Module Code & Module Title

CS5001NI Networking and Operating system

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Assignment Submission Date: 25 December 2020

Title (Where Required):

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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 submissions will be treated as non-submission and a mark of zero will be awarded.

ACKNOWLEDGEMENT

I would like to express my special thanks to the islington college for providing the module Network and Operating system and giving this assignment in this module. I am very thankful to the Mr.Puranjan Acharya who help us to guide in the project and know about this project more properly and widen my knowledge about this module.

And in second I want to thank my class mates and college mate who helped and provides their valuable time for the completion of time. And also, everyone who helped me to complete this assignment.

ABSTRACT

This assignment is all about the developing the topology of the network simulation model. It is about the mythical multination Asia in which the headquarter is in Edinburgh. In which it is willing to make a new branch in Nepal which in Butwal and itahari. In which the mythical multinational asia bank network is the WAN and the branches of Nepal Butwal and itahari are the LAN which passes the network in the local area. In the ever LAN there are 30 ATM in which 30 ATM nodes and one single teller in each LAN. In which Edinburg, itahari, Butwal LAN access is connected to the WAN clouds. In which it is the assignment is divided in the task A and task B in which both are described in the introduction of each task respectively.in which the task A network is completely done in comnet software which is the instrument that analyze the communication network which construct the computer network. By the network simulation it brings realistic exploration.

Contents

1. TASK A

1.1 INTRODUCTION

In the first assignment of the module of Networking and operating System it reflects about the how network and simulation with the software as comnet III. In this assignment, student was asked to do the assignment to know how they understood after the completion of course.

In this task A the task was to develop the topology of a network simulation model. In this topology the scenario is about the mythical multination Asia in which the headquarter is in Edinburgh. In which it is willing to make a new branch in Nepal which in Butwal and itahari. In each network in Nepal it consists of 30 ATM transaction node plus one single teller giving of 31 ATM each in a LAN. The Edinburgh subnet is connected to the WAN clouds through access point. And the Edinburgh LAN access point I connected to the token passing and the token passing is connected to the processing node and after it the processing node is connected to the response source. The itahari subnet is connected to the WAN clouds through access point And the itahari LAN access point It is connected to the router and the router to the CSMA/CD link and the CSMA/CD is connected to the processing node and after it the processing node is connected to the computer group and the computer group is connected to the message source. The Butwal subnet is connected to the WAN clouds through access point And the Butwal LAN access point It is connected to the router and the router to the CSMA/CD link and the CSMA/CD is connected to the processing node and after it the processing node is connected to the computer group and the computer group is connected to the message source.

Comnet III is a software or the application which analyze the communication network which construct model network control algorithm and after analyze it is simulate the control the performance of the network. So, by the simulation of the network it provides the report of the network. It is the application which was developed in the programming language MODSIM III which uses object-oriented plan.it is the application to represent the equipment to present the network. In the comnet application it uses the different tools and the tools are mention below:

- Cloud
- Subnet
- Access point
- Processing node
- Computer group
- Network device
- WAN link or virtual circuit
- CSMA/CD link
- Point to point link

- Token-passing link
- Message source
- Response source
- Background text etc.

These are the tool that are used in the comnet to define the networking device.

1.2 WAN MODEL (WAN)

A Wide Area Network (WAN) is a network which covers the network of large-scale geographical area. It covers with smaller networks like LAN and MAN which stands for Local Area Network and Metro Area Network respectively by which the network of computer and end user to communicate with different devices in the different location. In this network it is carried out by the routers, hubs, switches, fiber optics, modem in the transmission of data. By the help of public transmission system or a private network WAN network is used in it. As WAN is used in larger geographical areas it connects to more than one LAN. WAN are similar to a banking system, due to which the different branches with to share their official data. WAN works as similar to the LAN, but as LAN is used in local area. Typically, TCP/IP is the protocol used for a Wide Area Network (WAN) in combination with devices such as routers, switches, firewalls and modems

WAN (Wireless Area Network) has both advantage and disadvantage in it. So, its advantage is:

- It covers the network of large-scale geographical area which covers of 1000 Km. with the help of LAN it keeps connect to the different office branches which are in different country.
- It can centralize data, all the branches located in the network which share the data in the head office server. It can get back up the useful from the head office the data and it can synchronized to the branch's office.
- WAN message are transmitted with the help of latest LAN technologies.
- It helps the IT to increase the global business, by it the person who has the computer skill can do business and it can expand globally.
- It helps to decrease the travel charge because it helps to communicate and distribute the work to the people from the different place.

It disadvantages of WAN are:

- WAN has many technologies with each other which creates more security problem which create the security gap.
- WAN covers a large geographical area so by the covering of large area it will difficult to troubleshooting.

- In the initial phase it cost higher because of purchasing of router, switches, and other software.
- By the absence of firewall and antivirus in the device or computer in which internet accessed and which can be changed by hacker.
- Due to the improper electricity supply user may face the connection lost or the disconnect problems.

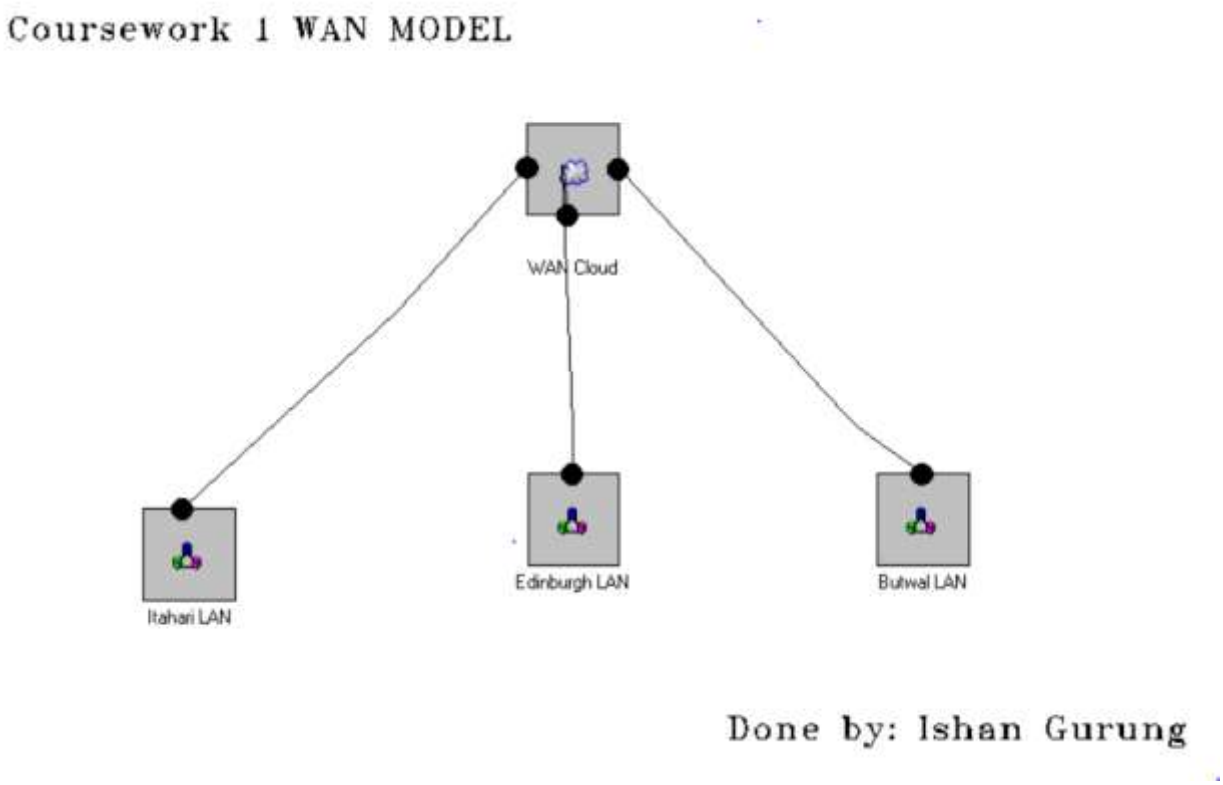

Figure 1 WAN MODEL

In the above shown figure the WAN model network in which there is one WAN cloud which link with the three different subnets or LAN which are Itahari LAN, Edinburgh LAN, Butwal LAN. And every subnet is connected by the access point.

1.2.1 EDINBURGH LAN

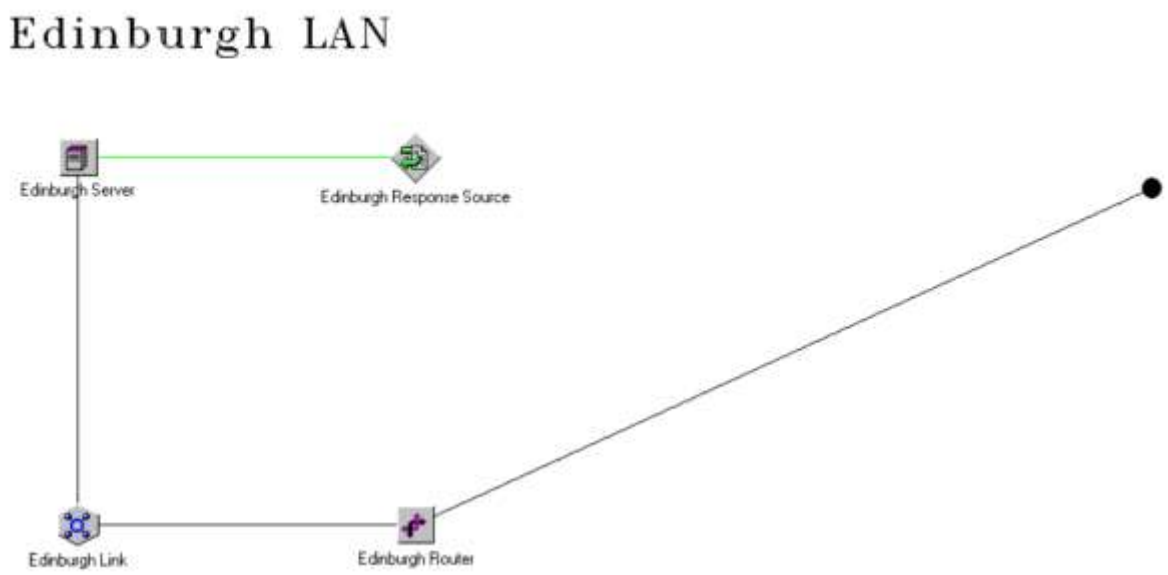

Figure 2 EDINBURGH LAN MODEL

In the above LAN Network of Edinburgh LAN in which there is one access point which is connected to the router named as Edinburgh router by it is connected to the token passing named as Edinburgh token passing link. From it the wire is connected to the processing node which is named as Edinburgh server and from it is connected to the response server which is named as Edinburgh response server.

1.2.1.1 NETWORKING DEVICE: ROUTER

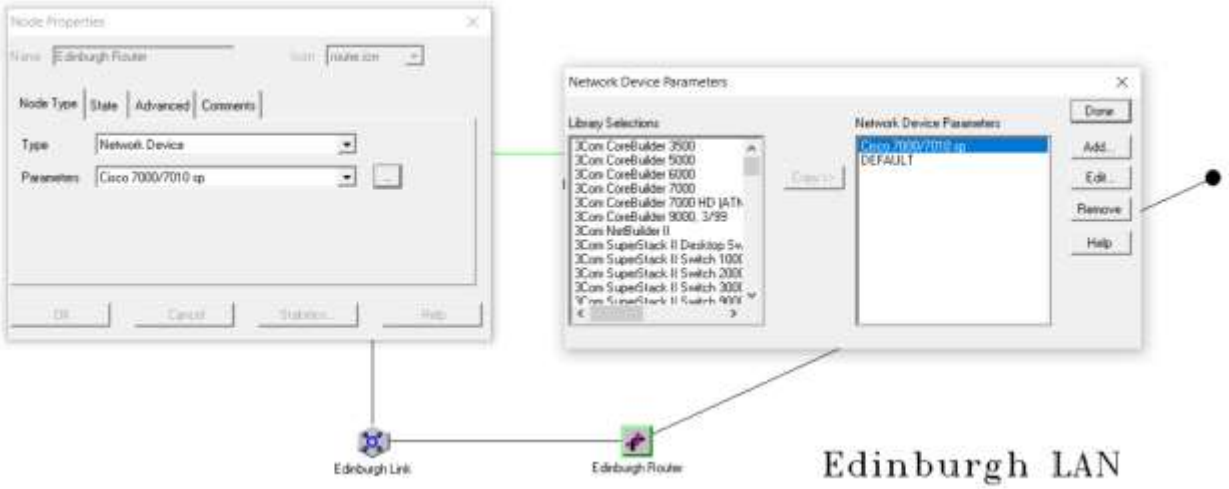

Figure 3 EDINBURGH LAN ROUTER CONFIGURATION

In the above shown figure, in the Edinburgh router the configuration is done as its parameter is set to Cisco 7000/70101 sp and its type is Network Device.

1.2.1.2 TOKEN PASSING LINK

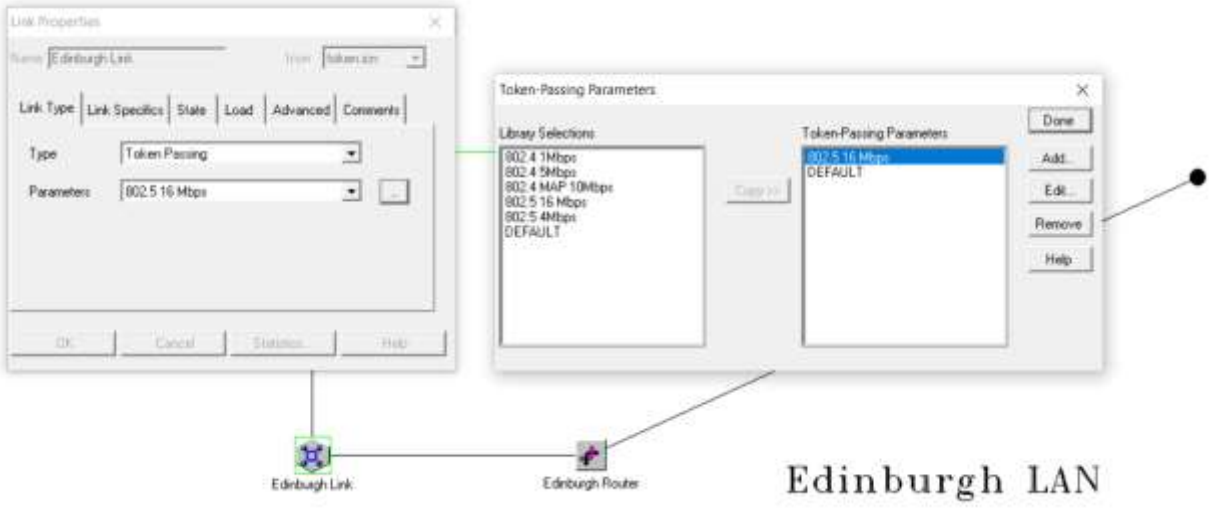

Figure 4 EDINBURGH LAN token passing link configuration

In the above shown figure, in the Edinburgh Link the configuration is done as its parameter is set to 802.516 Mbps and its type is Token Passing.

1.2.1.3 PROCESSING SERVER

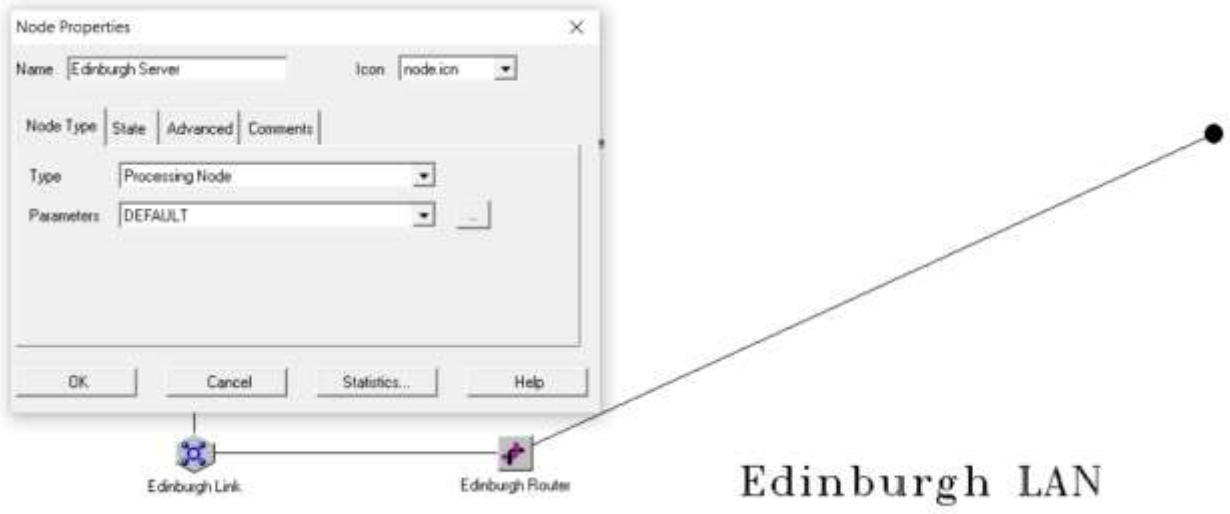

Figure 5 EDINBURGH PROCESSING SERVER CONFIGURATION

In the above shown figure, in the Edinburgh server the configuration is done as its parameter is set to Cisco Default and its type is Processing Node.

1.2.1.4 RESPONSE SERVER

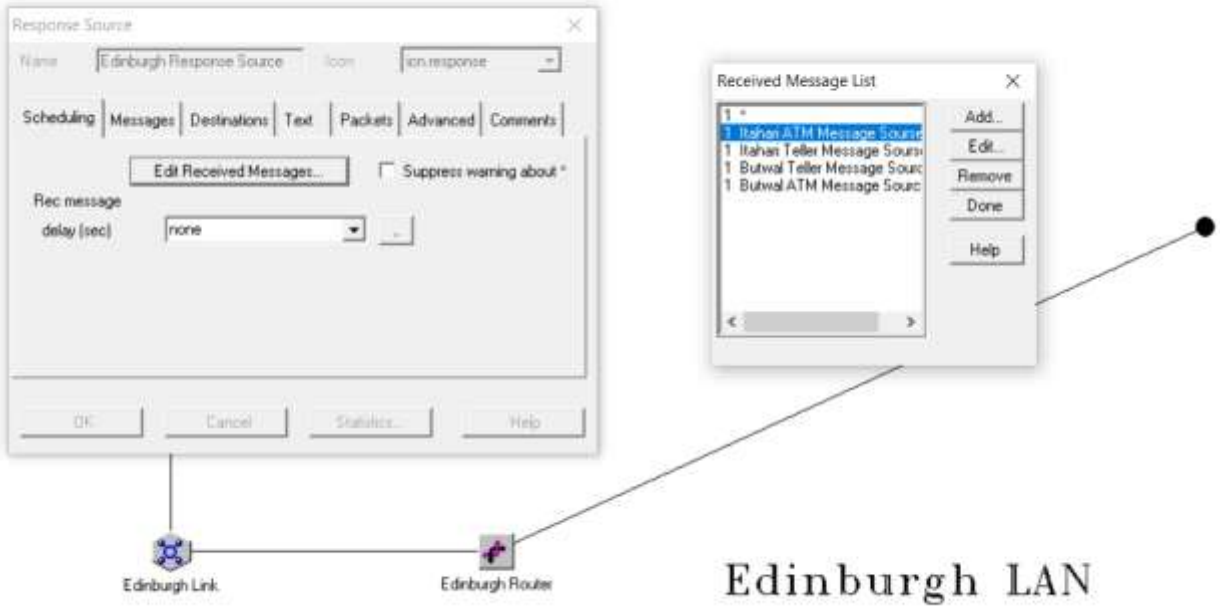

Figure 6 EDINBURGH LAN response server scheduling configuration

In the above shown figure, in the Edinburgh Response Server the configuration is done as its name as the Edinburgh Response Server and in scheduling and after clicking to the edit received message and after it select all the message source.

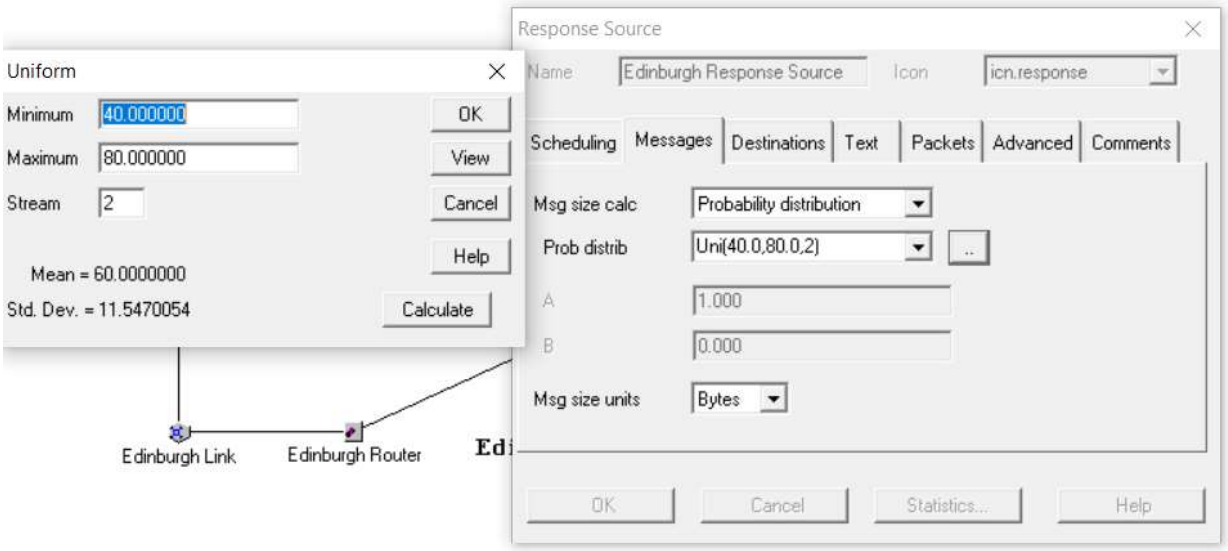

Figure 7 EDINBURGH LAN RESPONSE SERVER MESSAGE CONFIGURATION

In the above figure, in the Edinburgh response source its configuration is done as msg size calc as probability distribution and it is set as Uni (40.00,80.00,2) in which it is set minimum as 40, maximum as 80 and its stream as 2.

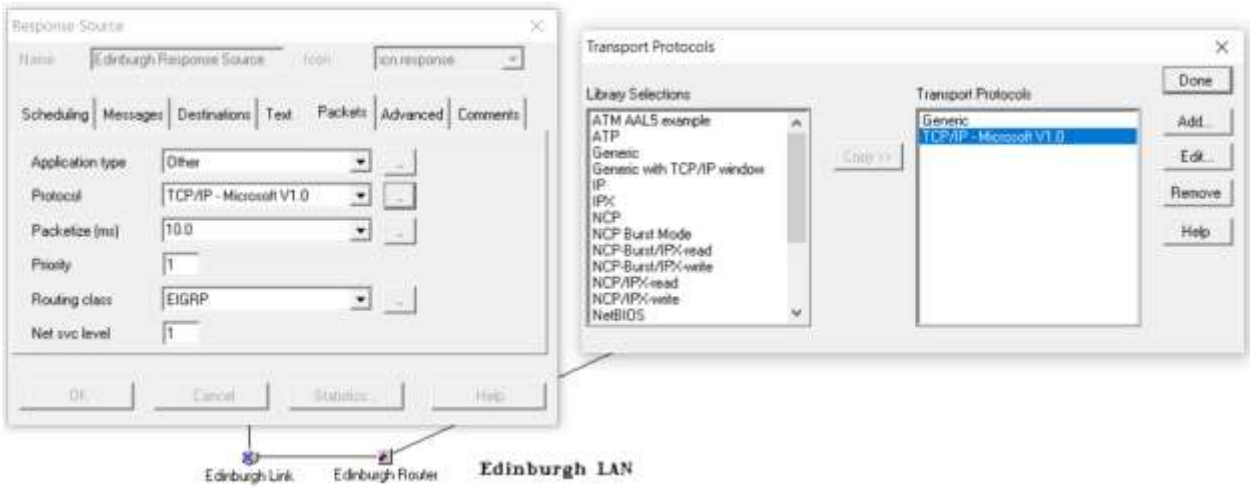

Figure 8 EDINBURGH LAN RESPONSE SERVER CONFIGURATION PACKET

In the above figure, in the Edinburgh response source its configuration is done as in packet the protocol is set as TCP/IP-Microsoft V1.0.

