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I confirm that I understand my coursework needs to be submitted online via Google classroom under the relevant module page before the deadline in order for my assignment to be accepted and marked. I am fully aware that late submission will be treated as non-submission and a mark of zero will be awarded.

ACKNOWLEDGEMENT

In the preparation of my task, I needed to take the assistance and direction of some regarded people, who deserve my most profound gratitude. As the finishing of this report gave me much joy, I want to show my appreciation to Mr Dipeshwor Silwal, Module pioneer, on Islington College for giving me a decent rule for assignment all through various counsels. I want to extend my appreciation to every one of the people who have straightforwardly and in a roundabout way directed me in writing this report. Many individuals, particularly my classmates who had help me and have offered important remark ideas which gave me a motivation to work on the nature of report.

Additionally, I would like to thank Islington College along with London Metropolitan University for allowing me to plan this report.

ABSTRACT

This is the first coursework which was appointed to us from the module ‘Networks and Operating System’. This coursework comprises two significant tasks: Task A and Task B. Here, based on the given scenario of the coursework, Task A may be a sort out restoration of an accumulated association named as ABC Bank. Likewise, with the assistance of COMNET III program, a pale demonstrate is accumulated. Furthermore, ABC headquartered in Manchester and its as of set ATM exchange systems in Kathmandu and Pokhara comprise the show. The exchange systems are related underneath LAN for the faded, using particular virtual circuits and get to join, to perform exchanges. The diversion get ready and Pale show is laid out using screenshots and bar charts respectively. This task in this way is finished with the depiction of reports.

Secondly, Task B may be a particular report on “Internet”. Starting with the brief concise show, this task joins history, commercial expansion, internet privacy, internet architecture, pros and cons of internet and lastly the past present and the future of internet. Thus, with the concise clarification of all the given topics task B is likewise wrapped up.

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1.TASK A

1.1. INTRODUCTION

LAN also known as Local Area Network is a computer network where devices are associated together with in a particular actual area like home, office, or a building. In a plain manner, it is a network which connects devices that are in a single, restricted area. Conversely, WAN otherwise called Wide Area Network is a collection of Local Area Network that exist over a large-scale geographical area. The primary benefits of LAN are it does not cost a lot and is not difficult to manage and control the whole LAN as it is accessible in one specific region whereas the fundamental benefit of WAN is its size. To whole up, for given coursework we are assigned to develop a network of three LAN which when connected through cloud forms WAN respectively.

1.2. WAN MODEL

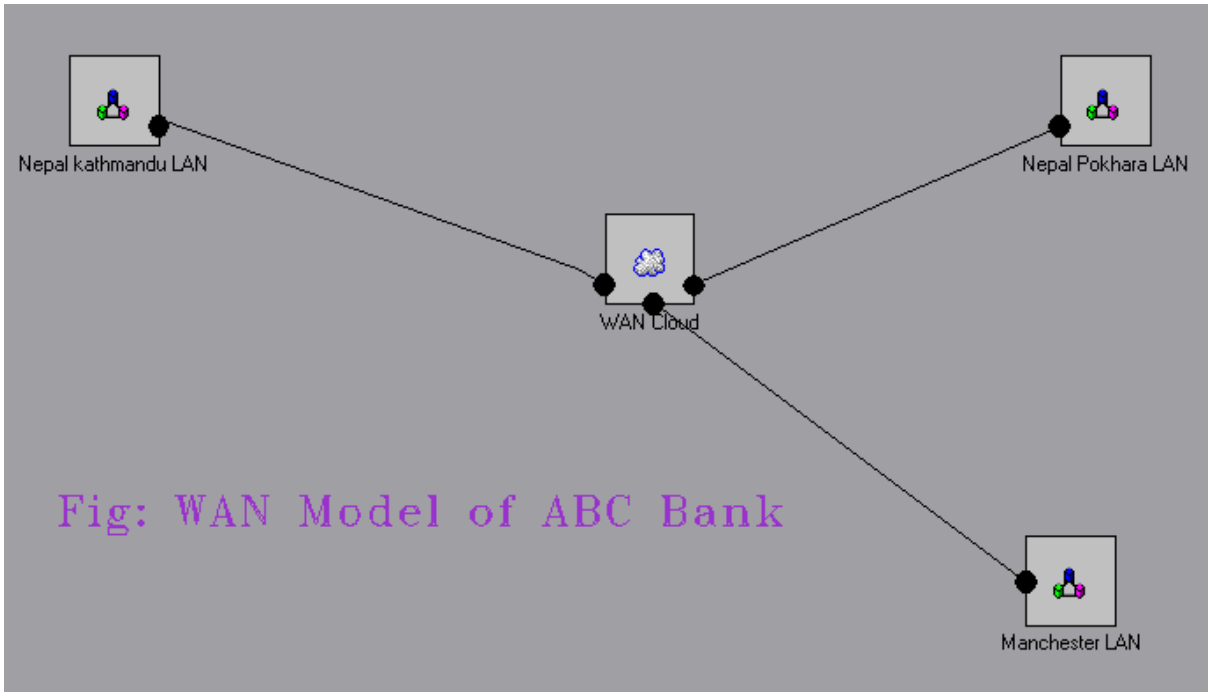


Figure 1. WAN Model

A multinational bank named as ABC bank is a company with a central command in Manchester. The bank is prepared to set up two ATM (Automatic Teller Machines) transaction network in two area of Nepal (Kathmandu and Pokhara). Each network in Nepal consists of 40 ATM transaction node in addition to one single teller giving a total of 41 ATMs. By utilizing IEEE 802.5 token ring 16 Mbps, Nepal LAN is set up. The Manchester LAN is additionally set up utilizing IEEE 802.3 CSMA/CD 10 BaseT networks with an ATM processing server. Every LANs is associated with the frame relay cloud through a cisco 7000/7010sp router. The tunnel from the LAN to WAN and links in the WAN have a transmission rate of 56 kbps CIR and the tunnel from the WAN to the LAN has a transmission of 9.6 kbps.

1.2.1. MANCHESTER LAN

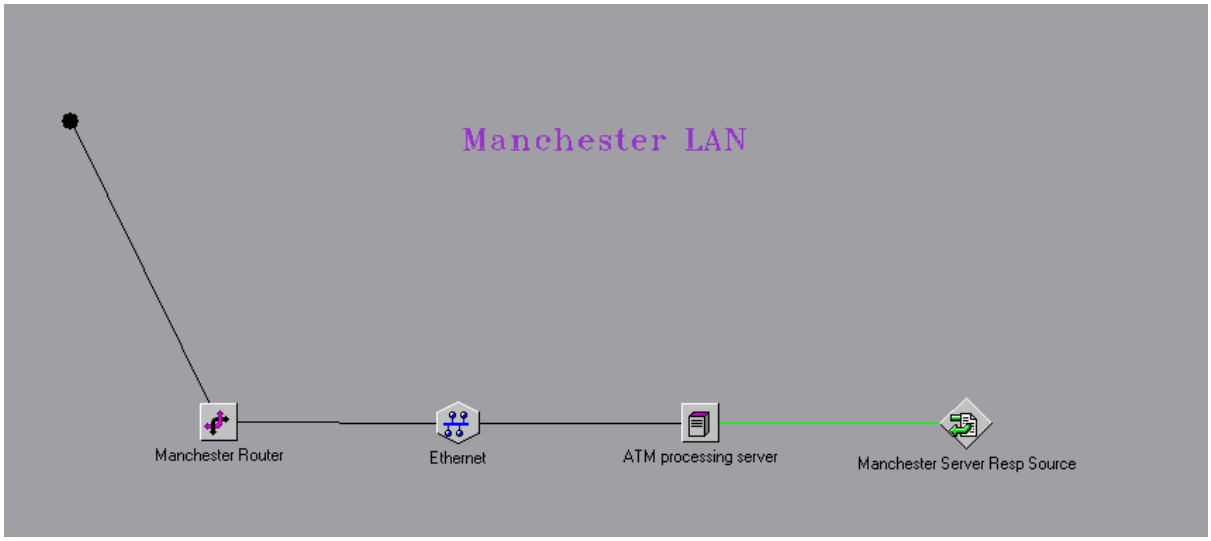


Figure 2. Manchester LAN

The Manchester LAN consist of a router (Manchester router) and a server (ATM processing server) along with CSMA/CD link (Ethernet) which is likewise connected to a message source response (Manchester Server Resp Source).

1.2.1.1. NETWORK DEVICE (ROUTER)

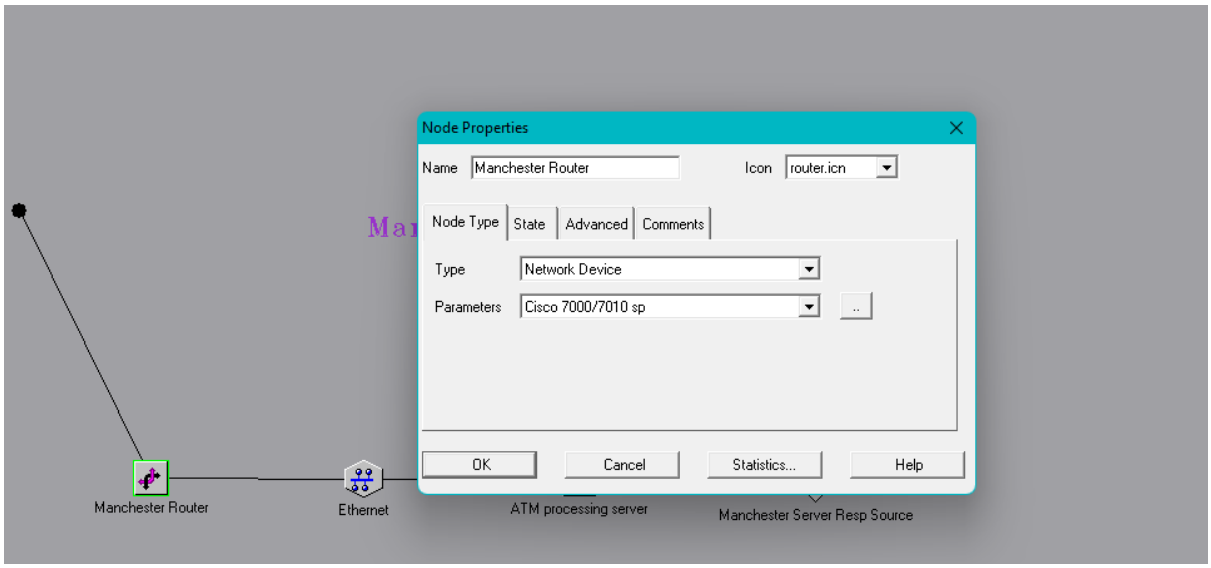


Figure 3. Manchester Router

Basically, network device is used to associate the Manchester LAN to the frame relay through the access point where the parameters with Cisco 7000/7010 sp router is used. Moreover, it is used to forward the data packets received from the Kathmandu LAN and Pokhara LAN to the Manchester ATM processing server as well as the other way around.

1.2.1.2. CSMA/CD LINK

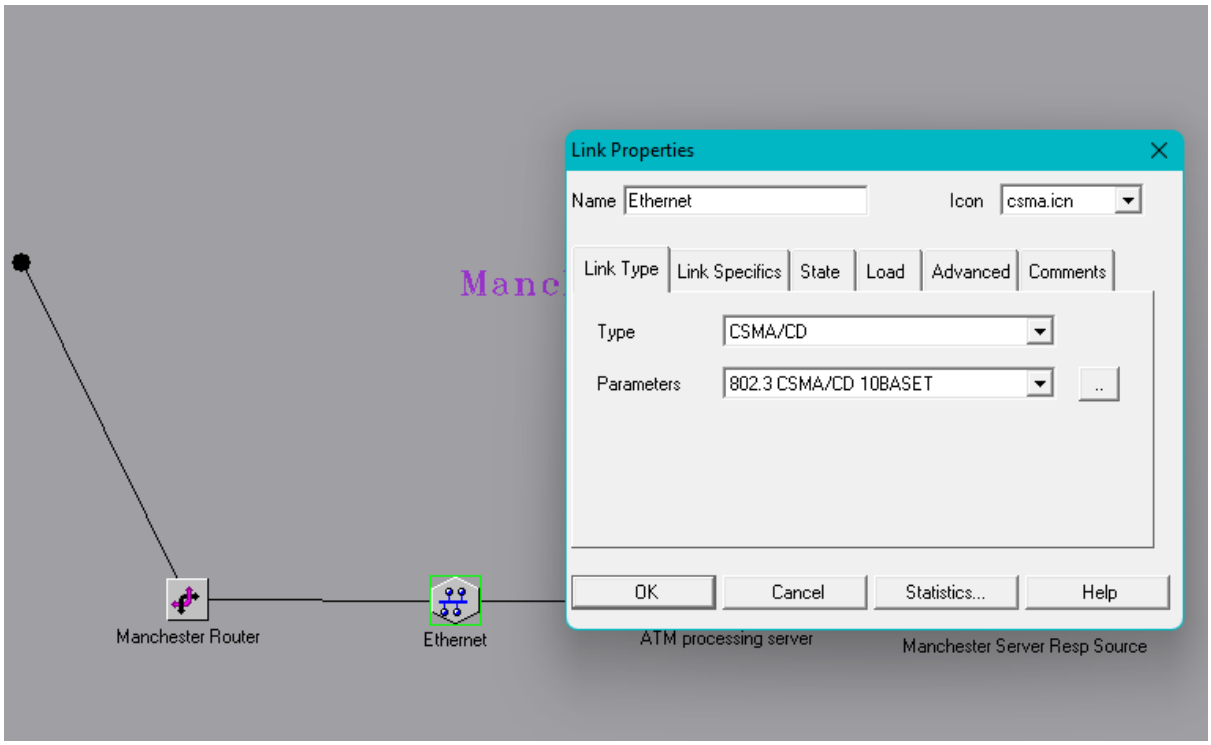


Figure 4.Manchester Token Passing Link (Ethernet)

In the above figure, CSMA/CD link is used with parameter 802.3 CSMA/CD 10 BASET.

1.2.1.3. PROCESSING NODE

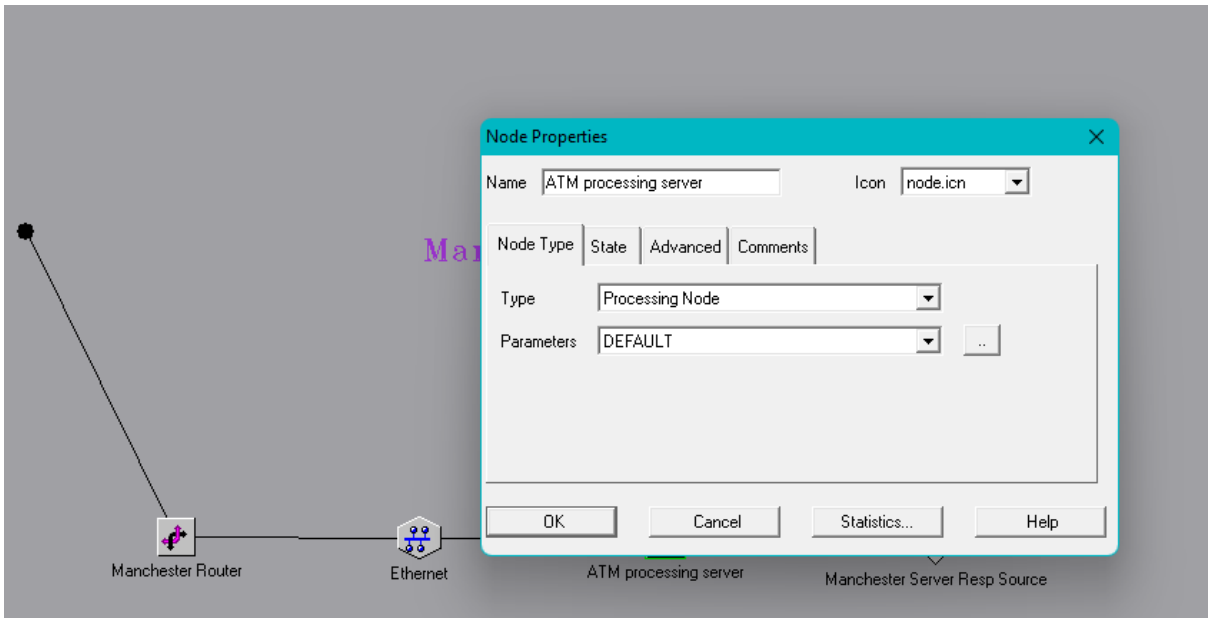


Figure 5. ATM Processing Server

Processing node (Manchester ATM Processing Server) handled the incoming data packets from the wide range of various network, likewise the request coming from the Kathmandu LAN and Pokhara LAN are additionally processed here where the processing server responds accordingly.

1.2.1.4. MESSAGE RESPONSE SOURCE

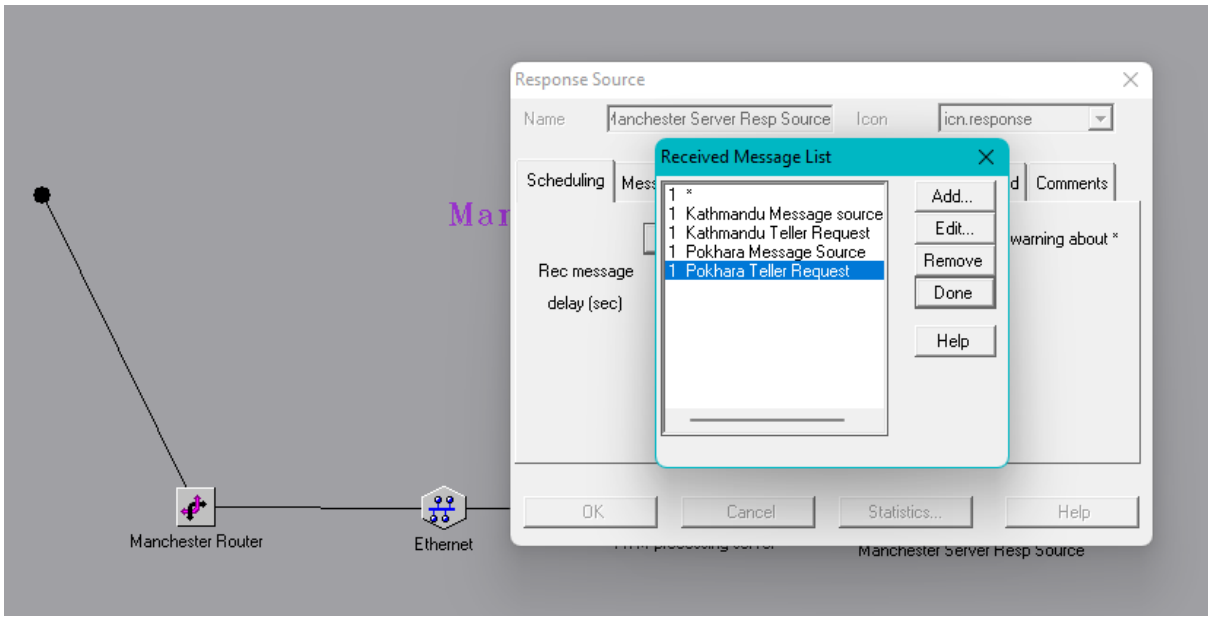


Figure 6. Message Response Source-1

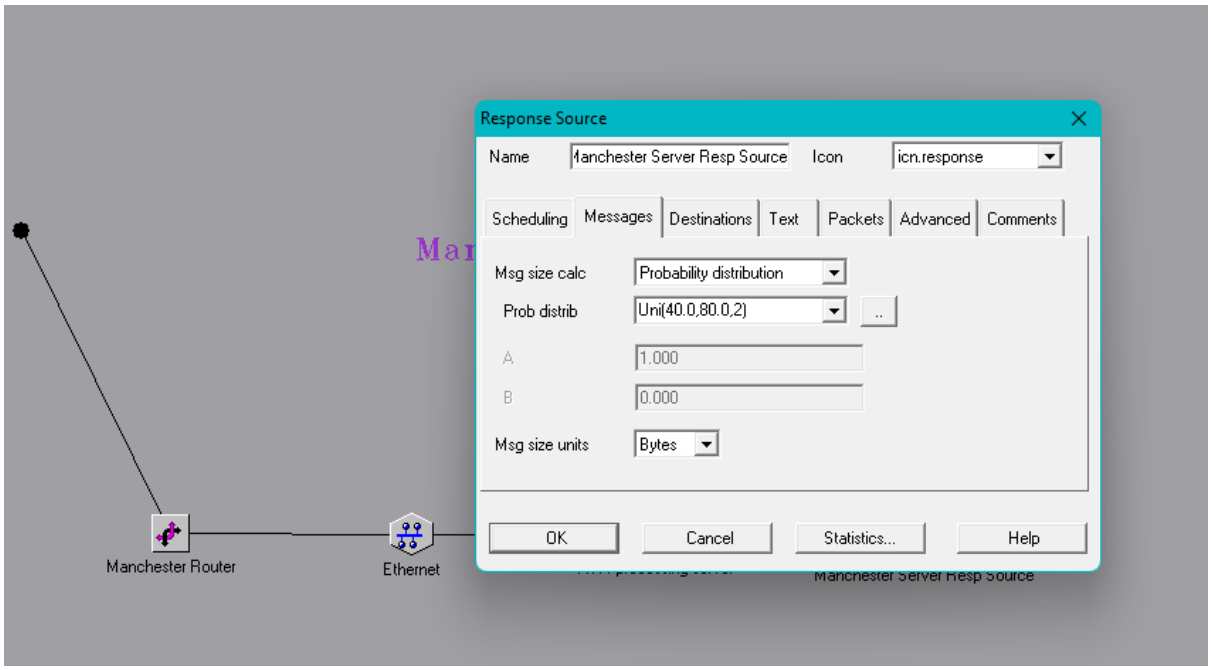


Figure 7.Message Response Source-2

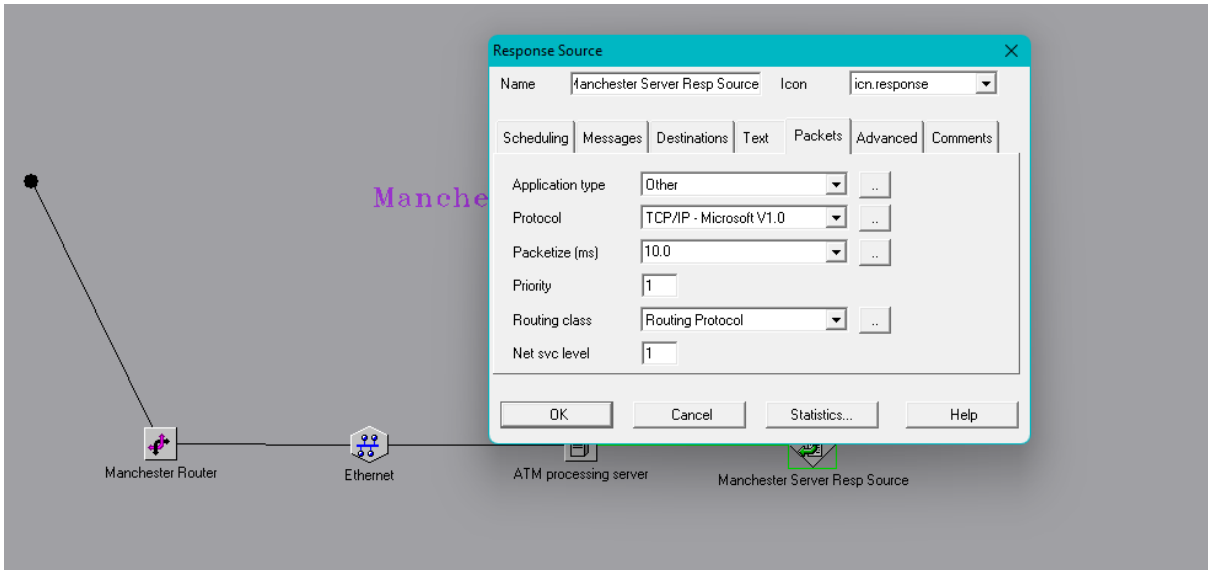


Figure 8.Message Response Source-3

Here, the message Response Source receives message from Kathmandu 1-40(Computer Group), Kathmandu Teller Request, Pokhara 1-40(Computer group), Pokhara Teller Request which responds accordingly. The size of authorization request can be described by a uniform distribution size which is set to disperse over the range of 40 to 80 bytes with stream 2. Furthermore, the routing protocol used is TCP/IP-Microsoft V1.0 with 10ms Packetize time and the routing class is defining with a hop count of 65535 with IGRP metric weight(k1) = 1 respectively.

