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EAST COAST DATACOM, INC

EDS-10G Emulator User Manual

Firmware Version 2.4

Table of Contents

Table of Figures

1 Overview

1.1 Product Family

Ethernet Delay Simulator emulates Network traffic conditions in many ways, based on input rules/configurations/simulation-profiles from user, the system would be used to emulate real traffic scenarios. Network emulation is commonly used to evaluate and examine the behavior and performance of applications on a congested and slow network.

The EDS-10G can forward up to 10 Gbps of packets in each direction on the 10 Gbps interfaces, and 1 Gbps of packets in each direction on the 1 Gbps interfaces

1.2 Operation

EDS-10g emulates the bandwidth, delay, loss, and other properties of the wide area network link between two local networks.

Depending on the model, the EDS-10G product emulates the traffic on pair of Ethernet ports.

Each pair, the EDS-10G Emulator is installed as either a bridge or router between the Ethernet segments connected to the eth1 and eth2 ports on the device. Frames received on one port are subjected to the emulated conditions before being forwarded to the opposite port

For each link, frames are processed by the EDS-10G Emulator in the following steps:

1/ Ethernet frames arrive on the eth1 or eth2 interface.

2/ Frames are subjected to random duplication at the configured duplication rate. Duplicated frames are added to the data stream immediately following the original frames.

3/ Random frames are selected for reordering according to the configured reordering probability.

4/ Ethernet frames are held for the specified delay before being reinserted into the data stream.

5/ Frames are throttled to the specified bandwidth.

6/ Frames are subjected to random discard based on the configured packet loss and bit-corruption.

7/ Ethernet frames are bridged or routed to the opposite interface and transmitted to the destination address

1.3 Configuration

The EDS-10G emulator is usually configured/controlled through the command line interface (CLI) and that can be accessed over the network using Telnet or SSH, through a dedicated Ethernet management port on the EDS-10G device.

EDS-10G Emulator can be configured as either bridge or router between the Ethernet segments connected to the pair of LAN ports (eth1 and eth2) on the device. Frames received on each port are subjected to emulate conditions before being forwarded to the opposite port.

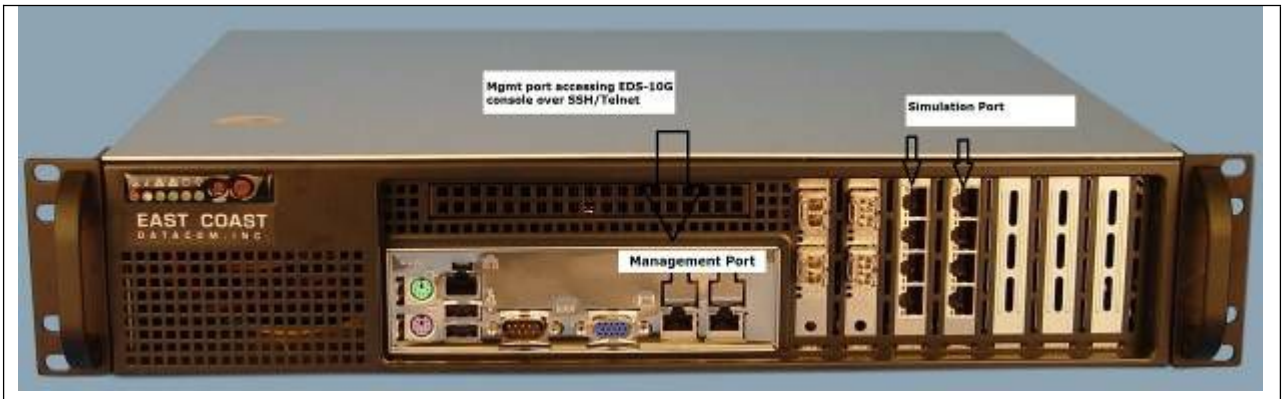

Figure 1 EDS-10G simulator

Application
Interconnection of 10GbE or 10/100/1000 devices simulating bandwidth, latency, packet loss and congestion on two independent LAN channels

Protocols Supported
UDP, TCP, MPLS, VLAN, ESP, LPD, Encrypted Packets and etc…

Password Protection
Implemented via the user LAN Management Port

Configuration Ports
Two Independent 10/100/1000 Ethernet Ports

Data Interface on Delay Ports
10/100/1000 or 10GbE, Copper or Fiber with SFP

Link Rates
300bps - 10GbE in 1bps increments, bi-directional or split speed, bps, Kbps, Mbps or Gbps

Link Throughput
Line Rate or Near Line Rate(90-100%) for any Packet Size with advanced user space drivers

Emulated Latency
0 ms to 8 sec. in 1ms increments for constant and variable

Emulation Statistics
Each link is capable of independent output statistics settings via the software scheduler

Packet Loss
0 to 100% in increments of 0.001%

Re-Ordering
Settings for Probability & Delay Min/Max

Surge Protection
Main Power Supply

Power Source
Mains: 100-240V AC@ 10%, 50/60HZ, 0.16/0.08A, Auto Range

Environmental
Operating Temperature....32º to 104º F (0º to 40º C)
Relative Humidity.....5 to 85% Non-Condensing
Altitude.....0 to 10,000 feet

Dimensions
Height ..... 3.50 inches (88.90 mm)
Width ..... 17.20 inches (436.88 mm)
Length ..... 14.50 inches (368.30mm)

Warranty
Three Years hardware, includes software support and software feature upgrades/improvements

Software Upgrade
Administered via the LAN user management Port

Regulatory Approvals
UL, CSA, CE, FCC and RoHS

System Accessing/Configuration
SSH, Telnet(over Management Port) & DVI

ORDERING INFORMATION
Main Unit Part Number: 210000
Model: EDS-10G
Description: EDS-10G Ethernet Delay Simulator

Part Number: 226000
Model: 4-Port 1G Copper
Description: 4-Port 10/100/1000 Copper Interface

Part Number: 226001
Model: 2-Port 1G Fiber
Description: 2-Port 10/100/1000 Fiber Interface

Part Number: 226002
Model: 2-Port 10G Copper
Description: 2-Port 10G Copper Interface

Part Number: 226003
Model: 2-Port 10G Fiber(SFP Included)
Description: 2-Port 10G Fiber Interface

INCLUDED WITH EACH UNIT:
1) Operations Manual
2) Power Cord
3) Rackmount Kit Ears

Other East Coast Datacom Products
RDS-PLUS, Serial Network Latency Simulator
(Supports all serial interfaces, T1, E1, DS3 ect..
STG-10G, 1G to 10GbE IP Traffic Generator

2 Command Line Interface

The EDS-10G Emulator includes a command line interface (CLI) that can be accessed remotely over the network through a Telnet or SSH connection. To access the CLI, log into the device, SSH can be used to either log into the EDS-10G CLI, similar to Telnet. The SSH and Telnet services are enabled by default. Multiple simultaneous sessions are allowed.

