes to having multimedia applications over the Internet, the bandwidth restrictions make things being different. Applications that include voice and video require large bandwidth and usually cannot tolerate large delays or variations in the delay (jitter). On the contrary, they are not so sensitive to limited packet loss.

However, Internet was not developed to carry multimedia traffic. The main goal in the early days was to connect computers from different manufacturers, provide underlying network in which resources can be shared and develop applications for exchange of data. The "best effort" service did not make any guarantee that the packets will be delivered in order or in time. The classic applications on the Internet (e-mail, telnet, FTP, WWW) have completely different nature than the multimedia traffic. They are primarily concerned about reliable data transfer and therefore they use TCP as a transport protocol.

Tasks to do:

1. Perform some research about the multimedia applications on the Internet and answer the following questions.

Which transport protocol is mainly used for the multimedia applications and why?

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What are the main characteristic of the UDP protocol and how is it different from TCP?

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Part II: Distributed Nature of the Internet

Theory

The Internet is not a single network, but a vast network of networks that voluntarily choose to interconnect with each other. The protocol that glues the networks together is IP (Internet protocol). The heart of the Internet is not a place or an organization, but a principle: cooperation. It is built on open standards: technical specification documents that are published by technical standards bodies. The key standards have been, and are still, developed through open processes, by teams of technical experts who work together to identify, study, and solve common engineering problems. After an exhaustive process of peer review within the community of Internet engineers and architects (including, essentially, anyone who chooses to participate and contribute), the resulting documents -- the standards themselves -- are published openly. At that point, it is up to the network operators and software writers to use or not use a newly-published standard. Because the Internet is a global network of voluntarily interconnected networks, there is no organization that can force it to adopt a new standard or technical protocol.

Tasks to do:

1. Visit the following web sites and read about the role of the different bodies in the development and standardization process of the Internet.
   www.ietf.org , www.ican.org , www.iana.org , www.rfc-editor.org/ , www.w3.org

Write the full names for the following organizations: IETF, IANA, ICCAN, and W3C. Describe shortly the main focus of interest for each of them.

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What is the meaning of the acronym RFC?

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Find the RFC that contains the well-known ports for the applications and write down the applications that use ports 21, 25 and 80.

Part III: Ethereal Network Analyzer

1. Go to the home page for the Ethereal network analyzer, http://www.ethereal.com . Download the latest version for your platform. Read the requirements for the system before you install the programs. Follow the link Documentation and the site closest to you to download the user-guide. Get acquainted with the instructions about installing the program and the main features of Ethereal. Install the analyzer and the package for capturing packets. You can also download the file "About Ethereal" that contains short description about Ethereal network analyzer.
2. From the page with this assignment on the WebCT server download the file *packets*. This file contains frames captured by the packet capturing program. You should be able to open this file with the Ethereal packet analyzer program.
3. Inspect frame 1 and answer the following questions.

What is the MAC source and MAC destination address and in which header did you find them?

What is the source and destination IP address and in which header did you find them?

Which type of transport protocol is used? What are the source and destination port?

What is the application protocol used?

4. Inspect packets 5, 6, 7 and 36, 37, 38, 39. Observe the TCP header. Pay attention to the length of the segments and to the flags. Answer the following questions.

What is the value of the SYN flag in the TCP header for packets 5, 6 and 7?

What is the purpose of packets 5, 6 and 7?

What is the value of the FIN flag in the TCP header for packets 36, 37, 38 and 39?

What is the purpose of packets 36, 37, 38 and 39?

5. Inspect packets 23 to 35. Answer the following questions.

What kind of application protocol is used?

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Can you explicitly see the user name and the password?

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Are you aware of what kinds of measures are taken for this? (We did not study these issues during this course, but perhaps you know something about the security measures implemented today). This question is optional and you don't need to answer it.

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6. Create a capture filter that will filter packets coming and going through the interface card on your computer and using port 80 and start capturing packets. After a while stop capturing. Answer the following questions.

What are the two kinds of filters that can be created in Ethereal? What is the purpose for each of them?

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Which actions you have made (where did you click) in order to be able to capture packets that use port 80?

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Show the first 10 packets you have captured and explain the purpose of each packet.

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7. From the page with this assignment on the WebCT server download the file *actions.zip* and *captures.zip*. The file *actions.zip* contains six pictures that show six actions or commands given at the Windows command prompt window. These commands are concerned with the TCP/IP protocol stack on the machine. Each command generates a flow of certain packets on the network interface through which the machine is connected to the network. The files with six actions are named: *cmd1.jpg, cmd2.jpg, cmd3.jpg, ..., cmd6.jpg*. The file *captures.zip* contains six files with captured packets. They have been captured after some of the

actions described above. Use the Ethereal network analyzer to be able to look at the packets captured. The name of the files are *capture1.cap, capture2.cap, ..., capture6.cap*. Match each action with the packets captured.

cmd1.jpg	
cmd2.jpg	
cmd3.jpg	
cmd4.jpg	
cmd5.jpg	
cmd6.jpg	