1.2.2.WAN CLOUD

The WAN cloud consist of four Frame Relay Virtual Circuit and three point to point access link. Likewise, the four Frame Relay Virtual Circuit are named as Manchester-Kathmandu, Manchester-Pokhara, Kathmandu -Manchester, Pokhara-Manchester. Each access link (Kathmandu access, Manchester access, and Pokhara access) is connected to access point and the Frame Relay VCs are also connected to access link.

1.2.2.1. ACCESS LINK

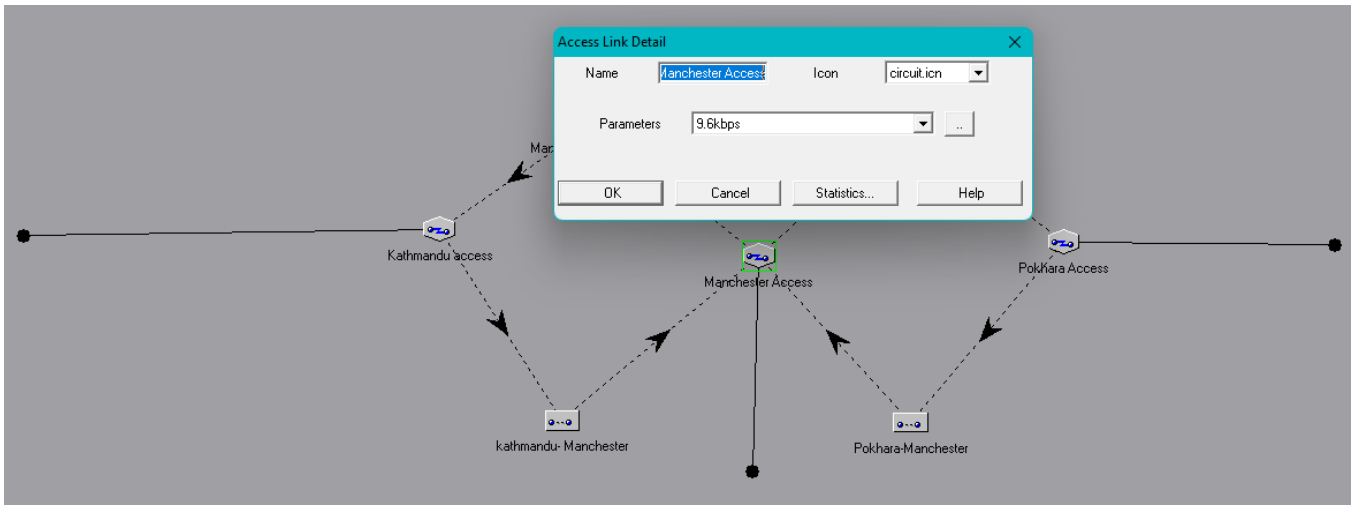


Figure 9. Access Link

As shown in the above figure, all these three-access links are connected using different virtual link. Similarly, each access link has the transmission rate of 9.6kbps.

1.2.2.2. VIRTUAL CIRCUIT

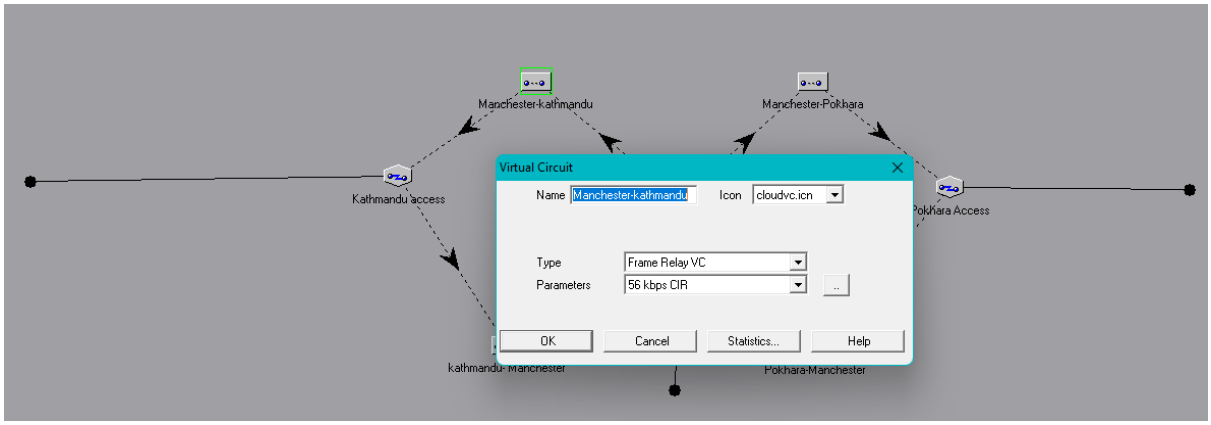


Figure 10.Virtual Circuit

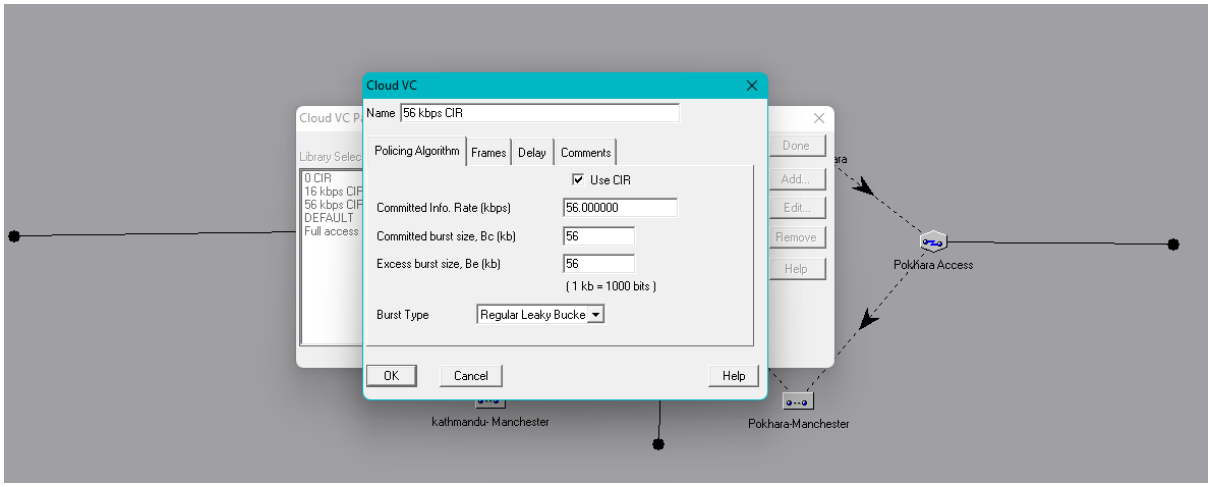


Figure 11.Virtual Circuit-2

In the WAN cloud, all these four virtual circuits are connected to the access links and frame relay is used with parameter 56 kbps CIR in all virtual circuit cloud.

1.2.3. KATHMANDU AND POKHARA LAN

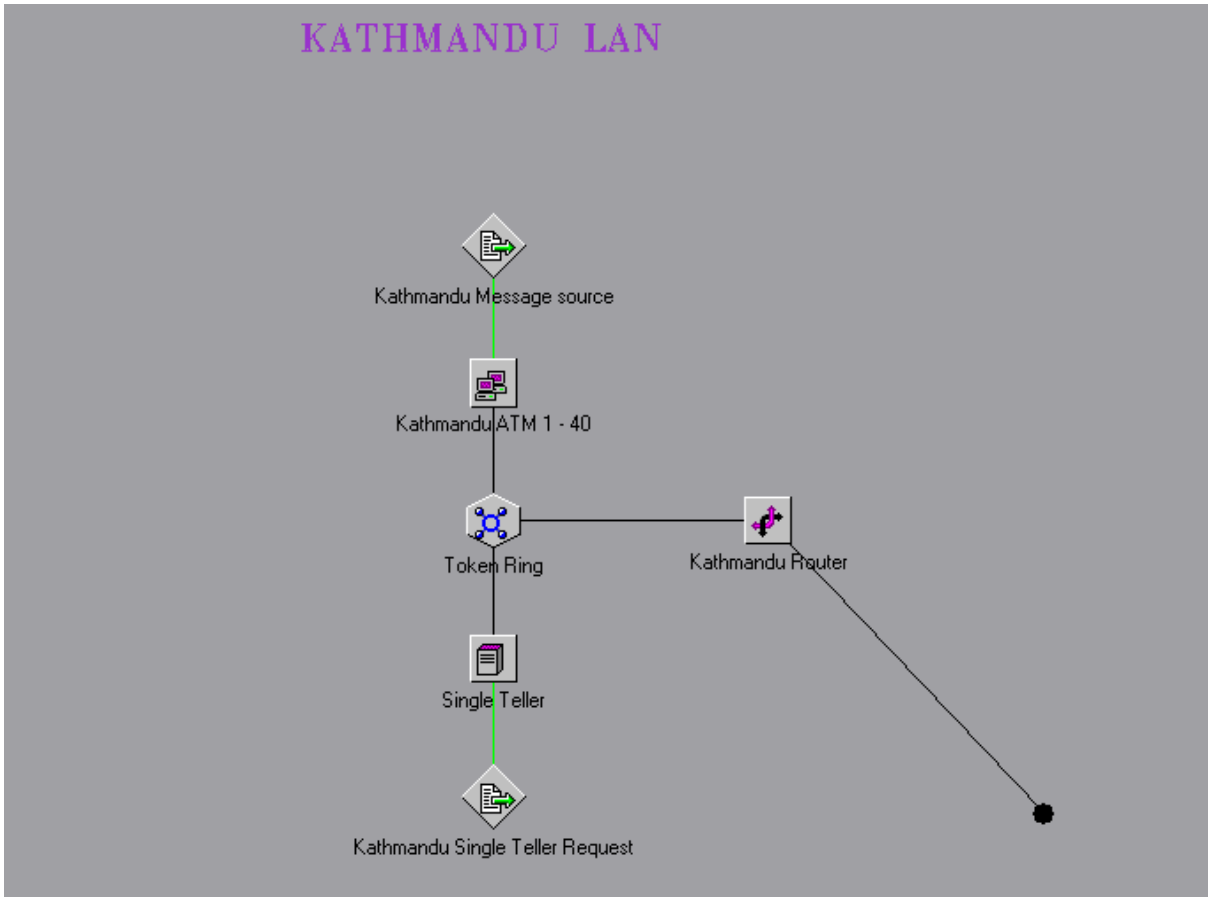


Figure 12. Kathmandu LAN

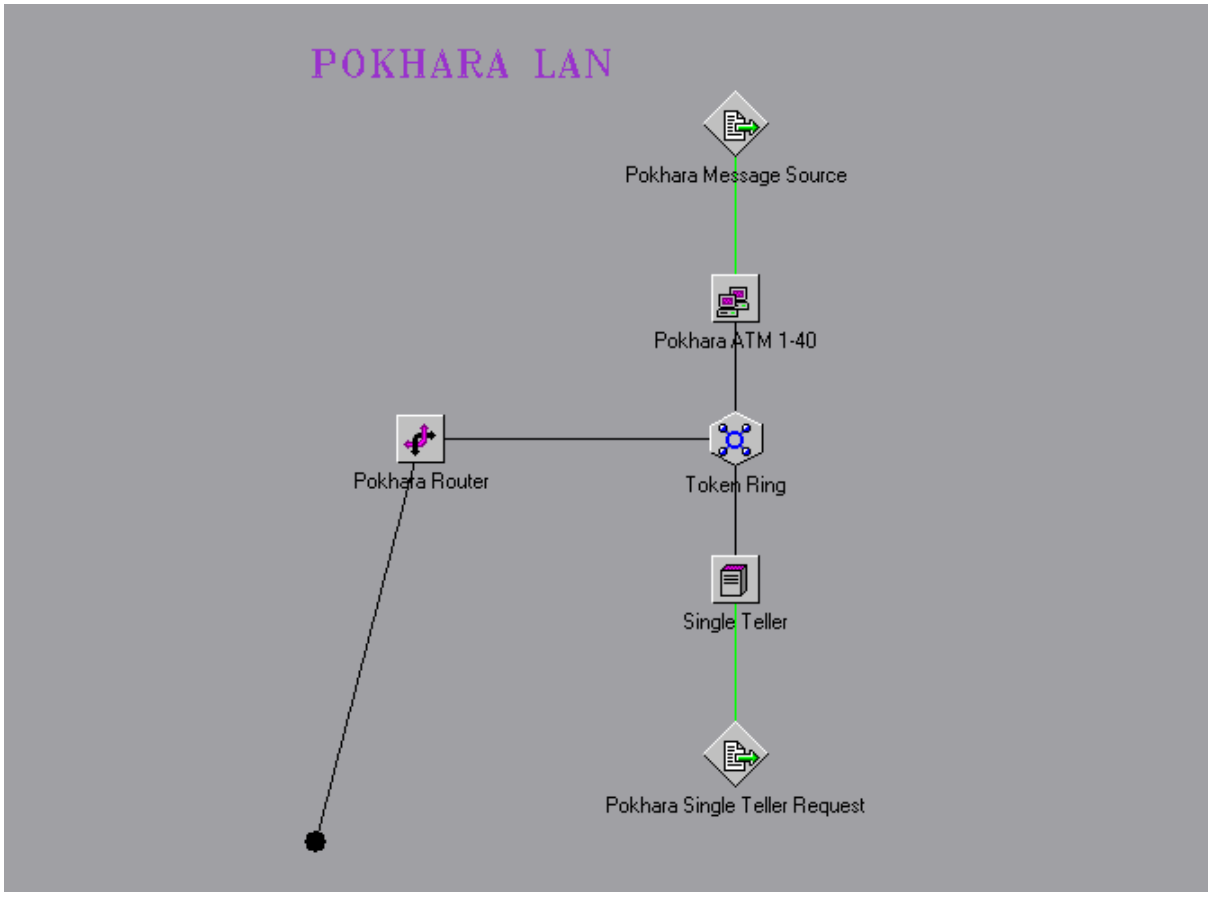


Figure 13. Pokhara LAN

Both Kathmandu and Pokhara LAN consist of router, message source, a single teller, a token passing link and a computer group of 40 computers. Through the router both LANs are connected to the frame relay (WAN cloud). In the two LANs, the ATM transaction requests are generated and are sent to Manchester LAN where request are handled. From that point forward, Manchester LAN send the result back to the places where the requests were generated.

1.2.3.1. NETWORK DEVICE: Router

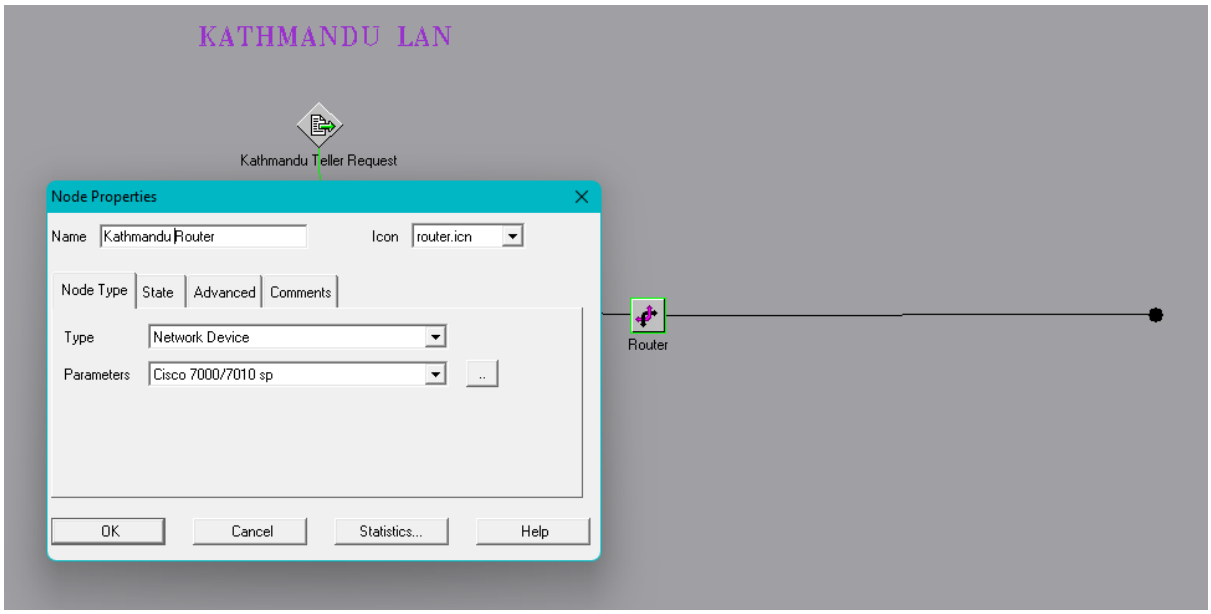


Figure 14. Kathmandu Router

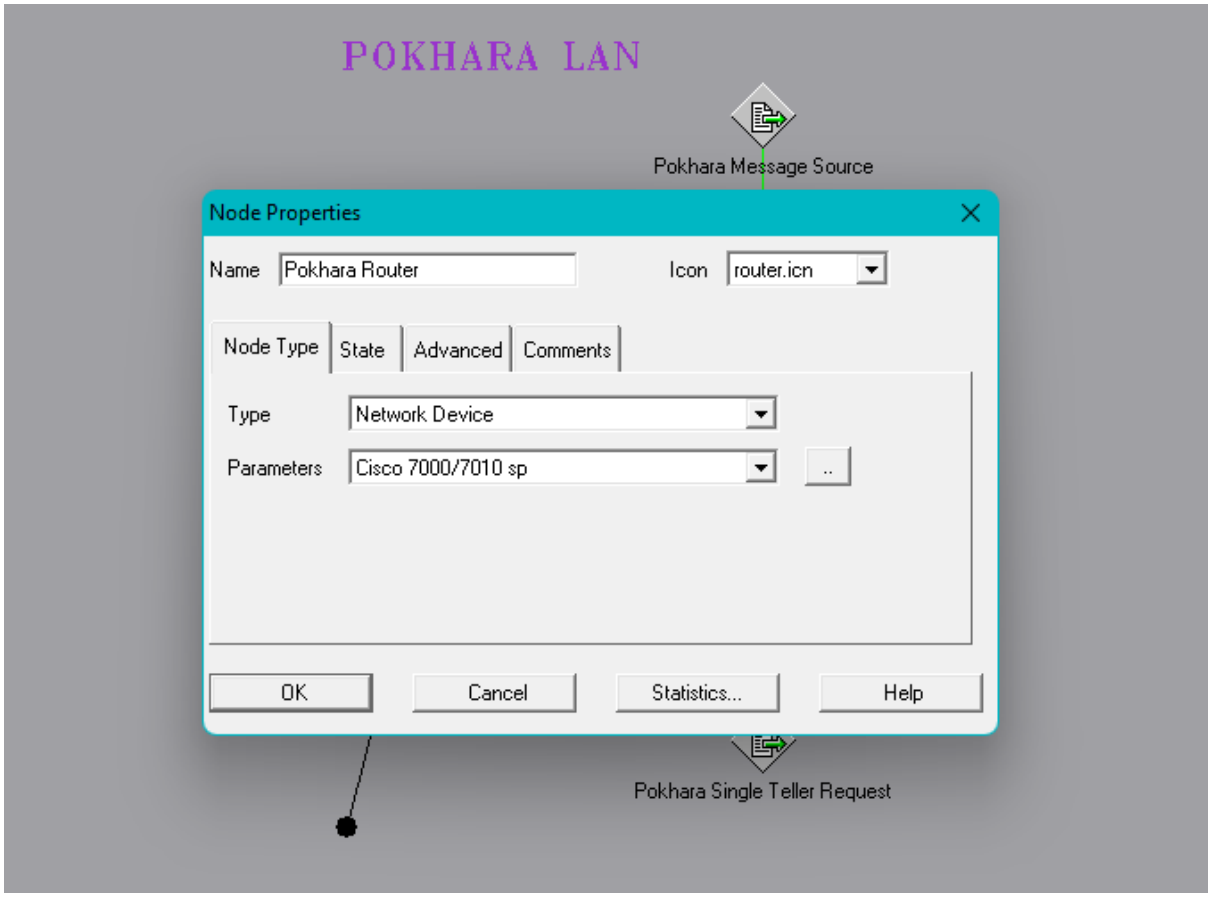


Figure 15. Pokhara Router

Both the Kathmandu and Pokhara routers associate the individual LANs to the WAN cloud through the access point where Cisco 7000/7010 sp router is used.

