भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

ANALYSING THE STRUCTURE OF NETWORK OF NETWORKS

PROJECT REPORT

Course Code:**AI3020**

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1. **DELIVERABLE DESCRIPTION**

   (a) **Data Collection:** We used command prompt to ping and trace route to the destinations(Total number of servers 11) from five different sources.Following are the sources:
   - *Source 1*: `IITH Campus Wifi`
   - *Source 2*: `Mobile Hotspot Jio`
   - *Source 3*: `Mobile Hotspot Airtel`
   - *Source 4*: `Osaka Wifi`
   - *Source 5*: `Worthington Wifi`

   Our Try of using public glasses failed because 80/100 proportion of the results from server end were timed out for 4-5 websites(servers).Therefore we used two different vpns(osaka and worthington) .We collected data of all servers from sources in notepad files.All raw files can be found at -clickable.Our Main Resource to get WHOIS Information is clickable We used a python code using the package selenium that made the tedious work of ”finding Asn Numbers,Organsiatons names,Locations of each Ip address one by one” truly enjoyable.All the notepad files were input to the code and thus we collected the preprocessed Information.All the processed files can be found at -clickable.The python code can be found at -clickable.Overall structure of the Final product(PIC) can be seen through this xlsx file-clickable generated by the code -clickable

   (b) **Sketch:** Since the quintessential purpose was to visualise the internet topology,we restricted ourselves to draw the complete Network manually without using any library.The End product can be found at - clickable or clickable.It can be seen that there are lesser no of nodes as compared to what one would expect while analysing the Internet.In our case ,the possibles reasons are our selections of sources and destinations having lot of common Intermediataries.Firstly We tried to classify each node on the basis of unique IP address .We dropped the the idea since the number of nodes in that case was huge.Similar issue we faced while classifying the nodes on the basis of distinct ISP name and AS number and Location.Thus,finally we classified nodes on the basis of ISP name and AS number.

2. **FINDINGS ABOUT THE INTERNET TOPOLOGY**

   (a) We found same ISPs/Organisations having different AS Numbers across different locations.Also same AS numbers having different ISPs .

(b) Most Servers from IITH network are accessed Through the ISP: Jio Reliance Incomm Limited, Maharashtra(55836)

(c) Most Connections of the Servers from osaka pass through ISP:Data Camp limited(212238) ,Tokyo ,japan.Then most of them pass through ISP: Data Camp Limited (60068),Miami,US before reaching the respective servers.

(d) Similary,Most Connections of the Servers from Worthington(US) pass through ISP:Data Camp limited(60068) ,Tokyo ,japan.

(e) Most websites rely on cloudfare as data centers.

(f) We also found some ISPs in some locations which do not have any AS number .Basically AS number 0 Indicates the absence of AS number of that organsiation in that location.

(g) Most connections in Japan and US rely on Gateway Communications(31713)

(h) We found that the path taken from the source to the destination and to the server is not determined or optimal .It is just random (Can be seen through the PIC)

(i) Most servers from the airtel network are accessed through the Bharti Airtel(9498),new delhi.Similary Most servers from jio are accessed through Reliance Jio Incomm Limited Maharastra(55836)

(j) We found the same ISP under different organsiations and also same organisation containing different ISPs

(k) Our resource website was not able to find the private IP address's WHOIS Information (Mostly starting from 10.... and 192...)

(l) Classifying the each spot in the network on the basis of IP address(even on the basis of distinct ISP name and AS number and Location) resulting in the huge number of nodes clearly indicates the Vastness of the Internet.

Finally,we can say that nowadays network has grown very vast .This is the primary reason for the randomness in the network of the networks(Internet).