To login to the system over SSH, execute the below command on remote Machine to access the EDS-10G CLI

- ssh 192.168.1.1 (Management Port)

Same as over telnet

- telnet 192.168.1.1 (Management Port)

Username and password details to access EDS-10G CLI from SSH and Telnet

- Username: eds-10g
- Password: madmax13

Once you login to the EDS-10G system over SSH/Telnet

1/ Provide the sudoer's password (madmax13)

2/ Then after provide Application password (eds@10g)

3 Password Recover

If user forget the password for Logging to EDS system then follow the below steps for accessing

1/ Connect DVI monitor to EDS System

2/ Login to system with user_id: recovery (no password)

3/ Execute the command **eds_recovery** on console terminal

It will perform the below operations

a. Application password with default password (eds@10g)

b. System Login **root** password with default password (eds@10g)

c. Management IP address to 192.168.1.1

d. Print the password and IP address on the console terminal for user reference

4 Main Menu

After log-in to EDS-10G System (Refer section 2 for the login details) main menu will appear on the console terminal as shown below.

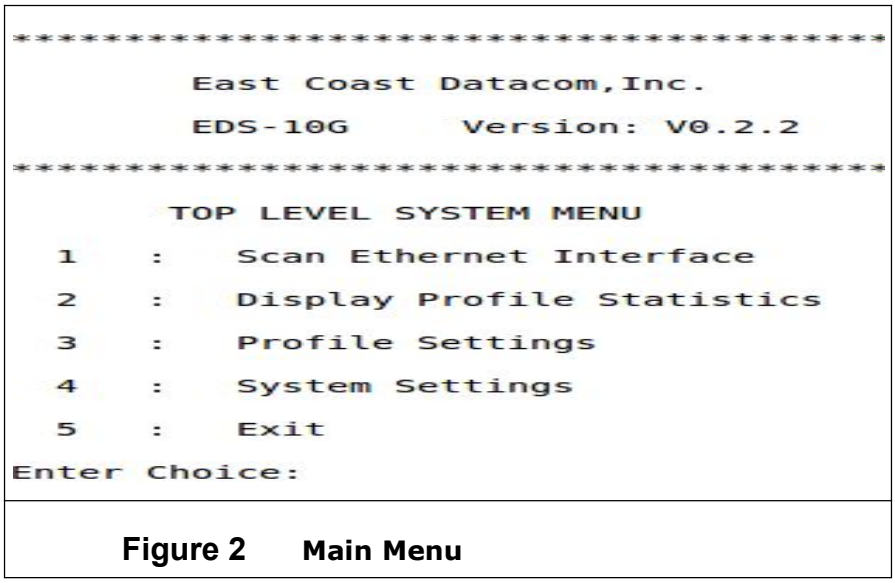

Figure 2 Main Menu

It displays the Organization name, Product name, Version number along with System Configuration menu.

This **Top Level System Menu** explains about all the

- Scan Ethernet Interface:
  - Ethernet Link status
  - IP address
  - MAC address
  - Link Speed
- Display Profile Status
  - Mode (Bridge, Route)
  - Current running profile on each Ethernet Interface
  - Emulation Parameters on profile (Bandwidth, Delay, Loss, Reordering, Duplication, etc…)

- Statistic of each Ethernet Interface (Rx Bytes/Packets, Tx Bytes/Packets)

- Profile Settings
  - Mode of operation (Bridge, Route)
  - Configure Emulation Parameters (Bandwidth, Delay, Loss, Reordering, Duplication, Bit error rate, log, etc…)
  - Run the Instance
  - Scheduling the Instance
- System Settings
  - System Upgrade
  - Password Change
  - Factory Default
  - Delete all profile

5 Scan Ethernet Interfaces

- ✓ Scans all the interfaces present in the current system and display each interface with Link status (Up/Down)
- ✓ Displays the Link speed of each interface (1G or 10G)
- ✓ Displays IP Address, MAC Address along with type of interface i.e. Management / LAN port

Gives detail information about all the Ethernet ports, so the user can get clear idea about each interface.