1.2.3.2. TOKEN PASSING LINK

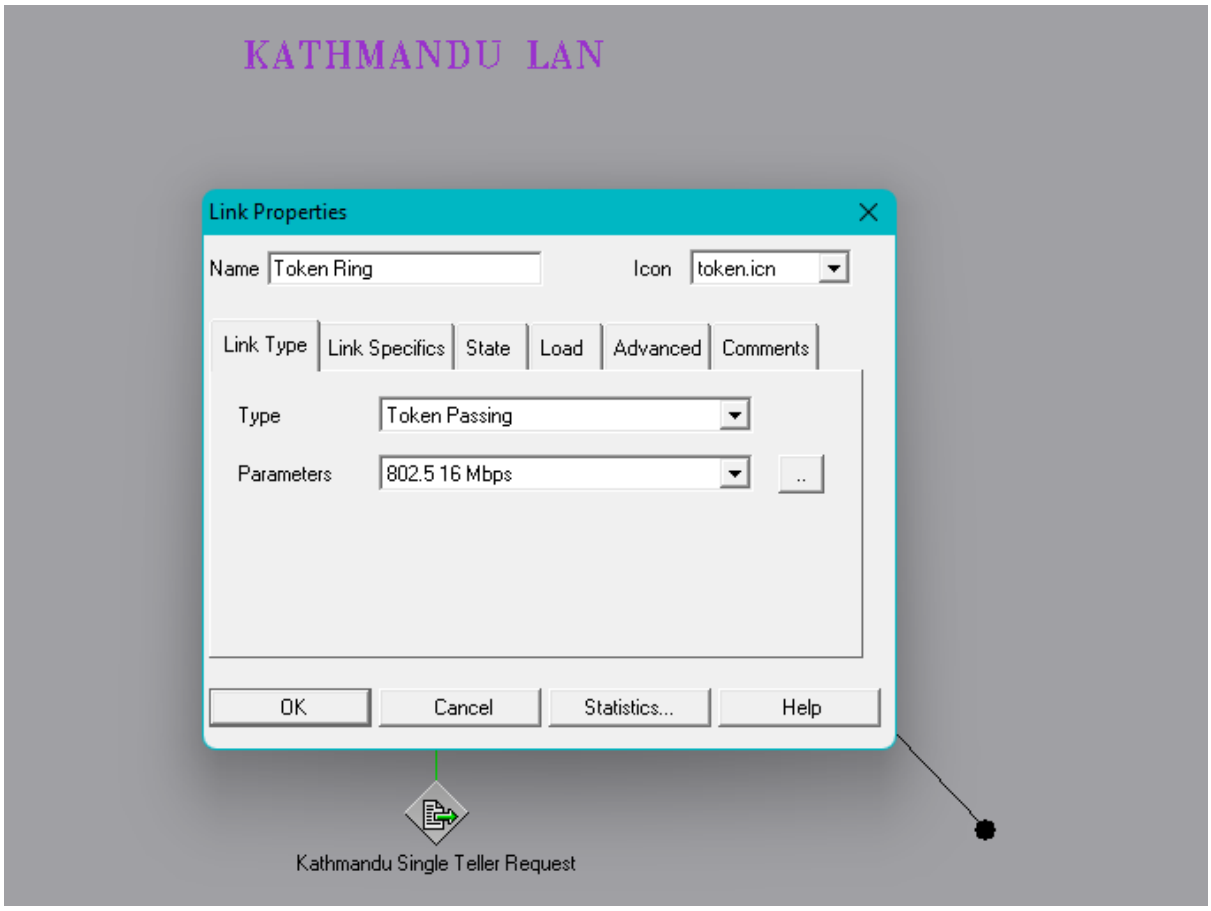


Figure 16. Kathmandu Token Passing Link

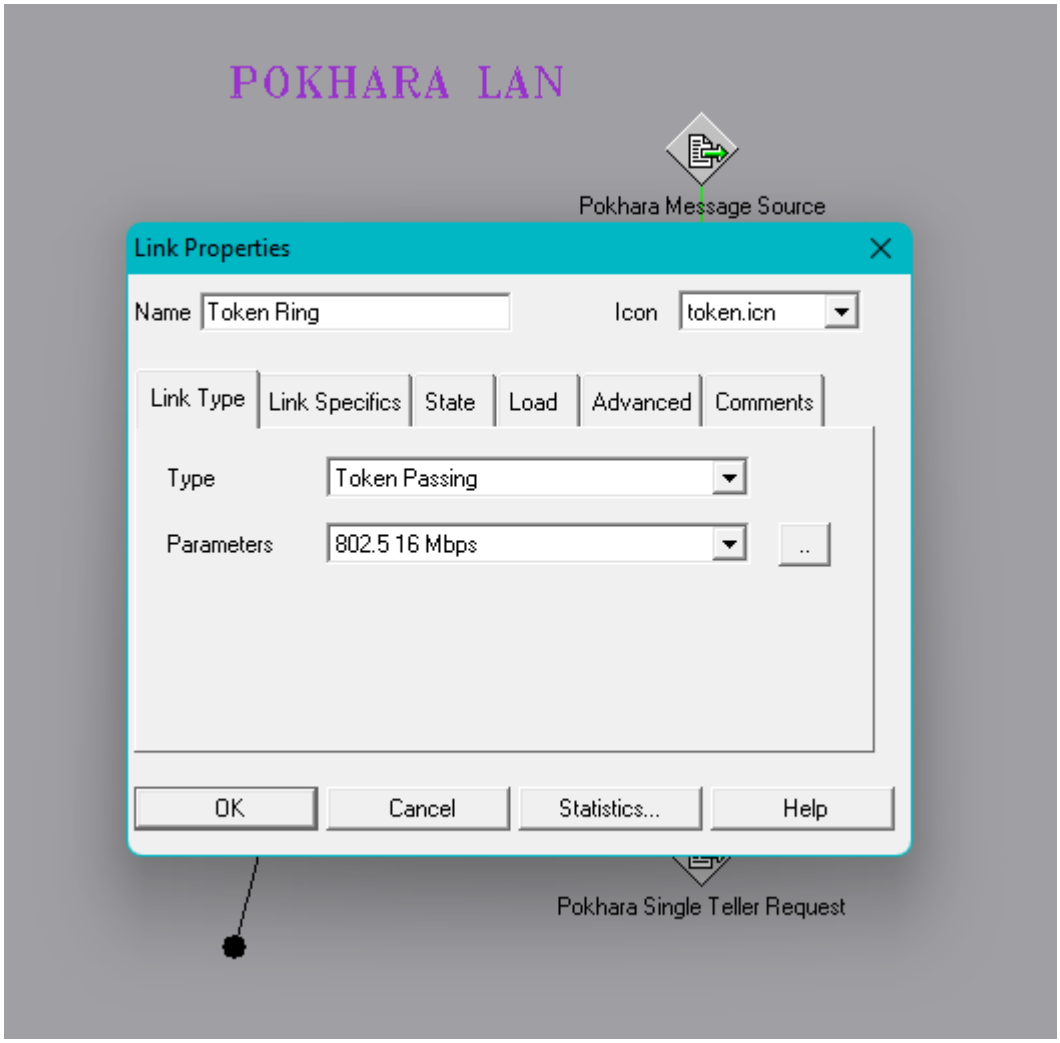


Figure 17. Pokhara Token Passing Link

In the above figure, both the Kathmandu and Pokhara LAN used the token passing type with parameters 802.5 16 mbps.

1.2.3.3. PROCESSING NODE

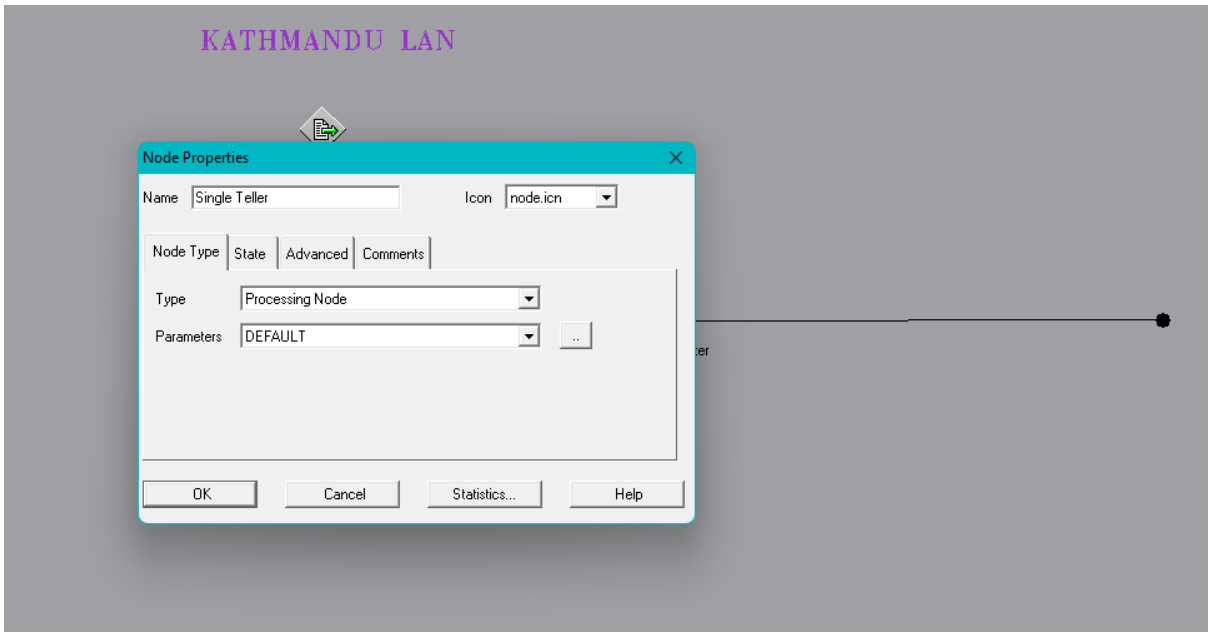


Figure 18. Kathmandu Processing Node

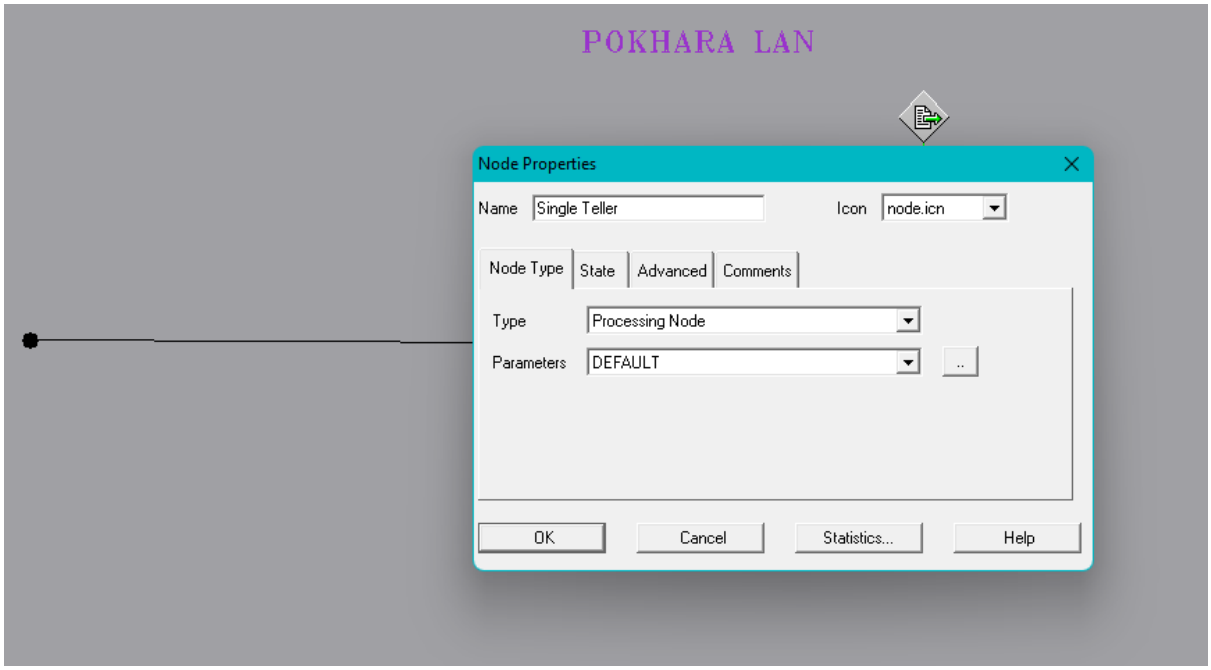


Figure 19. Pokhara Processing Node

The above figure shows that the single teller receives and forward the information about the transaction done by the computer group to the router and router to frame relay aggregately. Additionally, default parameter was utilized for single teller machine of type processing node.

1.2.3.4. COMPUTER GROUP

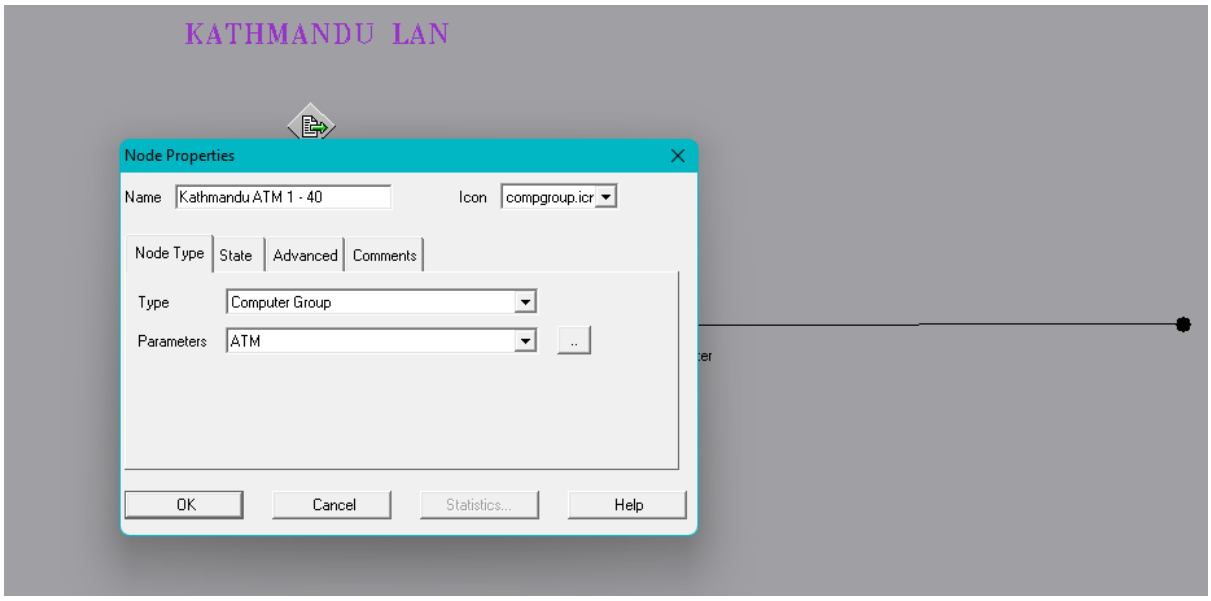


Figure 20. Kathmandu Computer Group-1

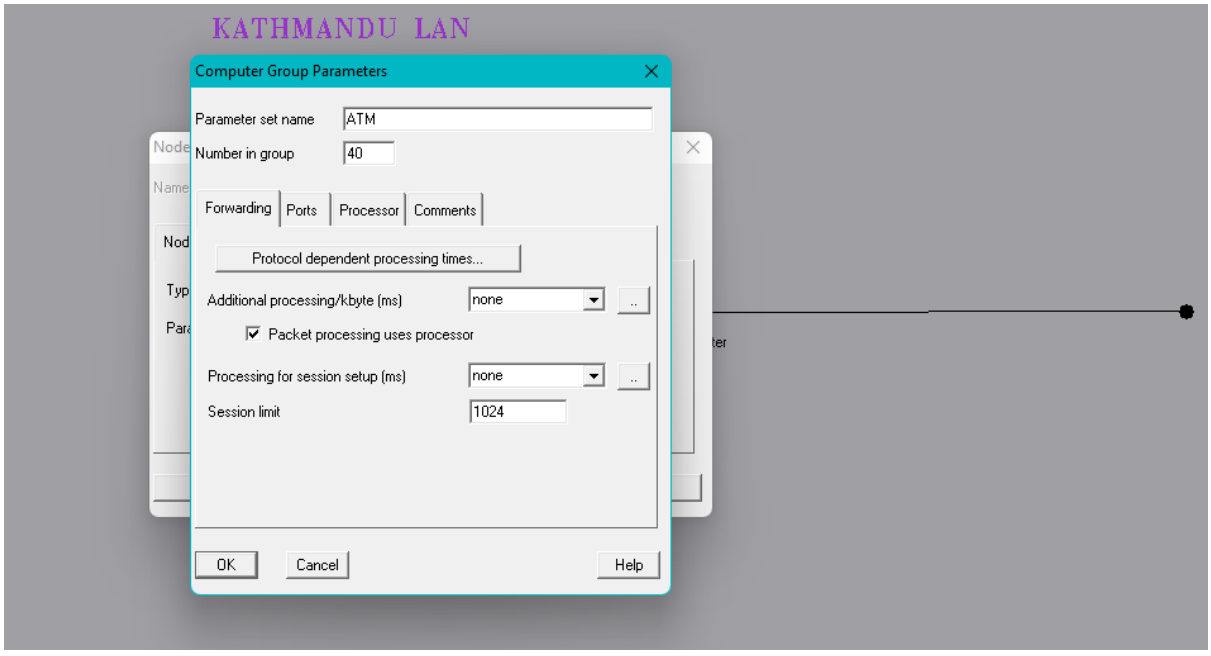


Figure 21. Kathmandu Computer Group-2

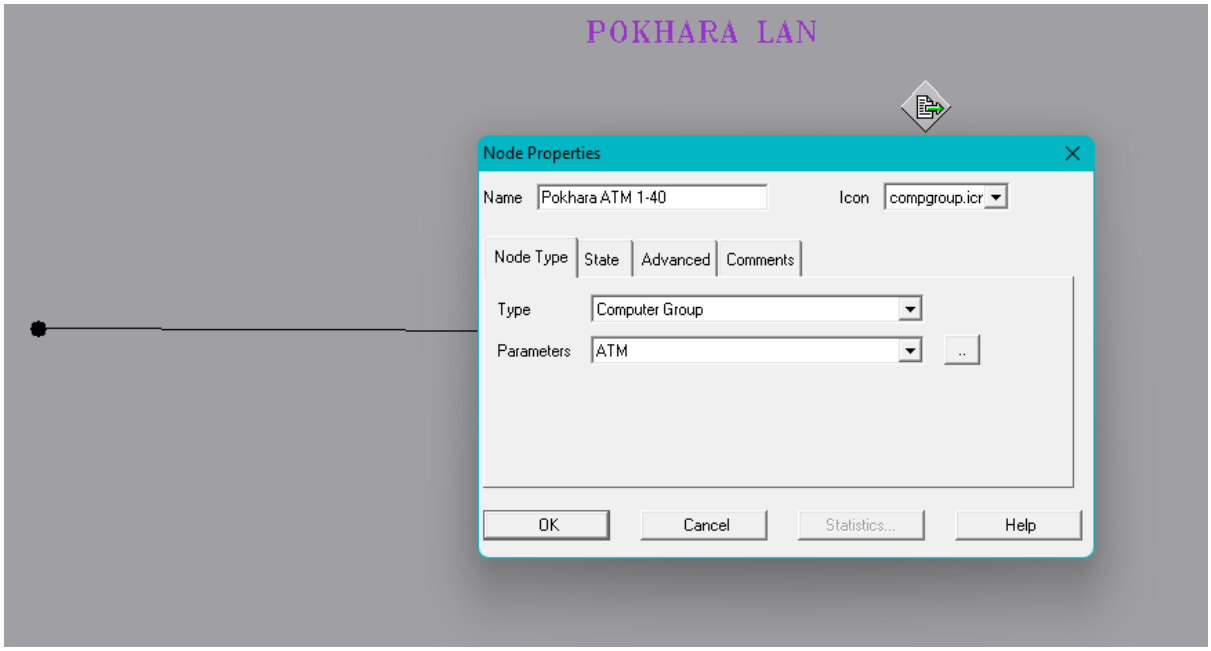


Figure 22. Pokhara Computer Group-1

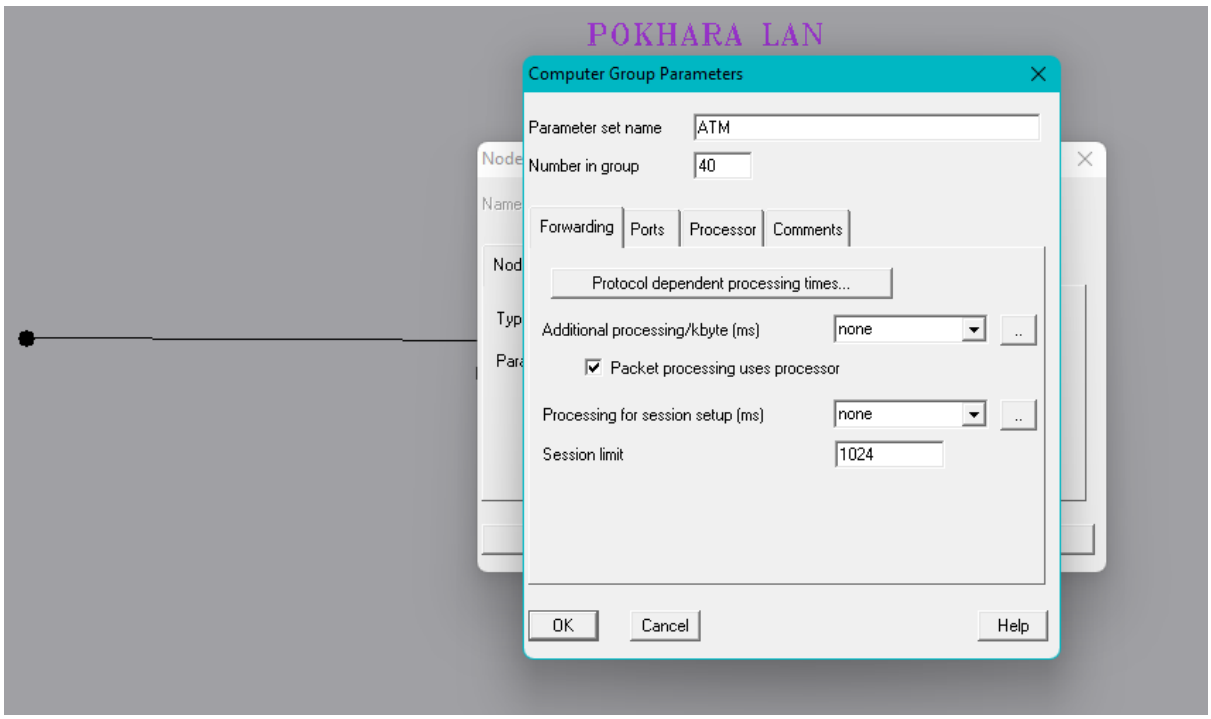


Figure 23. Pokhara Computer Group -2

In both LANs, each computer groups consists of 40 computers which works as a transaction node for the model where all of the ATM transactions are conducted and the information about transaction is sent to the singe teller. For both Kathmandu and Pokhara ATM, computer group type was utilized with ATM parameters.