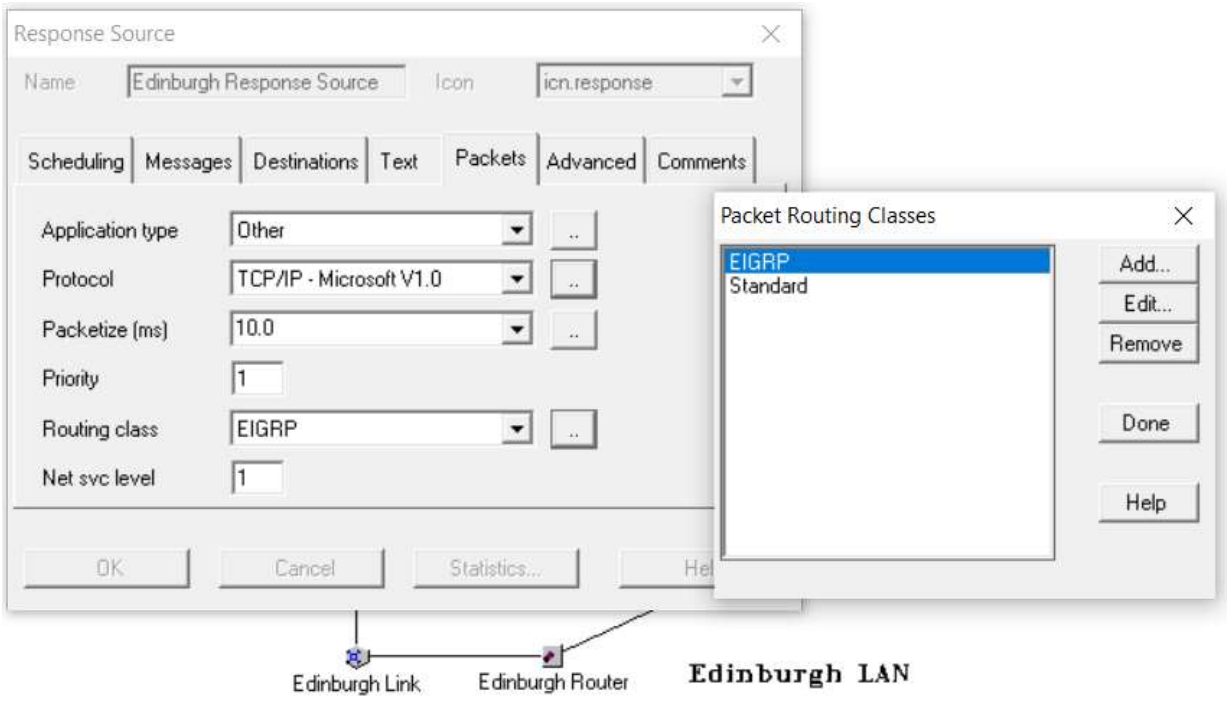

Figure 9 EDINBURGH LAN RESPONSE SERVER CONFIGURATION

In the above figure, in the Edinburgh response source its configuration is done as routing class as ERGIP.

1.2.2 WAN CLOUD

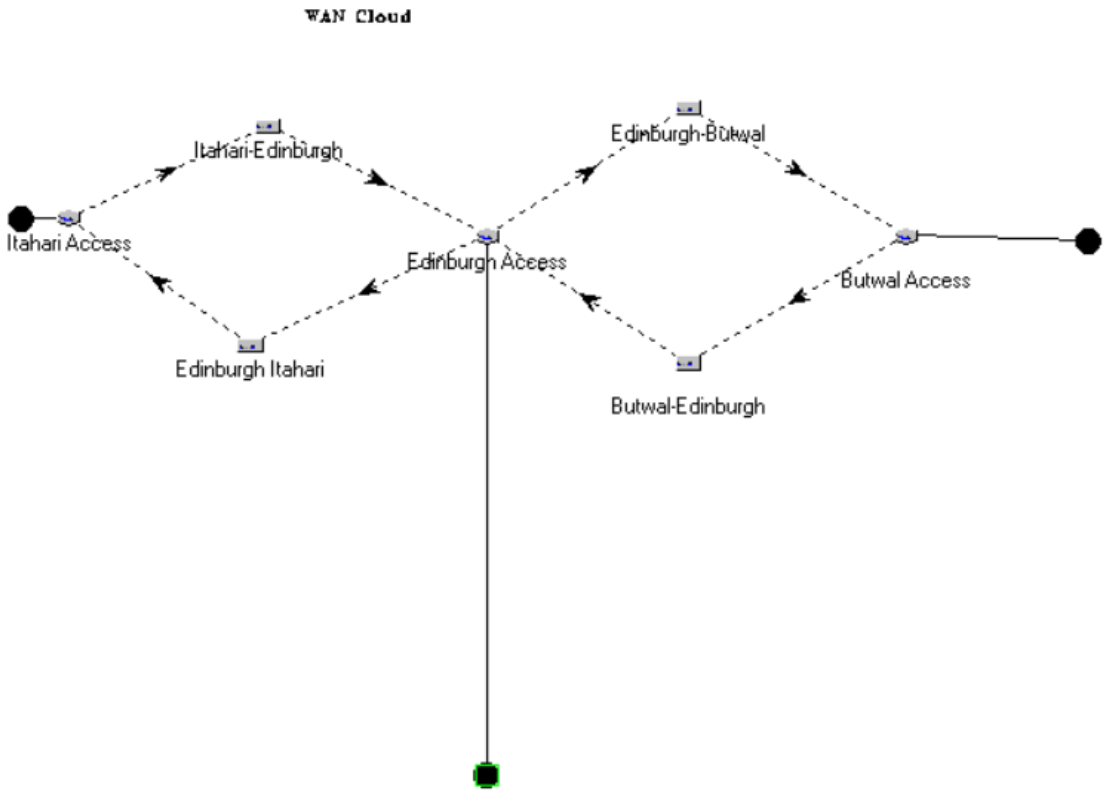

Figure 10 WAN CLOUD

Description:

In the WAN cloud, there are three access point which is named as itahari Access, Butwal Access, Edinburgh Access) which connect to the point-to-point Link which is connected to the virtual circuit which are Edinburgh-Itahari, Itahari-Edinburgh, Butwal-Edinburgh, Edinburgh-Butwal).

1.2.2.1 ACCESS LINK

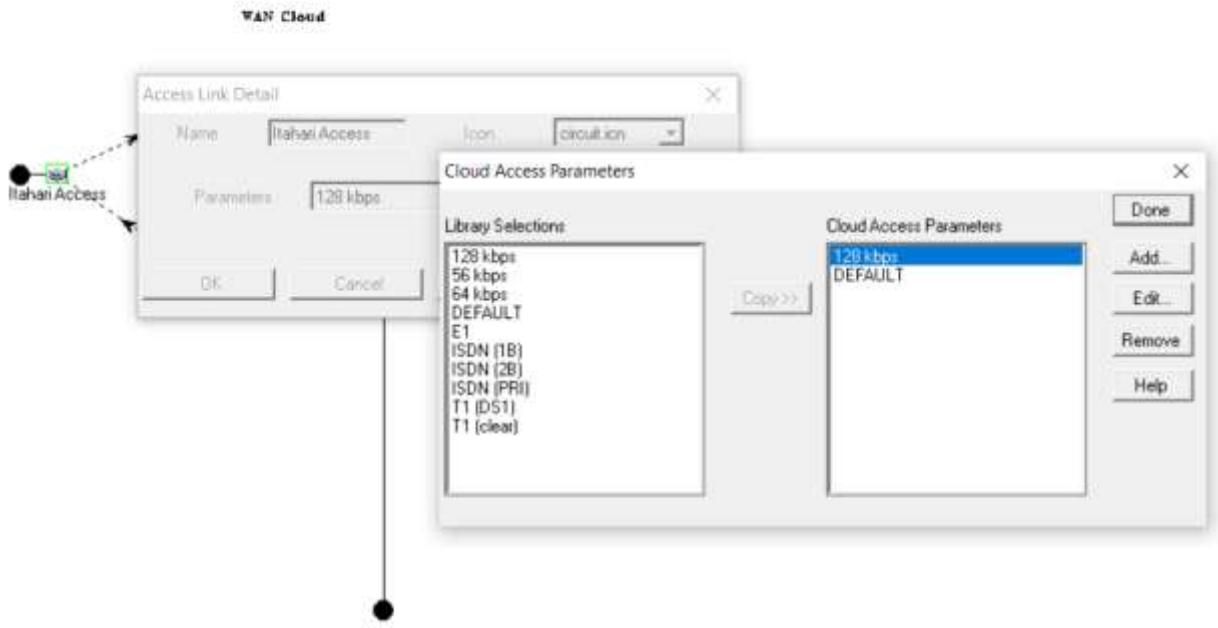

Figure 11 ITAHARI ACCESS POINT

Description,

In the above figure, in the itahari Access its configuration is done as or named as itahari access and its parameter is set as 128kbps.

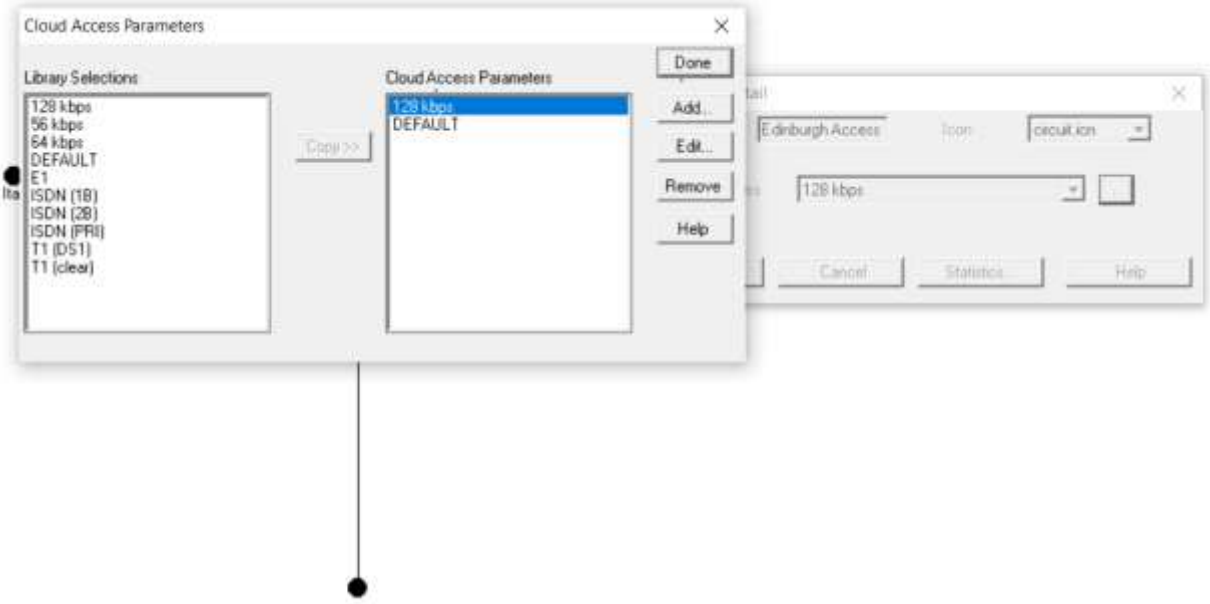

Figure 12 EDINBURGH ACCESS POINT

Description

In the above figure, in the Edinburgh Access its configuration is done as or named as Edinburgh access and its parameter is set as 128kbps.

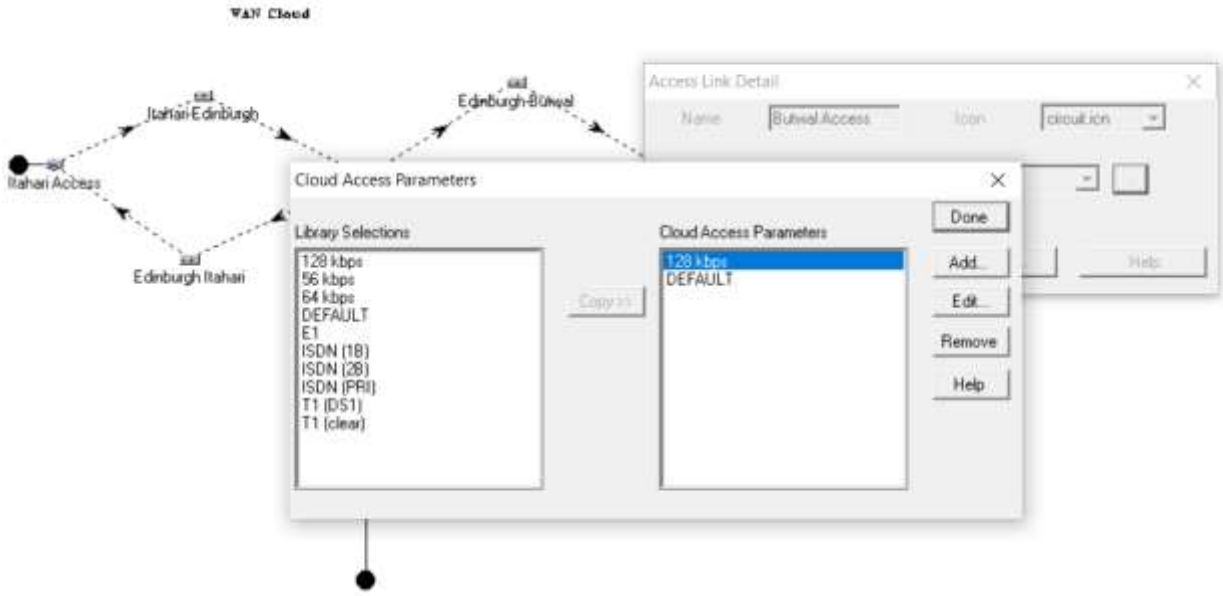

Figure 13 BUTWAL ACCESS POINT

Description

In the above figure, in the Butwal Access its configuration is done as or named as Butwal access and its parameter is 128kbps.

1.2.2.2 VIRTUAL CIRCUIT

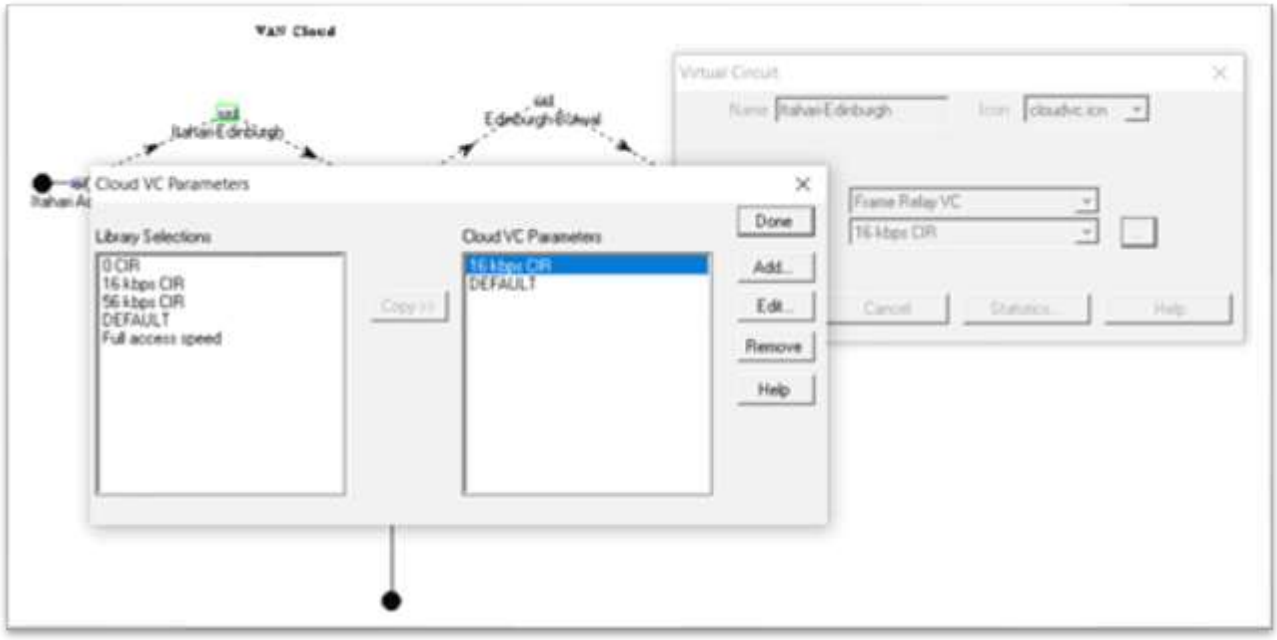

Figure 14 ITAHARI-EDIBURGH VIRTUAL CIRCUIT

Description

In the above figure, in the virtual circuit in Itahari-Edinburgh its configuration is done as or named as Itahari-Edinburgh and its parameter is 16kbps CIR.

Figure 15 EDINBURGH ITAHARI VIRTUAL CIRCUIT

In the above figure, in the virtual circuit in Edinburgh- Itahari its configuration is done as or named as Edinburgh- Itahari and its parameter is 16kbps CIR.

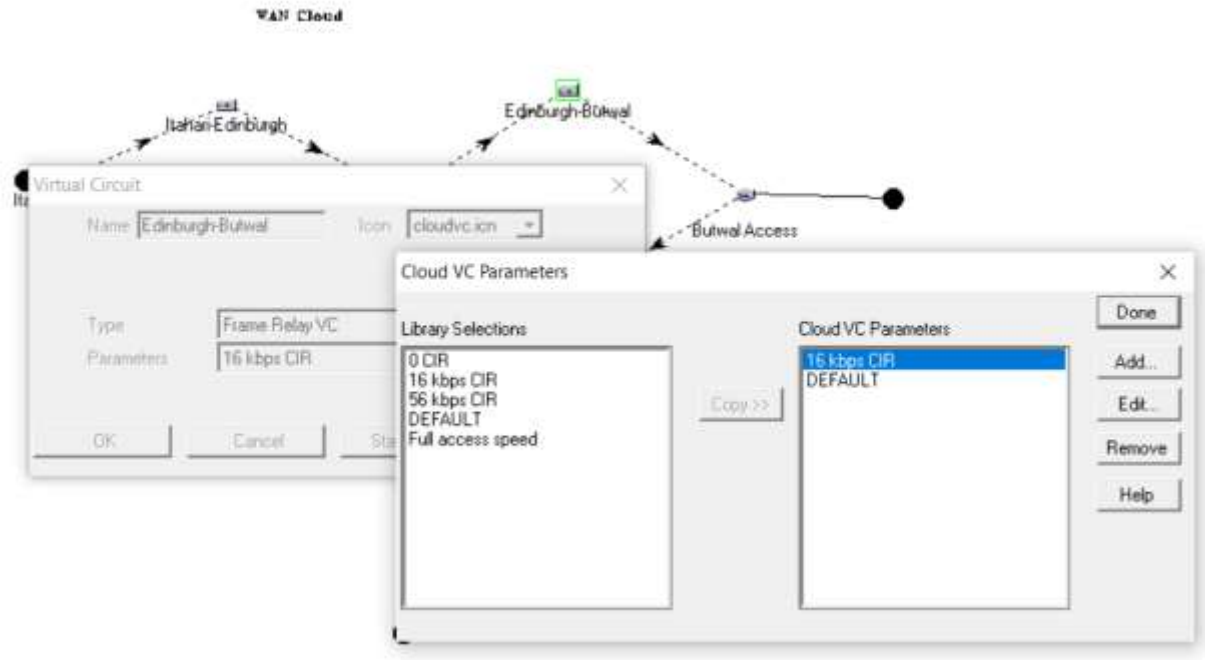

Figure 16 EDINBURGH BUTWAL VIRTUAL CIRCUIT

In the above figure, in the virtual circuit in Edinburgh- Butwal its configuration is done as or named as Edinburgh- Butwal and its parameter is 16kbps CIR.

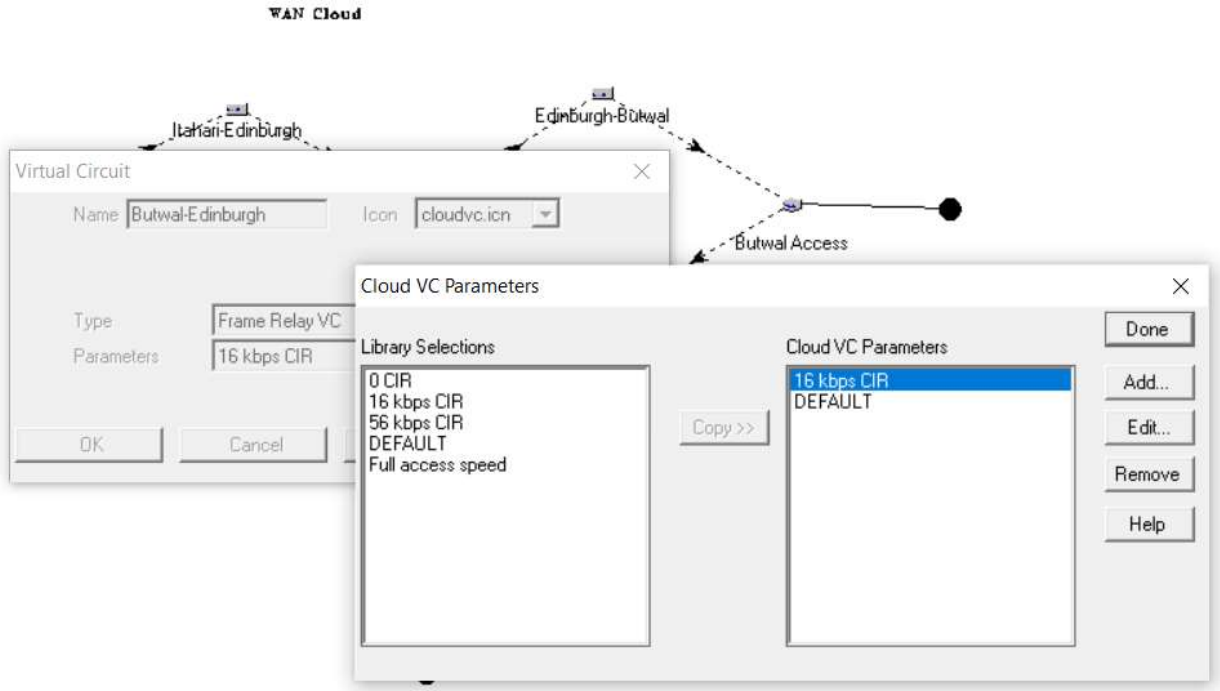

Figure 17 BUTWAL EDINBURGH VIRTUAL CIRCUIT

In the above figure, in the virtual circuit in Butwal-Edinburgh its configuration is done as or named as Butwal-Edinburgh and its parameter is 16kbps CIR.

1.2.3 ITHARAI AND BUTWAL LAN

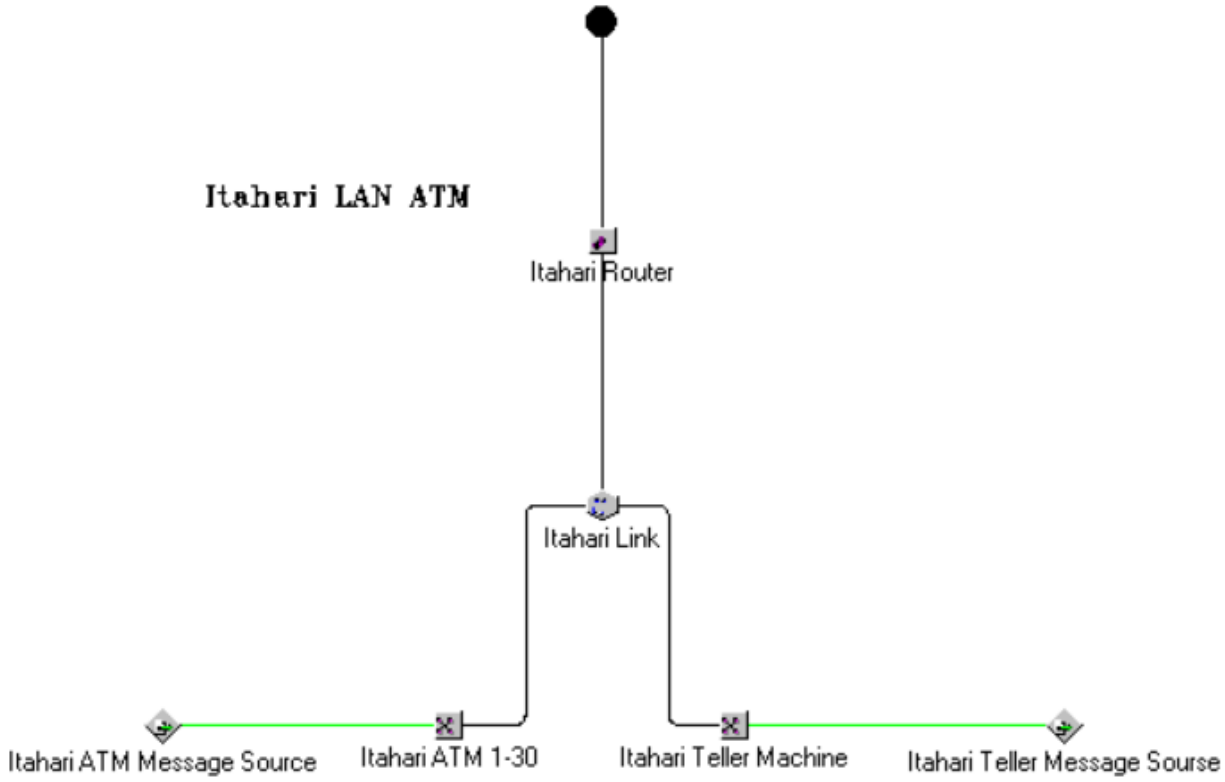

Figure 18 ITAHARI LAN MODEL

Description

In the above figure itahari LAN ATM shown as above which is connected with the frame relay cloud network device which is connected to the router named as itahari router, and the nect point of the router I connected to the token-passing links itahari link , processing link, computer group are connected to the message source (itahari message source) and processing node is connected with the message source (itahari teller message source). This LAN network consists of 30 ATM transaction nodes.