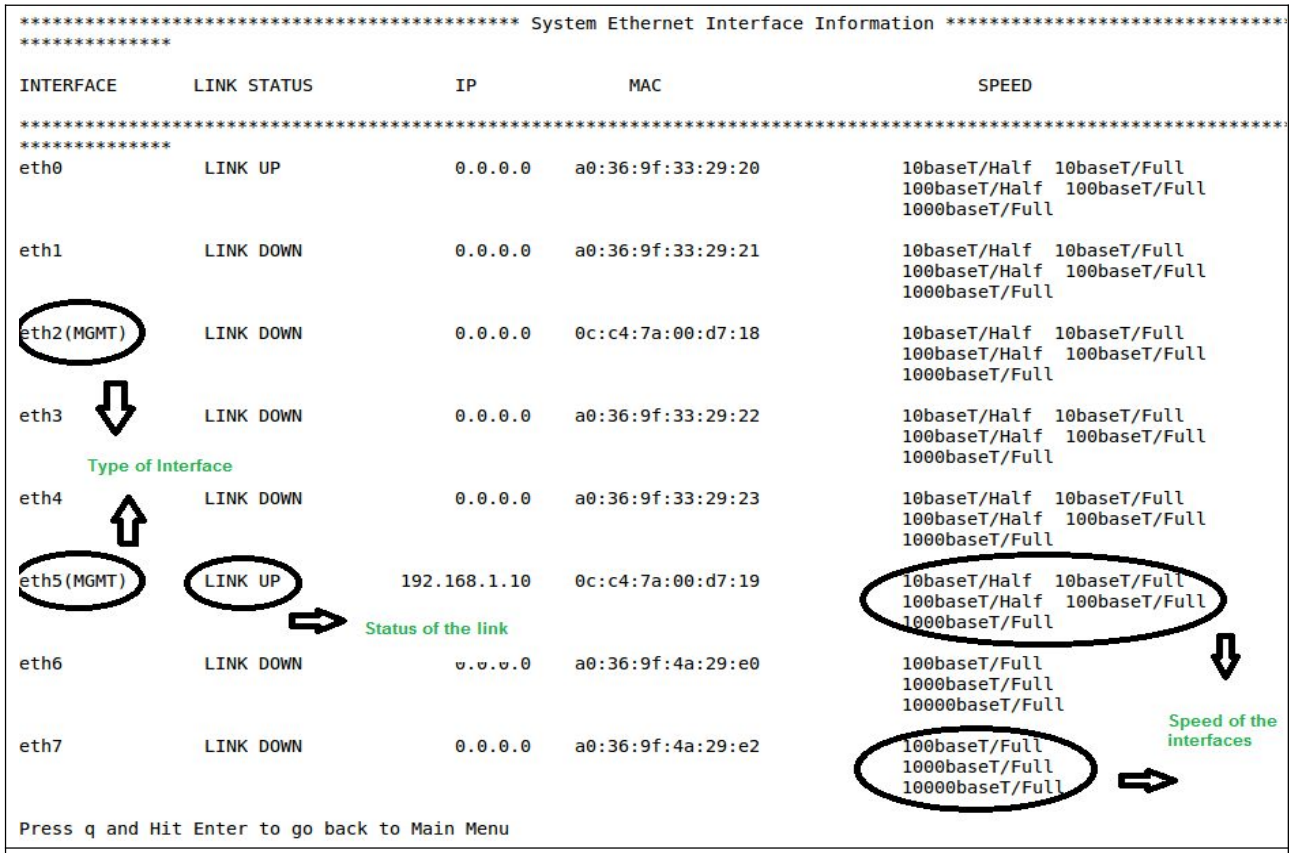

Figure 3 Scan Ethernet Interfaces

6 Display Profile Statistics

This Menu displays detailed information about the current Configured/Running/Scheduled profile on each pair of Ethernet Interfaces (As user configured)

- ✓ Displays each interface name (i.e. eth0, eth1 etc…)
- ✓ Current Configured/Running/Scheduled Profile name
- ✓ Mode (Bridge or Route)
- ✓ Traffic control parameters (i.e. Delay, Loss etc…)
- ✓ Displays Tx and Rx Packets/Bytes counter value

```
****************************************** Displaying Ethernet Interface Statistics ******************************************

          PROFILE
LAN   R/S NAME  Mode    B/W     Delay   Loss   Reorder  Duplicate   RxPctr     RxBctr     TxPctr     TxBctr     PktL  PktR   PktD
-------------------------------------------------------------------------------------------------------------------------------

 eth0 R     all bridge   10gbit   100ms 0.500   0.500   0.500      2902481   93463428      91167  137001910   1451960 30259 30225

 eth1 R     all bridge   10gbit   100ms 0.500   0.500   0.500       834962 1262344745    2708930 4082110931   416675 897166 899955

 eth3 S    NONE   NONE     NONE     0ms 0.000   0.000   0.000           0          0          0          0      0     0     0

 eth4 S    NONE   NONE     NONE     0ms 0.000   0.000   0.000           0          0          0          0      0     0     0

 eth6 S    NONE   NONE     NONE     0ms 0.000   0.000   0.000           0          0          0          0      0     0     0

 eth7 S    NONE   NONE     NONE     0ms 0.000   0.000   0.000           0          0          0          0      0     0     0

 eth8 S    NONE   NONE     NONE     0ms 0.000   0.000   0.000           0          0          0          0      0     0     0

 eth9 S    NONE   NONE     NONE     0ms 0.000   0.000   0.000           0          0          0          0      0     0     0

 R-Running   S-Stopped


Press q and Hit Enter to go back to Main Menu
```

Figure 4 Display Profile Statistics

7 Interface Emulation Parameters Configuration

The Traffic Configuration Settings menu contains all the Emulation parameters for configuration. All the Emulation parameters are configured separately for each Interface on egress packets

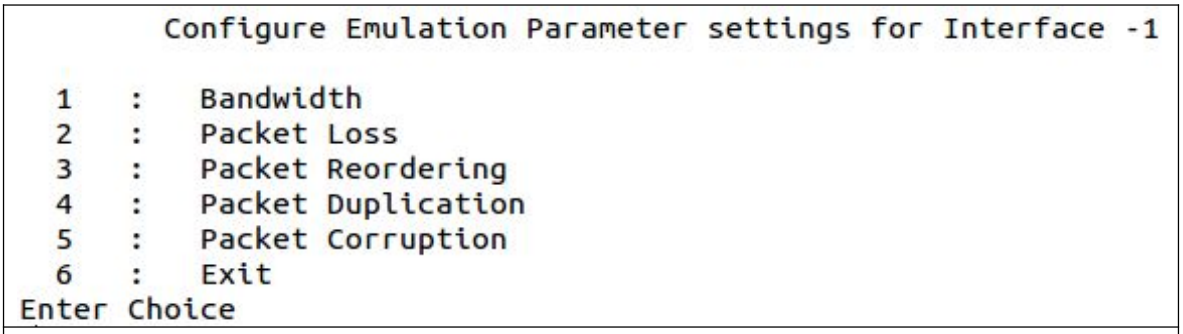

Figure 5 Traffic Config Settings

7.1 Delay

The Delay parameter specifies the link latency in milliseconds. Delay is the amount of time the packet waits after coming from ingress interface and the time it exits on the egress interface for all incoming packets

User can set the Delay from 0 milliseconds to 10 seconds. If entered delay value is not within the range then it will show it is not valid input please enter valid input

Delay distribution types

1/ Variable Delay

Delay ranging between the configured minimum and maximum values.

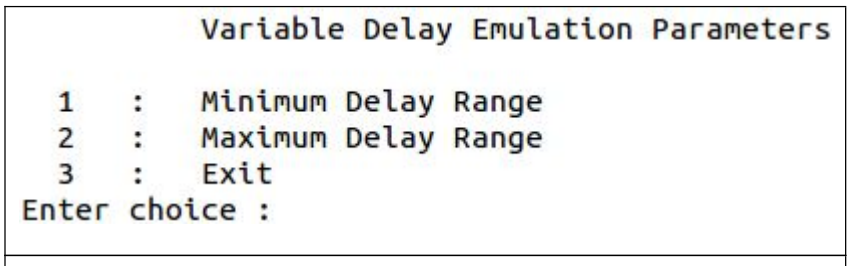

Figure 6 Variable Delay

2/ Constant Delay

Fixed value for delay on each Independent interface

```
          Delay Emulation On Interface 1/2

  1   :   Interface-1 Delay
  2   :   Interface-2 Delay
  3   :   Exit
Enter Choice
```