1.2.3.5. MESSAGE SOURCE

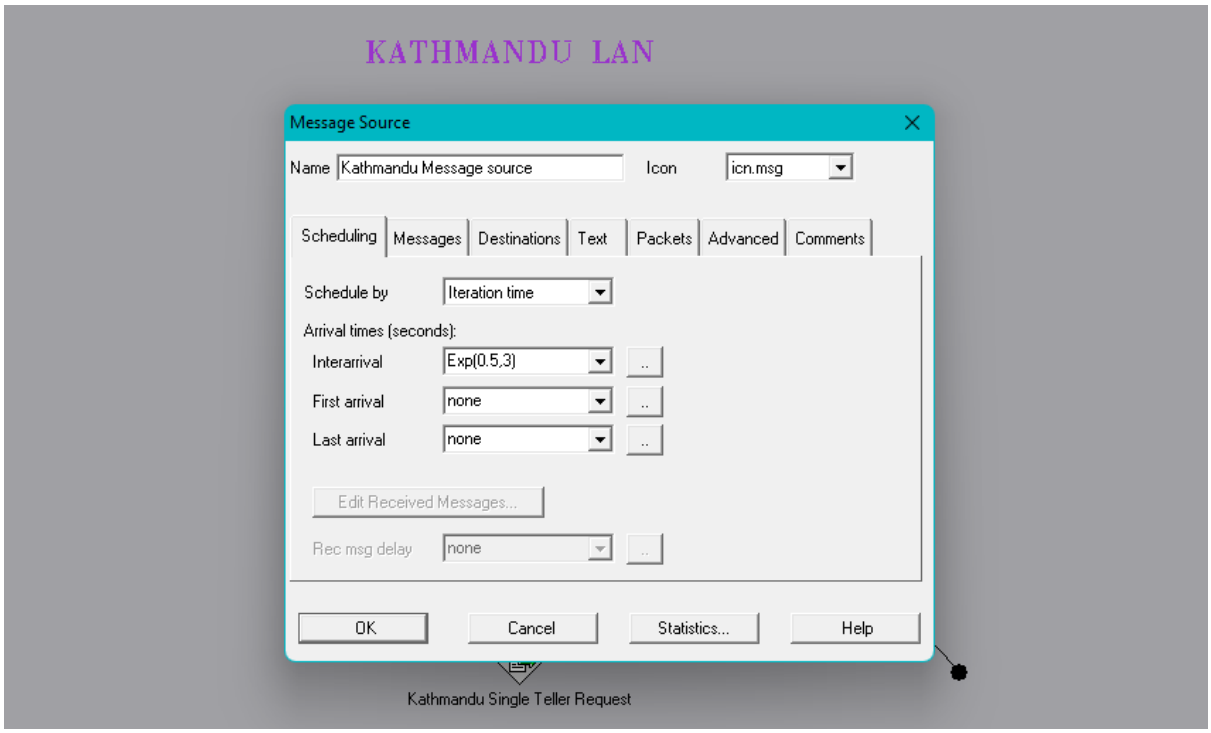


Figure 24. Kathmandu Message Source-1

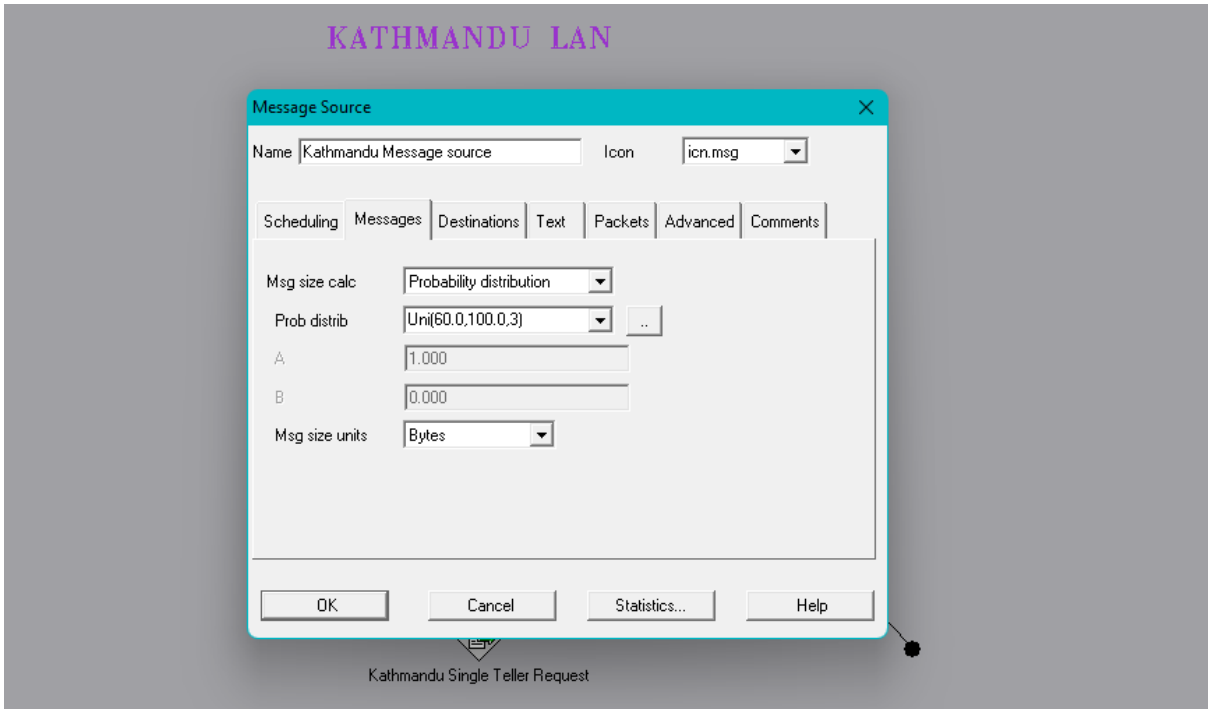


Figure 25. Kathmandu Message Source-2

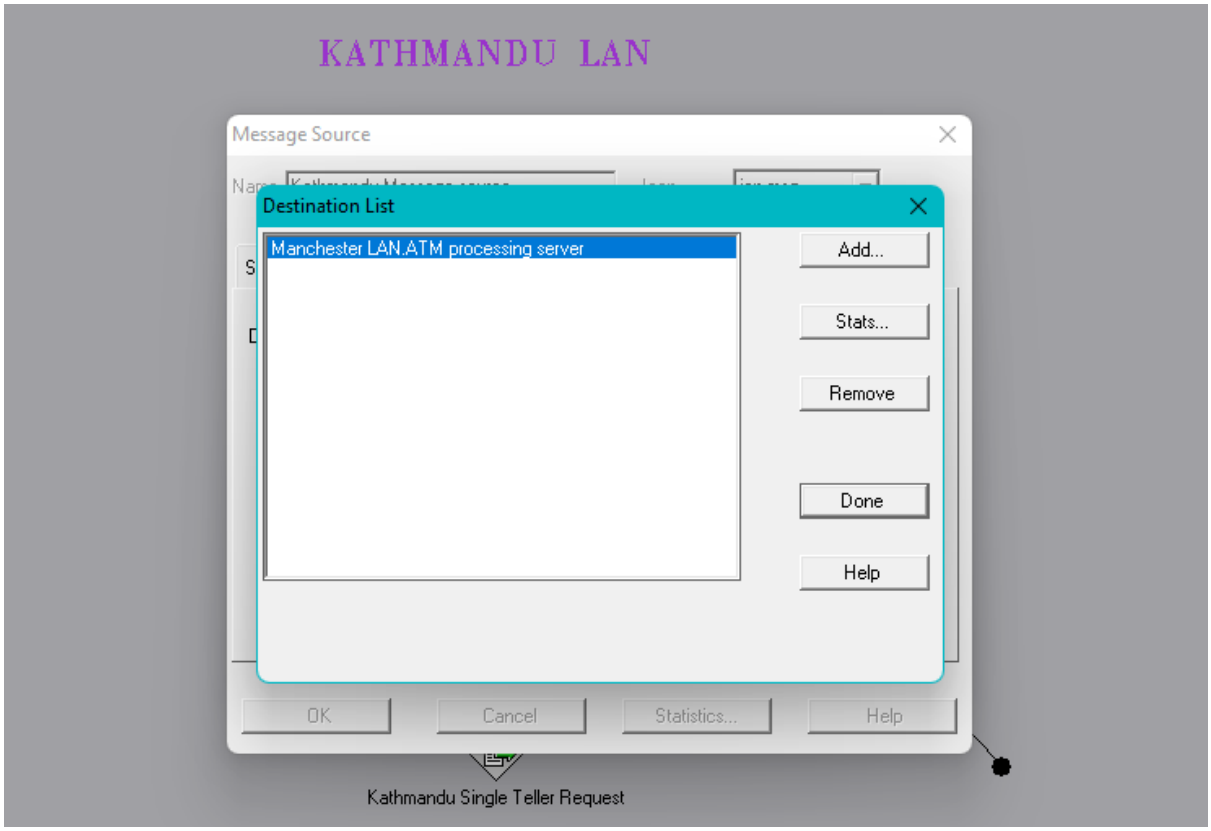


Figure 26. Kathmandu Message Source-3

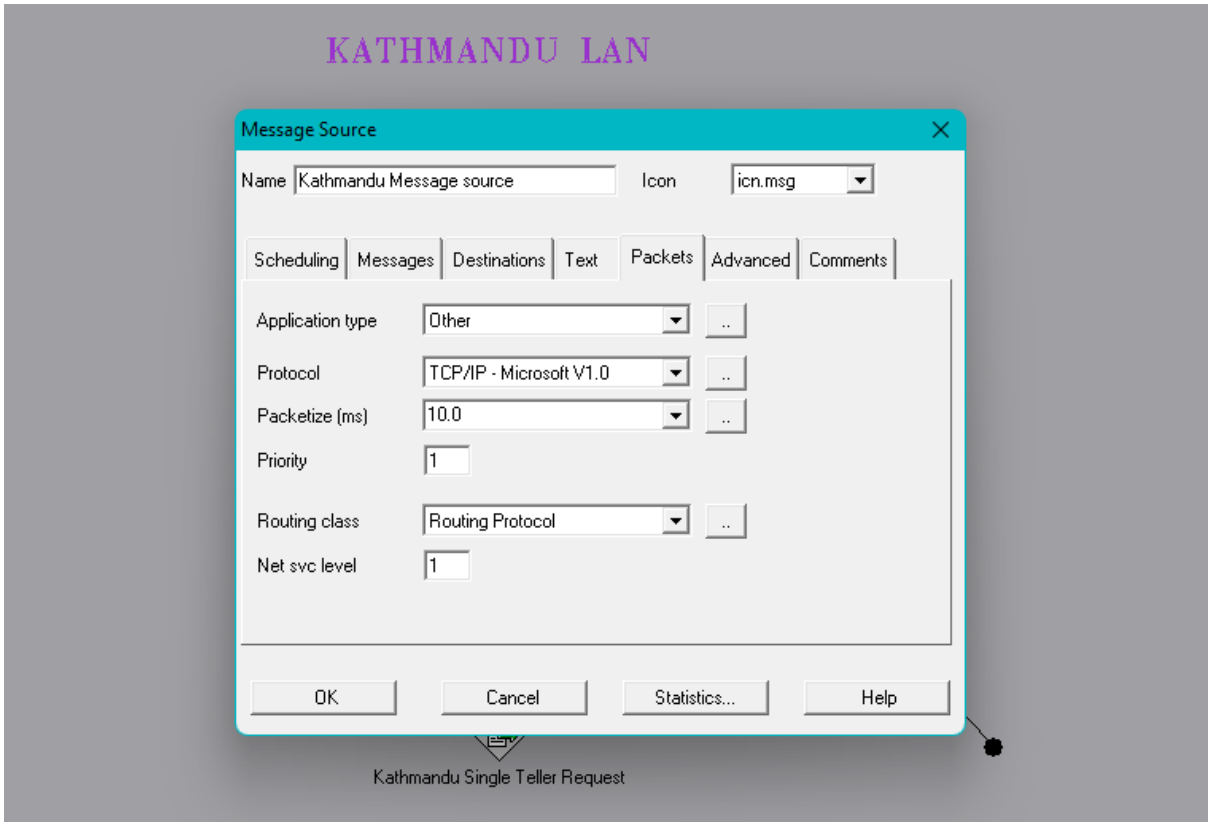


Figure 27. Kathmandu Message Source-4

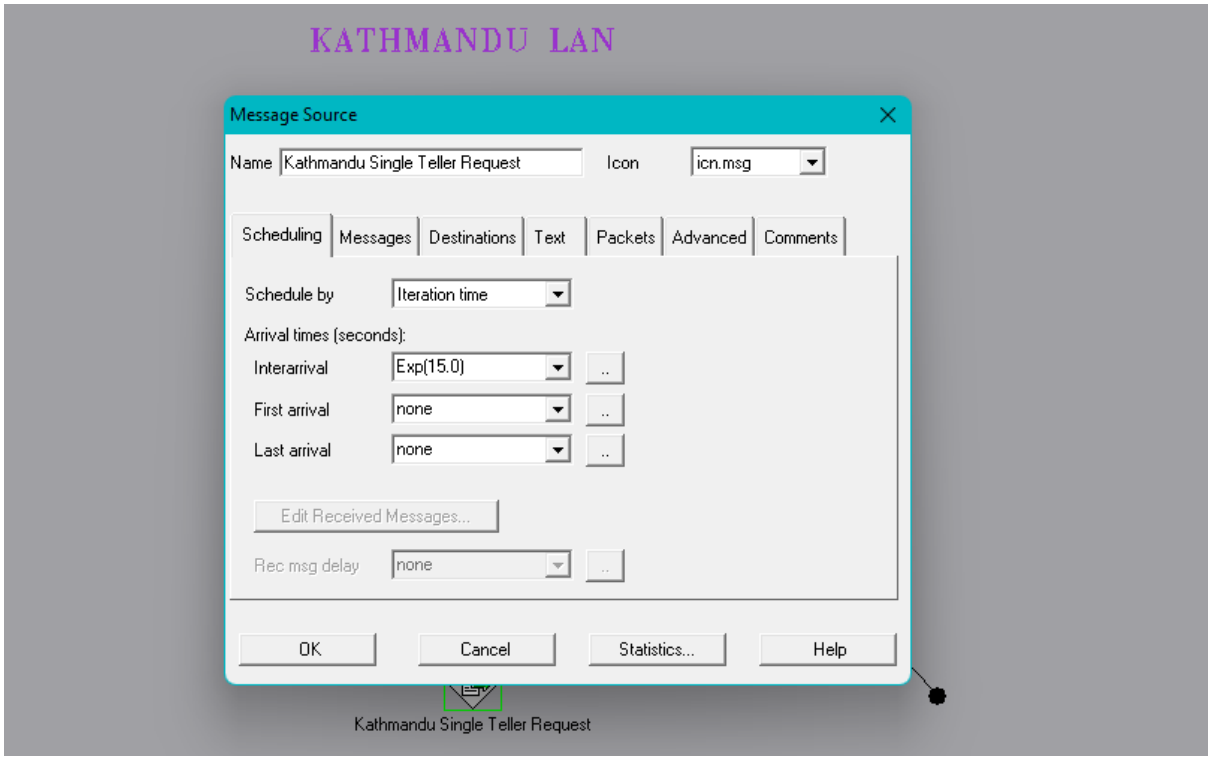


Figure 28.Kathmandu Single Teller Request-1

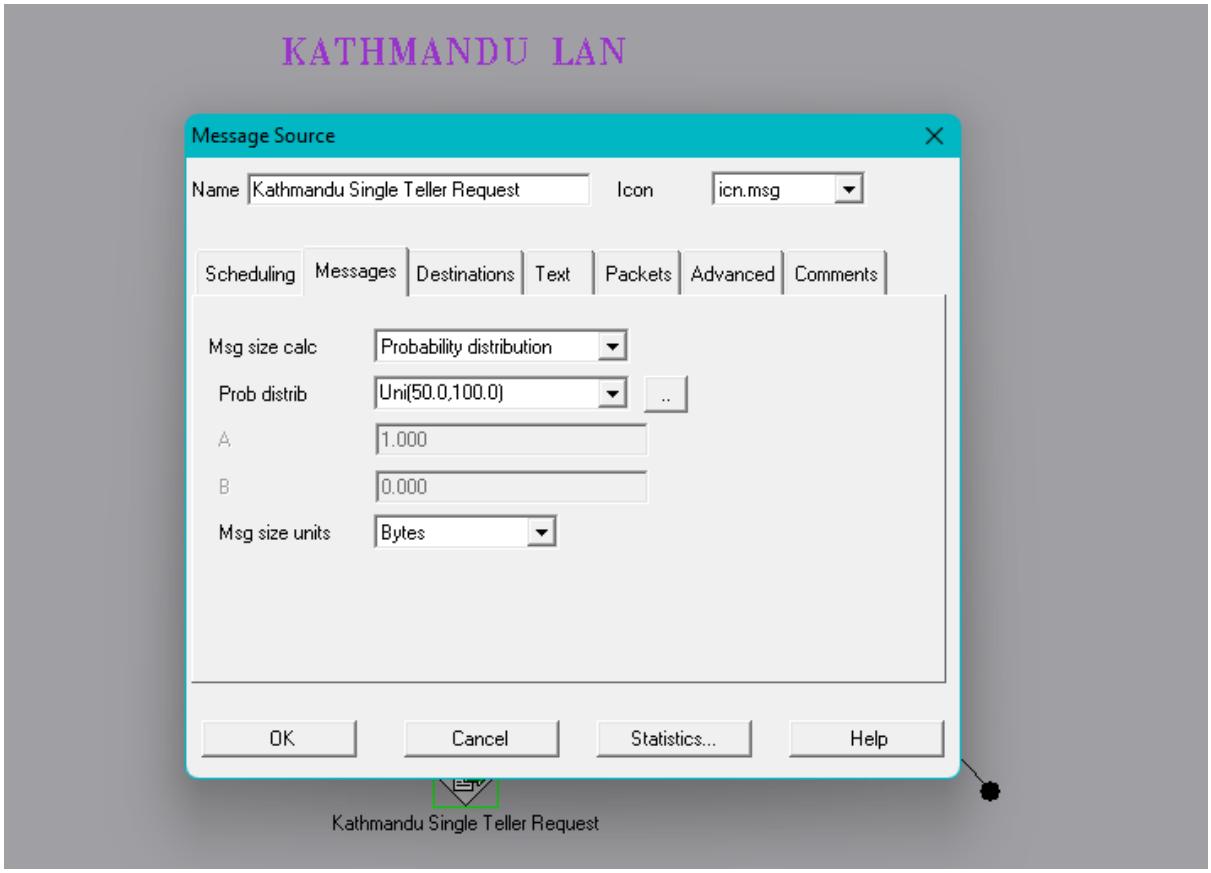


Figure 29.Kathmandu Single Teller Request-2

Figure 30.Kathmandu Single Teller Request-3

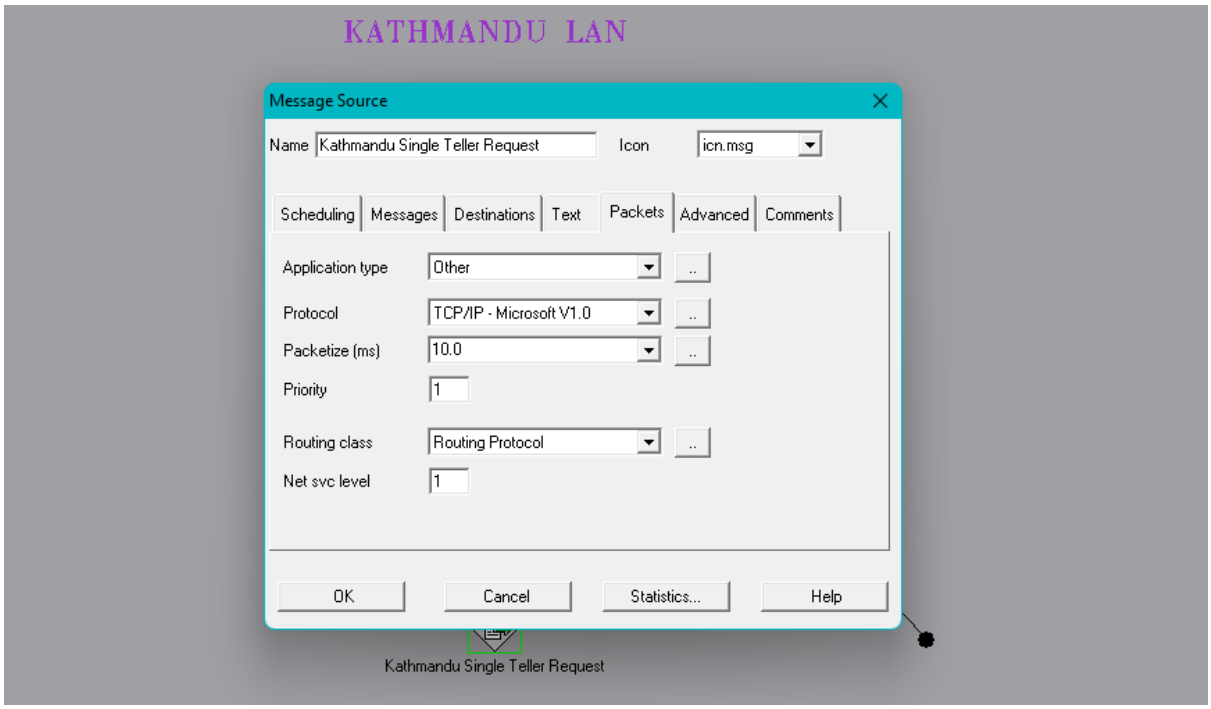


Figure 31.Kathmandu Single Teller Request-4

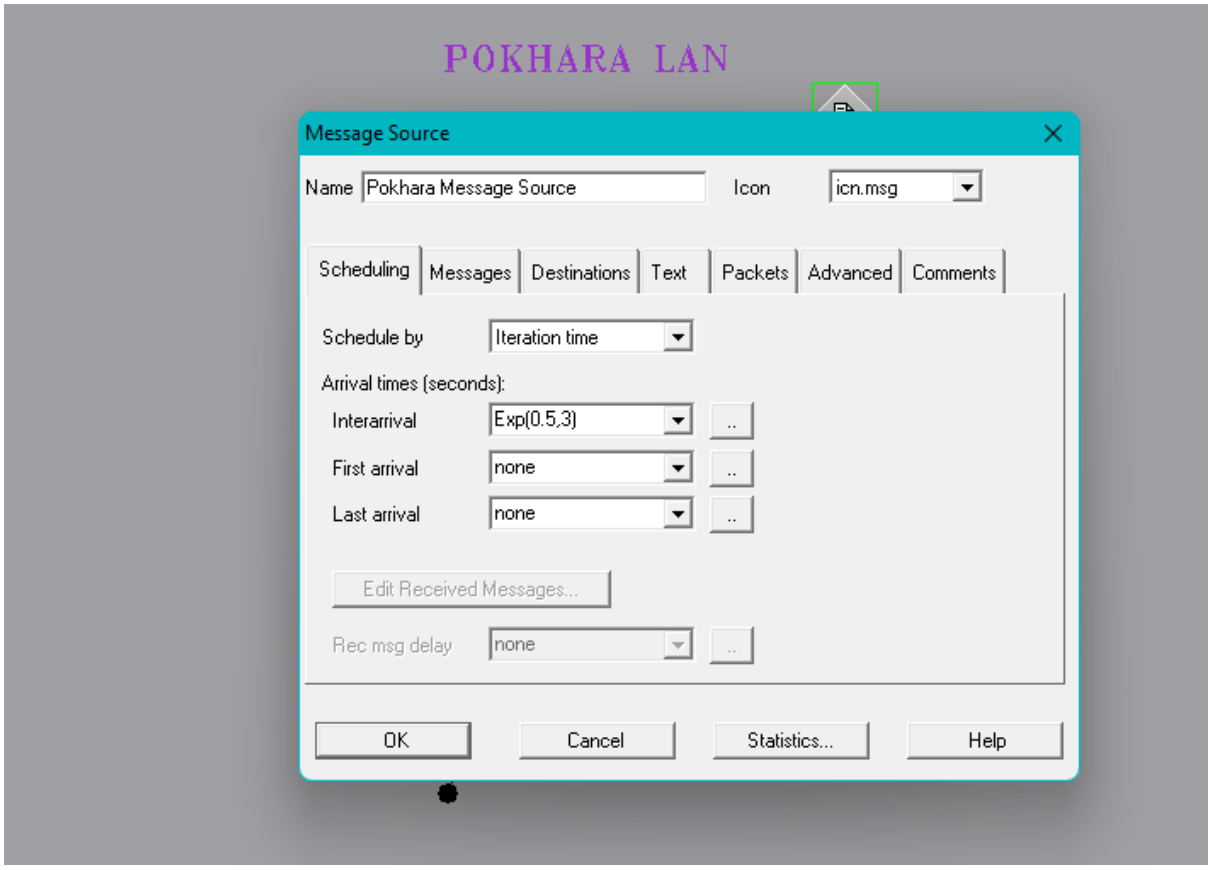


Figure 32. Pokhara Message Source-1

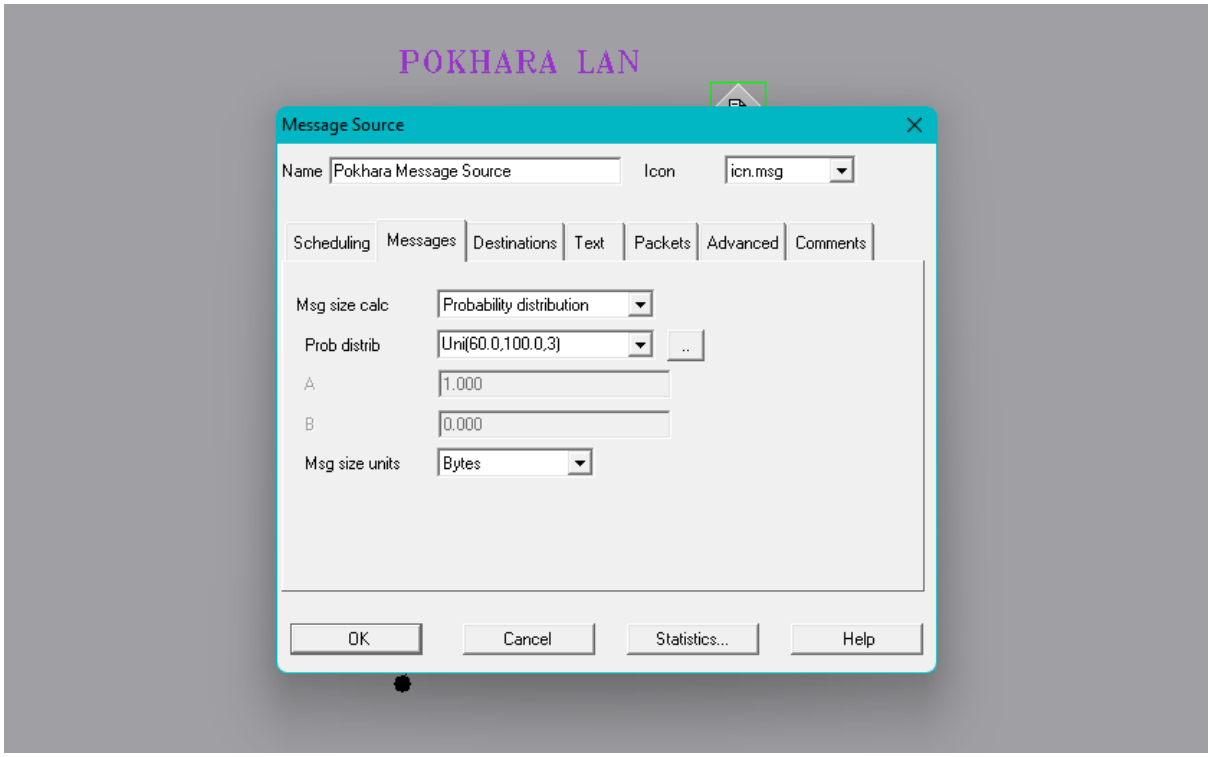


Figure 33. Pokhara Message Source-2

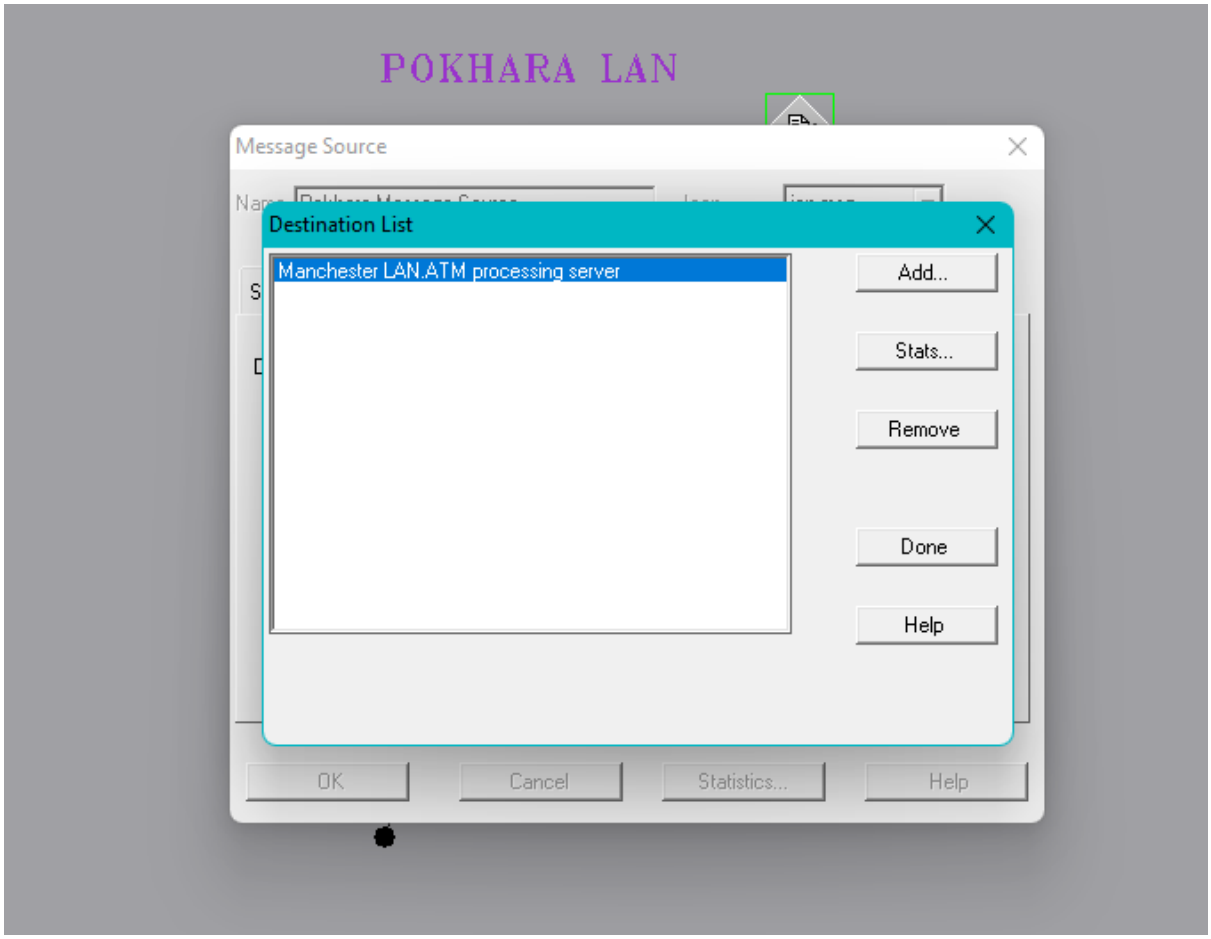


Figure 34.Pokhara Message Source-3

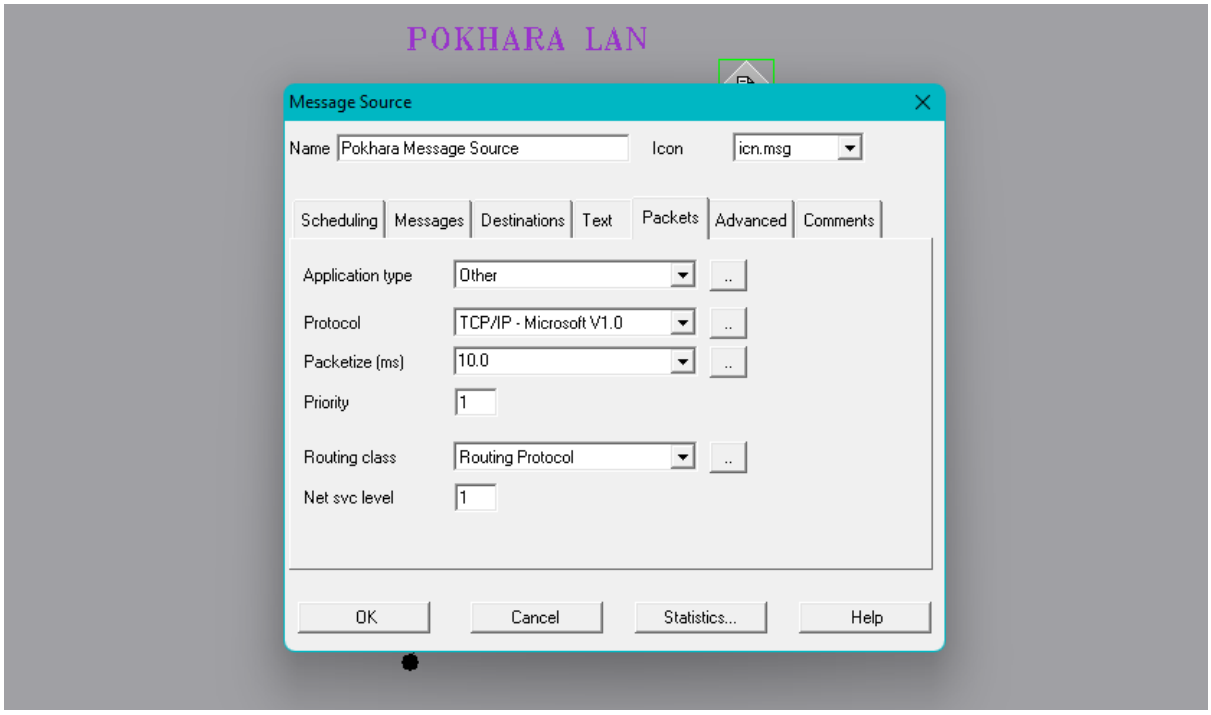


Figure 35.Pokhara Message Source-4

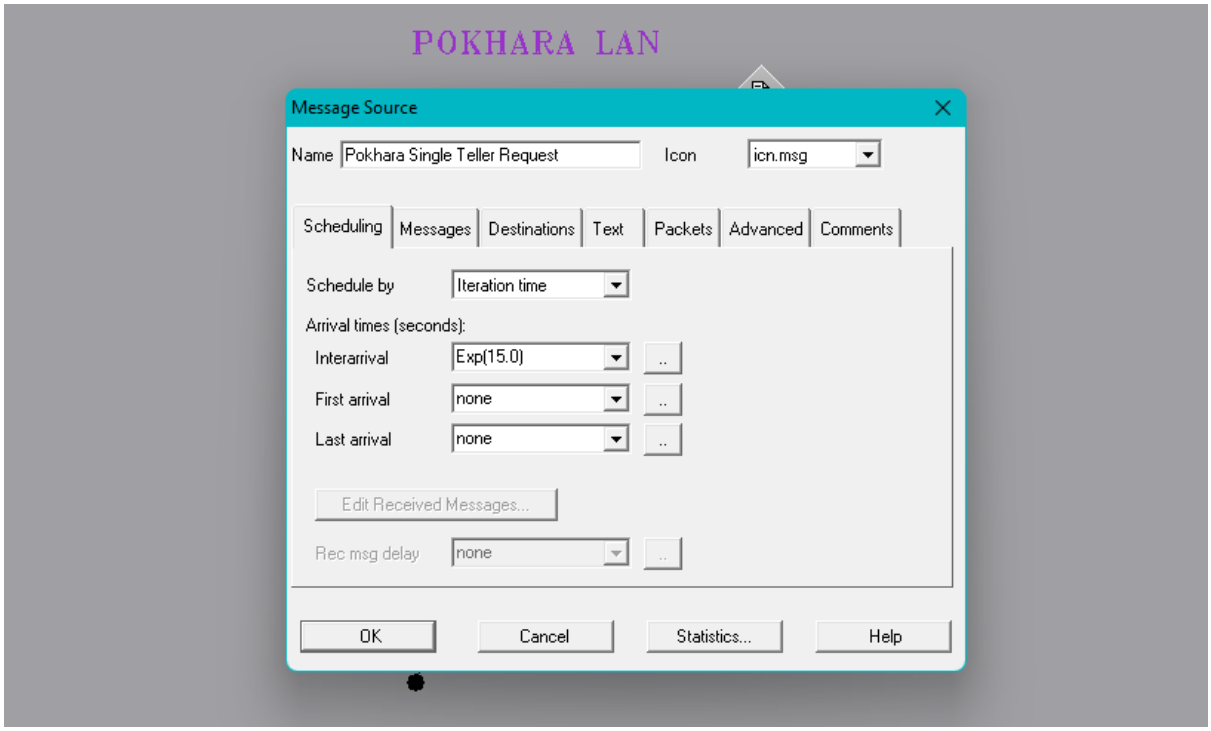


Figure 36.Pokhara Single Teller Request-1

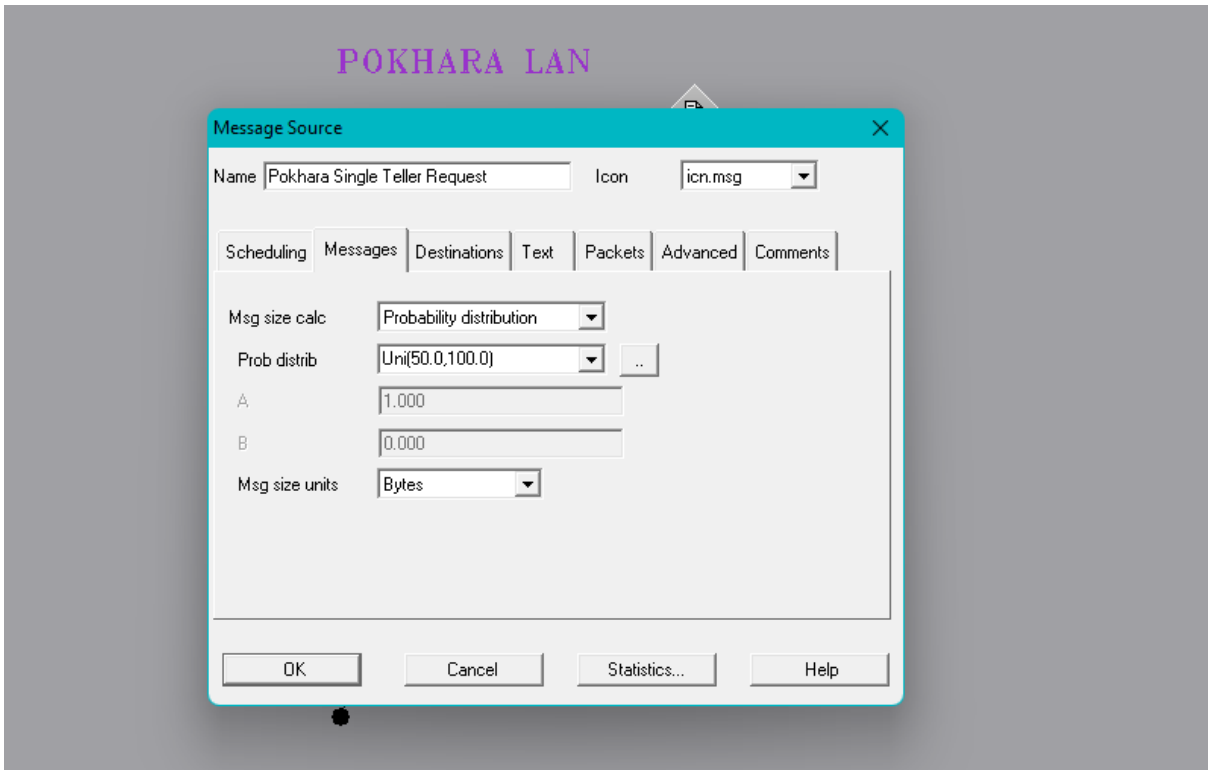


Figure 37.Pokhara Single Teller Request-2

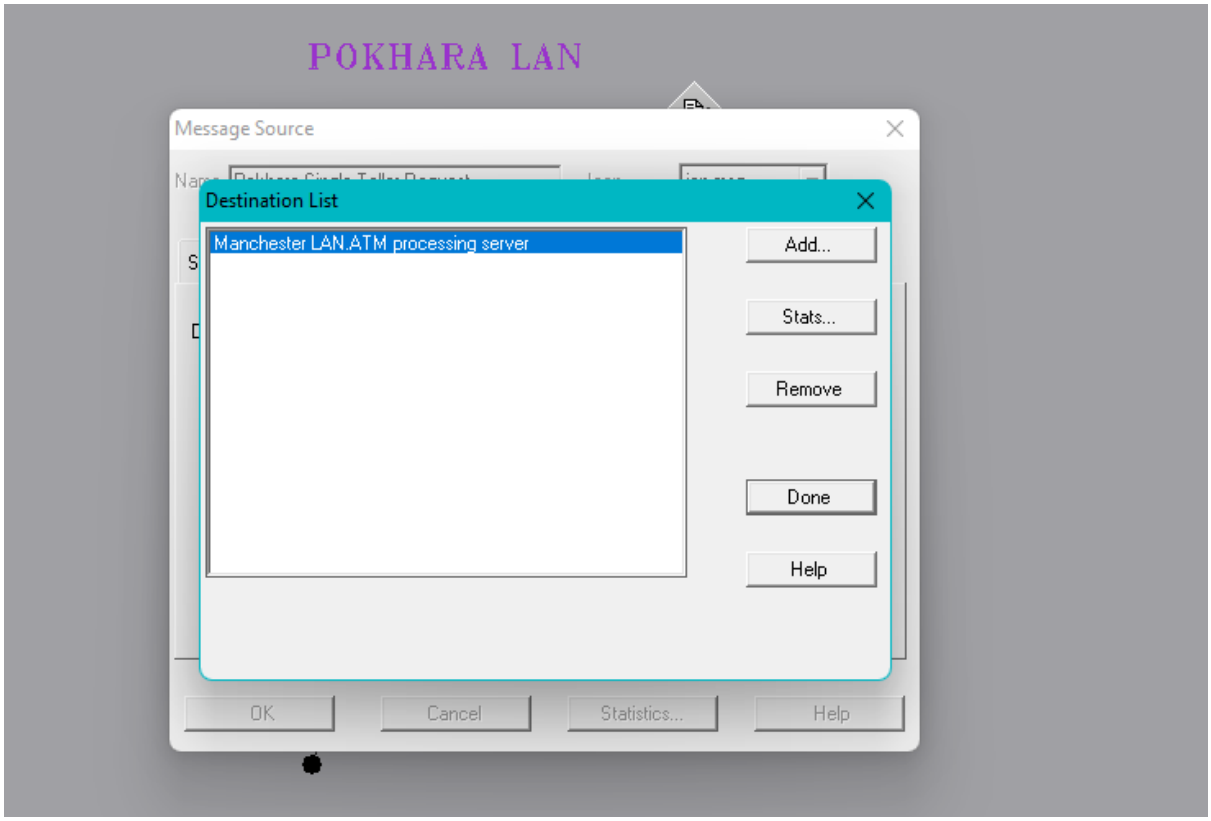


Figure 38.Pokhara Single Teller Request-3

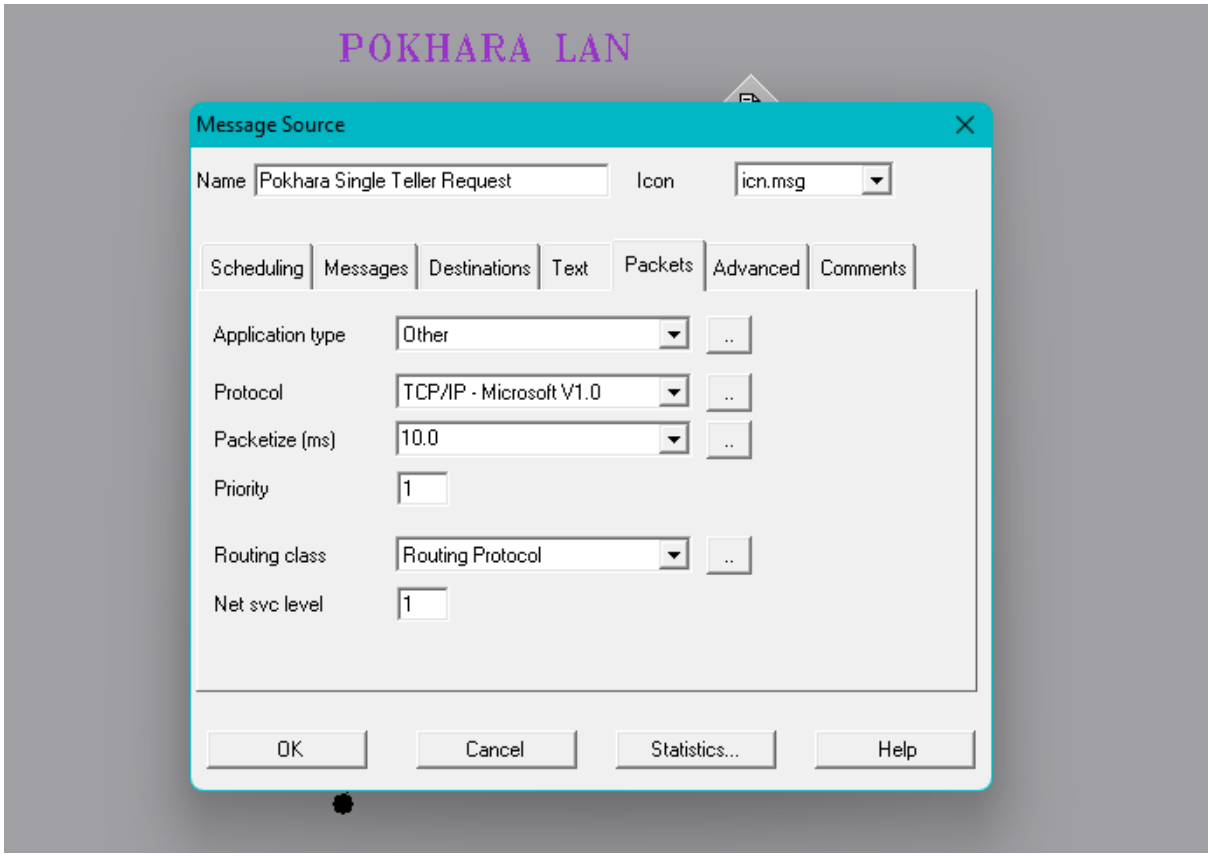


Figure 39.Pokhara Single Teller Request-4

In both LANs, there consist of two message sources named as Kathmandu message Source and Kathmandu Single Teller Request for Kathmandu LAN and message source in Pokhara LAN are named as Pokhara Message Source and Pokhara Single Teller Request.

Moreover, both the Kathmandu and Pokhara message source has an interval time with exponential distribution of 0.5 alongside stream 3 and the size of authorization request can be depicting by a uniform distribution size set to disperse over the range of 60 to 100 bytes with stream 3. Along with this, Manchester LAN, ATM Processing Server is added in the destination list of these message source. Likewise, TCP/IP Microsoft V1.0 protocol with 10ms Packetize time is use.