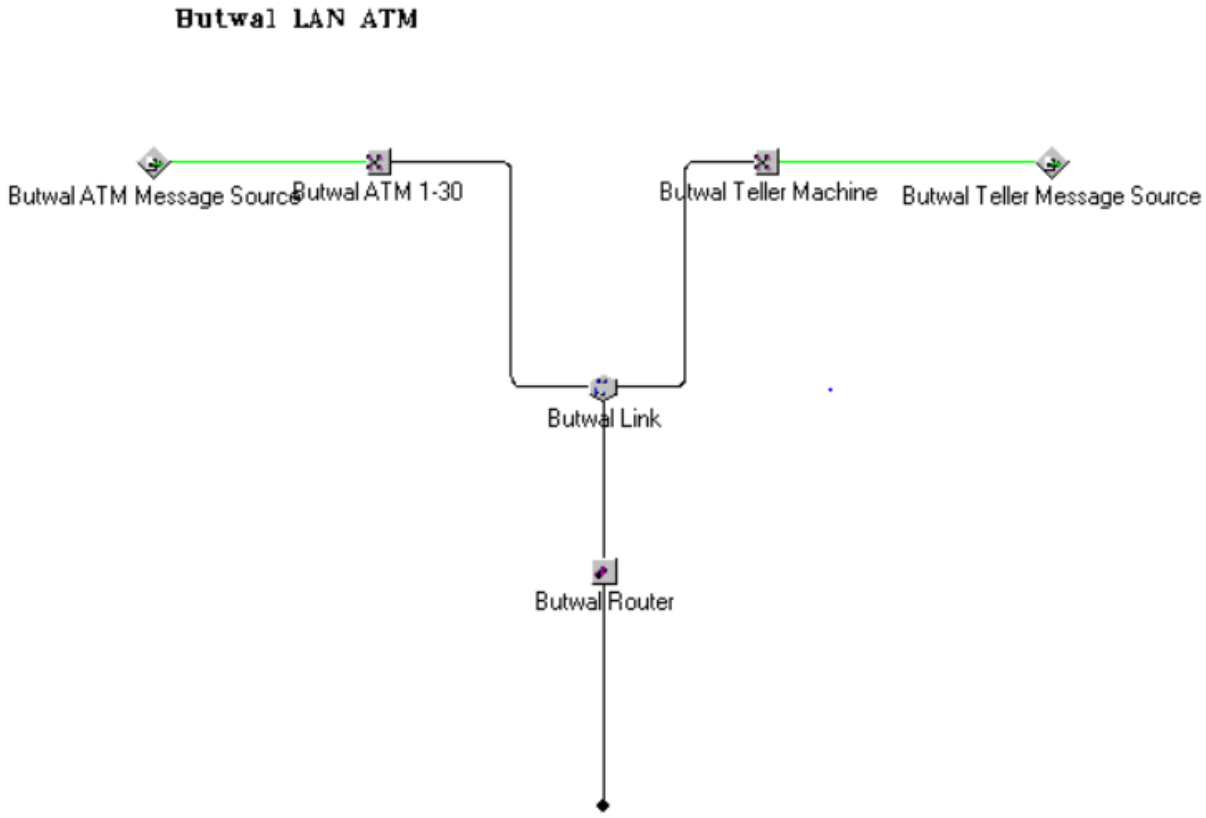

Figure 19 BUTWAL LAN MODEL

Description

In the above figure butwal LAN ATM shown as above which is connected with the frame relay cloud network device which is connected to the router named as butwal router, and the next point of the router I connected to the token-passing links butwal link , processing link, computer group are connected to the message source (butwal message source) and processing node is connected with the message source (butwal teller message source). This LAN network consists of 30 ATM transaction nodes.

1.2.3.1 NETWORKING DEVICE: ROUTER

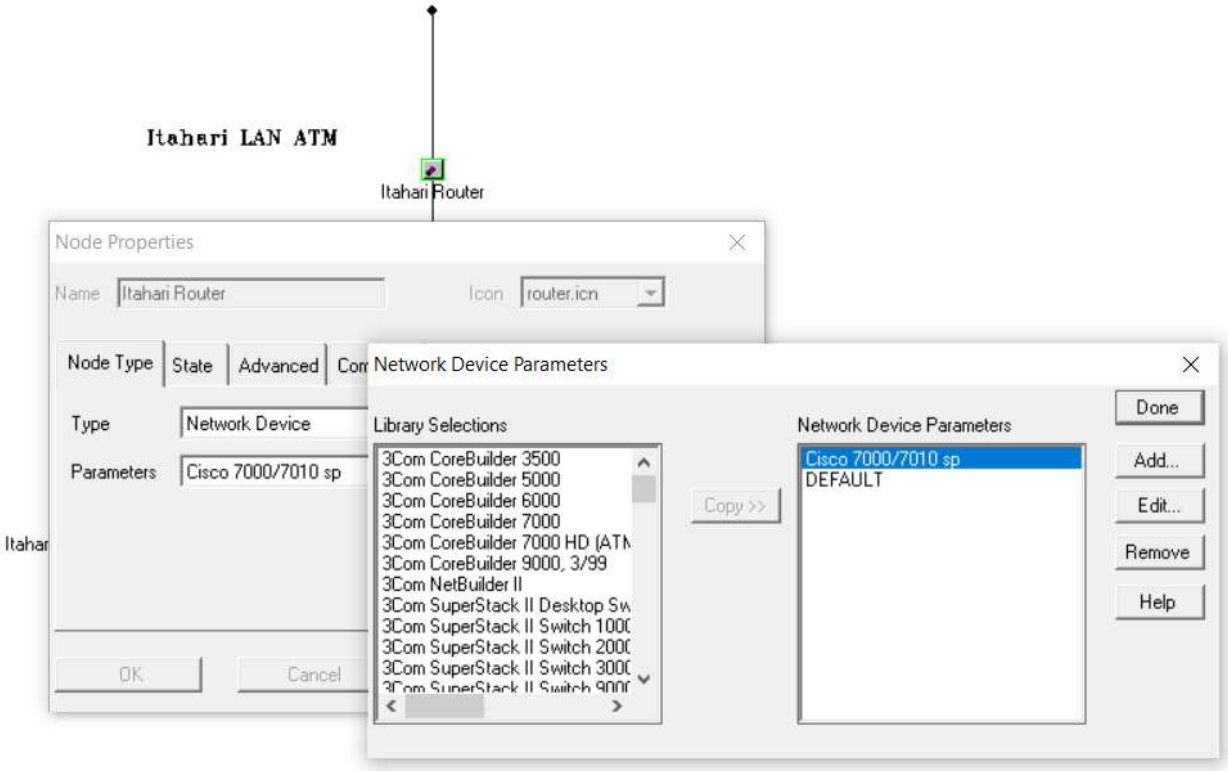

Figure 20 ITAHARI LAN ROUTER

Description

In the above shown figure, in the itahari router the configuration is done as its parameter is set to CISCO 7000/7010 SP and its type is Networking Device.

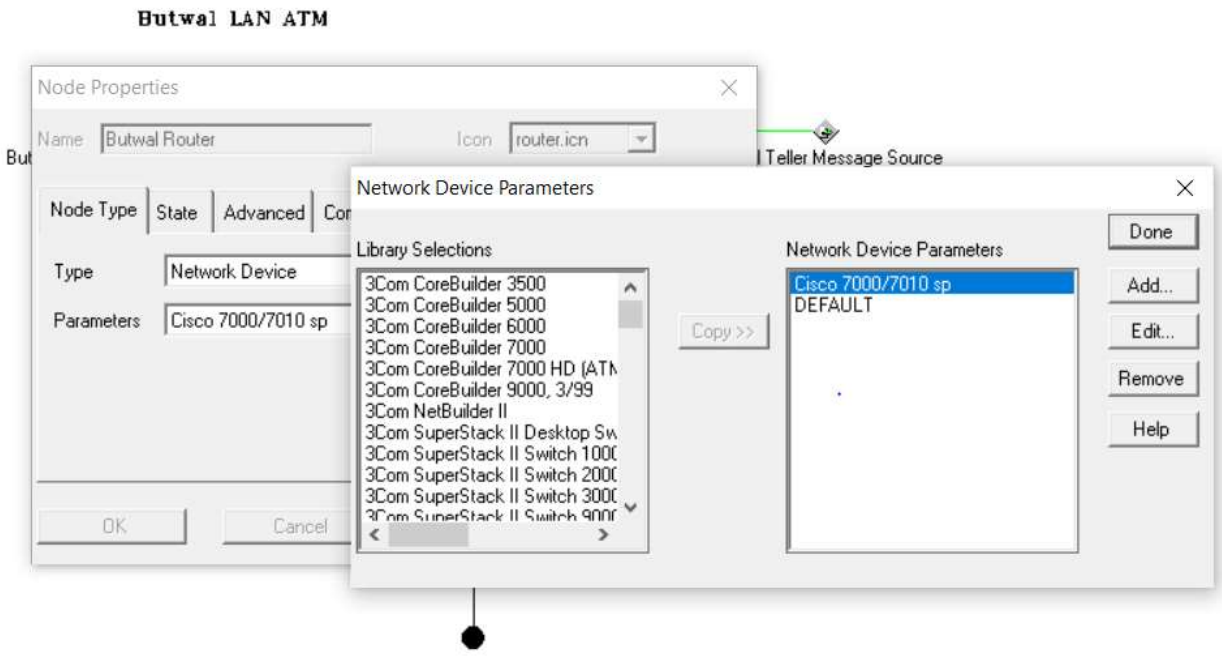

Figure 21 BUTWAL LAN ROUTER

Descripition

In the above shown figure, in the router the configuration is done as its parameter is set to CISCO 7000/7010 SP and its type is Networking Device.

1.2.3.2 CSDMA/CD LINK

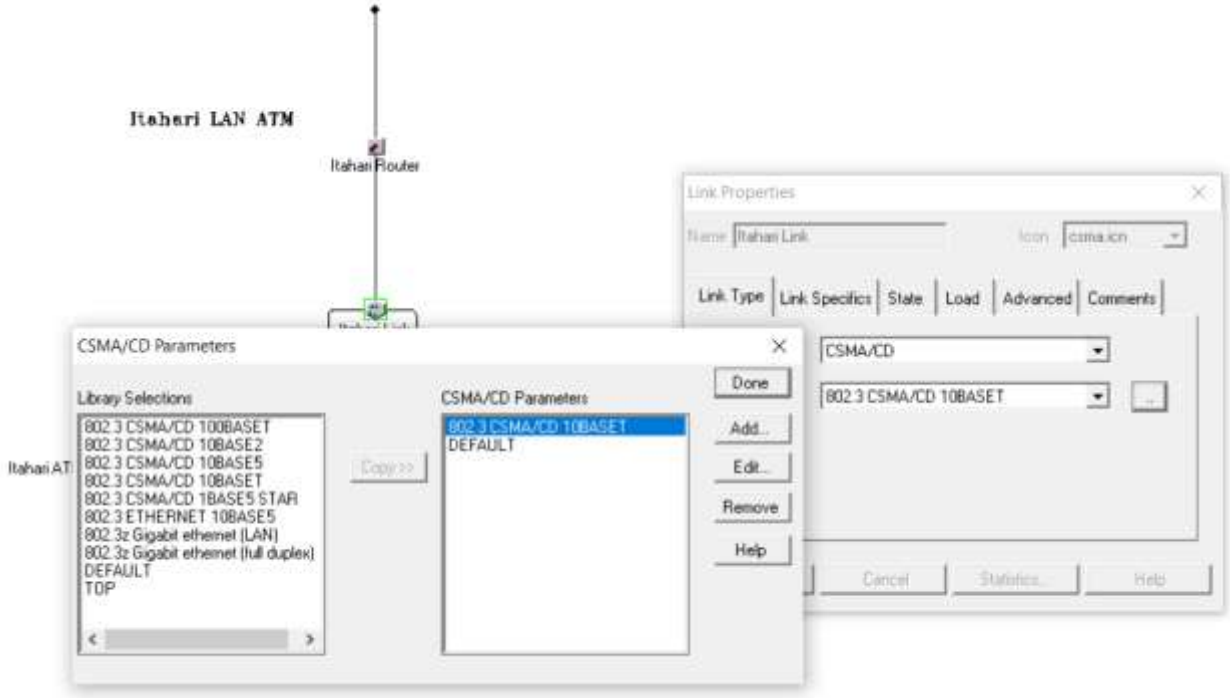

Figure 22 ITAHARI LAN CSMA/CD

Description

In the above shown figure, in the itahari link the configuration is done as its parameter is set to 802.3 CSMA/CD 10BASET and its type is itahari link.

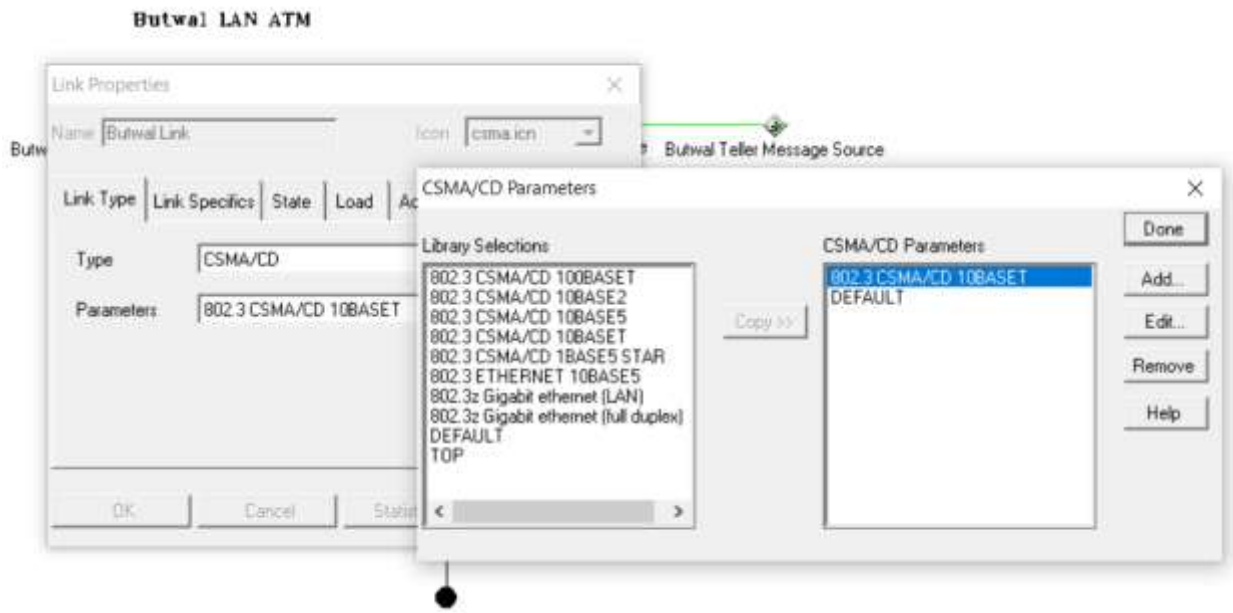

Figure 23 BUTWAL LAN CSDMA/CD

Description

In the above shown figure, in the butwal link the configuration is done as its parameter is set to 802.3 CSMA/CD 10BASET and its type is butwal link.

1.2.3.3 PROCESSING NODE

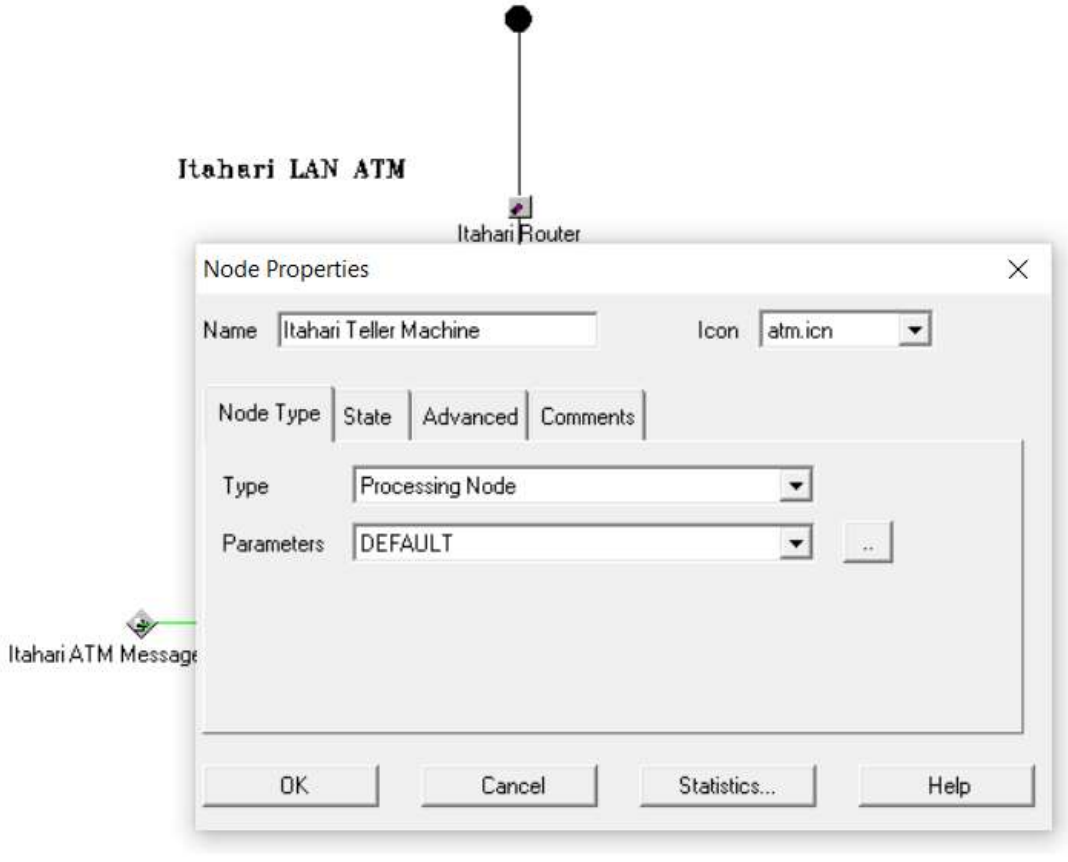

Figure 24 ITAHARI LAN PROCESSING NODE

Description

In the above shown figure, in the itahari teller message the configuration is done as its parameter is set to default and its type is processing node.

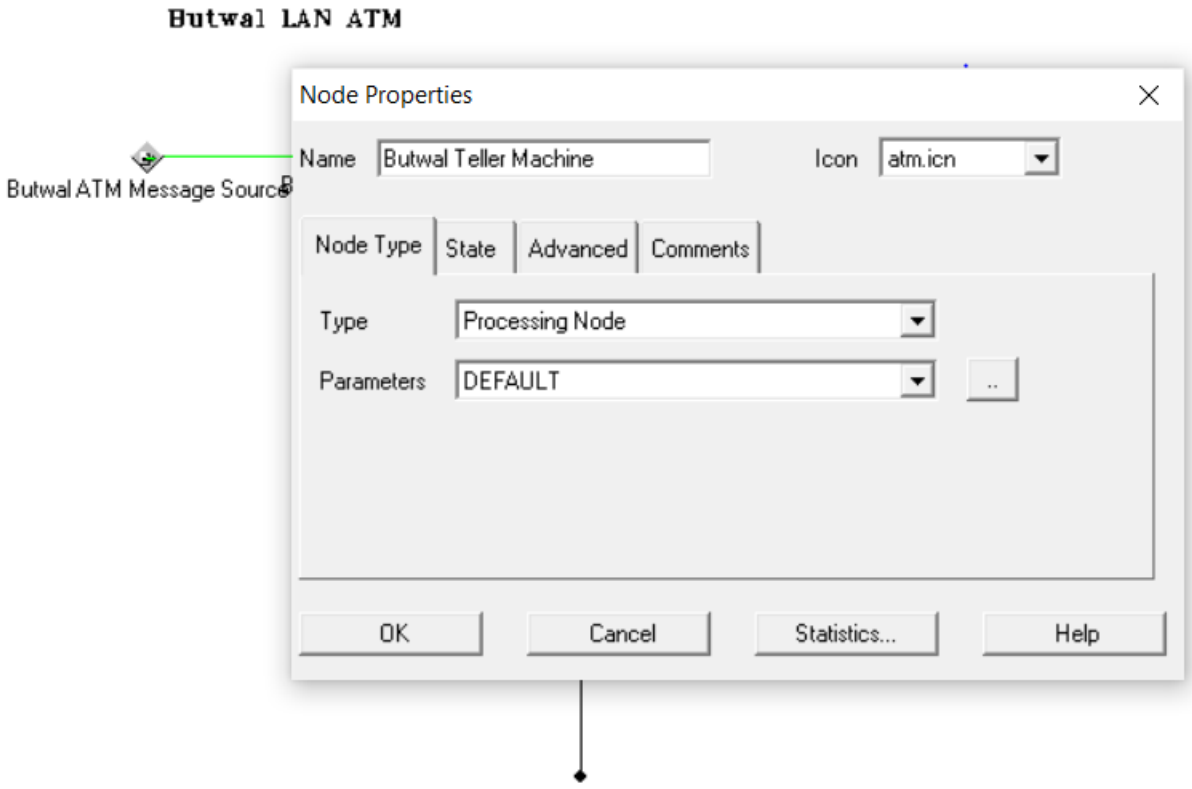

Figure 25 BUTWAL LAN PROCESSING NODE

Description

In the above shown figure, in the butwal teller message the configuration is done as its parameter is set to default and its type is processing node.