Figure 7 Constant Delay

7.2 Bandwidth

The bandwidth option displays the configured link rate of emulated WAN. The Minimum bandwidth is set to 300 bps. Link rate is set independently in each direction. The link rate is set in units of bps, kbps, Mbps or Gbps.

```
        Configure Emulation Parameter settings for Interface -1

  1   :   Bandwidth
  2   :   Packet Loss
  3   :   Packet Reordering
  4   :   Packet Duplication
  5   :   Packet Corruption
  6   :   Exit
Enter Choice
1
Bandwidth input has to be given in terms of kbit/mbit/gbit

For 10/100/1000 Ports:  kbit: 1kbit - 999kbit (eg: 50kbit,500kbit, etc)
                        mbit: 1mbit - 1000mbit (eg: 100mbit etc..,  For Max B/W input 1000mbit)
-------------------------------------------------------------------------------------------
For 10-G Ports:         kbit: 1kbit - 999kbit (eg: 50kbit,500kbit, etc)
                        mbit: 1mbit - 1000mbit (eg: 500mbit etc..,  For Max B/W input 10gbit)

Enter the amount of bandwidth to be applied on interface-1:1000mbit
```

Figure 8 Bandwidth

Note: *Link rate should not be greater than Physical interface rate*

7.3 Packet Loss

Loss is measured in number of packets lost or dropped with respect to the number of packets transmitted.

Packet Loss rate can be set from 0 to 1 percent (e.g. input 0.1 to simulate 10 percent packet loss)

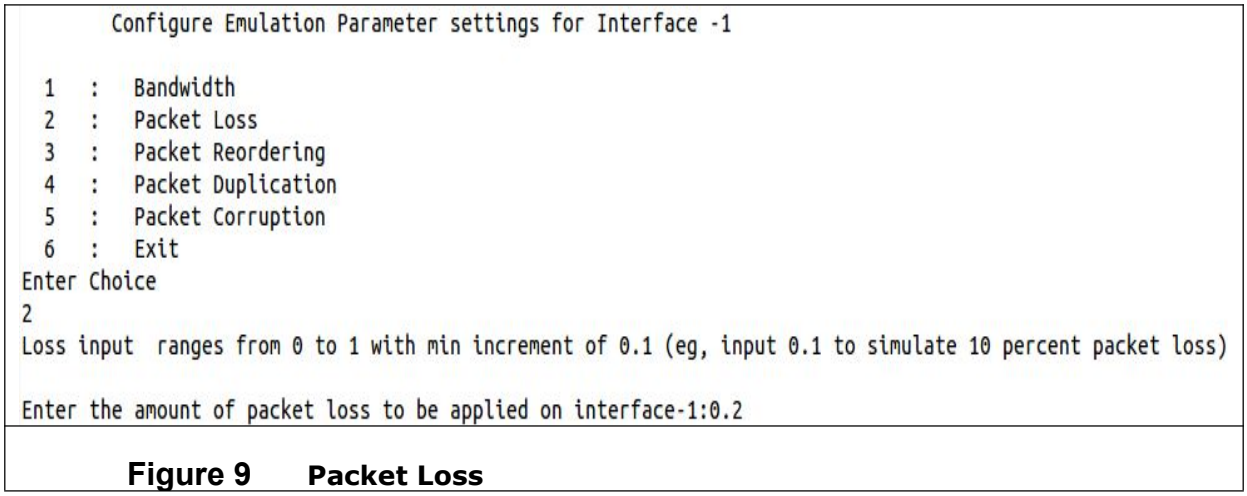

Figure 9 Packet Loss

7.4 Reordering

Packet reordering is a well-known phenomenon that the order of packets is gets inverted. Reordering can affect the performance of both the network and the packets receive

The Reordering row specifies the probability that each frame is reordered and the amount of time that reordered frames are delayed from their original position

Reordering value can also be set in Percentage. Range is 0 to 1 (e.g. input 0.1 to simulate 10 percent reordering). To reorder the packets Delay should be configured, it specifies how long each reordered frame is held before being reinserted into the data stream

```
       Configure Emulation Parameter settings for Interface -1

  1   :   Bandwidth
  2   :   Packet Loss
  3   :   Packet Reordering
  4   :   Packet Duplication
  5   :   Packet Corruption
  6   :   Exit
Enter Choice
3
Reordering input  ranges from 0 to 1 with min increment of 0.1 (eg, input 0.1 to simulate 10 percent packet reordering)

Enter the amount of packet reordering to be applied on interface-1:0.2
```

Figure 10 Packet Reordering

7.5 Packet Duplication

The Duplication parameter specifies the probability that a frame will be duplicated. Copy of original frame is inserted into the data stream immediately after the original frame.

Duplication value can be set from range of 0 to 1%. (E.g., input 0.1 to simulate 10 percent packet loss)

```
       Configure Emulation Parameter settings for Interface -1

  1   :   Bandwidth
  2   :   Packet Loss
  3   :   Packet Reordering
  4   :   Packet Duplication
  5   :   Packet Corruption
  6   :   Exit
Enter Choice
4
Duplication input  ranges from 0 to 1 with min increment of 0.1 (eg, input 0.2 to simulate 20 percent packet duplication)

Enter the amount of packet duplication to be applied on interface-1:0.5
```

Figure 11 Packet Duplication

7.6 Packet Corruption

Random noise can be emulated with the corrupt option. This introduces a single bit error at a random offset in the packet

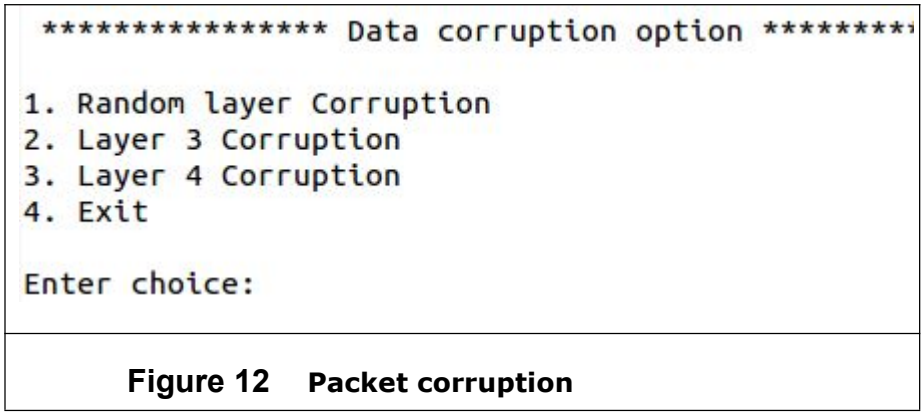

Figure 12 Packet corruption

Packet corruption rate value can be within the range of 0 to 1(e.g. input 0.1 to simulate 10 percent bit error rate)

It can of 3 types

- ✓ **Random corruption**

  This introduces a single bit error at a random offset in the packet based on percentage.