Furthermore, both the Kathmandu Single Teller Request and Pokhara Single Teller Request has an interval time with an exponential distribution with 15 mean approximately and the size of authorization request can be described by a uniform distribution size is set to disperse over the range of 50 to 100 bytes. In these message source, Manchester LAN, ATM Processing Server is added in the destination list. Lastly, TCP/IP Microsoft V1.0 protocol with 10 Ms Packetize time is use.

1.3. DESCRIPTION OF REPORTS

1.3.1. NODE REPORT: RECEIVED MESSAGE COUNT

Table 1. Node Report: Received Message Count

RECEIVER	MESSAGE NAME	COUNT
Manchester LAN.ATM pro	Kathmandu Message Source	113
Manchester LAN.ATM pro	Pokhara Message Source	110

The above table shows that Manchester Processing node(server) received 113 messages from Kathmandu message source and 110 messages from Pokhara message source.

The Receiver (Message Name) Vs Count graph is shown below:

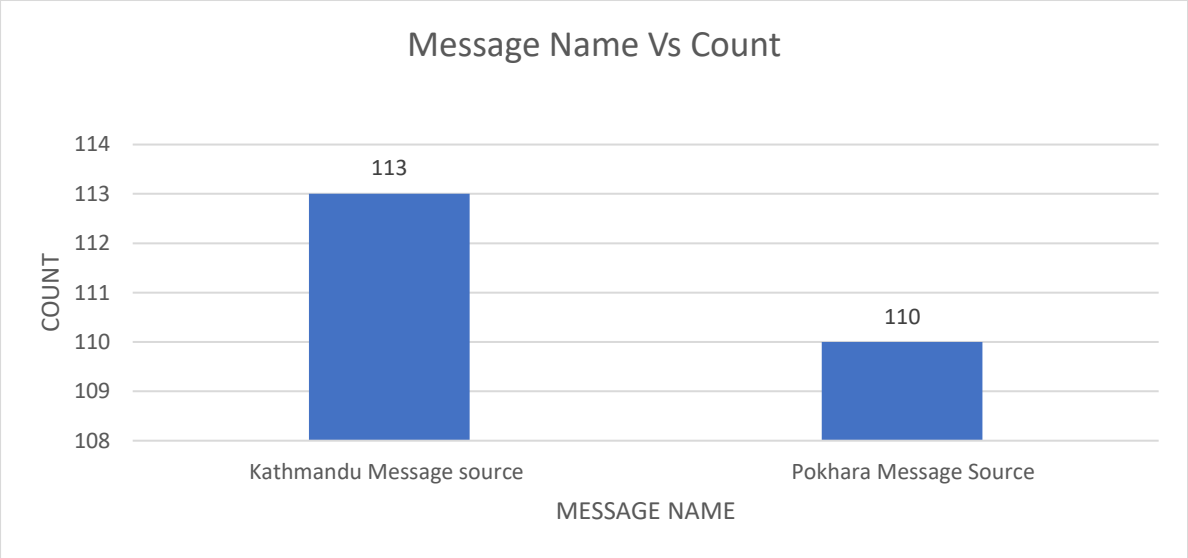


Figure 40. Graph: Receiver (Message Name) Vs Count

From this graph we can know that the received message count of Kathmandu Message Source is higher than that of Pokhara Message Source.

1.3.2. LINK REPORT: CHANNEL UTILIZATION

Table 2. Link Report: Channel Utilization

LINK	FRAMES		TRANSMISSION DELAY (MS)			%
	DELIVERED	RST/ERR	AVERAGE	STD DEV	MAXIMUM	UTIL
Nepal Kathmandu LAN.To	11966	0	0.036	0.012	0.082	0.3549
Nepal Pokhara LAN.Toke	11989	0	0.036	0.012	0.082	0.3562
Manchester LAN.Etherne	4860	0	0.065	0.013	0.136	0.2447

The above report shows that the Nepal Pokhara LAN has the most raised utilization rate whereas the Manchester LAN has the lowest which gives the idea that it is not used utterly.

The Link Vs %Utilization graph is shown below:

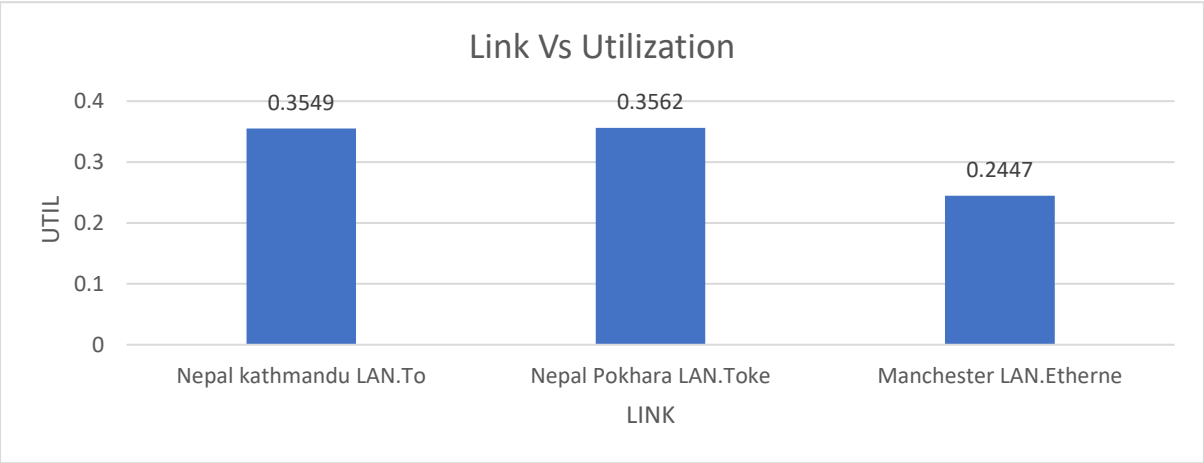


Figure 40.Graph: Link Vs %Utilization

From this graph we can know that the %utilization in Nepal Kathmandu LAN is higher than that of Nepal Pokhara LAN and Manchester LAN.

1.3.3.WAN CLOUDS REPORT: FRAME DELAY, FRAME COUNT, ACCESS LINK STAT

1.3.3.1.WAN CLOUD: FRAME DELAY BY VC