1.2.3.4 MESSAGE SOURCE

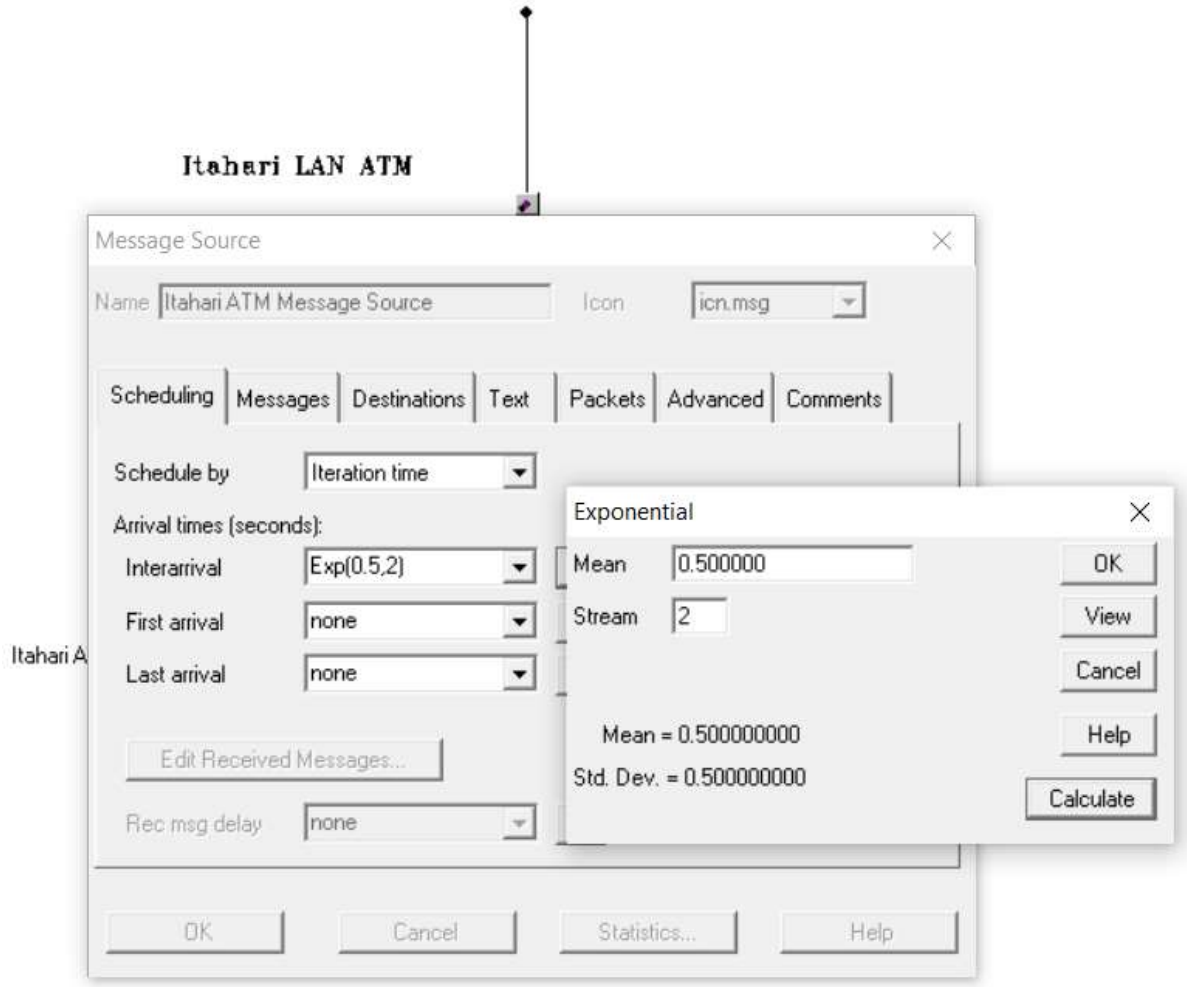

Figure 26 ITAHARI MESSAGE SOURCE SCHEDULING CONIGURATION

Description

In the above shown figure, in the itahari ATM Message Source configuration is done as Scheduling which is schedule by iteration time in which interarrival of Exp(0.5,2) which mean is 0.500 and steam is 2.

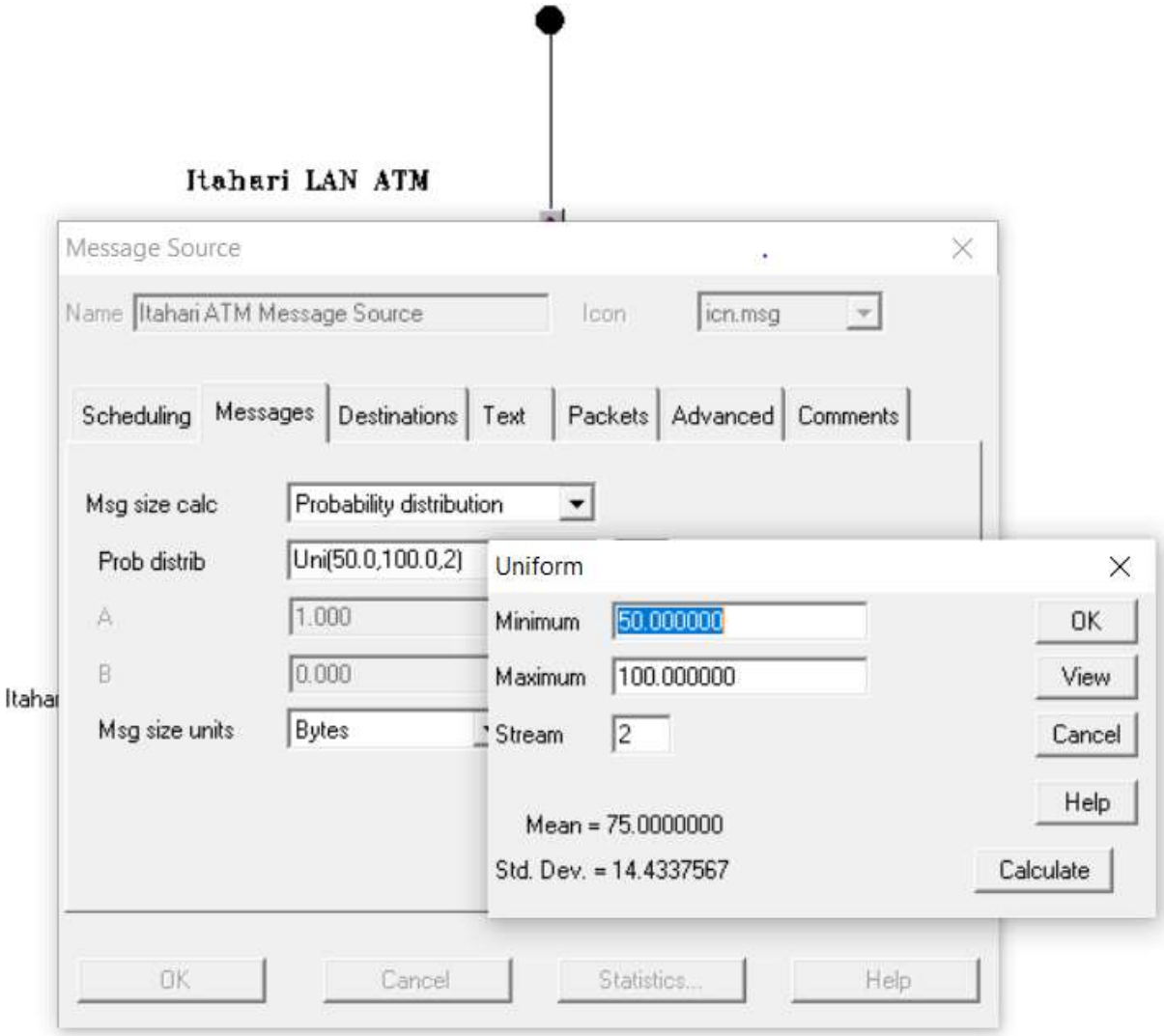

Figure 27 ITAHARI LAN MESSAGE SOURCE MESSAGE CONFIGURATION

Description

In the above shown figure, in the itahari ATM Message Source configuration is done as Message which is Msg size calc probability distribution and its prob distribution is Unit (50.0,100.0,2)

in which minimum is 50.00 and maximum is 100.0 and steam is 2.

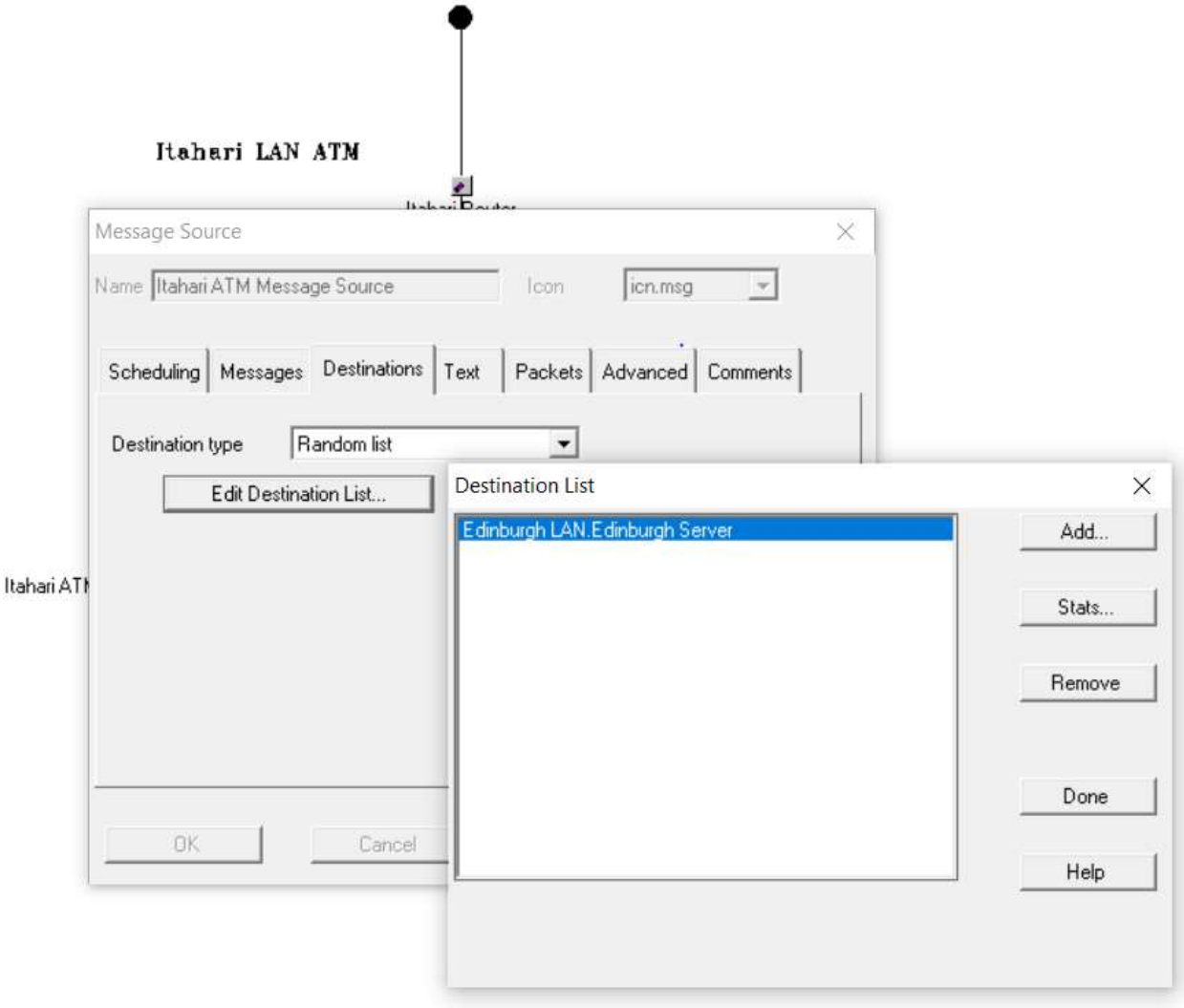

Figure 28 ITAHARI LAN MESSAGE DESTINATION CONFIGURATION

Description

In the above figure in the itahari ATM message source we have done the configuration as the destination type which is random list and in it random list there is edit destination list where there is Edinburgh server Edinburgh LAN

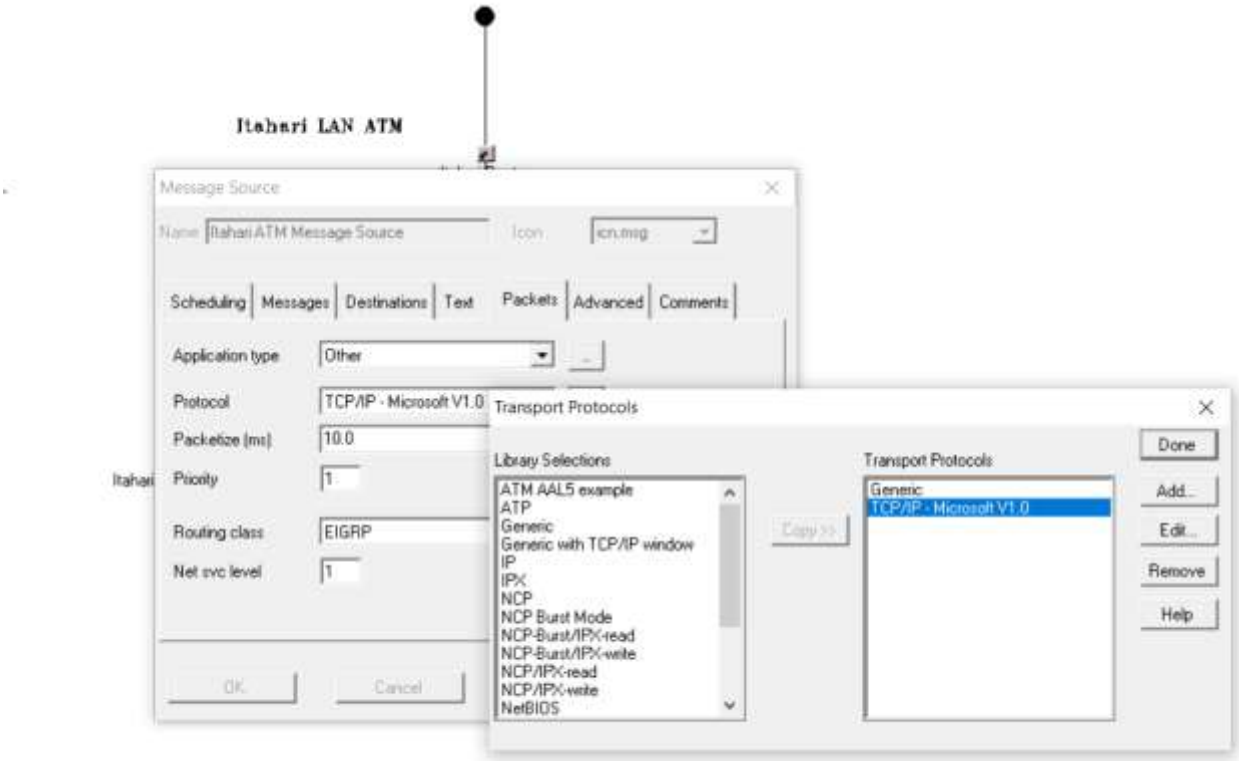

Figure 29 ITAHARI LAN MESSAGE PROTOCOL CONFIGURATION

Description

In the above figure, in the itahari ATM message source we have done the configuration in the packet TCP/IP-Microsoft V1.0s is set in packet.

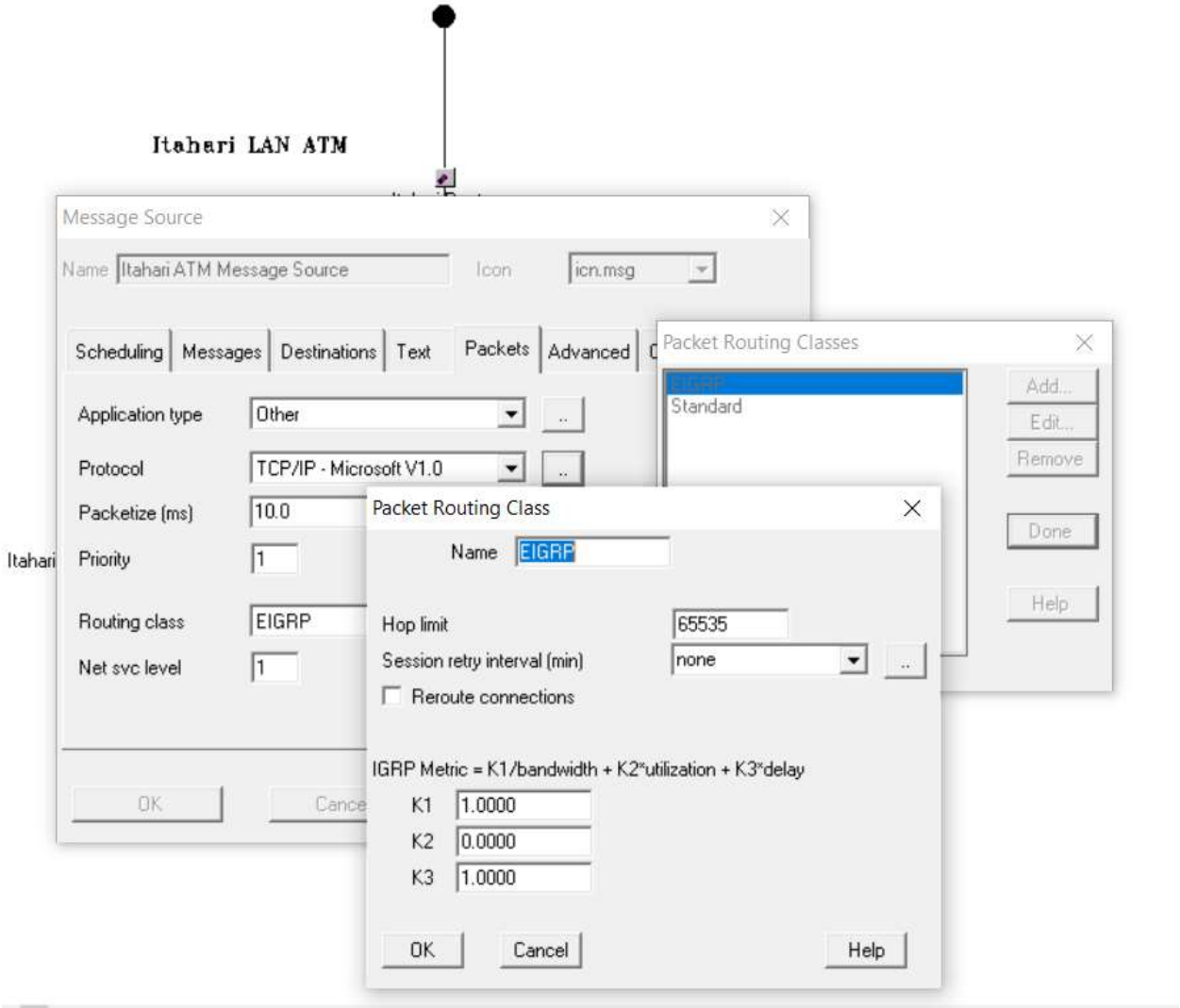

Figure 30 ITAHARI LAN MESSAGE TO ROUTING CLASS CONFIGURATION

Description

In the above figure, in the itahari ATM message source we have done the configuration in the packet ERGIP is set in routing class.

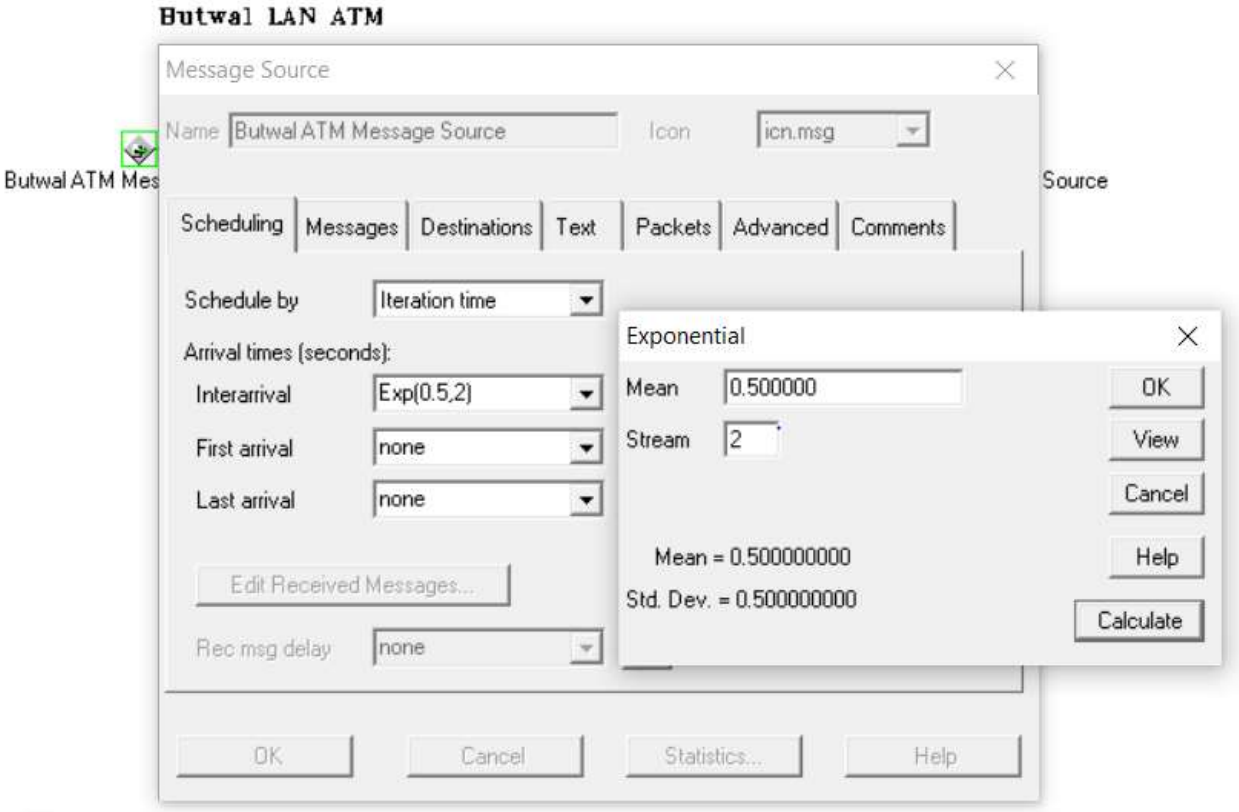

Figure 31 BUTWAL LAN MESSAGE SCHEDULING

Description

In the above shown figure, in the butwal ATM Message Source configuration is done as Scheduling which is schedule by iteration time in which interarrival of Exp(0.5,2) which mean is 0.500 and steam is 2.

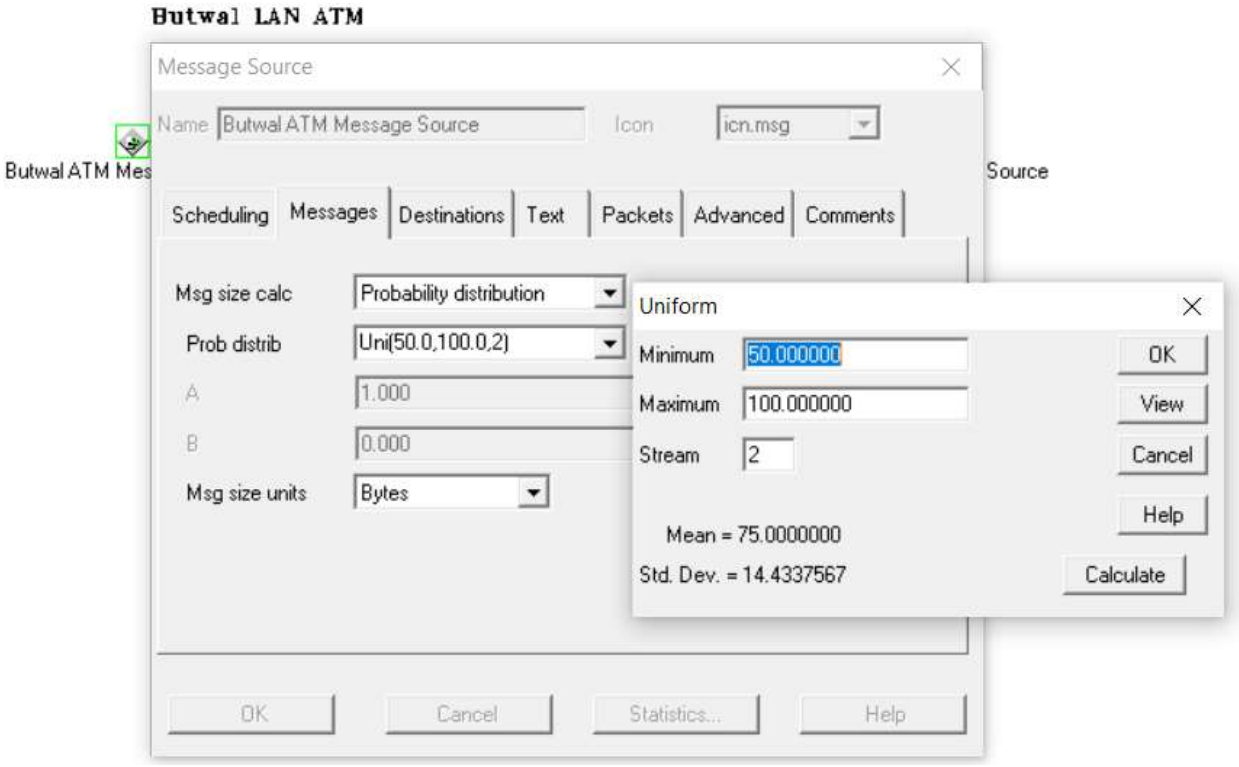

Figure 32 BUTWAL LAN MESSAGE SOURCE CONFIGURATION

Description

In the above shown figure, in the butwal ATM Message Source configuration is done as Message which is Msg size calc probability distribution and its prob distribution is Unit (50.0,100.0,2)

in which minimum is 50.00 and maximum is 100.0 and steam is 2.