- ✓ **Layer 3 corruption**

  It is of 2 types

  - Random corruption : This introduces a single bit random offset error of layer 3 header
  - Checksum corruption: This introduces a single bit error in checksum field of layer 3 header

- ✓ **Layer 4 corruption**

  It is of 2 types

  - Random corruption : This introduces a single bit random offset error of layer 4 header(Tcp/Udp/Icmp/All)
  - Checksum corruption : This introduces a single bit error in checksum field of layer 4 header(Tcp/Udp/Icmp/All)

8 Bridge and Route Mode Configuration

The EDS-10G Emulator can be installed as either a bridge or router to forward frames between Ethernet interfaces. By default, the EDS-10G Emulator is not configured to any mode of operation (bridge, route), and this mode is recommended for simplicity unless the interfaces need to be on separate subnets.

To switch to Routing Mode from Bridging Mode, configure through Mode of Operation Menu.

Bridge/Route settings are not stored with emulation parameters and will not change when a stored emulation is loaded.

8.1 Bridge Mode

In Bridging Mode, the EDS device functions as a bridge between the Ethernet segments connected to the LAN A and LAN B ports. In this mode, it can forward any Ethernet- based frame regardless of network layer protocol, including IP, IPv6, IPX, and Apple Talk. VLAN tagged frames (IEEE 802.1Q) are supported

This option enables the simulation in bridge mode. Both the Interface should have same speed. Example both interfaces can be 1G port or 10G ports, but it is invalid if one port is 1G and other is 10G

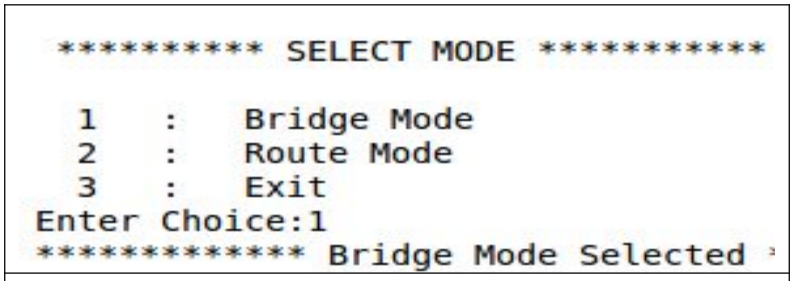

Figure 13 Bridge Mode

8.2 Route Mode

Routing mode provides a default routing mechanism that elimates the need for multiple status routes. When a gateway address is set for both interfaces, the default next hop for packets received on one interface is the gateway address of the opposite interface. For example, if a packet is received on the LAN A interface and

has a destination address on a sub-net that is not directly connected to either the LAN A or LAN B interface, the packet is forwarded across the emulated link to the LAN B gateway router

This option enables the simulation in route mode. Both the Interface should have same speed. Example both interfaces can be 1G port or 10G ports, but it is invalid if one port is 1G and other is 10G

```
********** SELECT MODE ***********

  1   :   Bridge Mode
  2   :   Route Mode
  3   :   Exit
Enter Choice:2
************** Route Mode Selected ***
```

Figure 14 Route Mode

On selection of the mode, IP-Address needs to be configured for each interface. All addresses are entered in dotted-decimal notation

```
************ INTERFACE SETTINGS *************
  1   :   Interface Name
  2   :   Interface Ip-Address
  3   :   Exit
 Enter Choice:1
 Enter Port-1 interface name: (eg: eth0, eth1.....ethN)
 eth0
 ************ Port-1 interface name entered successfully
 ########### 1G Port Selected #########
 ************ INTERFACE SETTINGS *************

  1   :   Interface Name
  2   :   Interface Ip-Address
  3   :   Exit
 Enter Choice:2
  Port1 Name  :   eth0
 Enter Port-1 ip address : 192.168.0.10
****** Port 1 ip address entered succesfully***
```

```
************ INTERFACE SETTINGS *************
  1   :   Interface Name
  2   :   Interface Ip-Address
  3   :   Exit
Enter Choice:1
Enter Port-2 interface name: (eg: eth0, eth1.....ethN)
eth1
************ Port-2 interface name entered successfully
########### 1G Port Selected #########
 ************ INTERFACE SETTINGS *************

  1   :   Interface Name
  2   :   Interface Ip-Address
  3   :   Exit
Enter Choice:2
 Port2 Name  :   eth1
Enter Port-2 ip address : 10.20.30.1
****** Port 2 ip address entered succesfully*****
```

Figure 15 Interface- 1/2 Route Mode Configuration

9 Packet Filtering and Non-Filtering

By default if any packet arrives on any of the configured Interface, the Emulation rules will apply on the egress interface

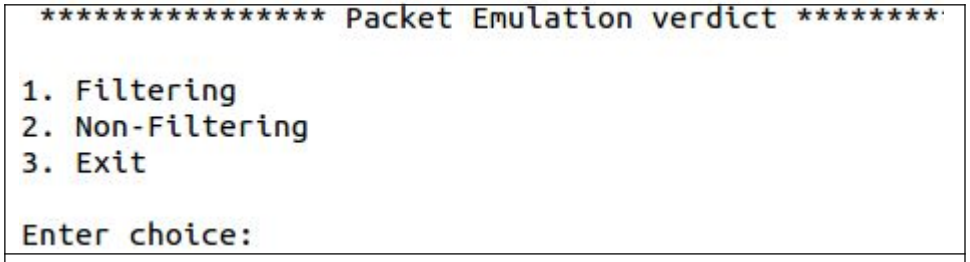

Figure 16 Traffic Config Settings

9.1 Filtering Menu

Emulation rules were applied only to the specific packets / frames these can be controlled with filtering mechanism.

