**Assignment – 3: Network Protocol Analysis Using Wireshark**

**Submission Deadline: 1st Feb 2021 (11:59 pm)**

Wireshark is a free and open-source packet sniffer and network protocol analyser tool. It helps to capture network packets and understand the structure of different networking protocols.

**Instructions:**

 Install Wireshark (download from www.wireshark.org), and learn how to capture packets and filter the required content.

 A specific application is assigned to each student (refer to **Table 1** below). Each student needs to perform various activities according to functionalities available in the assigned application and collect the traces for the application using Wireshark. Application-specific activities, if any, are mentioned in the table.

 You should carry out your experiments across different network conditions including different time(s) of the day and locations (e.g., lab or hostel, etc.).

 It is advisable to provide only trace-based description while answering the questions. While answering, provide snapshots of the traces in the report and highlight the content as and when required.

 If something is missing/incorrect in a problem description, clearly mention the assumption with your answer.

 Be precise with your answers; there is no credit for being unnecessarily verbose (may award you negative marks for the same). Unless specified otherwise, do not describe the tool or application or protocol in general.

**Questions:**

1. List out all the protocols used by the application at different layers (only those which you can figure out from traces).

2. Highlight and explain the observed values for various fields of the protocols. Example: Source or destination IP address and port number, Ethernet address, protocol number, etc.

3. Explain the sequence of messages exchanged by the application for using the available functionalities in the application. For example: upload, download, play, pause, etc. Check whether there are any handshaking sequences in the application. Briefly explain the handshaking message sequence, if any.

4. For the protocols listed in Question 1,Explain how the particular protocol(s) used by the application is relevant for functioning of the application.

5. Calculate the following statistics from your traces while performing experiments at different time of the day: Throughput, RTT, Packet size, Number of packets lost, Number of UDP & TCP packets, Number of responses received with respect to one request sent. Report the observed values in your answer, preferably using tables.

6. Check whether the whole content is being sent from same location/source. List out the IP addresses of content providers if multiple sources exist, and explain the reason behind this.

**Method of submission:**

 **Submit a soft copy of the report, preferably in PDF format, together with your collected traces in a zip file on Moodle. The name of the zip file should be like “Your\_Rollno.zip” (example: “*140101002.zip”*).**

 **Files submitted without proper naming format will not be evaluated.**

**Note:**

* **The deadline for submission must be strictly followed. Any submission done after the deadline will not be considered for evaluation.**
* **The report should not contain more than 6-7 pages.**
* **Plagiarism (copy cases) and other unfair means will be strictly punished by awarding NEGATIVE marks (equal to the maximum marks for the assignment).**

**Table 1: Assignment of applications to students**

|  |  |  |
| --- | --- | --- |
| Sl. No. | Application Name/Type | Roll number of student |
|  | Dailymotion  Activity: Uploading and downloading videos | 190010004,190010031,190010036,190010007,190010035,190010020,190010045 |
|  | Dropbox  Activity: Uploading and Downloading Large Files | 190010013,190010029,190010043,190010009,190010030,190030007,190010039 |
|  | Google Hangout | 160010021,190010015,190030043,190020020,190010028,190010034,190010023 |
|  | NPTEL/Coursera Video Lectures | 190010010,190010027,190010041,190010005,190010026,190010017,170010020 |
|  | Hotstar Video Streaming | 190010008,190010003,190010019,190010024,190010038,190010042,190010037 |
|  | Vimeo  Activity: uploading and downloading video | 190010044,190010016,190010012,190010001,190010018190010021,190030003,190030026 |
|  | Twitch (live streaming video platform) | 190010006,190010033,190010032,190010002,190010011190010025,190010040,190010046 |