Table 3. WAN Cloud Report: Frame Delay By VC

CLOUD:	**FRAME DELAY (MS)**			**BURST SIZE (kb)**	
VC	**AVG**	**STD**	**MAX**	**AVG**	**MAX**
WAN Cloud					
Manchester-Kathmandu	97	0	97	2	5
Kathmandu- Manchester	60159	17306	90032	5	10
Manchester-Pokhara	97	0	97	2	5
Pokhara-Manchester	60157	17334	90089	5	11

The above table shows that Kathmandu-Manchester has higher average frame delay and standard deviation in comparison to Manchester-Kathmandu, Manchester-Pokhara and Pokhara-Manchester likewise Pokhara-Manchester has the maximum frame delay. Similarly, Kathmandu- Manchester and Pokhara-Manchester, both has highest average burst size. Moreover, Pokhara- Manchester has the higher maximum burst size than other.

The graph of Cloud: VC Vs Frame Delay Average is shown below:

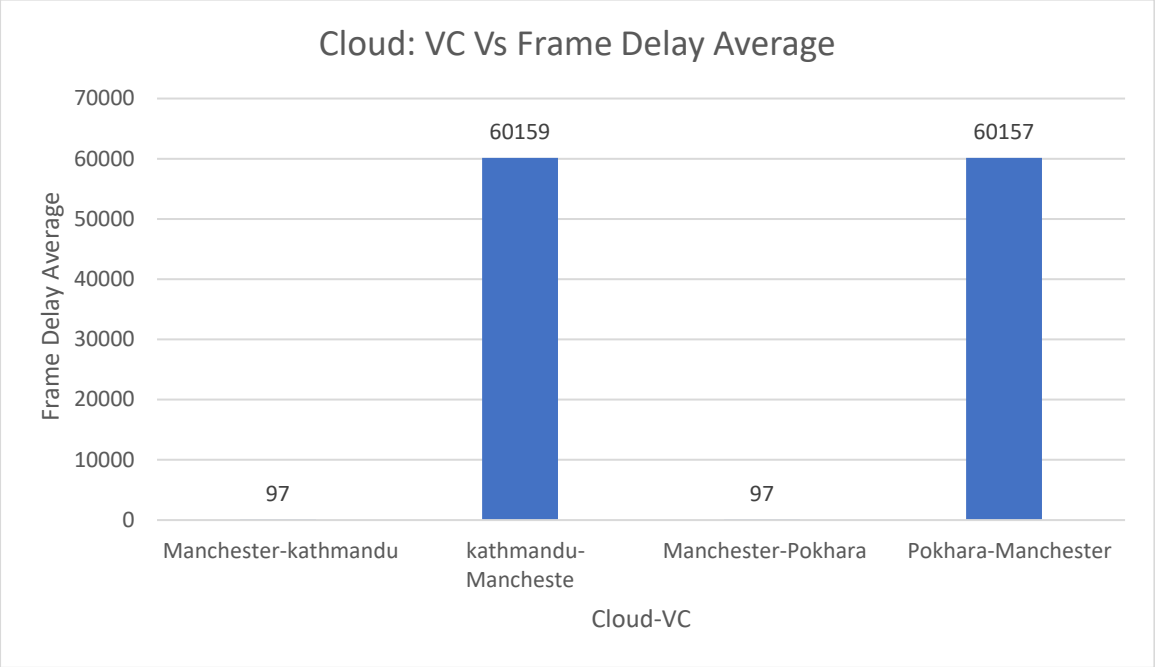


Figure 41. Graph: Cloud: VC Vs Frame Delay Average

From this graph we can know that the average frame delay is more in Kathmandu-Manchester virtual circuit in comparison to others.

The graph of Cloud: VC Vs Burst Size Average is shown below:

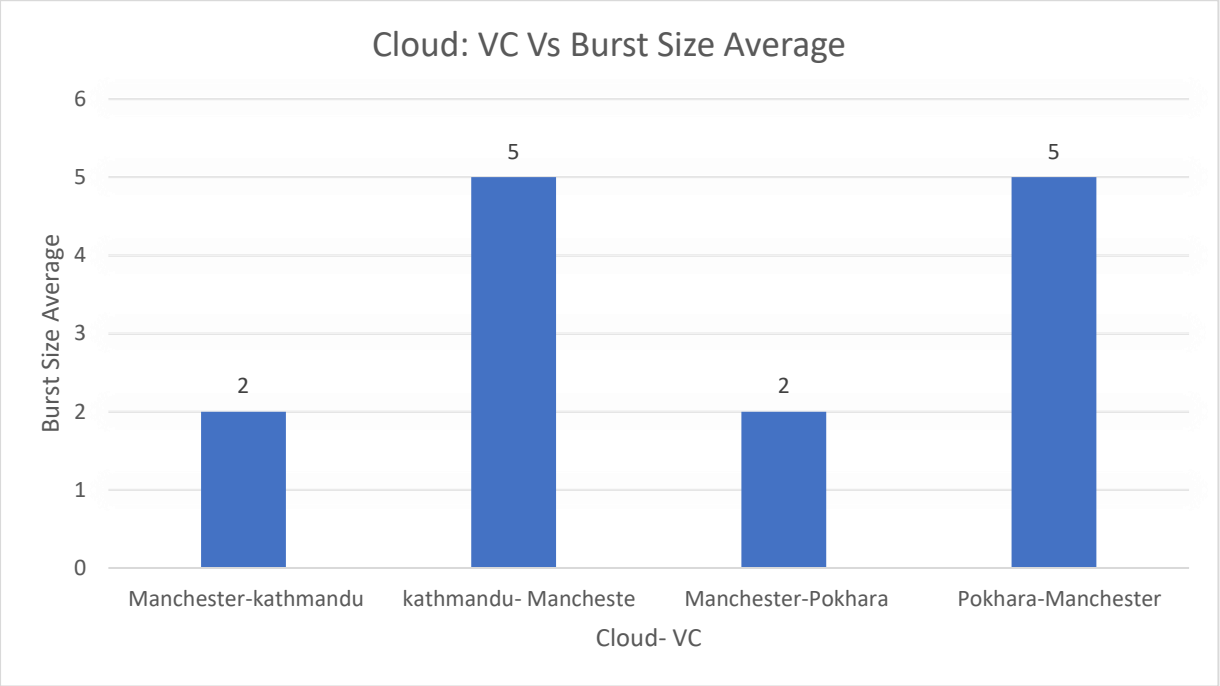


Figure 42. Graph: Cloud: VC Vs Burst Size Average

From this graph we can see that the Kathmandu-Manchester and Pokhara-Manchester has the same burst size average which is the highest among the remaining two virtual circuits (Manchester-Kathmandu and Manchester – Pokhara).

1.3.3.2.WAN CLOUD: FRAME COUNT BY VC

Table 4. WAN Cloud Report: Frame Count By VC

CLOUD:	**FRAMES/KILOBITES**			
VC: FRAMES	**ACCEPTED**		**DROPPED**	
KILOBITES	**NORMAL**	**DE**	**NORMAL**	**DE**
WAN Model			**TOTAL KILOBITS TRANSMITTED = 1696**	
Manchester- Kathm Frm	1212	0	0	0
Kb	388	0	0	0
Kathmandu-Manch Frm	1213	0	0	0
Kb	460	0	0	0
Manchester- Pokha Frm	1217	0	0	0
Kb	389	0	0	0
Pokhara-Manchest Frm	1217	0	0	0
Kb	458	0	0	0

The above report shows that the Manchester – Pokhara Fm and Pokhara - Manchester Frm has a similar frame accepted which is the highest compared to others. Likewise, Kilobits accepted is higher in Kathmandu – Manchester Frm in comparison to other three virtual circuit.