Packet filtering configuration can be based on MAC, IP, Port, Protocol and combination

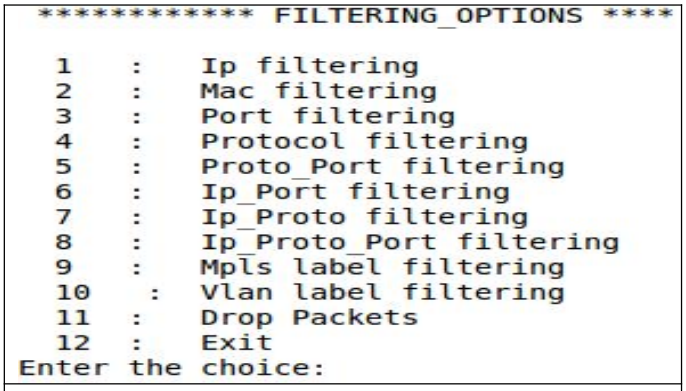

Figure 17 Filtering Menu

I. IP filtering

Emulation rules were applied based on Source and Destination IP address match. It asks for Source IP, Destination IP address along with all traffic control parameters

Note: *In IP filtering traffic control rules work only on user entered source IP and destination IP*

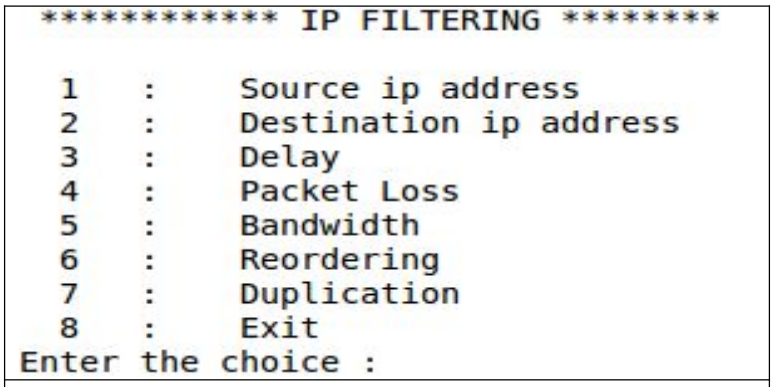

Figure 18 IP Filtering

II. MAC filtering

Emulation rules were applied on Source and Destination MAC address match. It asks for Source, Destination MAC address along with all traffic control parameters

Note: *In MAC filtering traffic control rules work only on user entered source MAC and destination MAC*

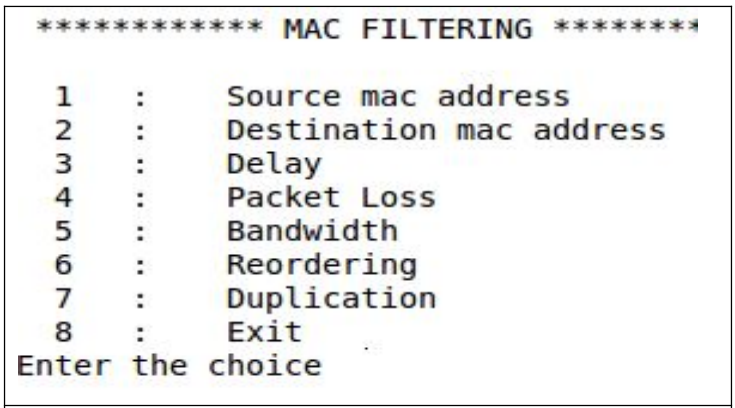

Figure 19 MAC Filtering

III. Port filtering

Emulation rules were applied based on Source and Destination port number match. It asks source port, destination port address along with all traffic control parameters

Port number ranges from 1024- 65535

Note: *In PORT filtering traffic control parameters work only on user entered source PORT and destination PORT number*

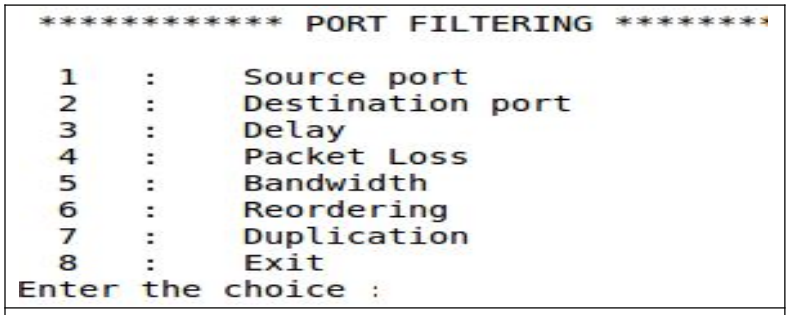

Figure 20 Port Filtering

IV. Protocol Filtering

Emulation rules were applied based on Protocol match. It asks for protocol along with all traffic control parameters.

Valid protocols: TCP, UDP, ICMP

Note: *In this filtering traffic control parameters work only on user entered Protocol*

Figure 21 Protocol Filtering

V. Protocol and Port Filtering

It filters the packet based on the combination of Protocol and Port. Emulation rules were applied based on combination of protocol and port number match.

Valid protocols: TCP, UDP

Note: *ICMP protocol is not valid for this option, as its packet header is not having any port number*

Traffic control parameter work on combination of protocol and port number

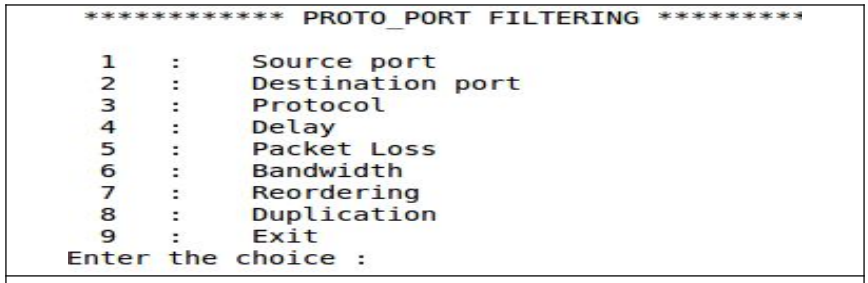

Figure 22 Protocol Port Filtering

VI. IP and Port filtering

It filters the packet based on the combination of IP address and Port number. Emulation rules were applied based on combination of IP and port number match.

Note: *In this filtering traffic control parameters work only on combination of user entered IP and port number*

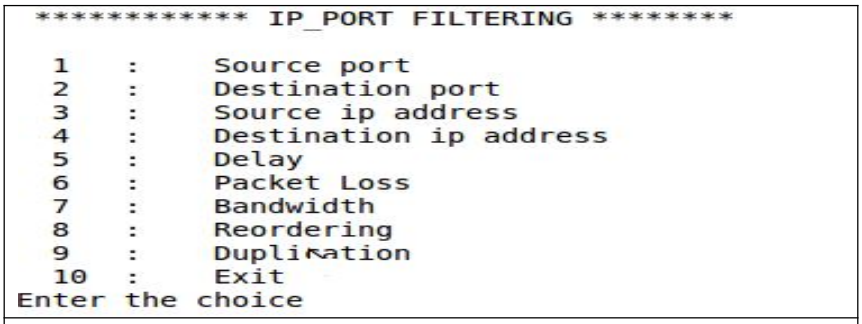

Figure 23 IP Port Filtering

VII. IP and Protocol filtering

It filters the packet based on IP and protocol. Emulation rules were applied based on combination of IP and port number match.

