CS 342: Networks Lab
(July - November 2021)
Assignment – 2: Network Protocol Analysis Using Wireshark

Submission Deadline: 28th August 2021 *(hard deadline)*

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 in 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: (Total Marks 20)

1. List out all the protocols used by the application at different layers (only those which you can figure out from traces). Study and briefly describe their packet formats. Mention and explain the observed values for at least 5 fields of the packets of each layer. Example: Source or destination IP address, port number, Ethernet address, protocol number, etc. **(1+4 =5 marks)**
2. Mention the important functionalities of the application as many as you can discover. (*Two example functionalities for each application is given in Table 1*). Explain which protocols are being used by which functionalities of the application. Give reason why those protocols are used for the functionalities. **(1+5 =6 marks)**
3. For any two functionalities of the application (mentioned in question 2), show the sequence of messages (attach screenshot) exchanged to achieve those functionalities. Explain those message sequences. Check whether there are any handshaking sequences in the messages, and briefly explain the reason. **(1+3+1 =5 marks)**
4. Calculate the following statistics from your traces while performing experiments at three different times (morning, afternoon, night) of the day: a) Throughput, b) RTT, c) Packet size, d) Number of packets lost, e) Number of UDP & TCP packets, f) Number of responses received with respect to one request sent. Report the observed values in your answer, preferably using tables. **(0.5*6 =3 marks)**
5. Check whether the content is being sent/fetched by the application to/from the same or different destination(s)/source(s) during the three different times of the day used in question 4. If multiple destinations /sources exist, list out their IP addresses, and explain the reason behind this. **(1 marks)**

Method of submission:

- **Submit a soft copy of the report in PDF format only, together with your collected traces in a zip file on Moodle. The name of the zip file should be like "Your_Rollno.zip" (example: "*190101002.zip*").**
- **Files submitted without proper naming format will not be evaluated.**
- **If your trace file size is so large that you are not able to upload the file on Moodle, in that case you are advised to provide the OneDrive/Google Drive link of the traces in your report.**

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 5-6 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: Application allocation to Students

App ID	App Name	Roll Number	Name
1	**Microsoft Team (Desktop App) video conference** Two example functionalities: a) Join meeting b) Post message Note: You can capture packet during online class	170123049	Sreenidhi shamanth N
		180101026	GOLI ANANDA VARDHAN
		190101001	AAYUSH SACHDEVA
		190101002	ADARSH KUMAR
		190101003	ADDURI SAI SRI DATTA
		190101004	ADITYA SINHA
		190101005	ADITYA TRIVEDI
		190101006	AJAY KUMAR
		190101007	AKSHAT ARUN
		190101008	AKSHAT SINHA
		190101009	ALURI ARAVIND LENIN
		190101010	AMANCHA JAGRUTH
		190101011	ANANT SHANKHDHAR
		190101012	ANJALI PRIYA
		190101013	ARYAN ANSHUMAN
		190101014	ARYAN RATHOD
		190101015	ASHISH KUMAR SONI
		190101016	ASTIK RAJ
		190101017	ATAL BHATIA
		190101018	ATHARVA VIJAY VARDE
2	**Online video game (Desktop App)** Two example functionalities: a) Start b) Pause/End	190101019	AVIRAL GUPTA
		190101020	AVULA BABITHA LAKSHMI SAI
		190101021	AYUSH KUMAR GUPTA
		190101022	BALLA PREM NIKHIL
		190101023	BELLAMKONDA KARTHEEK
		190101024	BHUKYA BHARATH
		190101025	BHUVAN AGGARWAL
		190101026	BODAVULA TEJA SAI SRIKAR

		190101027	BODELE GAURAV JAYANT
		190101028	BOLLEBOINA MADHUMITHA
		190101029	BRAJ NANDAN KALYA
		190101030	CHAPPIDI SHREYA
		190101031	CHELSI RAWAT
		190101032	CHITTALA VENKATA NAGA SINDHU
		190101033	DAKSH SHARMA
		190101034	DILENDRA UIKEY
		190101035	DYUTI MANGAL
		190101036	EKESHWAR GOWLA
		190101037	GOLLAPUDI N LAKSHMI NARAYANA
		190101038	HARDIK SUHAG
3	**WhatsApp (Desktop App) group activities** Two example functionalities: a) Share image b) Post message	190101039	HARSH JAISWAL
		190101040	HARSHIT SUREKA
		190101041	HEMANT SURESHRAO WANKHEDE
		190101042	KALAPATI KASVITHA
		190101043	KARAN RAJ SHARMA
		190101044	KARTIK VERMA
		190101045	KESHAV CHOURASIYA
		190101046	KSHITIJ ARORA
		190101047	KUNAL MAAN
		190101048	LAKSHMISOUJANYA KOLASANI
		190101049	M YOGESH KUMAR
		190101050	MARIYALA VAISHNAVI
		190101051	MARPINA BHARANI
		190101052	MAYANK CHANDAK
		190101053	MESHARYA M CHOUDHARY
		190101054	M.JAYANTH
		190101055	MOTATI SARATH CHANDRA REDDY
		190101056	MUSHANOLLA PRANATHI
		190101057	NANCY

