# CS 342: Networks Lab
## (September - November 2020)
# Assignment – 2: Network Protocol Analysis Using Wireshark

**Submission Deadline: 27th September 2020** *(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: "*180101002.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 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: Application allocation to Students**

| App ID | App Name | Roll Number | Name |
|---|---|---|---|
| 1 | **Microsoft Team (Desktop App) video conference**<br>Two example functionalities:<br>a) Join meeting<br>b) Post message<br><br>Note: You can capture packet during online class | 150101011 | ASHUTOSH KUMAR |
| | | 160101053 | RAHUL KUMAR |
| | | 180101001 | AARTI MEENA |
| | | 180101002 | ABHAY PRATAP GANGWAR |
| | | 180101003 | ABHISHEK KUMAR |
| | | 180101004 | ADITYA RAJESH PATIL |
| | | 180101005 | ALAY CHIRAG SHAH |
| | | 180101006 | AMAN KUMAR SINGH |
| | | 180101007 | ANIRAJ KUMAR |
| | | 180101008 | ANJALI GODARA |
| | | 180101009 | ANNAPURNE KRISHNA MANIK |
| | | 180101010 | ANSHUL MITTAL |
| | | 180101011 | ANSHUMAN KUMAR SINGH |
| | | 180101012 | ARYAN CHAUHAN |
| | | 180101013 | B VENKATESH |
| | | 180101014 | BEDADA AJAY KUMAR |
| | | 180101015 | BHASKER GOEL |
| | | 180101016 | BHAVISHAYA SAMRIYA |
| 2 | **Online video game (Desktop App)**<br>Two example functionalities:<br>a) Start<br>b) Pause/End | 180101017 | Chinmai Anandh Chappa |
| | | 180101018 | DARSHIT NAGAR |
| | | 180101019 | DEVANSHI GUPTA |
| | | 180101020 | DHAWAL BADI |
| | | 180101021 | DRISHTI CHOUHAN |
| | | 180101022 | DRISTIRON SAIKIA |
| | | 180101023 | FALAK CHHIKARA |
| | | 180101024 | GADIPALLY PAVAN PREETHAM REDDY |
| | | 180101025 | GALI JAYA PRAKASH REDDY |
| | | 180101026 | GOLI AANANDA VARDHAN |
| | | 180101027 | HARSH GUPTA |
| | | 180101028 | HARSH MOTWANI |
| | | 180101029 | Harshal Sharma |
| | | 180101030 | HARSHITA GUPTA |
| | | 180101031 | HIMANSHU |
| | | 180101032 | JAGANA VINEETH |
| | | 180101033 | KARTIKAY GOEL |
| | | 180101034 | KARTIKEYA SAXENA |
| 3 | **WhatsApp (Desktop App) group activities**<br>Two example functionalities:<br>a) Share image<br>b) Post message | 180101035 | KHANDESH SAI LOKESH |
| | | 180101036 | KOMATIREDDY SAI VIKYATH REDDY |
| | | 180101037 | ANKET SANJAY KOTKAR |
| | | 180101038 | KRISHNA PRAVIN PANDE |
| | | 180101039 | Manish Chandolia |
| | | 180101040 | MANSHARAM NIGWAL |

| | | | |
|---|---|---|---|
| | | 180101041 | Manshi Sharma |
| | | 180101042 | Mohan Kumar |
| | | 180101043 | MOHIT JAIN |
| | | 180101044 | MUKKANTI VENKATA SAKETH |
| | | 180101045 | MUNINDRA NAIK |
| | | 180101046 | Sandeep |
| | | 180101047 | NARESH BHARASAGAR |
| | | 180101048 | NIHARIKA BHAMER |
| | | 180101049 | NIKUNJ HEDA |
| | | 180101050 | NISHANK SIDDHARTH |
| | | 180101051 | NISHCHAY MANWANI |
| | | 180101052 | NISHTHA SHARMA |
| **4** | **Outlook client (Desktop App)**<br>Two example functionalities:<br>a) Send mail<br>b) Refresh Inbox | 180101053 | NIYATI CHAUDHARY |
| | | 180101054 | PAIDIMARRI MANOJ |
| | | 180101055 | PARAM ARYAN SINGH |
| | | 180101056 | PARTH DHANANJAY BAKARE |
| | | 180101057 | POOJA GAJENDRA BHAGAT |
| | | 180101058 | PRANAV GUPTA |
| | | 180101059 | PREETI KUMARI KOTIYA |
| | | 180101060 | Rahul Choudhary |
| | | 180101061 | RAHUL KUMAR |
| | | 180101062 | RAHUL MALA |
| | | 180101063 | RAKSHIT RAJENDRA PATHADE |
| | | 180101064 | RATHOD SAINATH |
| | | 180101065 | RISHIKESH SONGRA |
| | | 180101066 | RITIK MANDLOI |
| | | 180101067 | RITWIK GANGULY |
| | | 180101068 | SAI SUMANTH MADICHERLA |
| | | 180101069 | SANKET KISAN PANDHARE |
| | | 180101070 | SARASWATULA PHANI SAI PRANAV |
| **5** | **GitHub client (Desktop App)**<br>Two example functionalities:<br>a) Clone a repository<br>b) Submit a file | 180101071 | Satyendra Dhaka |
| | | 180101072 | SAURABH BARANWAL |
| | | 180101073 | SHIVAM BAGHEL |
| | | 180101074 | SHIVAM KUMAR AGRAWAL |
| | | 180101075 | SHIVANGI KUMAR |
| | | 180101076 | SHIVANSH MISHRA |
| | | 180101077 | SHIVRAJ AHIRWAR |
| | | 180101078 | SIDDHARTHA JAIN |
| | | 180101079 | Tanneeru Jaswanth |
| | | 180101080 | TARUN UBA |
| | | 180101081 | TEJAS PRASHANT KHAIRNAR |
| | | 180101082 | TUSHAR JAIN |
| | | 180101083 | UJWAL KUMAR |
| | | 180101084 | V ANIRUDH |
| | | 180101085 | VADIGE PRANEETH CHANDRA |
| | | 180101086 | VAIBHAV KUMAR SINGH |
| | | 180101087 | VARHADE AMEY ANANT |
| | | 180101088 | VATSHAL NILESHKUMAR PATEL |
| | | 180101089 | VISHESH KUMAR JYANI |