Note: *In this filtering traffic control, parameters work only on combination of user entered IP and protocol*

```
************ IP_PROTO FILTERING *******

  1    :     Enter Protocol
  2    :     Source ip address
  3    :     Destination ip address
  4    :     Delay
  5    :     Packet Loss
  6    :     Bandwidth
  7    :     Reordering
  8    :     Duplication
  9    :     Exit
Enter the choice :
```

Figure 24 IP Protocol Filtering

VIII. IP, Protocol and Port Filtering

It filters the packet based on the combination of IP address, Protocol and port. Emulation rules were applied based on combination of IP, protocol and port number match.

Note: *In this filtering traffic control parameters work only on combination of user entered IP and protocol and Port number*

```
************ IP_PROTO_PORT FILTERING **********

  1    :     Source port
  2    :     Destination port
  3    :     Source ip address
  4    :     Destination ip address
  5    :     Enter Protocol
  6    :     Delay
  7    :     Packet Loss
  8    :     Bandwidth
  9    :     Reordering
  10    :    Duplication
  11    :    Exit
Enter the choice :
```

Figure 25 IP Protocol Port Filtering

IX. MPLS Filtering

Emulation rule were applied on all MPLS packet or for specific label MPLS packet along with traffic control parameters.

Note: *In this filtering traffic control rules work only on of user entered MPLS label*

Figure 26 MPLS Filtering

X. VLAN filtering

In this option user can select either for all VLAN packet or for specific tag VLAN packet along with traffic control parameters.

Note: *In this filtering traffic control, parameters work only on of user entered VLAN tag.*

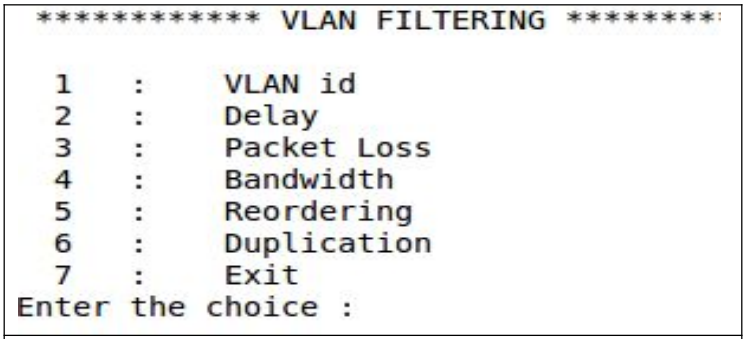

Figure 27 VLAN Filtering

XI. Drop packets

- ✓ **IP deny** it ask for source and destination IP. Packets will get dropped only in that particular user entered IP address.
- ✓ **MAC deny**: It ask for source and destination MAC. Packets will get dropped only in that particular user entered MAC address.
- ✓ **Protocol deny**: It ask for protocol. Packets of specified protocol will get dropped.
- ✓ **IP and protocol deny**: It ask for protocol along with IP address. Packets with same protocol and IP specified by user will get dropped.

```
************ DROP PACKETS *******

  1    :    Ip deny
  2    :    Mac deny
  3    :    Protocol deny
  4    :    Ip_Protocol deny
  5    :    Exit
Enter the choice :
```

Figure 28 Drop Packets

9.2 Non Filtering

Emulation rules applies to all the egress packets for every packets

```
          Traffic Emulation On Interface 1/2

  1    :    Delay Type
  2    :    Interface-1 Setting
  3    :    Interface-2 Setting
  4    :    Exit
Enter Choice
```

Figure 29 Non filtering

10 Profile Setting

This Profile configuration is used for creating/editing/deleting profiles which are created in order to enable the simulation in either Bridge mode or Route mode, even option for stopping simulation is also present. The profile setting is having sub menu options as shown below

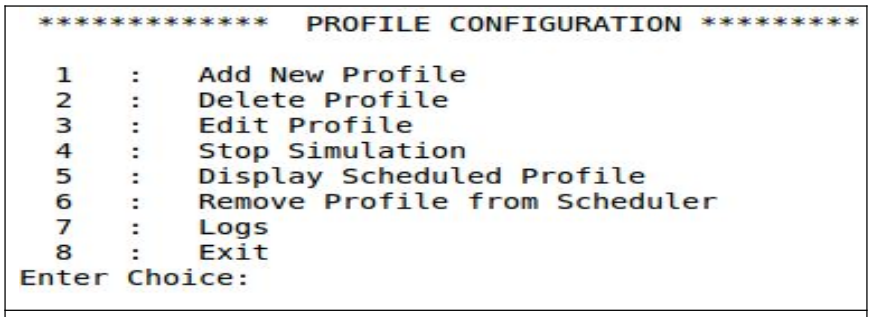

Figure 30 Profile Configuration

10.1 Add New Profile

To Perform/Run simulation on any of the Ethernet interface, new profile needs to be created before running any Traffic Emulation. On selection of this menu user can Configure/Create new profile, by entering profile name

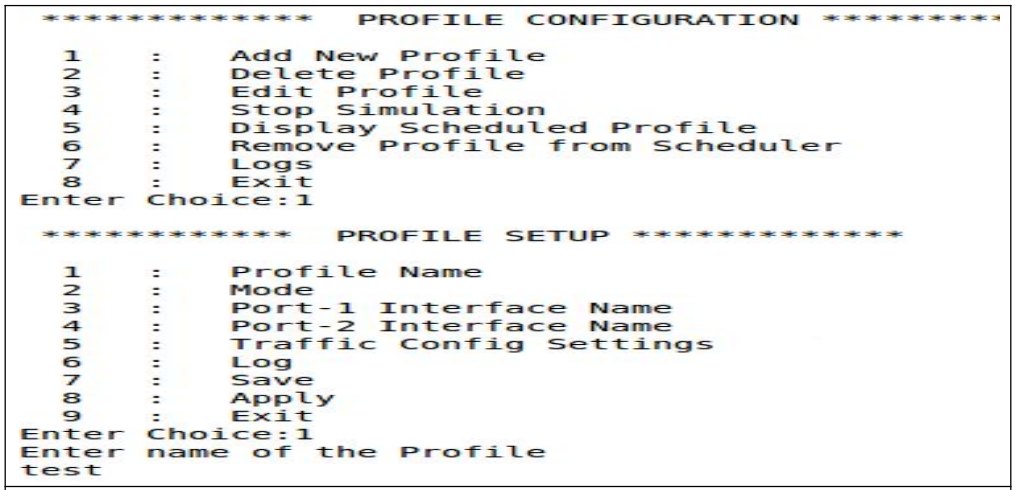

Figure 31 Add New Profile

1/ Profile Name

Enter the profile name to create new profile, it will only accept characters and numbers as input, special characters are not valid