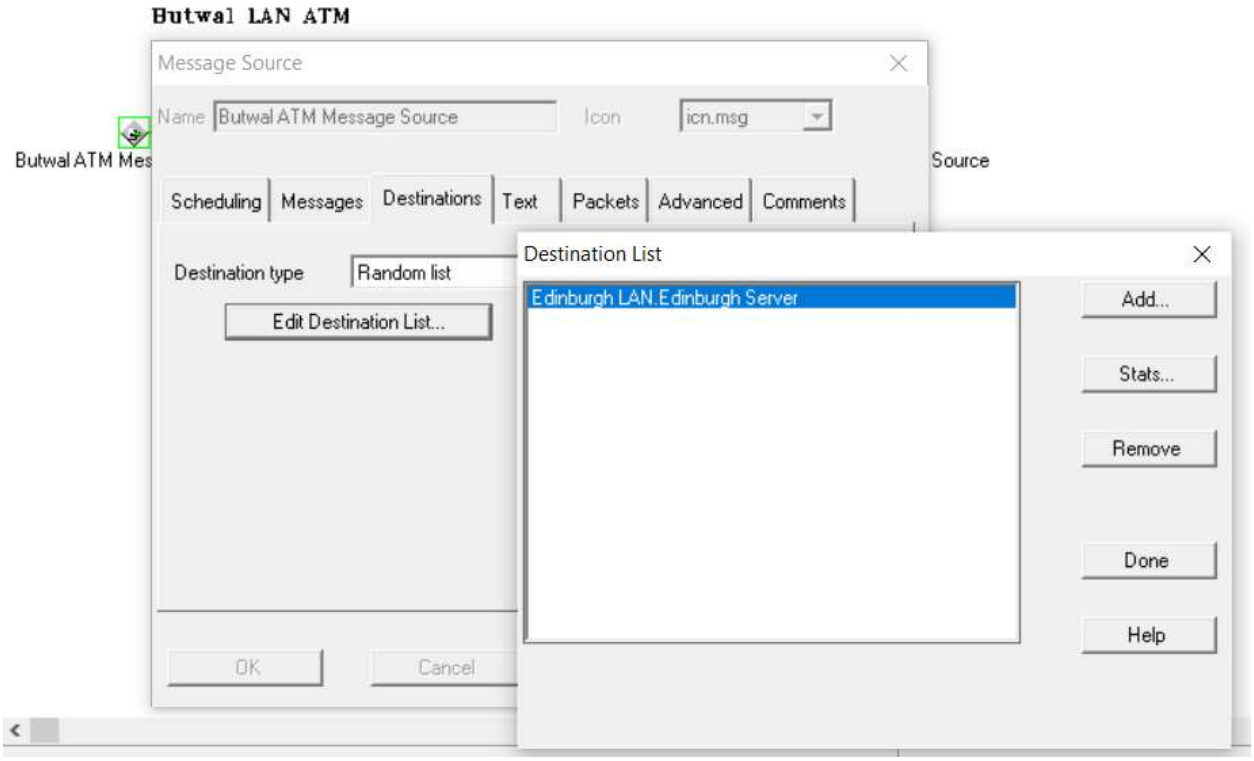

Figure 33 BUTWAL MESSAGE SOURCE DESTINATION CONFIGURATION

Description

In the above figure in the itahari ATM message source we have done the configuration as the destination type which is random list and in it random list there is edit destination list where there is Edinburgh server Edinburgh LAN

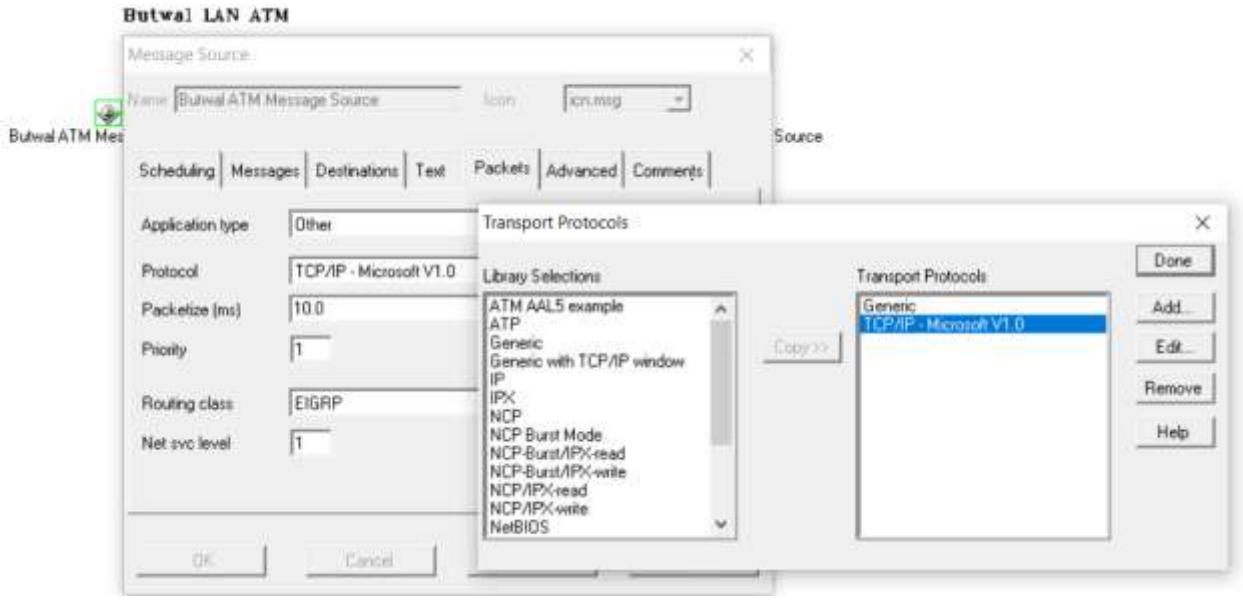

Figure 34 BUTWAL LAN MESSAGE PROTOCOL CONFIGURATION

Description

In the above figure, in the itahari ATM message source we have done the configuration in the packet TCP/IP-Microsoft V1.0s is set in packet.

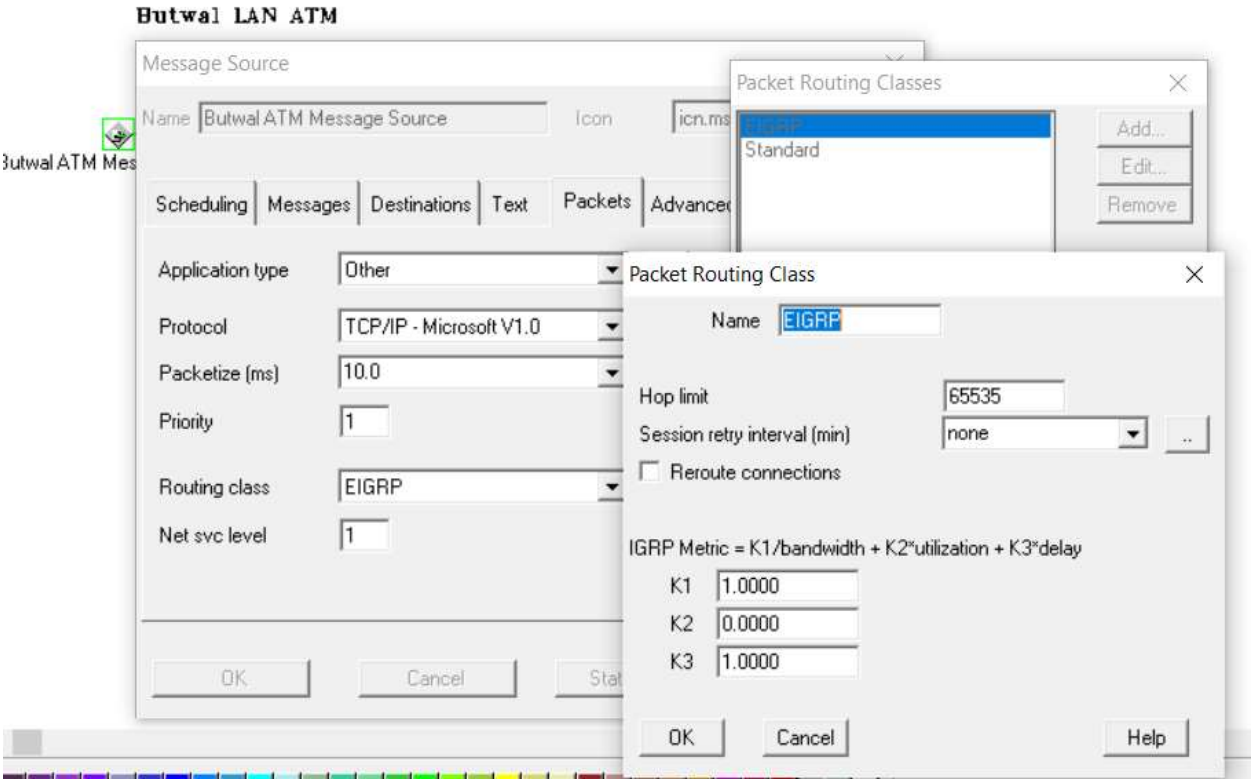

Figure 35 BUTWAL LAN MESSSAGE ROUTING CLASS PROTOCOL

Description

In the above figure, in the butwal ATM message source we have done the configuration in the packet ERGIP is set in routing class.

1.2.3.4 COMPUTER GROUP

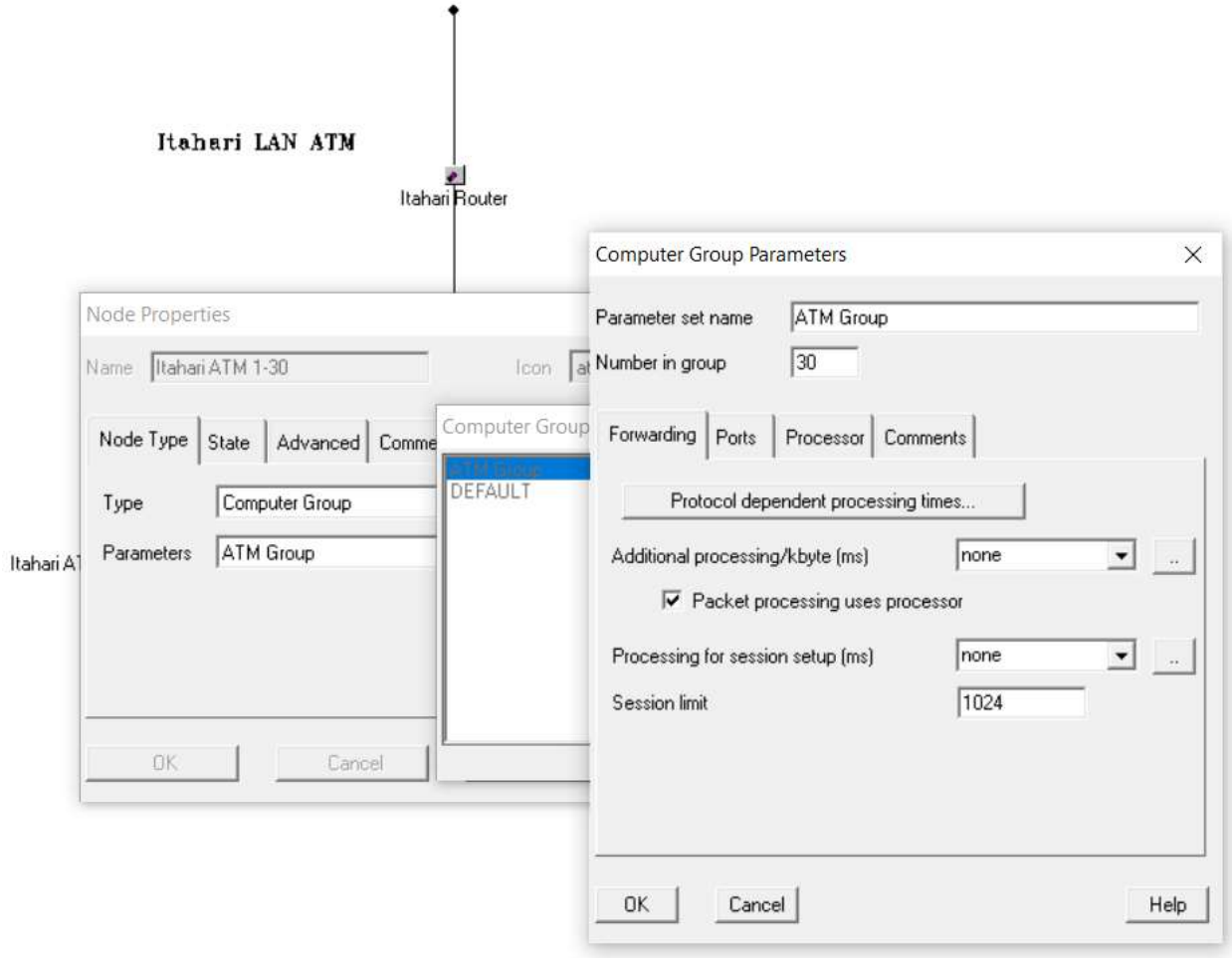

Figure 36 ITAHARI COMPUTER GROUP

Description

In the figure above, in itahari ATM 1-30 its configuration is done as computer group as its type and ATM Group, Number of computer 30.

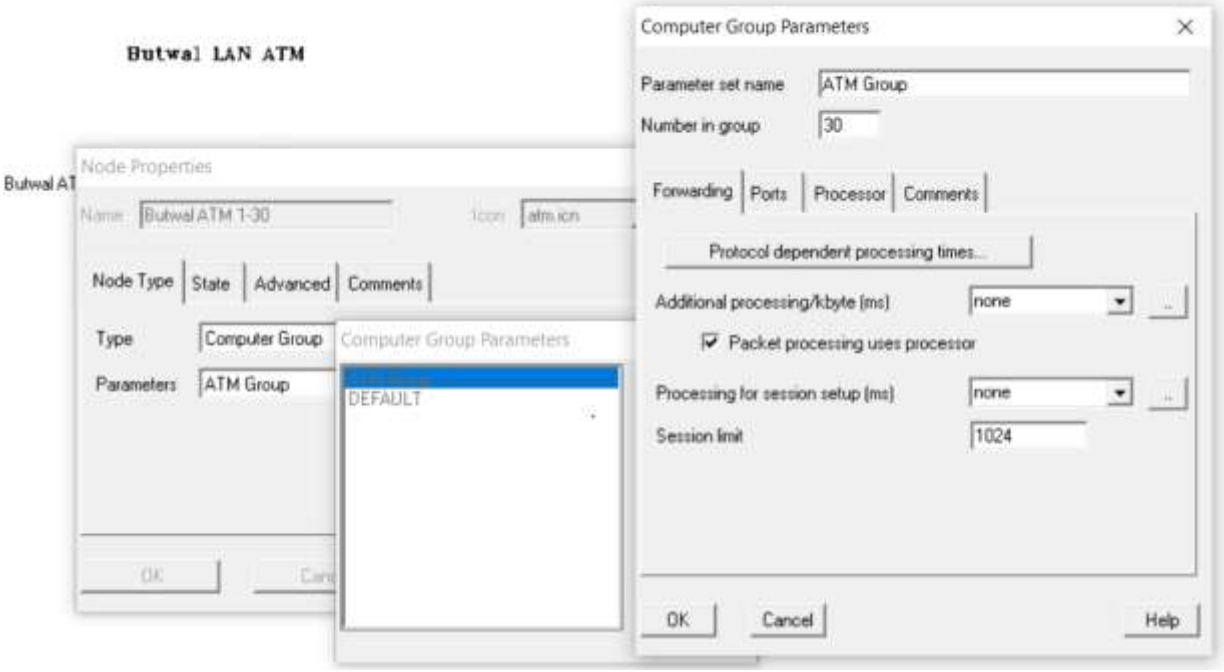

Figure 37 BUTWAL COMPUTER GROUP

Description

In the figure above, in itahari ATM 1-30 its configuration is done as computer group as its type and ATM Group, Number of computers 30.

1.2.3.5 MESSAGE SOURCE

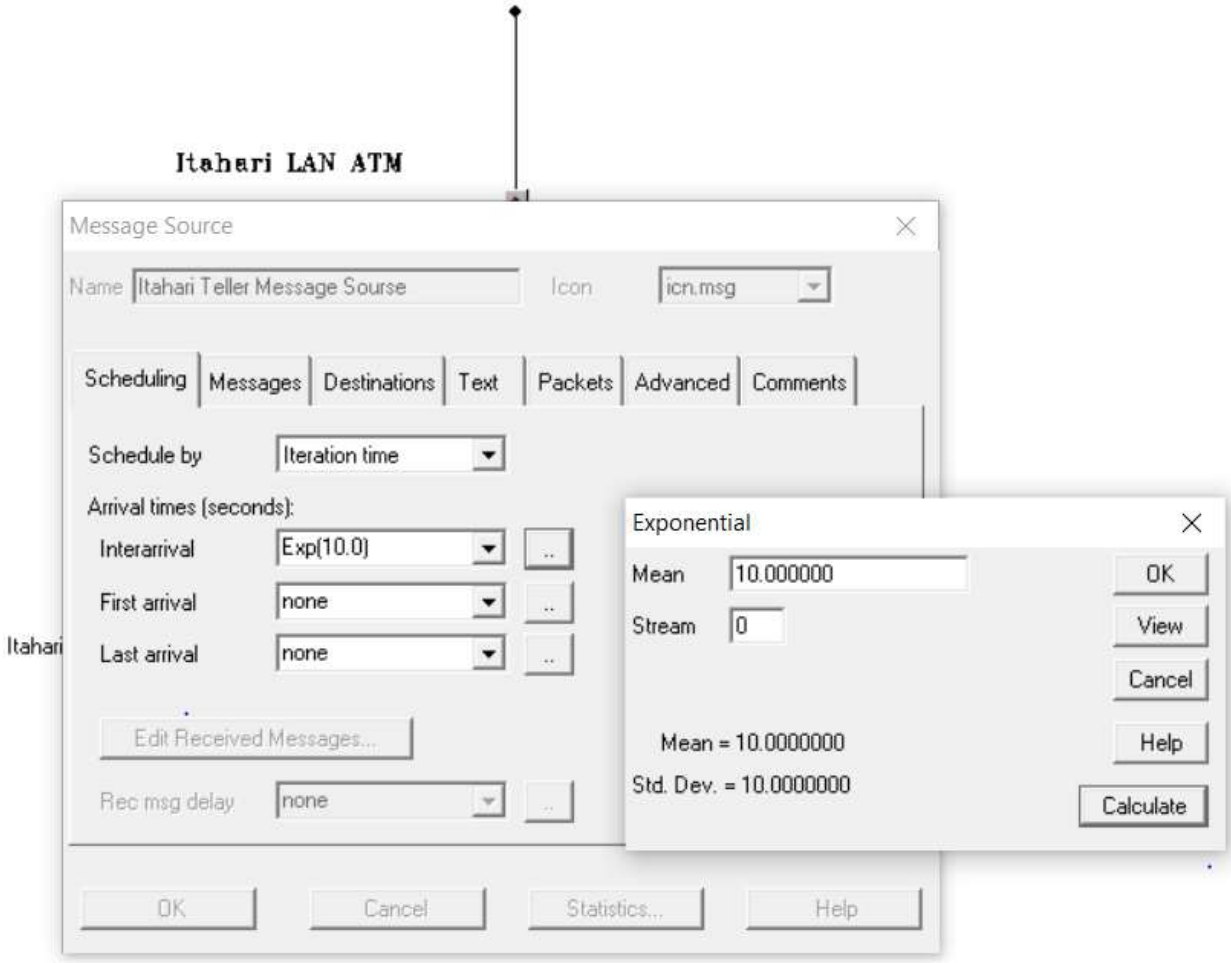

Figure 38 ITAHARI LAN TELLER MACHINE MESSAGE SOURCE SCHEDULING CONFIGURATION

Description

In the above figure in itahari teller message source it has done the configuration as itahari ATM message Source. Which is scheduling as iteration time in schedule by and interarrival as EXP (10,0)

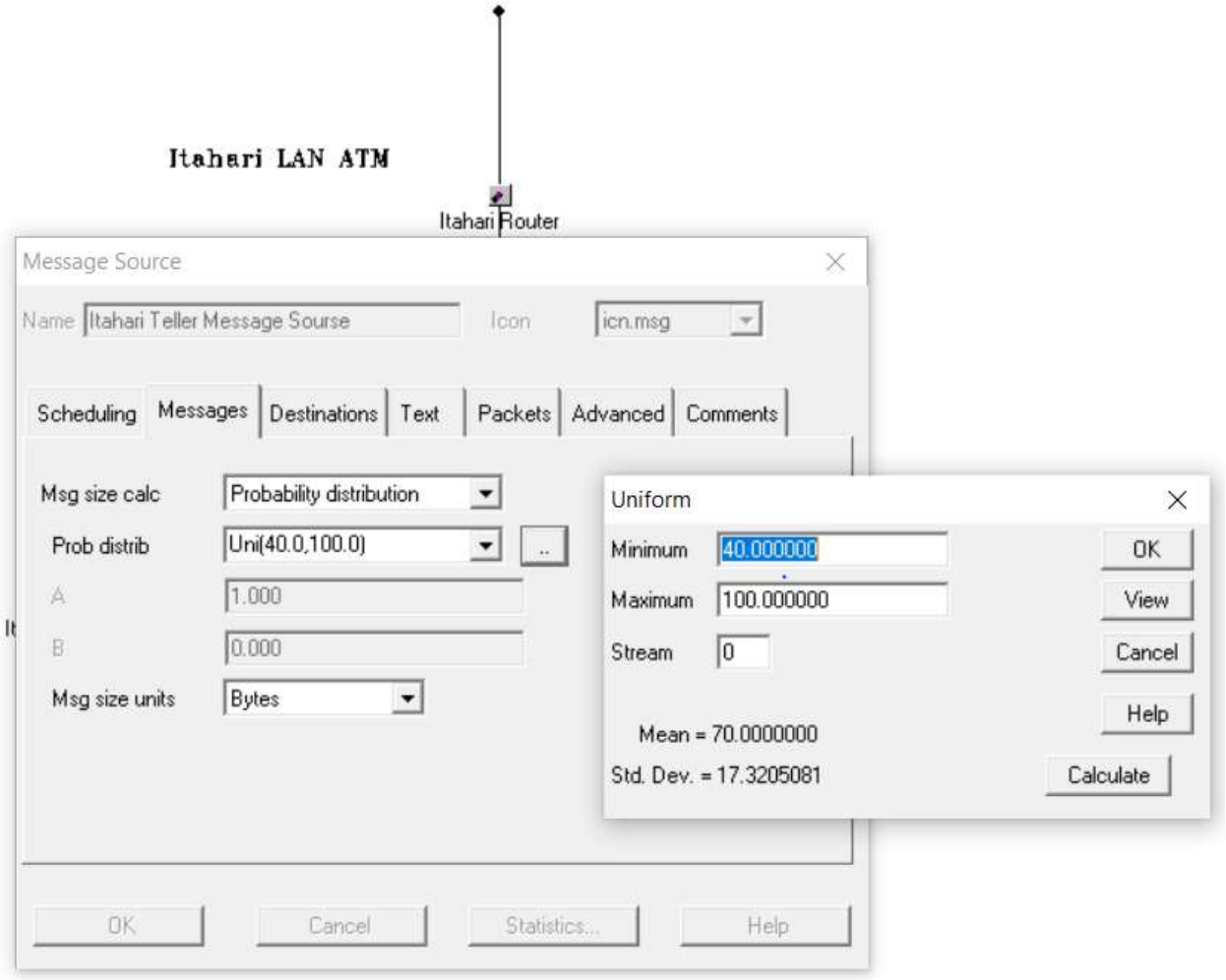

Figure 39 ITAHARI LAN TELLER MACHINE CONFIGURATION

Description

In the above figure, in itahari teller message source it has done the following configuration in message in Msg size calc and probability distribution and probability distribution is set as Unit (40.0,100.0,0) and set minimum as 40 and maximum as 100 and stream as 0.