The graphs of Cloud: VC Vs Frame Accepted Vs Kilobits Accepted is shows below:

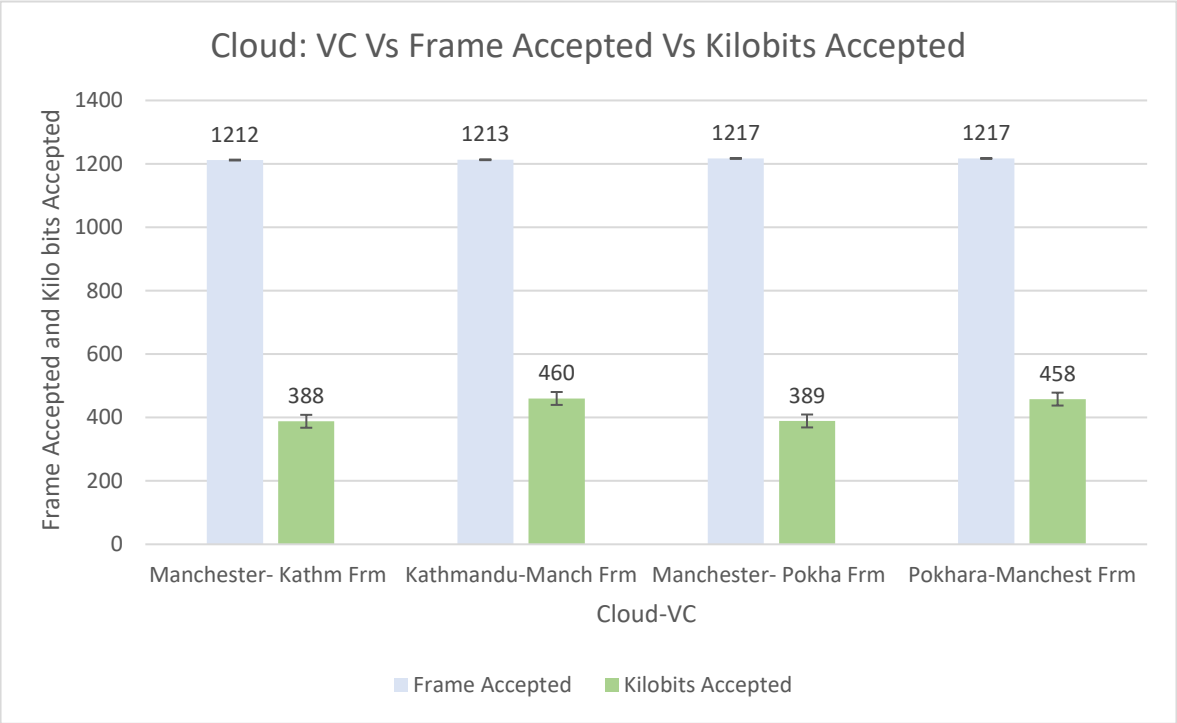


Figure 43. Graph: Cloud: VC Vs Frame Accepted Vs Kilobits Accepted

From this graph we can know that the both the Manchester-Pokhara Frm and Pokhara-Manchester Frm has the same Frame accepted which is the highest among the other two virtual circuit. Likewise, Kilobits accepted is higher in Kathmandu-Manchester Frm respectively.

1.3.3.3.WAN Cloud: Access Link Stats

Table 5. Access Link Stats

CLOUD	**FRAMES**		**BUFFER (BYTES)**			**% UTIL**
ACCESS LINK (ENTRY)	**ACCEPTED**	**DROPPED**	**MAX**	**AVG**	**STD**	
(EXIT)						
WAN Cloud						
Kathmandu access Entry	2417	0	N/A	N/A	N/A	100
Exit	1212	0	40	18	20	43.76
Manchester Access Entry	2429	0	N/A	N/A	N/A	87.74
Exit	4841	0	172587	114915	33254	100
Pokhara Access Entry	2425	0	N/A	N/A	N/A	100
Exit	1217	0	40	18	20	43.95

The above table shows that the frame accepted entry and frames accepted exit both are higher in Manchester Access Entry in comparison to others two.

The graph of Cloud Access Link Vs Frame Accepted Entry Vs Frame Accepted Exit is show below:

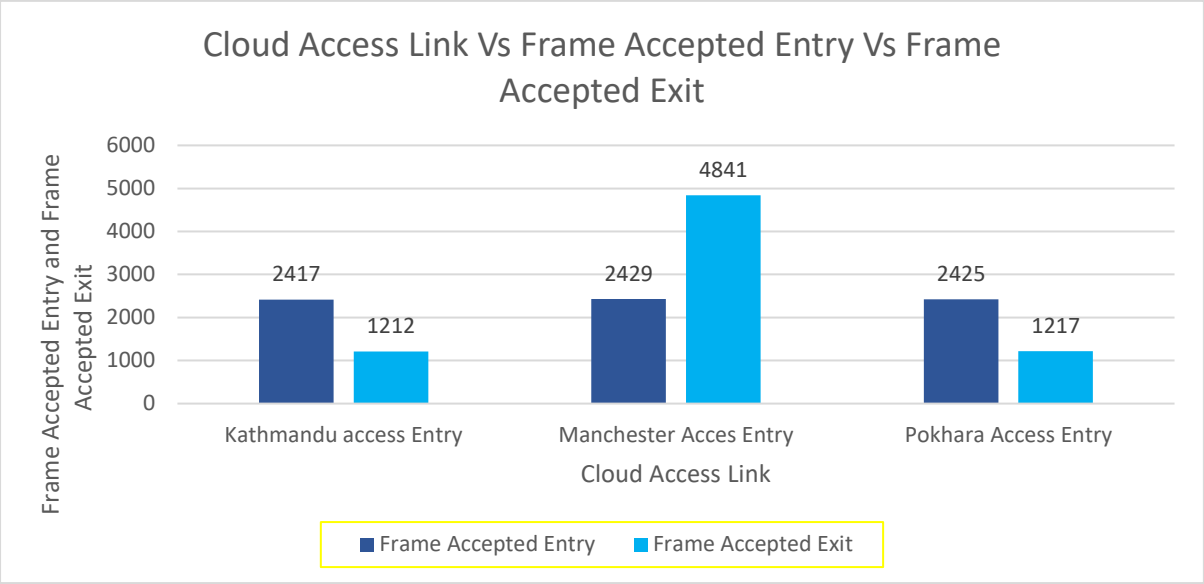


Figure 44. Graph: Cloud Access Link Vs Frame Accepted Entry Vs Frame Accepted Exit

From this graph we can know that frame accepted entry is higher in Manchester Access Entry compared to other in the same way, the frame accepted exit is also higher in Manchester Access Entry.

1.3.4. MESSAGE + RESPONSE SOURCE: MESSAGE DELAY FOR ALL NODES

Table 6. Message and Response Source: Message Delay for All Nodes

ORIGIN/ MSG SRC NAME:	MESSAGES ASSEMBLE	MESSAGE DELAY		
DESTINATION LIST		AVERAGE	STD DEV	MAXIMUM
Nepal kathmandu LAN.Kathmandu ATM 1 -40 / src Kathmandu Message Source: Manchester LAN.ATM p	17	117.20039 S	36140.339 MS	177.90295 S
Nepal Kathmandu LAN.Single Teller / src Kathmandu Single Teller Request: Manchester LAN.ATM p	0	0.000 MS	0.000MS	0.000 MS
Nepal Pokhara LAN.Single Teller / src Pokhara Single Teller Request: Manchester LAN.ATM p	0	0.000 MS	0.000 MS	0.000 MS
Nepal Pokhara LAN.Pokhara ATM 1-40 / src Pokhara Message Source: Manchester LAN. ATM p	17	118.51851 S	35018.643 MS	177.49400 S
Manchester LAN.ATM processing server/ src Manchester Server Resp Source: ECHO	0	0.000 MS	0.000 MS	0.000 MS

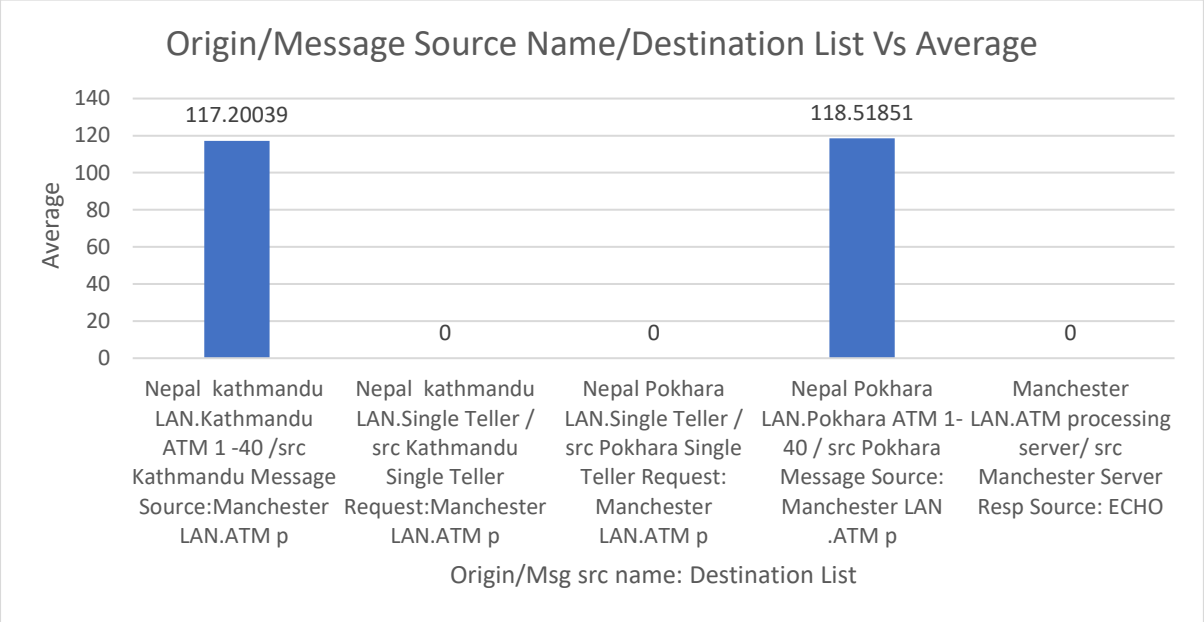


Figure 45.Graph.Origin/Message Source Name/Destination List Vs Average

From this graph we can see that Pokhara ATM 1-40 has the highest average message delay.

1.4. CONCLUSION

Thusly, the given report depicting the model and result that came after the absolute simulation has been portrayed in a brief way. The given scenario in the question assisted me with finding out with regards to the LAN and WAN and how the devices in such networks work in an extremely huge manner. Furthermore, the outcomes that came after the simulation of the module are introduces in the tabular form and represent in short. For the most part, this overall report had an effect on me in the improvement of my investigation and documentation capacities.

2. TASK B

2.1. INTRODUCTION

Figure 46.Internet

Can we be able to recall when we were unable to tweet, post, email, blog, snap, or like somebody on the web? Many individuals today have grown up having the option to do these things. In any case, in the past no part of this was conceivable. What makes this conceivable today is the thing that we call the Internet.

As indicated by techopedia, the internet is a globally connected network system facilitating worldwide communication and access to data resources through a vast collection of private, public, business, academic and government networks. It is governed by agencies like the Internet Assigned Numbers Authority (or IANA) that establish universal protocols. (Anon., 2021).

The Internet gives a limit so amazing and general that it might be used for essentially any reason that depends upon information, and it is available by every individual who interfaces with one of its constituent organizations. It maintains human correspondence through online media, electronic mail (email), newsgroups, and sound and video transmission and permits individuals to work agreeably at a wide scope of region. It upholds admittance to advanced data by numerous applications, including the World Wide Web. So fundamentally, the terms internet and World Wide Web are regularly utilized reciprocally, yet they are not the very same thing, the internet alludes to the worldwide correspondence structure, including equipment and establishment, while the web is one of the organizations passed on over the web.

2.1. AIMS AND OBJECTIVES

The aim of task B is to compose a report on the given theme ‘Internet’ which incorporates various topics. In like manner, the principle point of this report is to give detail date concerning about how and when the internet began, how it commercially extended and the upsides and downsides of internet individually.

The objectives of this report are:

- Acquiring information on the given topic.
- Research and data gathering.
- Neutral presentation of facts.

2.2. BACKGROUND

2.1.1. INTERNET

2.1.1.1. HISTORY

The coming of the internet is vigorously impacting most customary specialized techniques like papers, phones, TV, and so on They are bringing about new administrations, for example, internet telephone and internet television. The trading of data has been sped up dramatically and considerably and has prompted an improvement of the norm of life for some individuals across the globe.

The Internet started during the 1960s as a way for government experts to share information. Computers during the '60s were tremendous and stable and to use information put away in any one PC, one expected to one or the other head out to the site of the PC or have engaging PC tapes sent through the customary postal system. January 1, 1983 is seen as the power birthday of the Internet. Before this, the diverse PC networks didn't have a standard strategy for talking with each other. One more exchange show was set up called Transfer Control Protocol/Internetwork Protocol (TCP/IP). This allowed different kinds of PCs on different associations to "talk" to each other. ARPANET and the defence Data Network legitimately changed to the TCP/IP standard on January 1, 1983, hence the presentation of the Internet. All that associations could now be related by a comprehensive language. The picture related to history of internet is shown below:

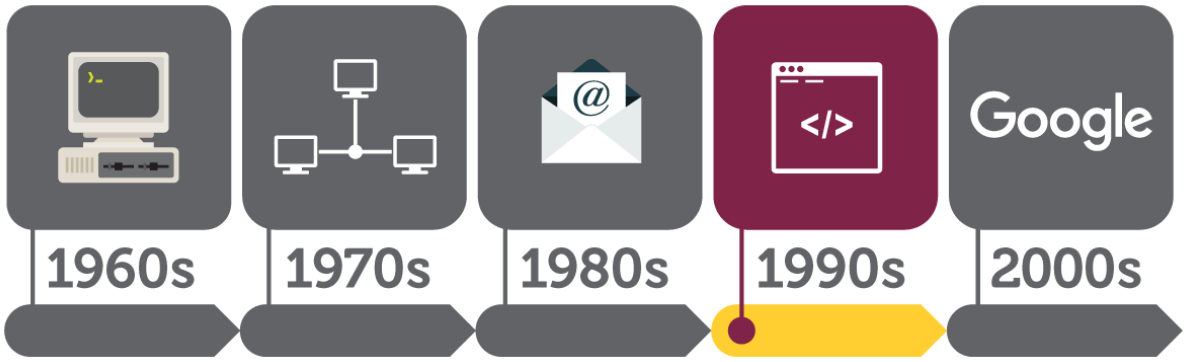


Figure 47. History of Internet

2.1.1.2. COMMERCIAL EXPANSION

The rise of commercial Internet services and applications helped to fuel a rapid commercialization of the Internet. This phenomenon was the result of several other factors as well. One important factor was the introduction of the personal computer and the workstation in the early 1980s—a development that in turn was fuelled by unprecedented progress in integrated circuit technology and an attendant rapid decline in computer prices. Another factor, which took on increasing importance, was the emergence of Ethernet and other “local area networks” to link personal computers. But other forces were at work too. Following the restructuring of AT&T in 1984, NSF took advantage of various new options for national-level digital backbone services for the NSFNET. In 1988 the Corporation for National Research Initiatives received approval to conduct an experiment linking a commercial e-mail service (MCI Mail) to the Internet. This application was the first Internet connection to a commercial provider that was not also part of the research community. Approval quickly followed to allow other e-mail providers access, and the Internet began its first explosion in traffic.

In 1993 federal legislation allowed NSF to open the NSFNET backbone to commercial users. Prior to that time, use of the backbone was subject to an “acceptable use” policy, established and administered by NSF, under which commercial use was limited to those applications that served the research community. NSF recognized that commercially supplied network services, now that they were available, would

ultimately be far less expensive than continued funding of special-purpose network services. (Anon., 2021)

(continue reading…)

2.1.1.3. ADVANTAGES AND DISADVANTAGES

These days, the most remarkable medium on the earth is the internet, and there is no question it has made our life more invaluable and more straightforward. This is down to it being the greatest mode of correspondence, advancing, and information source, which are essential to basically all aspects of our work nowadays. Regardless, despite how extraordinary as the web might be, it in like manner goes with its shortcomings as well.

To introduce the two advantages and disadvantages of the internet, a portion of the likely benefits of internet are:

i. Communication, Connectivity, and sharing

One of the top advantages of the internet is communication. Internet innovation has permitted individuals and business to talk with their buddies and client even more profitably. Various types of communication, for instance, VOIP and talk has empowered us to send any data immediately to anybody on the planet. With the web, we can interface with each other from various corner of the world where we can share typical interest and talk in regard to what we appreciate. Besides, we can impart out thoughts or perspective to anybody by settling on an online video call through applications like skype, WhatsApp, line and so forth.

ii. Learning, knowledge, and Information

One more great advantage of the internet is plentiful information and knowledge. The internet permits individuals to learn information about any point and offers a response to an inquiry, as it contains interminable information and knowledge. With the internet, we are one stage away from getting practically any sort of data we might require for personal use or business. Utilizing web index like Mozilla Firefox, Google Chrome, and that's just the beginning, they all permit users to pose any inquiry and observe a website page with a reply regarding that inquiry. Additionally, we can online courses in various subjects.

iii. Boundless Education

These days, a great many people figure out how to do things utilizing the internet inside a couple of moments, hours, days, or months. For instance, we can sort out how to be a computer programmer without going to class however essentially through web information. Besides, most college and school concentrate on utilizing web materials like distributed, research papers, and that's only the tip of the iceberg.

iv. Entertainment

The other renowned justification for why individuals serve the internet is entertainment. The diverse media outlet has become fruitful because of web technology. The internet furnishes us with a wide scope of amusement we will at any point consider. It tends to play or downloading games, riding YouTube or big-name locales, or getting the ball really rolling with our latest Netflix series. It does not have any effect what it is we are looking for; the internet got us covered.

(continue reading….)

Individuals' insane love for the Internet might carry a lot of harm to their life. The Internet's downsides can't be neglected any more as such countless youngsters are experiencing Internet Addiction Disorder, thus numerous ladies have become online shopaholics. Some of the disadvantages of internet are:

i. Cyber Crime

In this days and age, Cybercrime is one of the quickest developing crimes across the world and can affect both individuals and businesses. Cybercrime can affect people in various ways, and by and most cases casualties will feel stressed and frightened by what has occurred. Moreover, Geeks can make viruses that can get into our personal computer and ruin our significant data. Likewise, anybody can be a victim of cybercrime it can be a youngster who feels they are being tormented or harassed online or an older person or business who has been scammed out of cash or significant data.

ii. Addiction

Internet addiction disorder is likewise one of the drawbacks of Internet. People these days who make excessive use of the internet affect their lives adversely causing a serious level of reliance and habit. Nonetheless, internet addiction does not only affect physical wellness yet in mental well-being as well.

iii. Waste of time

Internet in a sense is a massive waste of time. In many regards, it has made life quicker and more straightforward, yet it has brought difficulties and side effects also. Similarly, it may have made many tasks simpler, however it has expanded distractions and shepherded in more ways to stall. We have likely

seen that while we can get many things done faster than ever, we invest a great deal of time doing nothing of worth.

iv. Family Communication Worsen

The internet contrarily affects the family since there is less correspondence among its members because of the unreasonable utilization of the device that incorporate it.

(continue reading….)

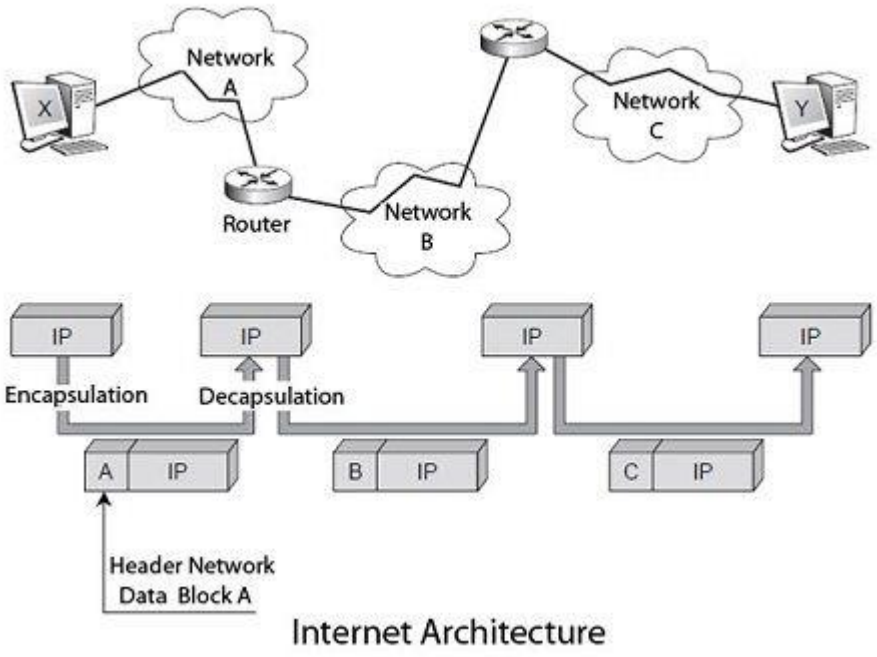
2.1.2. INTERNET ARCHITECTURE

The internet architecture depends on a straightforward thought, it is simply a continually changing collection of thousands of people networks intercommunicating with a common protocol. This architecture is situated in the actual determination of the standard TCP/IP protocol, designed to interface any two networks which might be altogether different in internal hardware, software, and technical design. Furthermore, when two networks are interconnected, communication with TCP/IP is enabled from start to finish, so that any node on the Internet has the close to magical capacity to communicate with some other regardless of where they are. This transparency of design has enabled the Internet architecture to develop to a worldwide scale.

In practice, the Internet technical architecture looks a bit like a multi-dimensional river system, with small tributaries feeding medium-sized streams feeding large rivers. For example, an individual's access to the Internet is often from home over a modem to a local Internet service provider who connects to a regional network connected to a national network. At the office, a desktop computer might be connected to a local area network with a company connection to a corporate Intranet connected to several national Internet service providers. In general, small local Internet service providers connect to medium-sized regional networks which connect to large national networks,

which then connect to very large bandwidth networks on the Internet backbone. Most Internet service providers have several redundant network cross-connections to other providers in order to ensure continuous availability. (B.Carpenter, 1996)

(continue reading….)



Internet Architecture

(Thakur, n.d.)

2.1.3. PRIVACY AND THE INTERNET

The reality of the situation is that the internet privacy has reliably has an effect, whether it's 2010 or 2020. The main contrast between the decade is that online threats and data breaches have heightened multiple times. That is anything but a decent number nor an exceptional chance to head online without any security measures. Additionally, Internet privacy is turning into a developing concern these days for people of all ages.

Internet privacy, also commonly referred to as online privacy, is a subset of data privacy and a fundamental human right. Basically, it refers to the personal privacy that you're entitled to when you display, store, or provide information regarding yourself on the Internet. This can include both personally and identifying information (PII) and non-personally and identifying information, such as the individual behaviour on a website. Without Internet privacy, all the activities are subject to being collected and analysed by interested parties. (Shahid, 2021)

Some of the internet behaviours that impact our privacy are mentioned below:

i. Using similar credentials for multiple account.
ii. Using services without reading their Terms and Conditions.
iii. Opening suspicious attachments and downloading malicious files.
iv. Staying logged into websites.