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|---|---|---|---|
| 6 | **Skype (Desktop App) video conference**<br>Two example functionalities:<br>a) Initiate call<br>b) Terminate call | 180101090 | YOGESH KUMAR |
| | | 180101091 | MILIND B PRABHU |
| | | 180101092 | TANVISH |
| | | 180101093 | PULKIT CHANGOIWALA |
| | | 180101094 | KOUSIK RAJESH |
| | | 180101095 | VEDIKA JITENDRA KULKARNI |
| | | 180101096 | KUSHAL SANGWAN |
| | | 180101097 | SAMAY VARSHNEY |
| | | 180101098 | DODDAVULA LIKHITHKUMAR REDDY |
| | | 180123001 | ADITI BIHADE |
| | | 180123002 | AKSHAT GUPTA |
| | | 180123003 | ANISH KUMAR |
| | | 180123004 | ANMOL CHOUDHARY |
| | | 180123005 | ANSH RAJIV BHATT |
| | | 180123006 | ASHISH KUMAR BARNAWAL |
| | | 180123007 | AYAZ ANIS |
| | | 180123008 | BHARGAB GAUTOM |
| 7 | **OneDrive (Desktop App)**<br>Two example functionalities:<br>a) Create a folder<br>b) Download/Upload file | 180123009 | BINEETA ORAM |
| | | 180123010 | DAMAYANTI R SAMBHE |
| | | 180123011 | DHOOLAM SAICHANDAN |
| | | 180123012 | DRIGESH ANURAGI |
| | | 180123013 | GURRAM JOSEPH SPOURGEON |
| | | 180123014 | HARSH VARDHAN SINGH YADAV |
| | | 180123015 | HARSH YADAV |
| | | 180123016 | HIMANSHU YADAV |
| | | 180123017 | J.NEERAJA |
| | | 180123018 | JAY CHHAJED |
| | | 180123019 | JAY VIKAS SABALE |
| | | 180123020 | KARTIKEYA KUMAR GUPTA |
| | | 180123021 | KARTIKEYA SINGH |
| | | 180123022 | KASHAN HASAN |
| | | 180123023 | KAUSHAL CHHALANI |
| | | 180123024 | KRITIKA RAJ |
| | | 180123025 | KUSHAL JHANWAR |
| | | 180123026 | MANAV CHIRANIA |
| 8 | **YouTube live video**<br>Two example functionalities:<br>a) Start watching<br>b) Pause/Go live<br><br>Note:<br>You can capture online IITG live convocation program on 22nd Sept 2020 from Youtube. | 180123028 | MRIDUL GARG |
| | | 180123029 | NAMAN GOYAL |
| | | 180123030 | NILESH KUMAR MEENA |
| | | 180123031 | PANKAJ KUMAR |
| | | 180123032 | PRAGATI RAMESH MAHAMUNE |
| | | 180123033 | PRATHAPANI SRAVYA |
| | | 180123034 | PRIYA GULATI |
| | | 180123035 | RAHUL KRISHNA |
| | | 180123036 | RASHI MOHTA |
| | | 180123037 | RATHOD VIJAY MAHENDRA |
| | | 180123038 | RAUNAK TIWARI |
| | | 180123039 | ROHAN MODI |
| | | 180123040 | SAMIKSHA SACHDEVA |

| | | | |
|---|---|---|---|
| | | 180123041 | SATYADEV BADIREDDI |
| | | 180123042 | SHASHANK GOYAL |
| | | 180123043 | SHASHANK RAJESH THOOL |
| | | 180123044 | SHIVAM KUMAAR ARYA |
| | | 180123045 | SHREYANK SNEHAL |
| **9** | **FortiClient VPN (Desktop App)**<br>Two example functionalities:<br>a) Establish connection<br>b) ssh remote machine | 180123046 | Shubham Gandhi |
| | | 180123047 | SIDHARTH BANKUPALLE |
| | | 180123048 | SUBHAM KUMAR |
| | | 180123049 | Sudhanshu Bhatia |
| | | 180123050 | TANMAY JAIN |
| | | 180123051 | TRINAYAN DAS |
| | | 180123052 | VAARSHIK REDDY C |
| | | 180123053 | VISHISHT PRIYADARSHI |
| | | 180123054 | VIVEK KUMAR |
| | | 180123055 | YASHWANTH K |
| | | 180123057 | MOHAMMAD HUMAM KHAN |
| | | 180123058 | SOURAV GOEL |
| | | 180123059 | AADI GUPTA |
| | | 180123060 | JATIN DHINGRA |
| | | 180123061 | TEJUS SINGLA |
| | | 180123062 | A B SATYAPRAKASH |
| | | 180123063 | UDANDARAO SAI SANDEEP |
| | | 180123064 | KARAN GUPTA |
| | | 180123065 | EKLAVYA JAIN |
| | | 160123034 | SAGAR MEWAR |