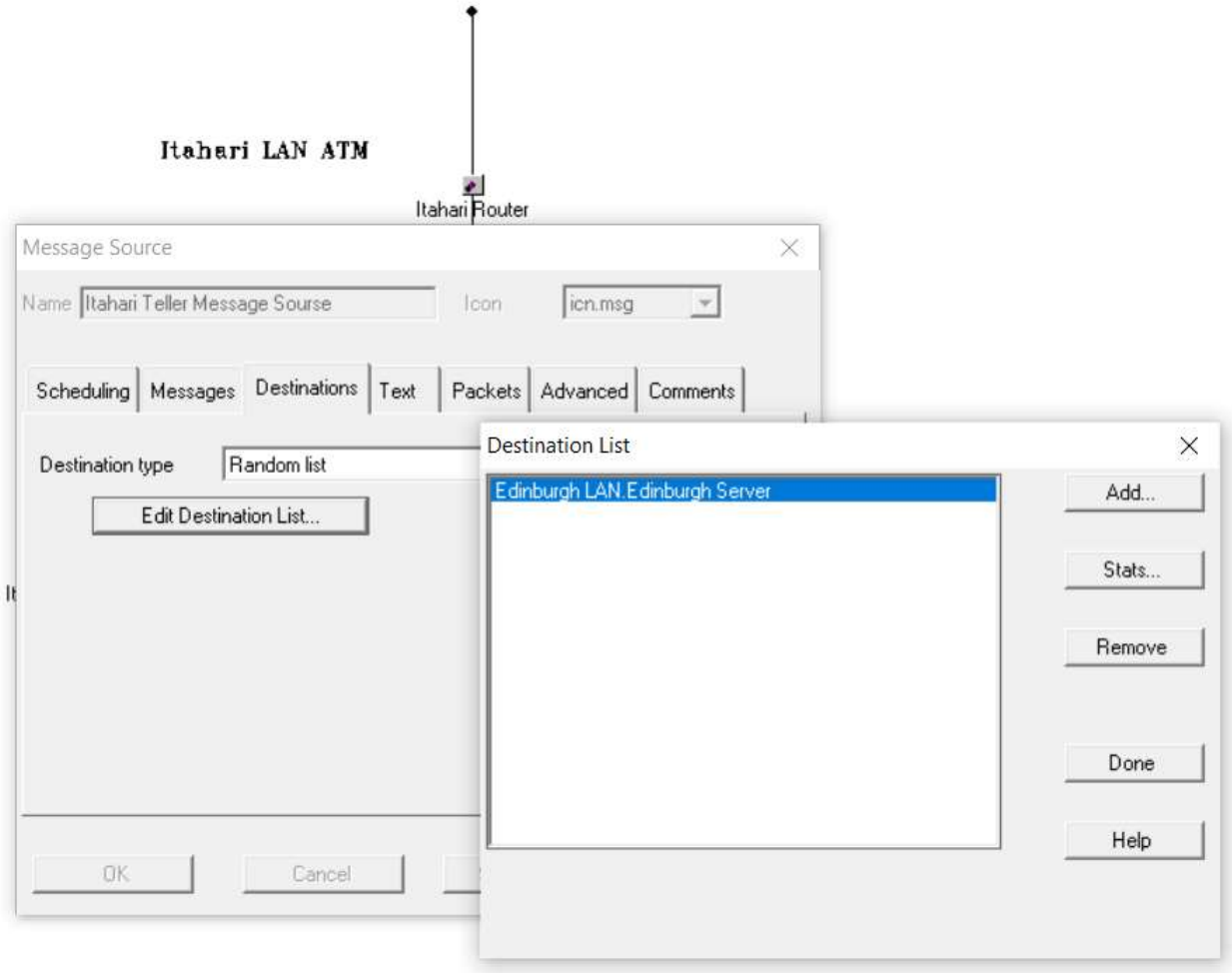

Figure 40 ITAHARI LAN DESTINATION CONFIGURATION

Description

In the following figure in itahari message source configuration is done as random list in destination type in destination. And in random list it is set as Edinburgh server Edinburgh LAN in edit destination list.

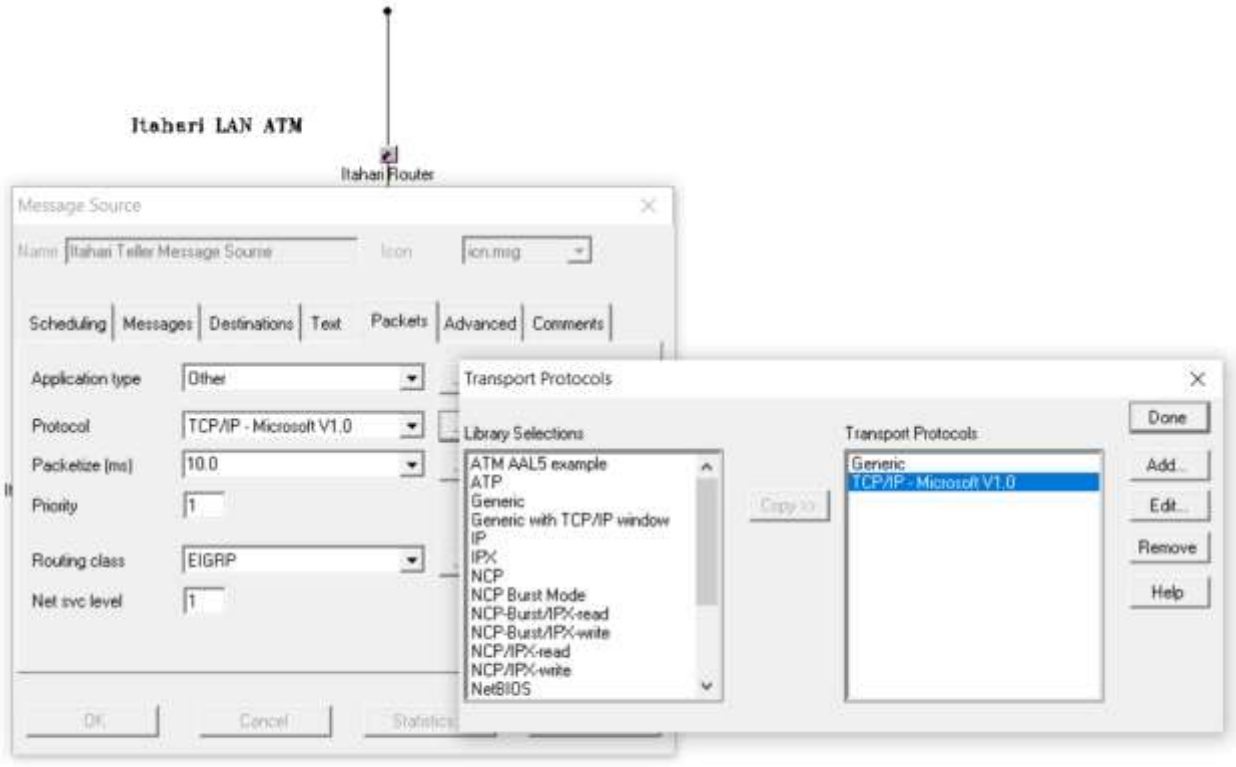

Figure 41 ITAHARI LAN TELLER MACHINE PROTOCOL CONFIGURATION.

Description

In the above figure in itahari teller message source its configuration is done as TCP/IP-Microsoft V1.0s in protocol in packets.

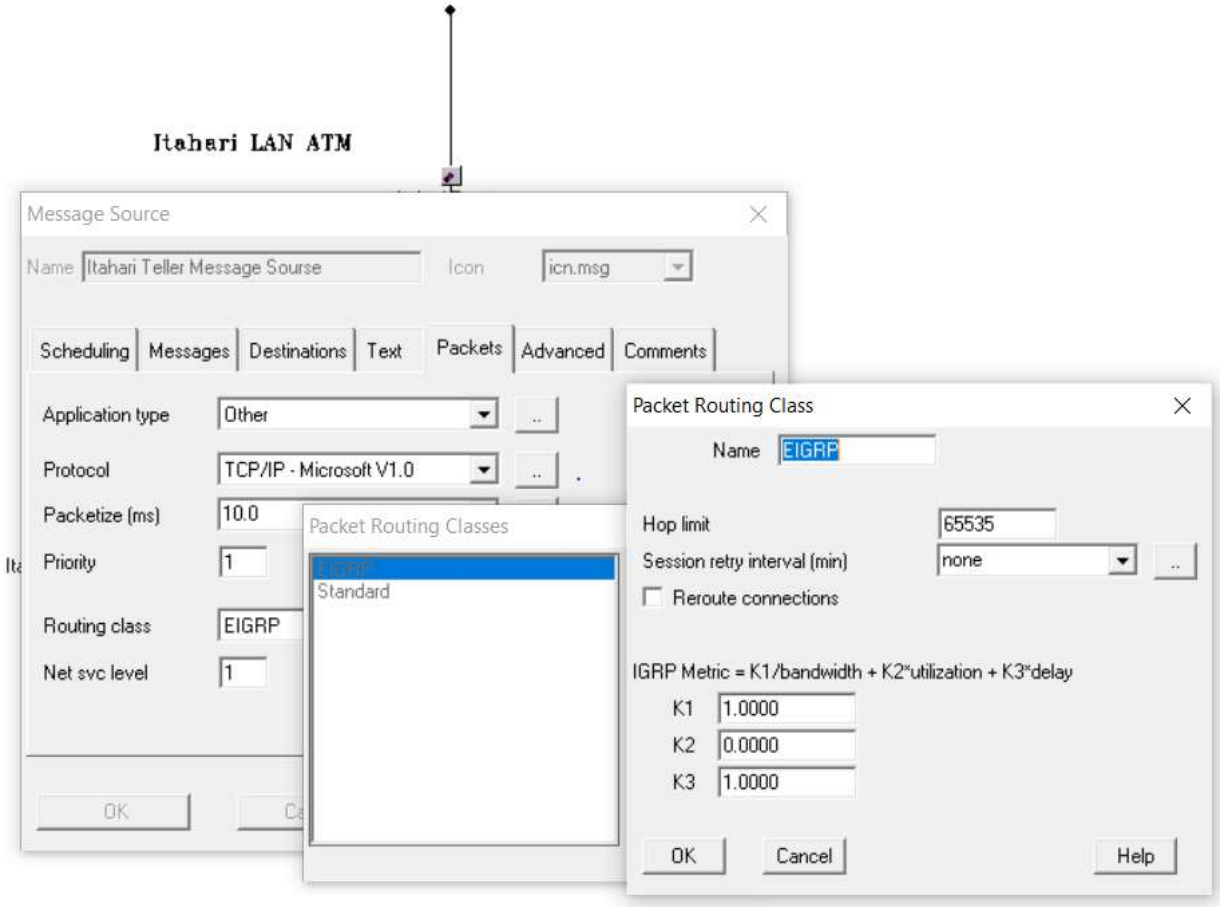

Figure 42 ITAHARI LAN TELLER MACHINE OF ROUTING CLASS PROTOCOL

Description

In the above figure in itahari teller message source its configuration is done as EGRIP in routing class in packets.

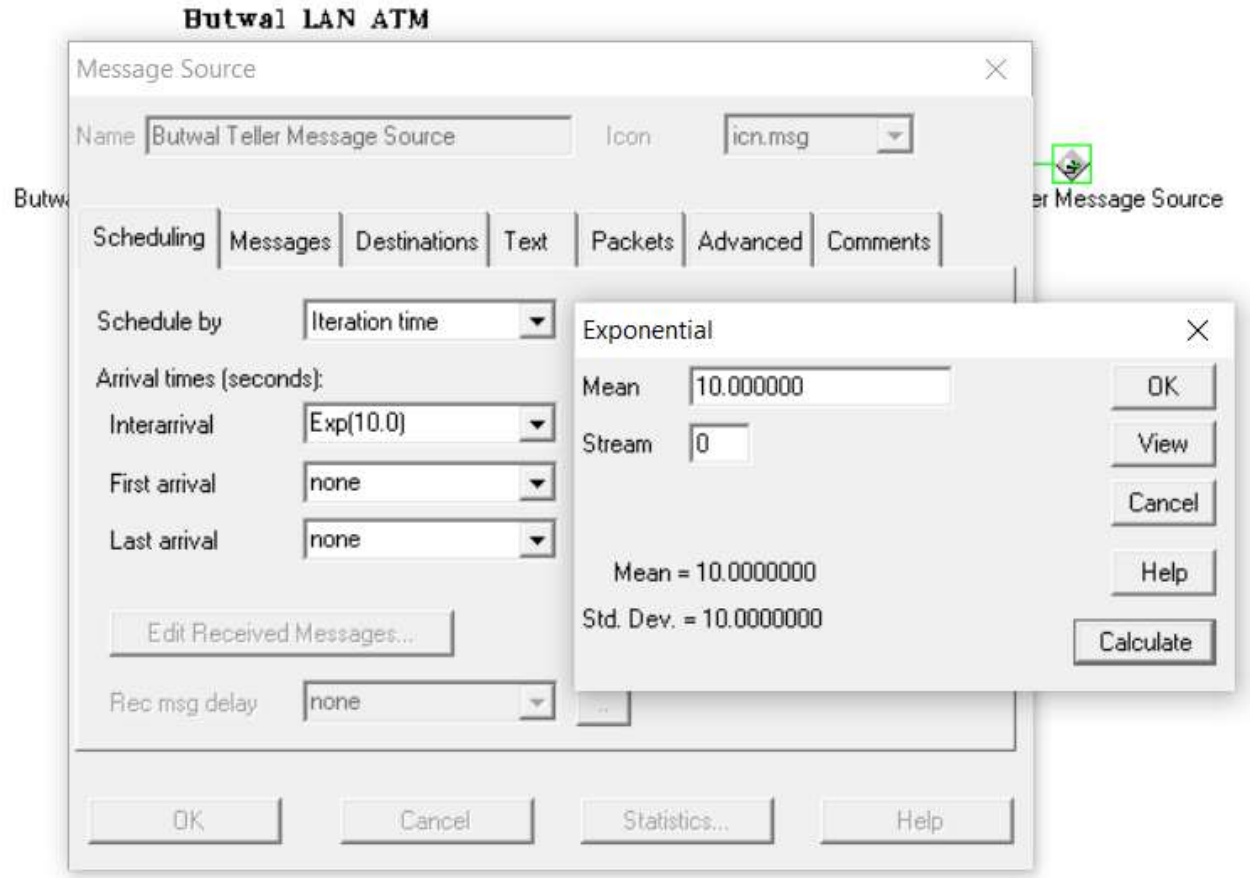

Figure 43 BUTWAL LAN MESSAGE OF SCHEDULING CONFIGURATION

Description

In the above figure in butwal teller message source it has done the configuration as Butwal ATM message Source. Which is scheduling as iteration time in schedule by and interarrival as EXP (10,0)

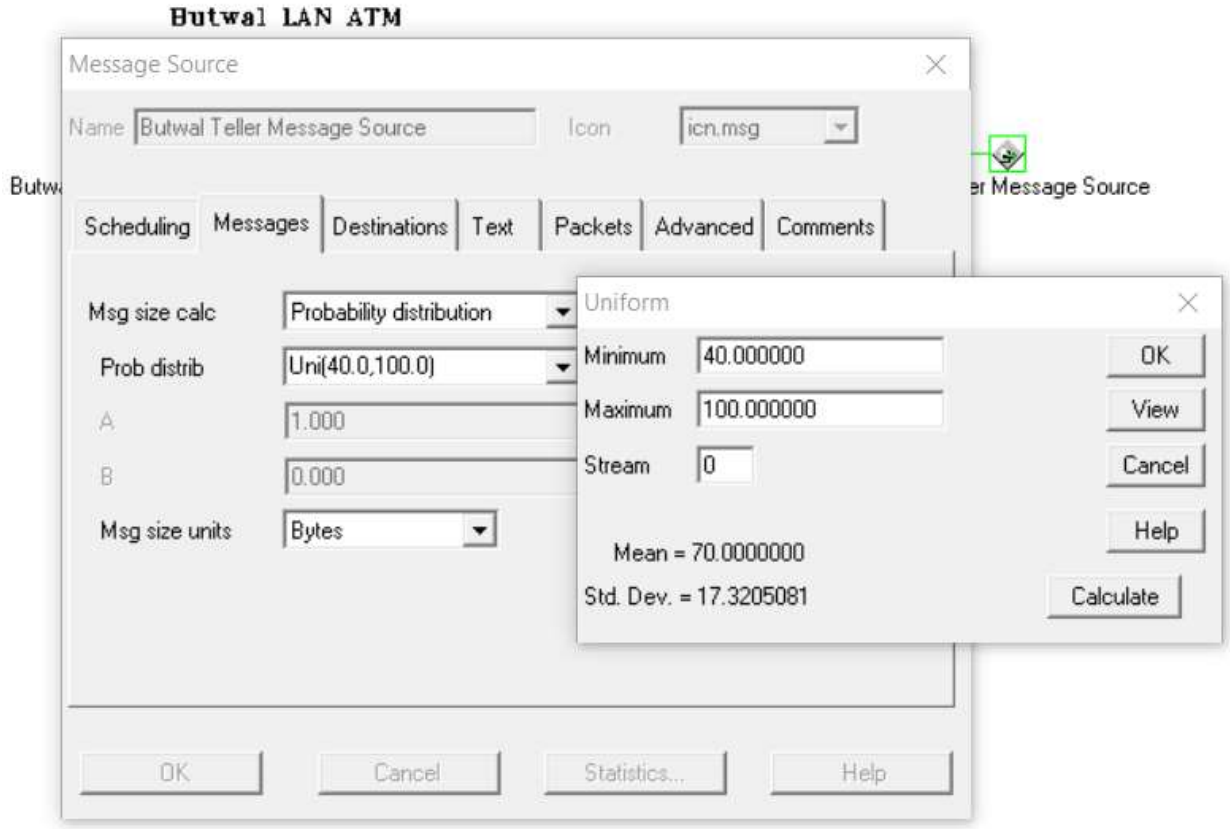

Figure 44 BUTWAL LAN MESSAGE CONFIGURATION

Description

In the above figure, in butwal teller message source it has done the following configuration in message in Msg size calc and probability distribution and probability distribution is set as Unit (40.0,100.0,0) and set minimum as 40 and maximum as 100 and stream as 0.

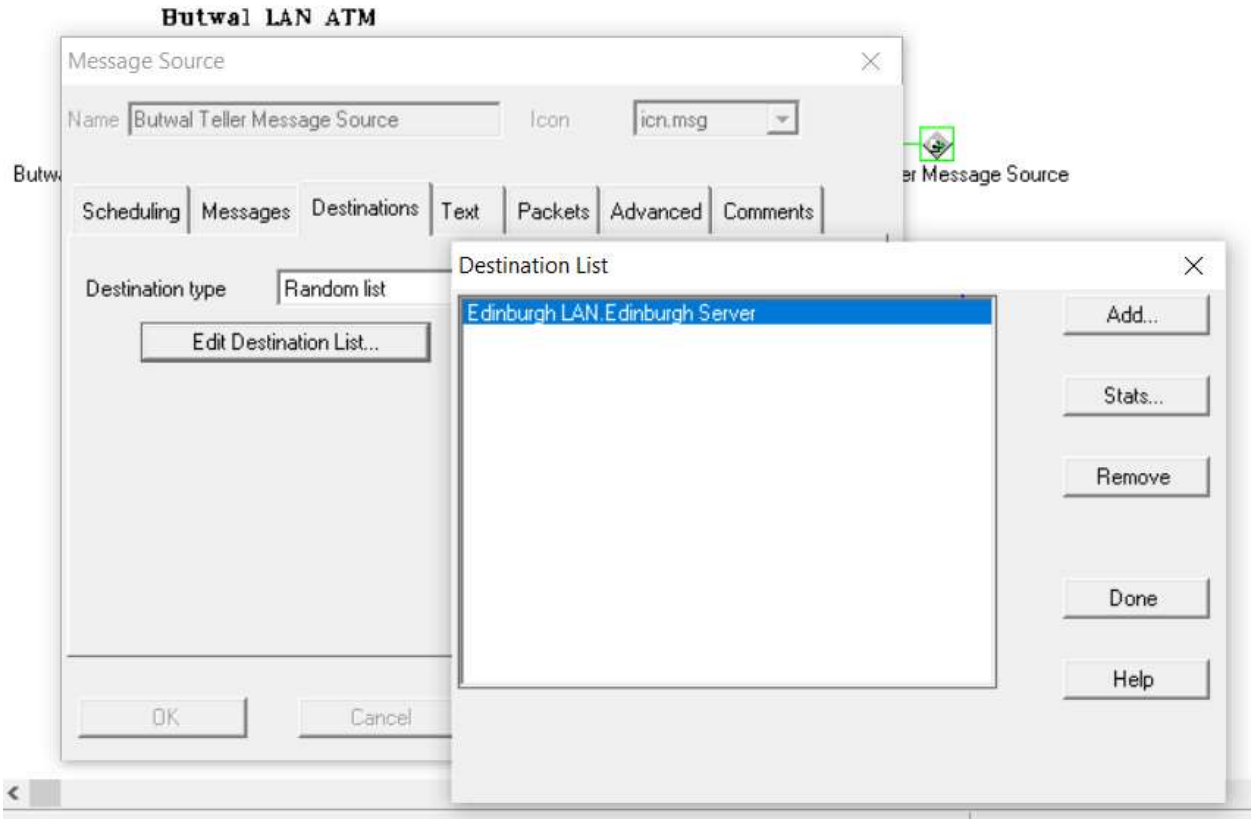

Figure 45 BUTWAL MESSAGE DESTINATION CONFIGURATION

Description

In the following figure in Butwal message source configuration is done as random list in destination type in destination. And in random list it is set as Edinburgh LAN Edinburgh server in edit destination list.

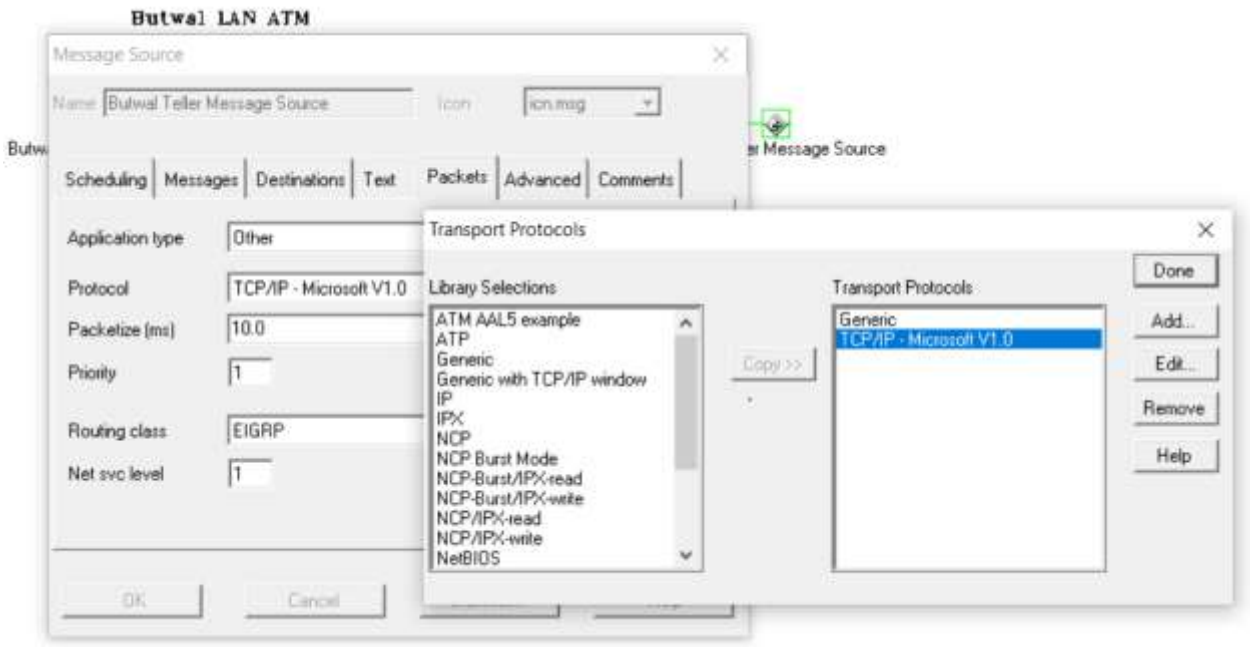

Figure 46 BUTWAL LAN MESSAGE OF PROTOCAL CONFIGURATION.

Description

In the above figure in butwal teller message source its configuration is done as TCP/IP-Microsoft V1.0s in protocol in packets.