		190101058	NARREDDY KAILASH REDDY
4	**Outlook client (Desktop App)** Two example functionalities: a) Send mail b) Refresh Inbox	190101059	PATEL SANIDHYA SATISHBHAI
		190101060	PATHLAVATH SRIKANTH
		190101061	PATNANA SAI ASHRRITTH
		190101062	PAWANEET SINGH
		190101063	PEDDAIAHGARI RAHUL REDDY
		190101064	PRANAV VINCHURKAR
		190101065	PRERIT TUDU
		190101066	PRIYAL SHARMA
		190101067	PRIYANK SONI
		190101068	RAAHIL RASHMIN BADIANI
		190101069	RAGHAV GUPTA
		190101070	Prakhar Jitendra Rajpali
		190101072	RISHAV MONDAL
		190101074	RITESH KUMAR
		190101075	RITIK KUMAR
		190101076	RITISH BANSAL
		190101077	ROHIT KUMAR
		190101079	S ROSHAN
		190101080	SAAKETH GUNTI
		190101081	SAKET KUMAR SINGH
5	**GitHub client (Desktop App)** Two example functionalities: a) Clone a repository b) Submit a file	190101082	SHELLY CHOUHAN
		190101083	SHREY VERMA
		190101084	SHREYANSH MEENA
		190101085	SIDDHARTH CHARAN
		190101086	SIMRAN GARG
		190101087	SOUMYA GUPTA
		190101088	SUGANDHI GUPTA
		190101089	SURYANSH SINGH
		190101090	SWAPNIL SRIVASTAVA
		190101091	SWASTIKA GUPTA

		190101092	TANAY MAHESHWARI
		190101093	TANISHQ KATARE
		190101094	TATTUKOLLA LOKESH
		190101095	UDAY SINGH
		190101096	UPENDER DAHIYA
		190101097	VANJA VIVEK VARDHAN
		190101098	VARENYAM BAKSHI
		190101099	VINEET AGARWAL
		190101100	VIVEK KUMAR
		190101101	YASHWARDHAN MODI
		190123066	ABHISHEK AGRAHARI
6	**Skype (Desktop App) video conference** Two example functionalities: a) Initiate call b) Terminate call	190101108	AHAAN SAMEER MALHOTRA
		190123069	AKSHAT AGRAWAL
		190101102	ANIKET KUMAR MISHRA
		190123070	ESHAN TREHAN
		190101110	MAHAJAN ANURAAG PRAMOD
		190101107	SHUBHAM SHANKAR
		190101105	VINAYAK BHARADWAJ
		190101111	PARAG PANIGRAHI
		190123068	TIWARI PIYUSH SHAILENDRA
		190123065	VIKRAM JITENDRA DAMLE
		190123071	RISHABH RAJ
		190123067	MANISH KUMAR
		190101104	ANIRUDH PHUKAN
		190101109	VIGNESH RAVICHANDRA RAO
		190123001	AAKASH SOLANKI
		190123002	ABHIJEET KUMAR
		190123003	ALOKEVEER MONDAL
		190123004	AMAN KUMAR
		190123005	ANKIT SARAF
7	**OneDrive (Desktop App)**	190123006	ANMOL ABHAY JAIN

	Two example functionalities: a) Create a folder b) Download/Upload file	190123007	ANUBHAV BAJAJ
		190123008	ANUL RAJEEV
		190123009	ANURADHA RAMESH HARALE
		190123010	ANURAG SINGHAL
		190123011	ARJUN DEY
		190123012	ARSH KANDROO
		190123013	ARYAN RATHEE
		190123014	ASHWANI KUMAR
		190123015	AYUSH RAJ
		190123016	AYUSH SANWAL
		190123017	AYUSHMAN SHARMA
		190123018	BOJANKI LAHARI
		190123019	BOYAPATI V S S PRUTHVI
		190123020	CHETTI BHARGAVI
		190123021	DASARI SAINAREN
		190123022	DEEPSHREE CHHAJED
		190123023	DIPIKA AGRAWAL
		190101106	DIVYAM SINGAL
		190123025	EPANAGANDLA GURU SAI KUMAR
8	**YouTube live video** Two example functionalities: a) Start watching b) Pause/Go live	190123026	GIRISHA AGRAWAL
		190123027	GITANJIT MEDHI
		190123028	HARSH KUMAR
		190123029	JAY KATKANI
		190123030	KAUSHTUBH KANISHK
		190123031	KOTTAKOTA VIJAY KUMAR
		190123032	KSHITIJ SINGHAL
		190123033	LAKAVATH PAVAN KALYAN
		190123034	MANAS SINGH JYOTI
		190123035	MANDA SUSHANTH REDDY
		190123036	MANDALA YATISH RAMKUMAR
		190123037	MANISH PRAJAPATI

		190123038	MEGHNA BARNWAL
		190123039	NARMIN KAUSER
		190123040	NIKHIL KUMAR PANDEY
		190123041	NILAY KALA
		190123042	NITIN KUMAR
		190123043	NITISH KUMAR
		190123044	PALLAV PANDEY
		190123045	PRACHURYA DAS
9	**FortiClient VPN (Desktop App)** Two example functionalities: a) Establish connection b) ssh remote machine	190101103	PRADNESH PRASAD KALKAR
		190123047	PRAKASH PARMAR
		190123048	PRITAM DAS
		190123049	RISHON DSOUZA
		190123050	ROSHAN KUMAR
		190123051	SAHIL KUMAR
		190123052	SAKSHI INGLE
		190123053	SANKRANTHI KARTHIK
		190123054	SHASHWAT MISHRA
		190123055	SHASHWAT SHARMA
		190123056	SHUBHAM AGARWAL
		190123057	SHWETA BINDAL
		190123058	SINHA SHAURYA JAYPRAKASH
		190123059	SRESHTH AGGARWAL
		190123060	SUMEDHA RAJ
		190123061	SUMIT KUMAR SINGH
		190123062	UTSAV BHARDWAJ
		190123063	VISHNU SWAROOP RAI
		190123064	YOGESH SAHOTA