Likewise, here are some of the measures on how to protect our privacy and security online:

i. Install an anti-virus program and activate firm wall.
ii. Keeping software up to date.
iii. Use a Virtual Private Network (VPN).
iv. Secure web browser.
v. Delete cookies at browser exit.
vi. Use HTTPS to secure online connection.
vii. Share online files securely.

(continue reading…)

2.3. CONCLUSION (PAST, PRESENT, AND FUTURE DIRECTION OF INTERNET)

In conclusion, we tend to not contemplate the internet in our everyday lives in a way we simply use it. It's normally not until we are disengaged from the advanced world that we understand how dependent we genuinely are to our internet enabled devices. Moreover, the development of the internet significantly affects we all, it likewise changed the manner in which we connect with each other or how we find and share information, and generally how we carry on with our everyday lives.

The adoption of internet has extended at an incredibly quick rate over the span of the latest twenty years. Similarly, research studies have shown that in 2017 practically all grownups in most of the country like United States, Canada, London, Japan will have some sort of interaction with the internet. This is very intriguing since, assuming that we take a look at the internet market penetration in the year 2000, just 52% of grownups in the United States were using the Internet. By the year 2008, that number has developed to 75%. Furthermore, starting at 2016, almost 90% of all grownups were consistently using the internet.

(continue reading….)

In our everyday lives, we never ponder that we are so dependent to the internet however the fact of the matter is, for the majority of us we would not have the option to endure a single day without touching the internet in some limit. For instance, let's consider some of our everyday activities. A large portion of us rely upon the internet for business related activities, for example, browsing our email, utilizing skype/messenger/WhatsApp to speak with each other, screensharing through WebEx, and keeping up with deals leads on Salesforce. We likewise utilize the internet during our recreation time to: watch videos on YouTube and Netflix, connect with friends via internet-based social media through Facebook, Twitter and Instagram, video visit on FaceTime, and shop online. Moreover, we utilize the internet to research and assemble data on Google and utilize online courses to acquire information. This rundown is a long way from exhaustive, yet it becomes clear that internet is a lot of a piece of our regular daily existences.

Hence, The Internet has in a general sense changes regular daily existence in the general public. It has improved ways to connect with loved ones, disrupted the way we continue with work and overhauled pretty much everything in middle. Yet, the Internet and the World Wide Web are still somewhat youthful, it still has a great deal of growing up to do.

(continue reading……)

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[Accessed 08 12 2021].

4.APPENDIX

4.1. APPENDIX – A (Glossary)

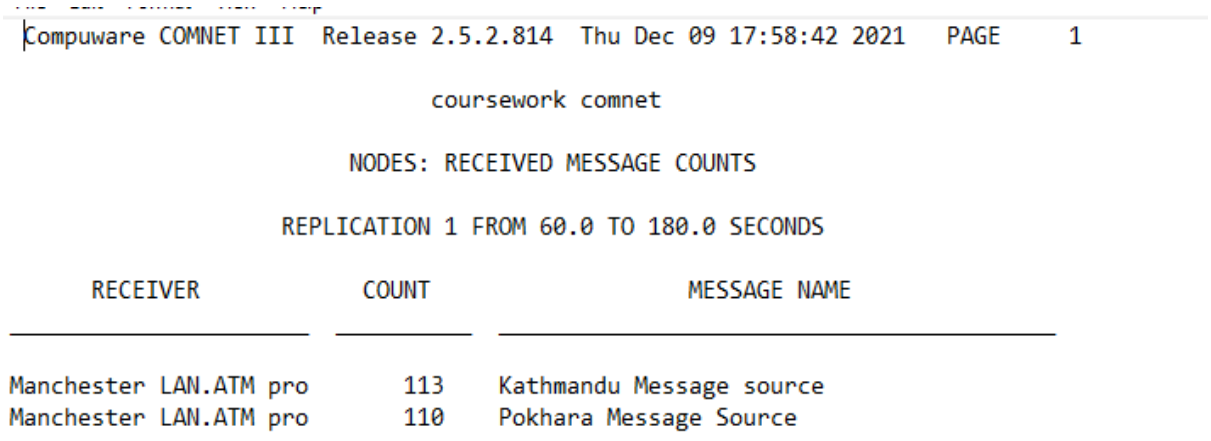
This is a glossary section where difficult word is mentioned along with their meanings. They are:

- Unprecedented: never done or known below.
- Contemplate: think about.
- Mishmash: confusion.
- Shepherded: guide or direct in a particular direction.

Since, there were no such troublesome words, so Appendix B is quite brief.

4.2. APPENDIX – B

Screenshots of report generated are given below:



```
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                        NODES: RECEIVED MESSAGE COUNTS

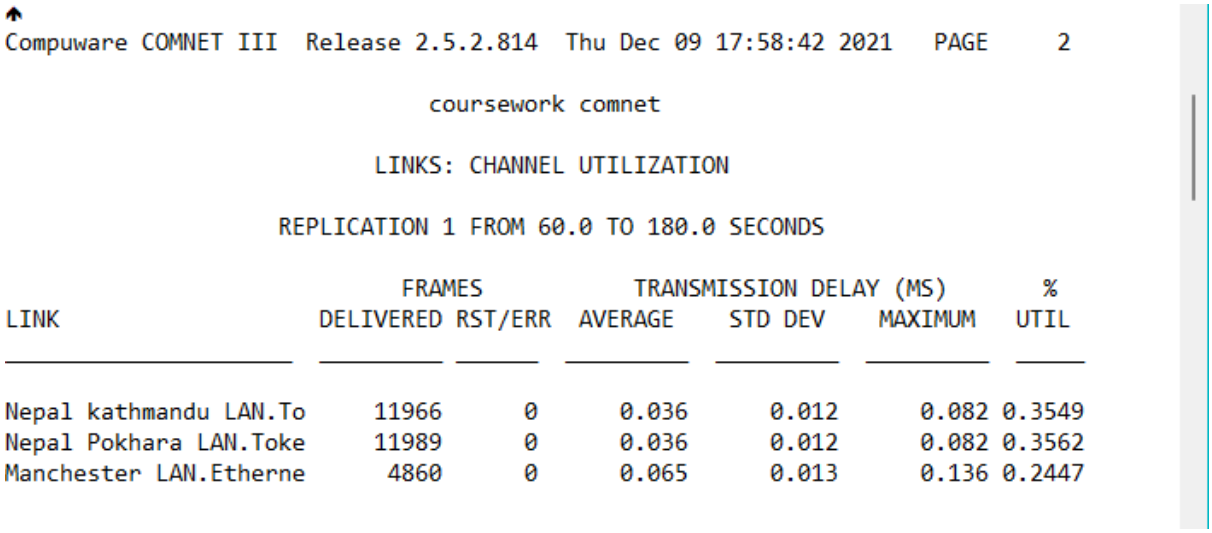
                    REPLICATION 1 FROM 60.0 TO 180.0 SECONDS

      RECEIVER              COUNT                  MESSAGE NAME
_____________________  __________  ____________________________________________

Manchester LAN.ATM pro        113    Kathmandu Message source
Manchester LAN.ATM pro        110    Pokhara Message Source
```

Figure 48. Nodes: Received Message Counts

The above screenshots from the simulation report shows that the total number of messages are received by two receivers. The Manchester LAN. ATM processing server (Kathmandu Message Source) received 113 messages and Manchester LAN. ATM processing server (Pokhara Message Source) received 110 messages.



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                          LINKS: CHANNEL UTILIZATION

                    REPLICATION 1 FROM 60.0 TO 180.0 SECONDS

                          FRAMES          TRANSMISSION DELAY (MS)       %
LINK                   DELIVERED RST/ERR  AVERAGE    STD DEV    MAXIMUM   UTIL
_____________________  _________ ______  _________  _________  _________  _____

Nepal kathmandu LAN.To     11966      0      0.036      0.012      0.082 0.3549
Nepal Pokhara LAN.Toke     11989      0      0.036      0.012      0.082 0.3562
Manchester LAN.Etherne      4860      0      0.065      0.013      0.136 0.2447
```

Figure 49. Links: Channel Utilization

The above screenshot from the simulation report shows the channel utilization in percentage (%) of different links that is token ring, and the frame delay and transmission delay are displayed in terms of millisecond (ms). Additionally, the % UTIL in Nepal Pokhara LAN with 0.3562 was the highest among the others.

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WAN CLOUDS: FRAME DELAY BY VC

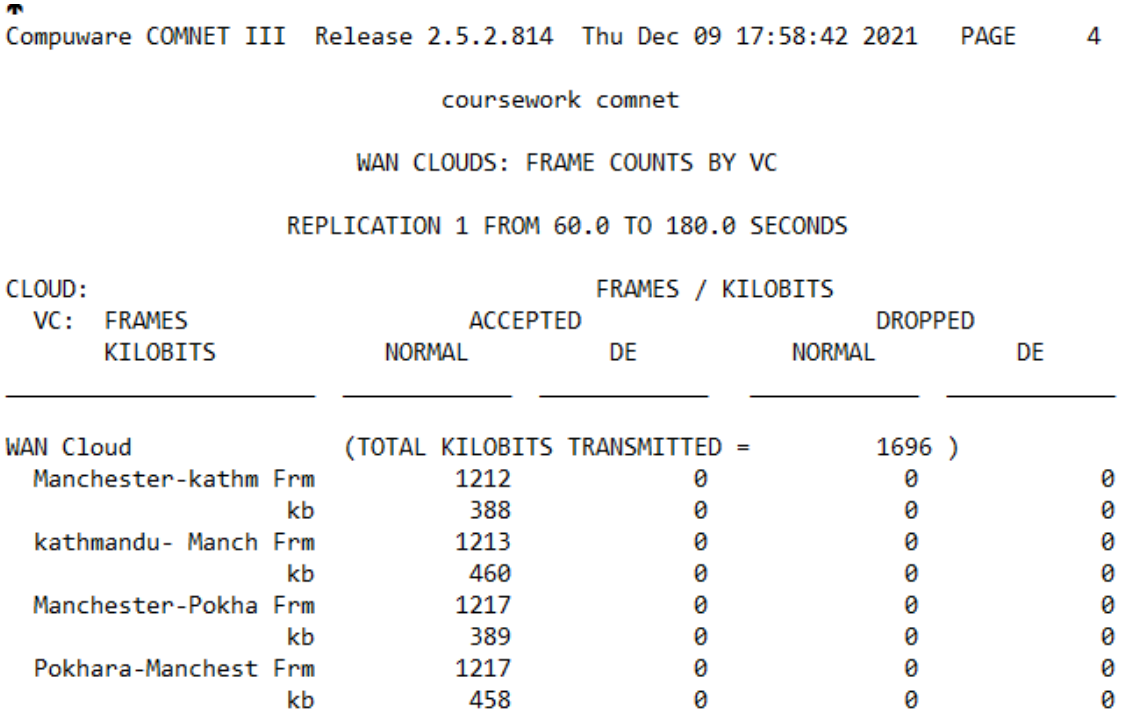
REPLICATION 1 FROM 60.0 TO 180.0 SECONDS

CLOUD: VC	FRAME DELAY (MS) AVG	STD	MAX	BURST SIZE (kb) AVG	MAX
WAN Cloud					
Manchester-kathmandu	97	0	97	2	5
kathmandu- Mancheste	60159	17306	90032	5	10
Manchester-Pokhara	97	0	97	2	5
Pokhara-Manchester	60157	17334	90089	5	11

Figure 50. WAN Clouds: Frame Delay By VC

The above screenshot from the simulation report shows that the virtual circuit and their average frame delay are in terms of millisecond (ms) whereas the average and max burst size are in terms of kilo bite (kb). The Kathmandu – Manchester had the highest average frame delay with approximately 60159 and Manchester-Kathmandu and Manchester-Pokhara, both virtual circuits had the exact number of frame delay which is 97.

Moreover, Kathmandu – Manchester and Pokhara – Manchester, both virtual circuits had the same number of average burst size which is 5 and it is the highest among the rest.



```
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                          WAN CLOUDS: FRAME COUNTS BY VC

                     REPLICATION 1 FROM 60.0 TO 180.0 SECONDS

CLOUD:                                      FRAMES / KILOBITS
  VC:  FRAMES                    ACCEPTED                      DROPPED
       KILOBITS              NORMAL          DE           NORMAL          DE
_____________________  _____________  _____________  _____________  _____________

WAN Cloud                (TOTAL KILOBITS TRANSMITTED =         1696 )
  Manchester-kathm Frm           1212              0              0              0
                   kb             388              0              0              0
  kathmandu- Manch Frm           1213              0              0              0
                   kb             460              0              0              0
  Manchester-Pokha Frm           1217              0              0              0
                   kb             389              0              0              0
  Pokhara-Manchest Frm           1217              0              0              0
                   kb             458              0              0              0
```

Figure 51.WAN Clouds: Frame Count By VC

The above screenshots from the simulation report shows the virtual circuit and frame counts as Frames and kilobits. Manchester – Kathmandu virtual circuit had 1212 frames and 388 kilobits. Similarly, Kathmandu-Manchester virtual circuit had 1213 frame and 450 kilobits, Manchester – Pokhara virtual circuit has 1217 frames and 389 kilobit and Pokhara – Manchester virtual circuit had an approximately 1217 frames and 458 kilobits discretely.

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WAN CLOUDS: ACCESS LINK STATS

REPLICATION 1 FROM 60.0 TO 180.0 SECONDS

CLOUD: ACCESS LINK	(ENTRY) (EXIT)	FRAMES ACCEPTED	FRAMES DROPPED	BUFFER (BYTES) MAX	BUFFER (BYTES) AVG	BUFFER (BYTES) STD	% UTIL
WAN Cloud							
Kathmandu access	Entry	2417	0	N/A	N/A	N/A	100.00
	Exit	1212	0	40	18	20	43.76
Manchester Acces	Entry	2429	0	N/A	N/A	N/A	87.74
	Exit	4841	0	172587	114915	33254	100.00
Pokhara Access	Entry	2425	0	N/A	N/A	N/A	100.00
	Exit	1217	0	40	18	20	43.95

Figure 52. WAN Clouds: Access Link Stats

The above screenshot from the simulation report shows access link stats including entry and exit frames, frame accepted and dropped, buffer in bytes and util in percentage. Here, Manchester Access Entry had the highest entry and exit frames i.e., 2429 and 4841 respectively however Kathmandu Access Entry had the lowest entry and exit frame i.e., 2417 and 1212.

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                  MESSAGE + RESPONSE SOURCES: MESSAGE DELAY

                   REPLICATION 1 FROM 60.0 TO 180.0 SECONDS

ORIGIN / MSG SRC NAME:  MESSAGES                MESSAGE DELAY
  DESTINATION LIST      ASSEMBLED      AVERAGE       STD DEV       MAXIMUM
_____________________  _________  ____________  ____________  ____________

Nepal kathmandu LAN.Kathmandu ATM 1 - 40 / src Kathmandu Message source:
  Manchester LAN.ATM p         17   117.20039 S   36140.339 MS  177.90295 S
Nepal kathmandu LAN.Single Teller / src Kathmandu Single Teller Request:
  Manchester LAN.ATM p          0       0.000 MS      0.000 MS      0.000 MS
Nepal Pokhara LAN.Single Teller / src Pokhara Single Teller Request:
  Manchester LAN.ATM p          0       0.000 MS      0.000 MS      0.000 MS
Nepal Pokhara LAN.Pokhara ATM 1-40 / src Pokhara Message Source:
  Manchester LAN.ATM p         17   118.51851 S   35018.643 MS  177.49400 S
Manchester LAN.ATM processing server / src Manchester Server Resp Source:
  ECHO                          0       0.000 MS      0.000 MS      0.000 MS
```

Figure 53. Message Delay

The above screenshot from the simulation report shows the Message Delay which includes Origin/ Msg Src Name: Destination List, Message Assembled and Message Delay.

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                MESSAGE + RESPONSE SOURCES: MESSAGE DELIVERED

                   REPLICATION 1 FROM 60.0 TO 180.0 SECONDS

ORIGIN / MSG SRC NAME:  MESSAGES                MESSAGE DELAY
  DESTINATION LIST      ASSEMBLED      AVERAGE       STD DEV       MAXIMUM
_____________________  _________  ____________  ____________  ____________

Nepal kathmandu LAN.Kathmandu ATM 1 - 40 / src Kathmandu Message source:
  Manchester LAN.ATM p        113   117.40456 S   34524.072 MS  177.81935 S
Nepal kathmandu LAN.Single Teller / src Kathmandu Single Teller Request:
  Manchester LAN.ATM p          0       0.000 MS      0.000 MS      0.000 MS
Nepal Pokhara LAN.Single Teller / src Pokhara Single Teller Request:
  Manchester LAN.ATM p          0       0.000 MS      0.000 MS      0.000 MS
Nepal Pokhara LAN.Pokhara ATM 1-40 / src Pokhara Message Source:
  Manchester LAN.ATM p        110   117.81080 S   34127.375 MS  177.88275 S
Manchester LAN.ATM processing server / src Manchester Server Resp Source:
  ECHO                          0       0.000 MS      0.000 MS      0.000 MS
```

Figure 54. Message Delivered

The above screenshot from the simulation report shows the Message Delivered which includes Origin/ Msg Src Name: Destination List, Message Assembled and Message Delay.

4.3. APPENDIX- C

4.3.1. APPENDIX – C (COMMERCIAL EXPANSION (cont...))

Since the word limit was 2500 for task B, a portion of the extra content were missed out. In task B, we examined about the Internet. So, there is a commercial expansion of internet that we passed up.

By the last piece of the 1990s there were approximately 10,000 Internet expert associations (ISPs) all around the planet, the larger part arranged in the United States. Nevertheless, by far most of these ISPs offered just neighbourhood help and relied upon permission to common and public ISPs for more broad accessibility. Mix headed toward the decade's end, with various little to medium-size providers mixing or being acquired by greater ISPs. Among these greater providers were social events like America Online, Inc. (AOL), what started as a dial up information organization with no Internet accessibility aside from rolled out an improvement in the last piece of the 1990s to transform into the principal provider of Internet organizations in the world—with more than 25 million allies by 2000 and with branches in Australia, Europe, South America, and Asia.

4.3.2. APPENDIX – C (PRIVACY AND THE INTERNET cont.….))

Concerns about privacy in cyberspace are an issue of international debate. As reading and writing, health care and shopping, and sex and gossip increasingly take place in cyberspace, citizens around the world are concerned that the most intimate details of their daily lives are being monitored, searched, recorded, stored, and often misinterpreted when taken out of context. For many, the greatest threats to privacy come not from state agents but from the architecture of e-commerce itself, which is based, in unprecedented ways, on the recording and exchange of intimate personal information. (Wallenfeldt, 2021).

In the meantime, the most serious risk to internet privacy in our development age is people. Internet users use weak passwords, click on phishing message and use an

unsecured internet connection. To avoid online threats, we really need to begin encrypting our online activities.

4.3.3. APPENDIX – C (ADVANTAGES OF INTERNET cont.….))

v. Online Services and E- commerce

Almost all companies or government institutions have shifted their services online, thanks to the continually evolving internet technology. Unlike ten years ago, now you can file your tax online, book a flight or medical appointment online or even shop online. You can also book an online consultation for almost anything.

The evolution of internet technology has seen the emergence of giant online E-commerce companies such as Amazon, Ali Baba, eBay, and Jindong. Thanks to the Internet, online shopping has now got a complete makeover. With sites like PayPal, online banking, and several online payment methods have made these shifts successful by making the transfer of money easy and instantaneous. (Freeman, 2021)

4.3.4. APPENDIX – C (DISADVANTAGES OF INTERNET cont.….))

v. Security Problem

Data are shared in a public medium so extra precaution is needed for the secure transmission and storage. In addition, due to the internet, there is increase of computer crimes like sending viruses, software piracy, hacking, plagiarism, pornography, spoofing and so on. (Prachandra Ram Shrestha, 2010).

4.3.5. APPENDIX – C (INTERNET ARCHITECTURE cont.…))

The Internet model completed with a third layer called the application level, which includes different protocols for building Internet services. Email (SMTP), file transfer (FTP), the transfer of hypermedia pages, transfer of distributed databases (World Wide Web), etc., are some of these services. The three layers of Internet architecture are mentioned below:

i. Application
ii. TCP (Transmission Control Protocol)
iii. IP (Internet Protocol)

The flexibility of the Internet architecture can sometimes be a default. The extent that global optimization of the network is carried out by sub-network subnet, by a succession of local optimizations. It does not allow a homogeneous function in different subnets traversed. Another essential feature of this architecture is to place the entire control system, to say, intelligence and control of the network, in the terminal machine, leaving virtually nothing in the network, at least in the current version, IPv4, the IP protocol. The control intelligence is in the TCP software on the PC connected to the network. (Thakur, n.d.)

4.3.6. APPENDIX – C (CONCLUSION (PAST, PRESENT AND FUTURE OF INTERNET cont.….))

Correspondingly, we see a fundamentally the same as pattern when we look at the statistics for mobile internet adoption. In the range of long time from 2011 to 2016, mobile internet adoption had expanded from 35% to 77% of the whole adult United States population. An alternate report that examines internet use by age revealed that essentially all grown up between the age 18-64 are internet user. As anyone might expect, the biggest socio economics of non-internet user originated from grown up who are more established than 65 years of age.

In addition, later on the Internet will become like electricity, less noticeable yet more significant and implanted in regular daily existence. During the following decade, the spread of the Internet will improve worldwide availability, cultivating more certain connections among societies. However, Abuses and victimizers will ‘develop and scale.’ Human nature isn’t changing; there’s laziness, harassing, stalking, idiocy, pornography, filthy stunts, wrongdoing, and the offenders will have new ability to make life hopeless for other people. Likewise, most individual are not yet seeing the significant changes, the present communications networks are now achieving, these networks will be even more problematic in the future.