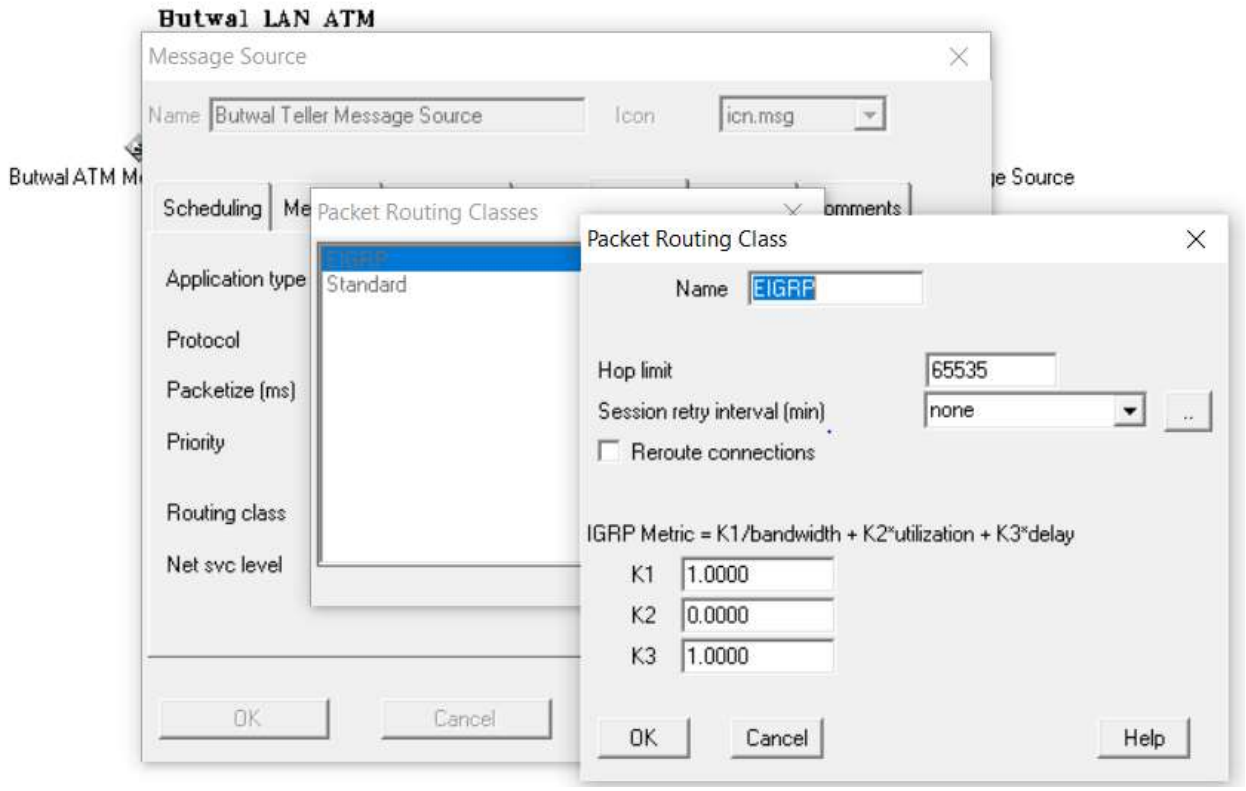

Figure 47 BUTWAL LAN MESSAGE ROUTING CLASS CONFIGURATION

Description

In the above figure in Butwal teller message source its configuration is done as EGRIP in routing class in packets.

1.3 DESCRIPTION OF REPORT

1.3.1 NODES: RECEIVED MESSAGE COUNTS Receiver (Message Name) vs Count

Table 1 RECIVED MESSAGE COUNT

Receiver	COUNT	MESSAGE NAME

Edinburgh Lan. Edinburg	983	Itahari ATM Message Source
Edinburgh Lan. Edinburg	996	Butwal ATM Message Source
Edinburgh Lan. Edinburg	1	Itahari Teller Message
Edinburgh Lan. Edinburg	2	Butwal Teller Message

Description

In the shown above table and this table is about receiver, count and message name of all nodes. This report was made after the completion of simulation model. There are foure nodes which are Edinburgh Lan. Edinburg, Edinburgh Lan. Edinburg, Edinburgh Lan. Edinburg, Edinburgh Lan. Edinburg as shown in the table.

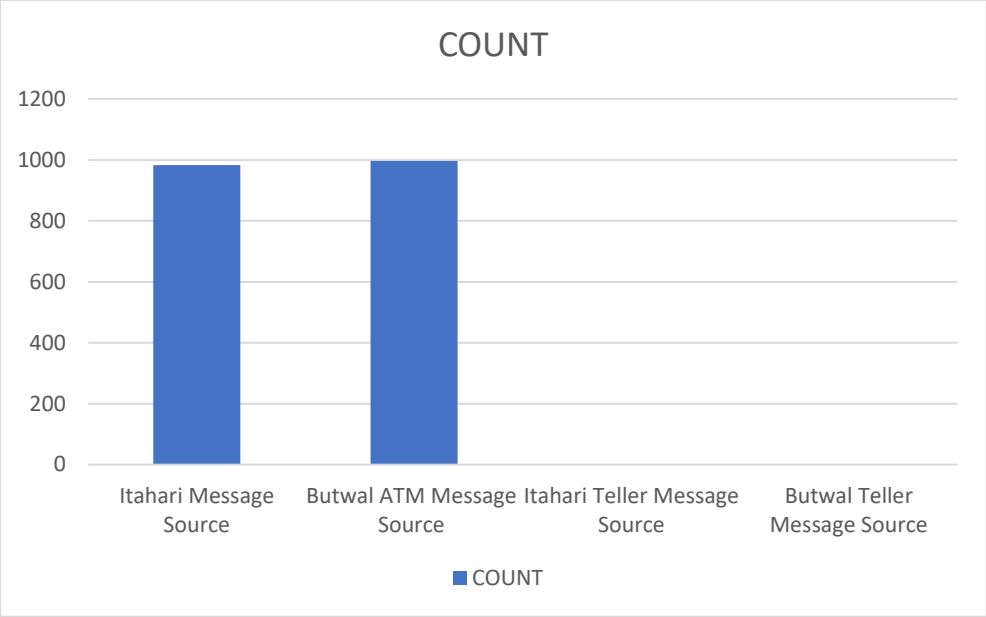

Figure 48 RECIVER VS COUNT

Description

In the above graph the highest peak of Butwal atm message source where the value is 996 and the second highest peak is itahari message source 983 and the third message is Butwal message source is 2 and itahari teller message is 1

1.3.2 Link: channel Utilization vs %Utilization

Table 2 CHANNEL UTILIZATION

LINK / APP TYPES	PACKETS DELIVERED	PKTS/ SEC	BYTES DELIVERED	KBPS DELIVERED	% Bytes	UTIL(%)
Itahari Lan. Itahari LAN	18957	315.950	1087665	145.022	100.000	2.25
Butwal Lan.	12730	212.167	657934	87.725	100.000	0.80

Butwal LAN Link						
Edinburgh LAN Edinburgh	19055	317.583	1090494	145.399	100.000	2.26

Description

In the shown above table and this table is about receiver, count and message name of all link. This report was made after the completion of simulation model. There are three link channel names as Itahari Lan. Itahari LAN, Edinburgh LAN. Edinburg, Butwal Lan. Butwal LAN Link.

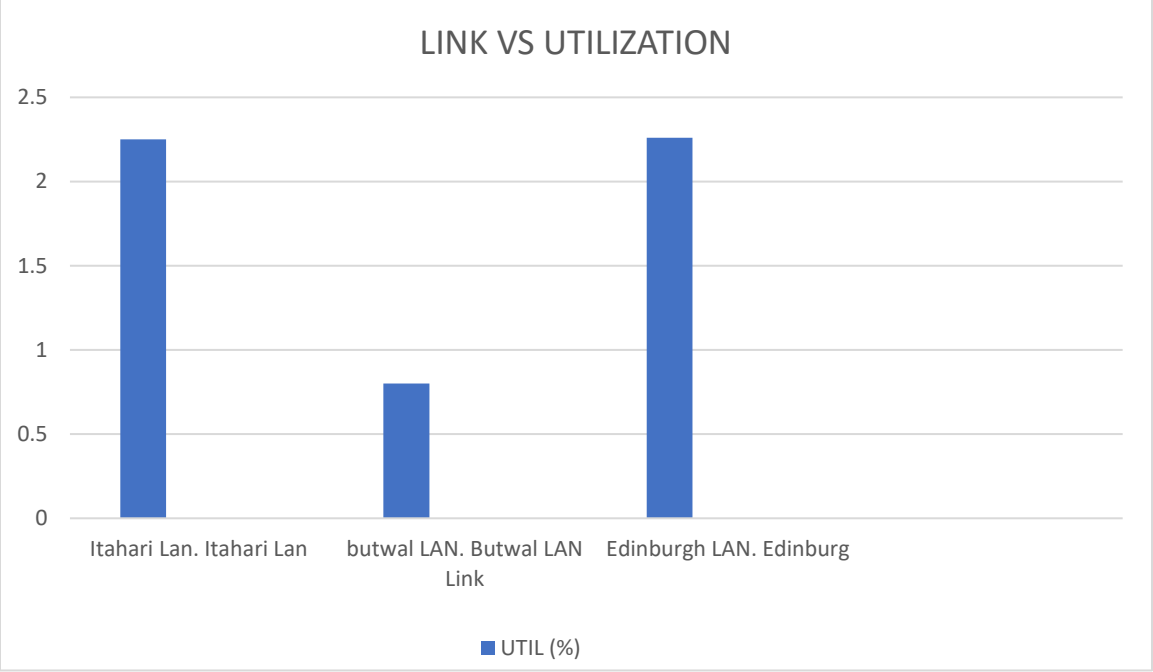

Figure 49 LINK VS UTILIZATION

Description

From the above graph it is shown as the highest link of utilization is Edinburgh LAN Edinburgh by 2.26% and the next in itahari LAN.Itahari LAN as 2.25% and the last is Butwal Lan Butwal Lan link cover by 0.8%.

1.3.3. WAN Cloud: Frame Count by VC Cloud: VC vs Frame Accepted vs Kilobit accepted

1.3.3.1 Cloud: VC vs Frame delay average

WAN CLOUDS: FRAME DELAY BY VC

REPLICATION 1 FROM 0.0 TO 60.0 SECONDS

Table 3 FRAME DELAY

CLOUD: VC WAN Cloud	FRAME DELAY (MS)			BURST SIZE (kb)	
	AVG	STD	MAX	AVG	MAX
Itahari-Edinburgh	1164	697	2520	158	320
Edinburgh-Itahari	17	0	17	111	243
Edinburgh-butwal	17	0	17	111	251
Butwal-Edinburgh	1169	`701	2522	160	320

Description

In the above shown table it has shown about the virtual circuit vs frame delay average. This report was shown after it completes the simulation report. There are four virtual circuit named as Itahari Edinburgh, Edinburgh Itahari, Edinburgh Butwal, Butwal Edinburgh. In the frame delay the average msg delay of virtual circuit set as itahari Edinburgh 1164, Edinburgh itahari 17, Edinburgh butwal 17, Butwal wdinburgh 1169.

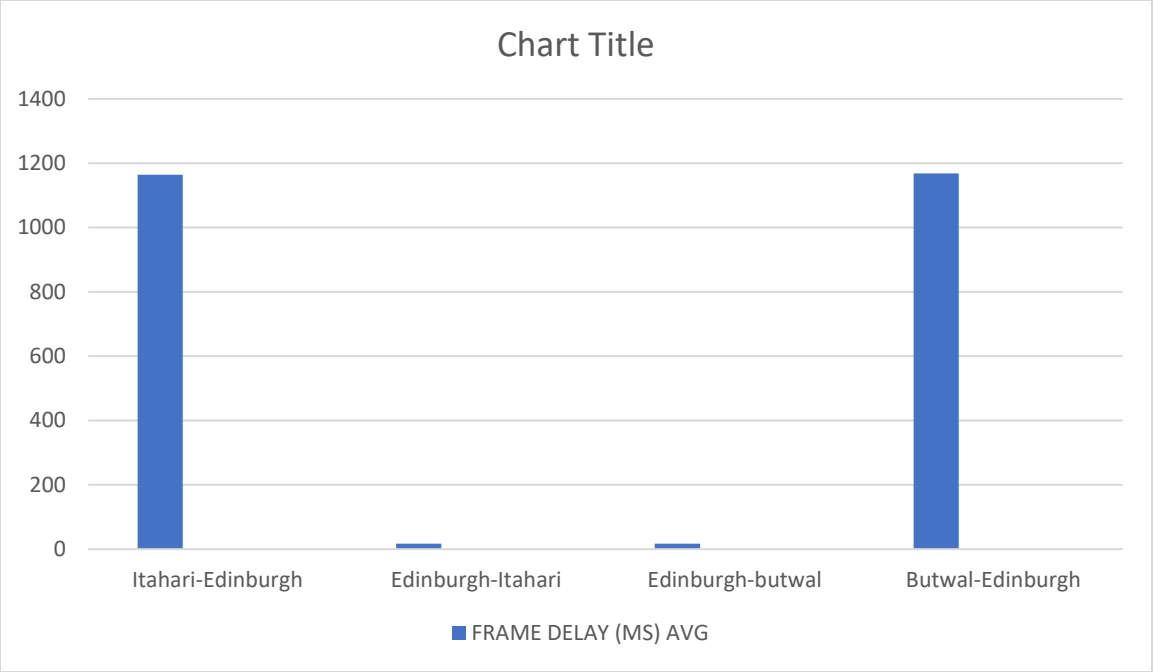

Figure 50 VC VS FRAME DELAY AVERAGE

Description

In the above figure it is about the frame delay of by average in which the highest peak is of Butwal Edinburgh with the value of 1169, second peak is set in itahari Edinburgh is set as 1164. And the average frame delay is set as 7 in Edinburgh Itahari and Edinburgh Butwal

1.3.3.2 Cloud: VC vs. Burst size average

Table 4 FRAME DELAY IN BURST SIZE

CLOUD: VC WAN Cloud	BURST SIZE (kb)
	AVG
Itahari-Edinburgh	158
Edinburgh-Itahari	111
Edinburgh-butwal	111

Butwal-Edinburgh	160

Description

In the above shown table it has shown about the virtual circuit vs frame Burst size. This report was shown after it completes the simulation report. There are four virtual circuit named as Itahari Edinburgh, Edinburgh Itahari, Edinburgh Butwal, Butwal Edinburgh. In the frame delay the burst size delay of virtual circuit set as itahari Edinburgh 158, Edinburgh itahari 111, Edinburgh butwal 111, Butwal Edinburgh 160.

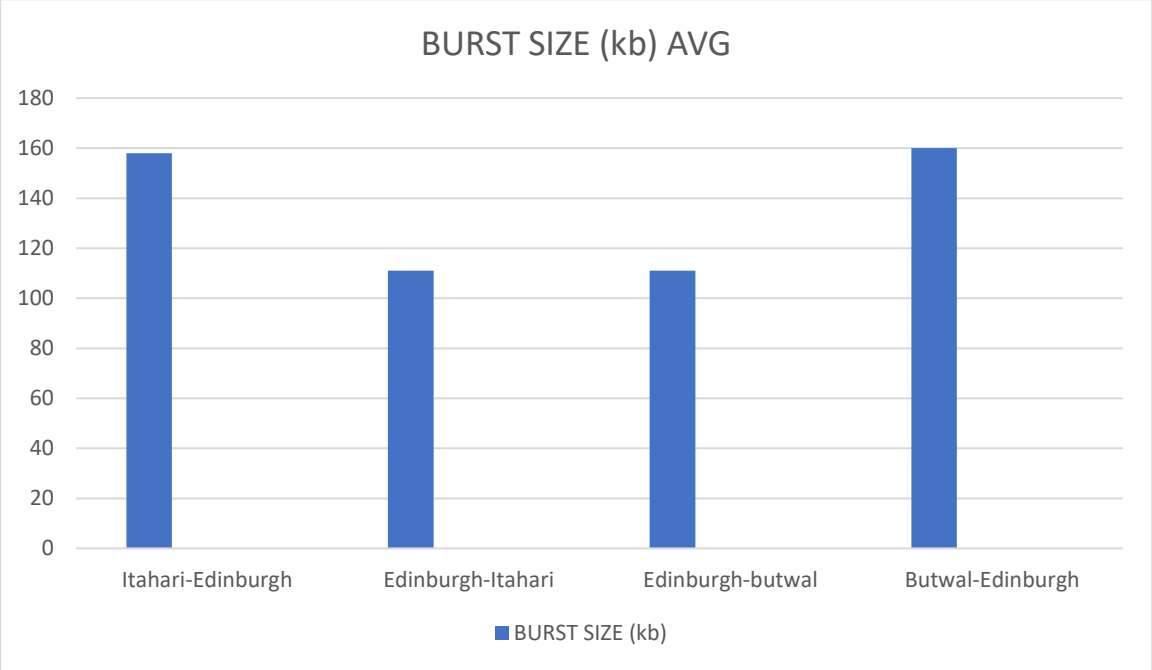

Figure 51 VC VS BURST SIZE AVERAGE

Description

In the above figure it is about the burst size of by average in which the highest peak is of Butwal Edinburgh with the value of 160, second peak is set in itahari Edinburgh is set as 158 And the average frame delay is set as 111 in Edinburgh Itahari and Edinburgh Butwal

1.3.3 WAN Cloud: Frame Count By VC

Cloud: VC vs Frame Accepted vs Kilobit accepted

WAN CLOUDS: FRAME COUNTS BY VC

REPLICATION 1 FROM 0.0 TO 60.0 SECONDS

Table 5 FRAME COUNT AND KILOBITS

CLOUD: VC: FRAMES	FRAMES / ACCEPTED		KILOBITS DROPPED	
KILOBITS	NORMAL	DE	NORMAL	DE
WAN Cloud	(TOTAL KILOBITS TRANSMITTED = 5263)			
Itahari-Edinburg Frm	1614	1567	0	9463
kb	803	811	0	4656
Edinburgh-Itahar Frm	2304	877	0	0
kb	737	281	0	0
Edinburgh-butwal Frm	2304	880	0	0
kb	737	282	0	0
Butwal-Edinburgh Frm	1597	1587	0	9565
kb	805	808	0	4692

Description

In the above shown table in about the cloud virtual circuit vs frames accepted. It was generated after the simulation is done. The frame accepted by wan cloud which is set as 1614 in itahari Edinburgh and kb as 803, 2304 in Edinburgh itahari and kb as 737. 2304 in Edinburgh Butwal frm 737. 1597 in Butwal Edinburgh and kb is 805.

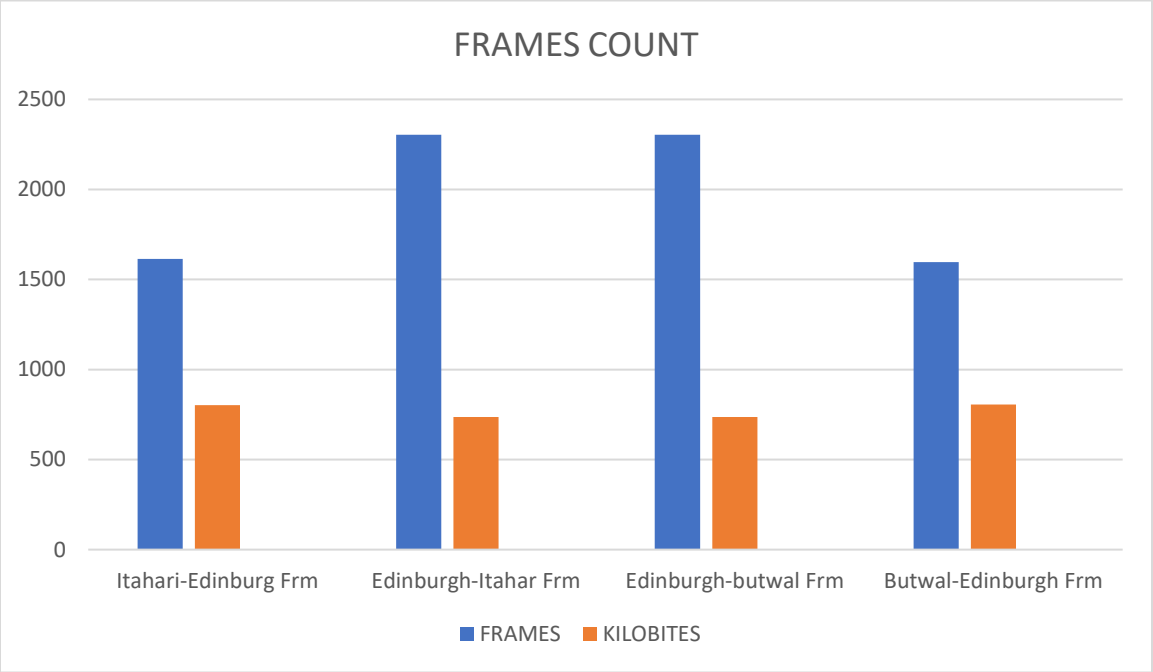

Figure 52 VC VS FRAME ACCEPTED VS KILOBIT ACCEPED

Description

In the above figure it is about the frame count of by average in which the highest peak is of Edinburgh-itahari and Edinburgh Butwal with the value of 2304 and its kb is 737, second peak is set in itahari Edinburgh is set as 1614 and 803. And the Butwal Edinburgh 1597 and kb as 805.

1.3.3.1 WAN CLOUDS: ACCESS LINK STATS

Cloud Access link vs frame accepted entry vs frame accepted exit

Table 6 MESSAGE RESPONCE MESSAGE DELAY

CLOUD:	FRAMES		BUFFER (BYTES)			% UTIL
ACCESS LINK (ENTRY)	ACCEPTED	DROPPED	MAX	AVG	STD	

(EXIT)						
Itahari Access Entry	3181	9463	N/A	N/A	N/A	97.44
Exit	3181	0	80	7	15	17.23
Edinburgh Access Entry	6365	0	N/A	N/A	N/A	34.48
Exit	6365	0	33930	7809	10305	49.97
Butwal Access Entry	3184	9565	N/A	N/A	N/A	98.03
Exit	3184	0	80	7	15	17.25

Description

In the above shown table in about the cloud access link vs frames entry. It was generated after the simulation is done. The entry and exit point of the respective link are: Itahari-Access Entry 3181, Exit 3181, and Edinburgh Access entry 6369, Exit 6365, and Butwal Access Entry 3184, exit 3184.

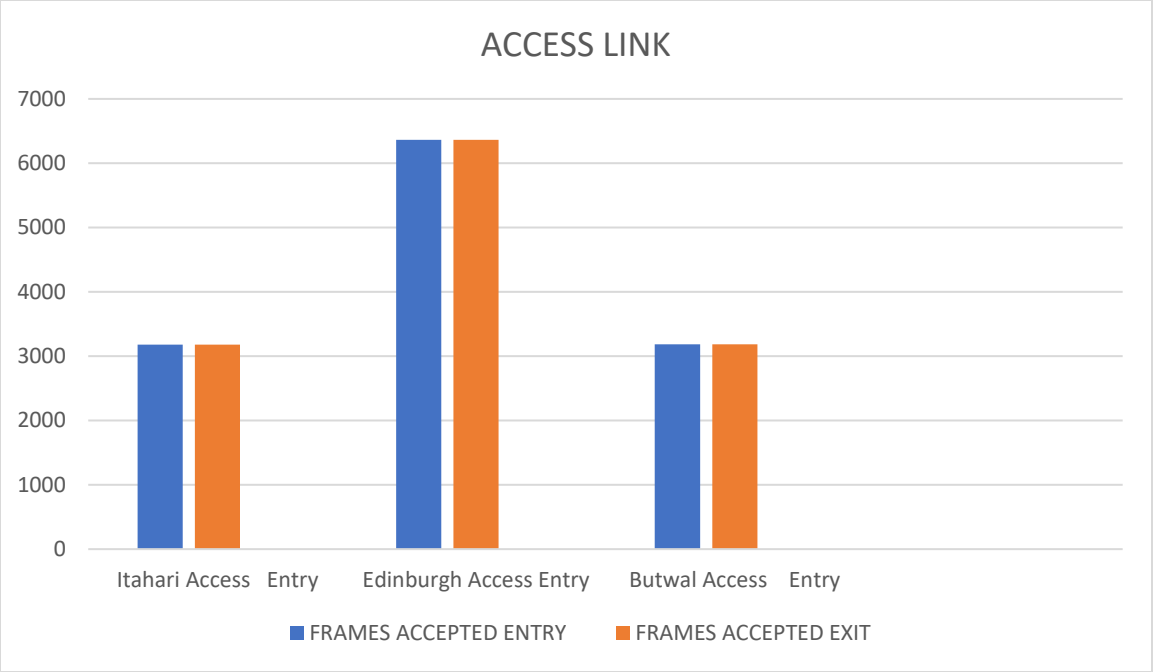

Figure 53 CLOUD ACCESS VS FRAME ACCEPTED ENTRY VS FRAME ACCEPTED EXIT

Description

In the above figure it is about the frame Access link of by average in which the highest peak is of Edinburgh access link set as 6369 and second itahari access link as 3184 as 3184. And the last is Butwal access link 3184 and exit 3184.

