Real-Time vs. Streaming Media

*A study of the network resource consumption of applications that deliver real-time media and those that deliver streaming media*

Goal:

In this project we study two types of applications that deliver audio and video information. One type is called streaming media. Examples of this type are YouTube and Blackboard. These stream the audio and video to the computing device that requests it. The media itself is not interactive. The end-user can start and stop the streaming and make other requests. But the end-user is not sending media back to YouTube or Blackboard. The other type is called Real-Time Media. Examples of this type are Skype, Magic Jack and Google+ Hangouts. In these the media is interactive. The end-users send the outputs of their webcams and mics to each other using these applications. Their goal is real-time communications.

Our goal this semester is to study the impact of these different types of application on the networks and computers that enable them. We want to find out the names of the application layer and transport layer protocols that are used by each. We want to find out the characteristics of the IP datagrams that are carrying the transport and application layers. After we find the answers to these questions we will look at the data we collected and see what conclusions we can draw and what new questions we have to answer.

Organization of the Work:

We will consider a set of real-time and streaming-media applications. You will take a trace while using each of these applications. Then you will analyze that trace asking a set of questions about the characteristics of the protocols used at each layer of the data network model. You will create some tables that will allow you to compare the different characteristics. As you work on the project you will become curious about one or another of the applications that you have selected and you will want to run some additional experiments to learn the answers to your questions.

We will also compare the behaviors of these two types of media-carrying applications to other applications that do not carry media. Email and web browsing are two examples of this type of application.

Method of work:

Each student in the class will take all the traces. Each student will do their own analysis of the traces. All students will submit a report at the end of the semester. Graduate students and undergraduates will use different templates. Graduate students’ papers will include an extra section called, “Related Work.” This section will contain a summary of three or more research papers published by the ACM and the IEEE. These papers will be found using the Library e-resources to be found on the myIIT portion of the school’s website.

There will be a series of Project Assignments. They will be identified as PA-1, PA-2, ...PA-n. In PA-1 each student will take a baseline trace that shows the interactions that their computer has with the Internet when all applications are turned off. PA-2 will be a YouTube trace; PA-3 will use a trace taken while watching a class on Blackboard.

After taking a trace you will analyze it using the “Statistics” menu provided by Wireshark as well as the trace of the messages that are exchanged during your capture. Your Project Assignment will include instructions for how to use this feature of Wireshark and for which statistics to record.

We will also compare the traces that you took with traces of other network applications that do not involve the transfer of media. We are looking for the characteristic behaviors of streaming, real-time and non-media services and applications.