1.3.3.6 Message + response Source: Message Delay

Origin /Message Source Name/ Destination List vs average

7 MESSAGE DELAY

ORIGIN / MSG SRC NAME: MESSAGES	MESSAGE DELAY			
DESTINATION LIST	ASSEMBLED	AVERAGE	STD DEV	MAXIMUM
Itahari Lan.Ithari Atm 1-30 / src Itahari ATM Message Source: Edinburgh Lan.Edinbu				
	983	16704.146 MS	10694.963 MS	49809.466 MS
Itahari Lan. Itahari Teller Machaine / src Itahari Teller Message: Edinburgh Lan.Edinbu				

	1	409.480 MS	0.000 MS	409.480 MS
Edinburgh Lan.Edinburgh Server / src Einburgh Response Source: ECHO				
	0	0.000 MS	0.000 MS	0.000 MS
Butwal Lan.Butwal Atm 1-30 / src Butwal ATM Message Source: Edinburgh Lan.Edinbu				
	996	17168.969 MS	11101.313 MS	50581.155 MS
Butwal Lan.Butwal Teller Machaine / src ButwalTeller Message: Edinburgh Lan.Edinbu				
	2	27620.207 MS	3046.105 MS	30666.312 MS

Description

From the above figure it has the origin message and the destination vs the e message delay. After the simulation mode the report was created. There are four message source name or origin as Itahari Lan.Ithari Atm 1-30 / src Itahari ATM Message Source: Edinburgh Lan.Edinburgh 16704.1146 average message delay, Itahari Lan.ITahari Teller Machaine / src Ithahari Teller Message: Edinburgh Lan.Edinburgh 409.480 ms average message delay, Edinburgh Lan.Edinburgh Server / src Einburgh Response Source: ECHO 0.0 average message delay, Butwal Lan.Butwal Atm 1-30 / src Butwal ATM Message Source: Edinburgh Lan.Edinburgh 17168.969 ms message average delay, Butwal Lan.Butwal Teller Machaine / src ButwalTeller Message: Edinburgh Lan.Edinburgh 27620.207 ms.

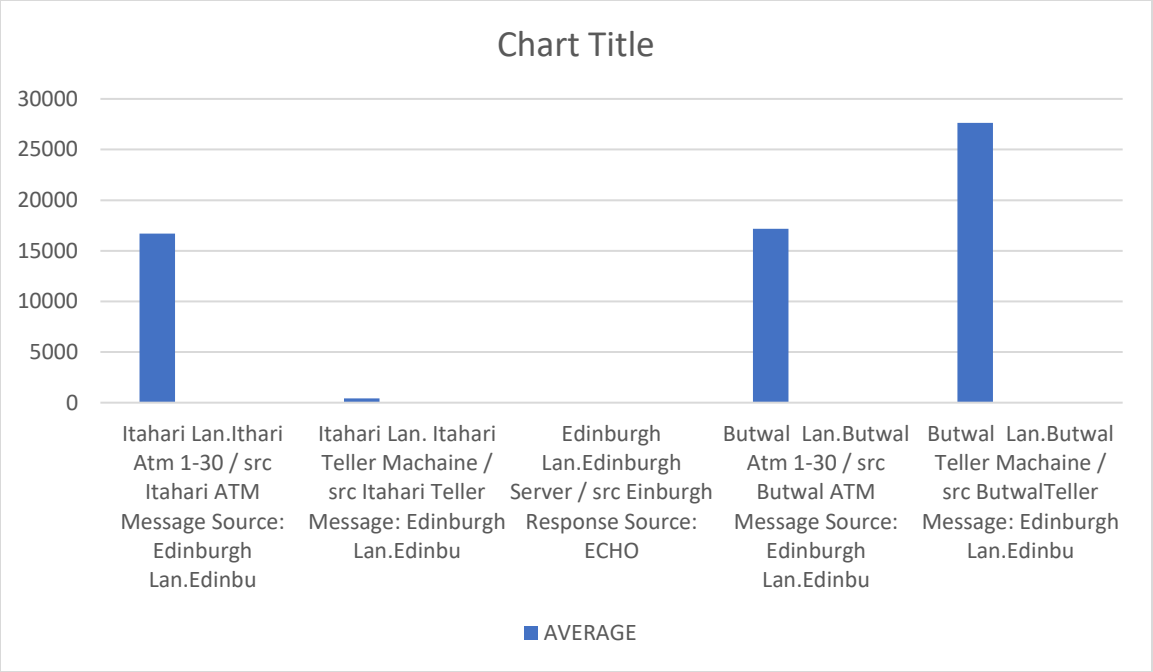

Figure 54 DESTINATION LIST VS AVERAGE

Description

In the above shown as the figure the highest average message delay of Butwal lan. Butwal teller machine / src Butwal teller message Edinburgh LAN Edinburgh set as 27260.207 and the second highest is average message delay of Butwal lan Butwal Atm 1-30 / src Butwal ATM Message Source: Edinburgh Lan.Edinburgh 17168.969 ms message average delay, Butwal Lan.Butwal Teller Machaine / src ButwalTeller Message: Edinburgh Lan.Edinburgh 27620.207 ms.

CONCLUSION

In the task A, making the network simulation model in the software COMNET III in the multinational bank in which it is set ATM transaction in Nepal and by testing the nodes and its transmission rates shows in the report graph. By the task it understands about the LAN of the different area are connected to each other and with frame relay cloud through the router. And in which LAN and WAN model is show in the scenario of task A.

In task A it gives the full knowledge of different components of the which is connected to the network model like routers, servers, circuit, computer groups, processing nodes, resource source, message source, different links, cloud and so on. Using all these components properly in interconnecting it becomes to the good networking system it not only gives the knowledge and idea of the simulation and in the report.

So, in the task A it gives the various knowledge of the different models such as LAN, WAN, point-to-point and so and it helps to learn about the different components or the tools which are used for developing the network.

2. TASK B

2.1. INTRODUCTION

A wireless network local-area network (LAN) which is also known as WLAN (Wireless Local-Area Network) which uses radio wave to connect internet in the devices such as mobile phones, laptop for the business network and its application. It is a flexible data communication system, in which wireless network uses wireless medium such as radio frequency to transmit the data and the information and reduce the needs of wire networks connection. Wireless network is basically developed or used to

develop something great in networking rather than the replacement of wired network and the wireless network are mostly used for the connectivity between wired network and mobile user.

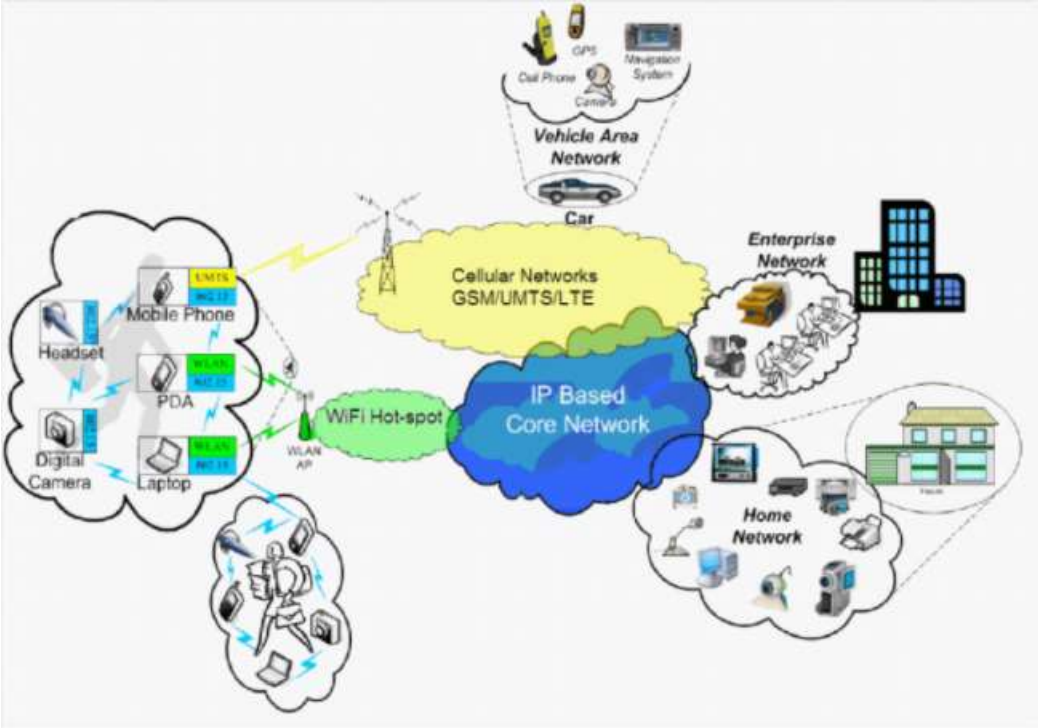

Figure 55 introduction to wireless network

Wireless network is increasing in all over the world in last five years. The old networking system was lacking in the networking field which was fulfilled by the todays wireless network. Like in the old day if the user should connect to a network to the physical cables, then the user feels the reduction of their performance. Whereas wireless connectivity, user does not pose any restriction for the user for the movement and the it helps the user for the free movement, mobility so the user can give high performance. So, the wireless network or wireless conductivity has made a whole new scenario in networking industry. Wireless devices are slowly replacing to the wired devices. Most of the office, organization had the wired devices like desktop, printer etc. which may be replaced by the wireless devices. Wireless devices have increasing the speed significantly. Wireless network has enabled the communication between different people of the different places. It also brings the changes to data networking, telecommunication, and it makes integrated networks. Wireless network has made the network portable because of digital modulation, wireless access and multiplexing. The user of the wireless technology has been the military, emergency services, and law enforcement organization. In today's networks and coverage, people communicating via

their mobile phones and devices and it helps the user for connectivity for everywhere. (GC, 2013/18/02) (Anon., n.d.) (Matin, n.d.)

2.2 BACKGROUND

In the wireless network world, wireless network uses transmit the data and the information from the different types of devices end devices, wireless devices like such as mobile phone, laptop etc. from the internet.

Figure 56 Wi Fi router

Figure 57wireless device

Wireless routers or (Wi Fi), for the communication equipment it operates the household. The first developed wireless network was Wi Fi to connect the computer or devices to the local communication in places.

2.1.1.1 Wireless Network

Wireless network is the network which allows the device to stay connected to the network by without any wire. If the device is connected to the router by wirelessly and so the device is far from the router then it will be also connected to its network. Wireless network also has type such as business wireless network and personal wireless network. So, if the user connects the Wi Fi hotspot at public place like airport, cafe, restaurant or any business then the user is connecting to

the business wireless network. And if the user is connected in the home or if the wireless network is connected for personal uses then it is known as personal wireless network. Wireless network is very useful than compared to the wired network. The biggest disadvantage of using wired network is to tethered to the router. Mostly the wired network uses the cable which connects to the one end to the ethernet port on the network router and another end cable is connect to the computer or devices. Lastly wired network, user thought that the wired network was faster and it was more secure but due to the enhancement networking system the wireless wired network has decreased than wireless network. (Anon., n.d.) (GC, 2013/18/02)

2.1.1.2 HISTORY

Wireless network was first developed in preindustrial age. These systems transmitted information over line-of-sight system by using the flashing mirror, smoke signals, flags etc. but now it is extending by using telescopes). A lager the combination of signals then to convey complex message with rudimentary signals. On the hilltops and the road side the observation station to relay message over large distance. By Telegraph network early communication network was replaced which was invented by Samuel Morse in 1838) and after telegraph network and then it was replaced by telephone. In 1895, after the invention of telephone after twenty years first radio transmissions were invented by the by Marconi and the communication was introduced. Radio technology has enabled transmission over a long distance with better quality, less power, radio communication, and wireless network etc.

In early days radio systems, it transmits analog signals but Nowadays, radio system transmits digital signals of binary bits, in which the binary bits are introduced directly from a data signal. Digital radio system transmits the continuous for the bit stream and it also group in bit in packets. Packet radio is characterized by burst transmissions. And later types of radio are called packet radio. In 1971, at university of Hawaii, first packet radio network was developed by Alohanet. In packet radio system, Alohanet has incorporated the first set of protocols for routing and for channel access. In mid-1980s DARPA has promoted as activity in packet radio. Nowadays packet radio network is mostly used by commercial provider of wide area wireless data services. It was firstly introduced in in early 1990s, enable wireless data access (including e-mail, file transfer) at the range of 20 Kbps. (jean waleand, 2000)

2.1.1.2 ADVANTAGE AND DISADVANTAGE

Wireless network also has the both advantage and disadvantage.it offers the cost advantage, productivity over traditional wired network. The advantage of wireless network is listed below;

- Mobility
- Installation speed and simplicity
- Reach of the network
- More flexibility

- Reduced cost of ownership
- Scalability

The described advantage of wireless network of listed above are listed below:

- Mobility: Employee can shift the desk from one place to another place easily without adding any cable which has the convenience of mobility. It gives access to the real time information for the wireless network and it can roam to the network in the range of network without disconnect from the network. Mobility helps to supports the service opportunities which is not supports with wired networks.
- Installation speed and simplicity: Wireless network is easy and it is fast for the installing a wireless system and it can remove cable passes through wall and ceiling.
- Reach of the network: Wireless system can pass the network in its range where there is no need of wired system.
- Reduced cost of ownership: the installation of the wireless network is expenses is lower as compared to the wired network. Because it reduces wiring costs for the installation to operate while the wired network cost higher.
- Scalability: It can configure the different topology for the installation in wireless network. Wireless network configuration can be changed easily and its network in the range from the peer-to-peer for the suitable in the network which enable roaming over in the area.

The disadvantage of wireless network of wireless network are described below:

- Security: Wireless network has the disadvantage in the security because it transmits data or information over wirelessly so due to the wirelessly connected to the transmissions of the data leak. Compared with the copper cabling it also has higher risk of data leak and its modification. I can be exposed to the attacker to the third person so in the wireless network user should pay more attention in the security.
- Less Reliable: As compared to the wireless network it is less reliable in wireless network. Due to the less reliable in wireless network it occurs the disturbance in the communication because of the interferences.
- Transmission speed: as compared to the wired network, wireless network has low speed in the transmission. Mostly the network has used the fiber for the high speed. (Anon., n.d.) (Anon., n.d.)

2.1.2 IEEE 802.11 Architecture

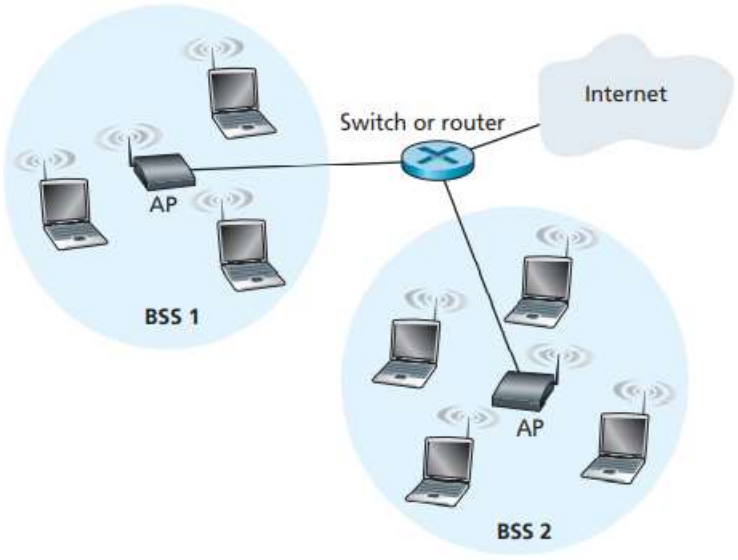

Figure 58 ieee 802.11 architecture

In the above figure, it describes the component of 802.11 architecture. Basic Service Set (BSS). In 802.11 parlance, BBS contains one or more wireless stations and in the central base station which is known as Access Point (AP). In the above figure as shown the AP in which each BSS is connected to the device such as switch or router, after it connected it gives in the access in the internet. In the personal network it only has one AP and only router which connects BSS to internet. (Anon., n.d.)

2.1.4 Wireless technologies

The technology which allows the user to communicate by not using the cables or wires to communicate that is called wireless technology. By the wireless technology the users of wireless network can communicate over a long distance. In wireless technology it includes radio wave and infrared wave which

is also known as RF and IR. In the telecommunication company, in the end of the nineteenth century wireless term was introduced at the previous time it says, “communication via radio wave rather than with the wire”. The term wireless technology may also refer to the wireless devices without any wires. In the simple word or another word, our smartphone or the mobile devices is also a wireless technology. In this type of wireless technology, it means the communication without wire or any types of cable. (Anon., n.d.)

2.1.2.1 WAP

WAP stands for Wireless Access Point which is networking devices which allows the user to connect wireless devices to the wired network. Wireless networks user uses the wireless network instead of wired network or cable network, In the installation of Wireless Access Point (WAP) the networks becomes more secure than the wired network, and cost- efficient than the wired network. By the installing the wireless access point it provides benefits to the network. Wireless network is more convenient to access as compared to wired network. It can easily add new user in the network whereas it will be complicated in wired network. The main function of wireless user is it gives flexibility to the user while moving to the different places. By using the password, the user can access to the network. Wireless network can protect the public user can be set in the configuring maximum wireless security. (Anon., n.d.)

2.1.2.2 WML

WML stands for Wireless Markup Language which is the application of XML (which stands for Extensible Markup Language) which is based on HDML which can be modified by Which WML can compared with HTML. It gives the transmission of the low bandwidth and also it cares of small screen. Likes as the HTML it is also the markup language which is defined in WAP specification. WML is very close to HTML where, in HTML websites are written and in WML are written in WAP. Both WML and HTML are written in plain text format. WML files use .WML file extension. (Anon., n.d.)

2.3 CONCLUSION

Wireless network is network which is doing something great to the people to communicate globally for the advanced technology. Wireless network can make lot of benefits and make the people more efficient. It has concerns for the advancement to the user for the betterment of the networking system in the todays world. Slowly the wireless network increasing all over the world. By which the wireless network is fulfilling all the lacking in the network which is faced in wired network. Wireless network uses radio wave to transmit the information or it uses to communicate over the long distance. Wireless network has its history and background. A history of wireless network it uses radio system it transmits analog signals but Nowadays, radio system transmits digital signals of binary

bits, in which the binary bits are introduced directly from a data signal. Digital radio system transmits the continuous for the bit stream and it also group in bit in packets. Wireless network has both advantage and disadvantage in which the advantage is Mobility, Installation speed and simplicity, reach of the network, more flexibility, Reduced cost of ownership, Scalability and the disadvantage are security, less reliable, transmission media etc. in the wireless technology of the wireless network it communicates the long distance which include the radio wave and infrared wave.

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4. APPENDIX

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NODES: RECEIVED MESSAGE COUNTS

REPLICATION 1 FROM 0.0 TO 60.0 SECONDS

RECEIVER	COUNT	MESSAGE NAME
Edinburgh LAN.Edinburg	983	Itahari ATM Message Source
Edinburgh LAN.Edinburg	996	Butwal ATM Message Source
Edinburgh LAN.Edinburg	1	Itahari Teller Message Sourse
Edinburgh LAN.Edinburg	2	Butwal Teller Message Source

Figure 59 received message count

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LINKS: CHANNEL UTILIZATION

REPLICATION 1 FROM 0.0 TO 60.0 SECONDS

LINK	FRAMES DELIVERED	FRAMES RST/ERR	TRANSMISSION DELAY (MS) AVERAGE	TRANSMISSION DELAY (MS) STD DEV	TRANSMISSION DELAY (MS) MAXIMUM	% UTIL
Itahari LAN.Itahari Li	18957	0	0.073	0.028	0.691	2.2473
Edinburgh LAN.Edinburg	12730	0	0.038	0.014	0.082	0.8029
Butwal LAN.Butwal Link	19055	0	0.073	0.028	0.691	2.2553

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LINKS: UTILIZATION BY APPLICATION

REPLICATION 1 FROM 0.0 TO 60.0 SECONDS

LINK / APP TYPES	PACKETS DELIVERED	PKTS/ SEC	BYTES DELIVERED	KBPS DELIVERED	% BYTES	UTIL (%)
Itahari LAN.Itahari Li						
Other	18957	315.950	1087665	145.022	100.000	2.25
Edinburgh LAN.Edinburg						
Other	12730	212.167	657934	87.725	100.000	0.80
Butwal LAN.Butwal Link						
Other	19055	317.583	1090494	145.399	100.000	2.26

Figure 60 CHANNEL UTILIZATION AND UTILIZATION BY APPLICATION

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WAN CLOUDS: FRAME DELAY BY VC

REPLICATION 1 FROM 0.0 TO 60.0 SECONDS

CLOUD: VC	FRAME DELAY (MS) AVG	STD	MAX	BURST SIZE (kb) AVG	MAX
WAN Cloud					
Itahari-Edinburgh	1164	697	2520	158	320
Edinburgh Itahari	17	0	17	111	243
Edinburgh-Butwal	17	0	17	111	251
Butwal-Edinburgh	1169	701	2522	160	320

Figure 61 FRAME DELAY BY VC

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WAN CLOUDS: FRAME COUNTS BY VC

REPLICATION 1 FROM 0.0 TO 60.0 SECONDS

CLOUD: VC: FRAMES KILOBITS	FRAMES / KILOBITS ACCEPTED NORMAL	DE	DROPPED NORMAL	DE
WAN Cloud	(TOTAL KILOBITS TRANSMITTED =	5263)		
Itahari-Edinburg Frm	1614	1567	0	9463
kb	803	811	0	4656
Edinburgh Itahar Frm	2304	877	0	0
kb	737	281	0	0
Edinburgh-Butwal Frm	2304	880	0	0
kb	737	282	0	0
Butwal-Edinburgh Frm	1597	1587	0	9565
kb	805	808	0	4692

Figure 62 FRAME COUNT BY VC

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WAN CLOUDS: ACCESS LINK STATS

REPLICATION 1 FROM 0.0 TO 60.0 SECONDS

CLOUD: ACCESS LINK	(ENTRY) (EXIT)	FRAMES ACCEPTED	FRAMES DROPPED	BUFFER (BYTES) MAX	BUFFER (BYTES) AVG	BUFFER (BYTES) STD	% UTIL
WAN Cloud							
Edinburgh Access	Entry	6365	0	N/A	N/A	N/A	34.48
	Exit	6365	0	33930	7809	10305	49.97
Itahari Access	Entry	3181	9463	N/A	N/A	N/A	97.44
	Exit	3181	0	80	7	15	17.23
Butwal Access	Entry	3184	9565	N/A	N/A	N/A	98.03
	Exit	3184	0	80	7	15	17.25

Figure 63 ACCESS LINK STATS

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MESSAGE + RESPONSE SOURCES: MESSAGE DELIVERED

REPLICATION 1 FROM 0.0 TO 60.0 SECONDS

ORIGIN / MSG SRC NAME: DESTINATION LIST	MESSAGES ASSEMBLED	MESSAGE DELAY AVERAGE	MESSAGE DELAY STD DEV	MESSAGE DELAY MAXIMUM
Itahari LAN.Itahari Teller Machine / src Itahari Teller Message Sourse:				
Edinburgh LAN.Edinbu	1	409.480 MS	0.000 MS	409.480 MS
Itahari LAN.Itahari ATM 1-30 / src Itahari ATM Message Source:				
Edinburgh LAN.Edinbu	983	16704.146 MS	10694.963 MS	49809.466 MS
Edinburgh LAN.Edinburgh Server / src Edinburgh Response Source:				
ECHO	0	0.000 MS	0.000 MS	0.000 MS
Butwal LAN.Butwal ATM 1-30 / src Butwal ATM Message Source:				
Edinburgh LAN.Edinbu	996	17168.969 MS	11101.313 MS	50581.155 MS
Butwal LAN.Butwal Teller Machine / src Butwal Teller Message Source:				
Edinburgh LAN.Edinbu	2	27620.207 MS	3046.105 MS	30666.312 MS

Figure 64 MESSAGE+RESPONSE SOURCE: MESSAGE DELIVERED