The maximum length of profile name can be 7 characters

2/ Mode Selection

Through this option user can select on which mode the simulation to be run (i.e. Route, Bridge). Both the Interface should paired with same Link speed

***Example:* eth2 and eth3 both interfaces should be 1G port or 10G ports, but it is invalid if one of the port is 1G and if other is 10G**

3/ Traffic Config Setting

User can configure the traffic emulation rules on every packet flows between each port on egress traffic, Delay, Loss, Bandwidth and etc are the emulation rules were applied. All rules were applied on basis of Filtering and Non Filtering method

```
************  PROFILE SETUP **************

  1    :    Profile Name
  2    :    Mode
  3    :    Port-1 Interface Name
  4    :    Port-2 Interface Name
  5    :    Traffic Config Settings
  6    :    Log
  7    :    Save Profile
  8    :    Apply/Load Profile
  9    :    Exit
Enter Choice:5
Traffic Control Configuration for Port-1 and Port-2
 ***************** Packet Emulation verdict ********

 1. Filtering
 2. Non-Filtering
 3. Exit

 Enter choice:
```

Figure 32 Traffic Config Settings

4/ Save Profile

The Save option is used to store current emulation parameters to a named profile. The saved profile stored on the EDS-10G Device. On selection of save profile emulation parameters will not be loaded on the Interface

```
************  PROFILE SETUP *************

  1   :   Profile Name
  2   :   Mode
  3   :   Port-1 Interface Name
  4   :   Port-2 Interface Name
  5   :   Traffic Config Settings
  6   :   Log
  7   :   Save Profile
  8   :   Apply/Load Profile
  9   :   Exit
Enter Choice:7
Saving configured parameters to xml file......
```

Figure 33 Save Profile

5/ Apply/Load Profile

Configured emulation profile can be loaded to run the simulation. Once loaded user can view the current profile status ***Display Profile Statistics*** page

```
************  PROFILE SETUP *************

  1   :   Profile Name
  2   :   Mode
  3   :   Port-1 Interface Name
  4   :   Port-2 Interface Name
  5   :   Traffic Config Settings
  6   :   Log
  7   :   Save Profile
  8   :   Apply/Load Profile
  9   :   Exit
Enter Choice:8
8

 ********* Types Of Simulation *********

1  : Instant Simulation
2  : Schedule Simulation
3  : Exit
```

Figure 34 Apply Profile

10.2 Edit Profile

This is used to edit existing profile. Profile name, mode, interface name along with all traffic control parameters can be edited.

Note: *If profile is running, it cannot be edited*

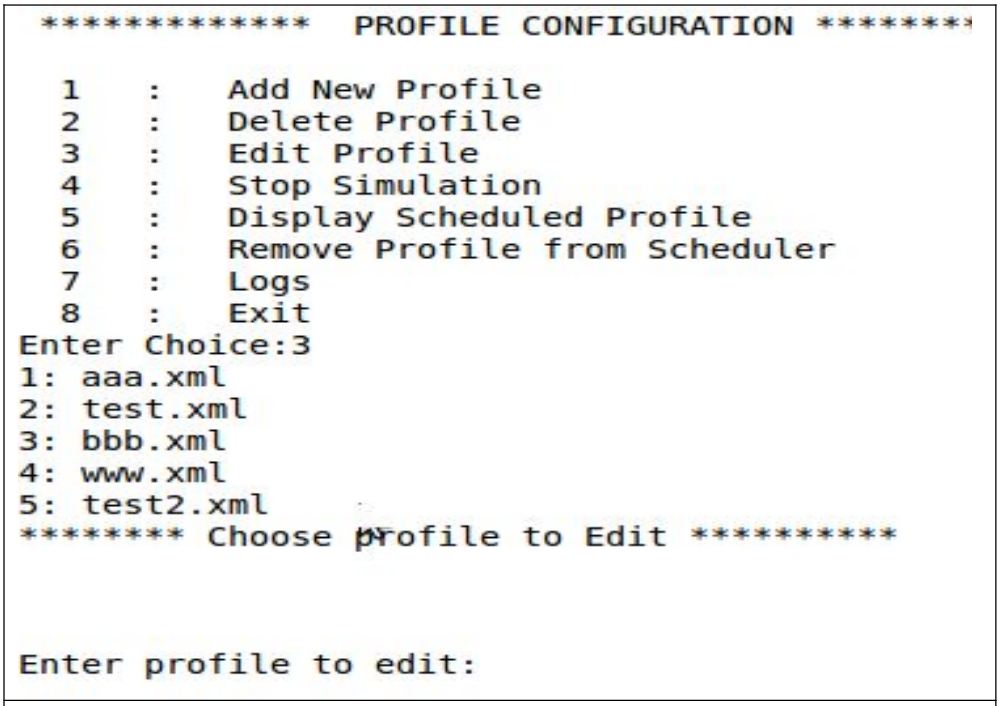

Figure 35 Edit Profile

10.3 Stop simulation

It will show all current running profile. It can stop any running profile simulation and can clear the statistics. Once it is stopped user can edit the profile

```
*************  PROFILE CONFIGURATION *************

  1    :    Add New Profile
  2    :    Delete Profile
  3    :    Edit Profile
  4    :    Stop Simulation
  5    :    Display Scheduled Profile
  6    :    Remove Profile from Scheduler
  7    :    Logs
  8    :    Exit
Enter Choice:4
1. test.xml
2. Exit

Enter Choice:1

************ Profile stopped Successfully ************

Want to clear statistics for this profile:
1. Yes
2. No

Enter Choice:1


********** Statistics cleared successfully **********
```

Figure 36 Stop Simulation

11 Profile Scheduling

After creating the profile, user can schedule the profile for simulation in 2 ways

- Instant Simulation
- Schedule Simulation

11.1 Instant simulation

It will start running the simulation immediately. There is no time span for this simulation. This simulation will run continuously until and unless it is stopped by user.

```
********* Types of Simulation *********

1  : Instant Simulation
2  : Schedule Simulation
3  : Exit

Enter choice :1

Applying saved parameters and starting the simulation

Build on Apr 27 2015 @ 15:13:27
EDS 1/10-G Version: V0.2.2
```

Figure 37 Instant Simulation

11.2 Scheduled simulation

EDS-10G provides a mechanism to automate running a sequence of different profiles on time basis.

This can be useful for both of emulating traffic dynamically changing link conditions and for automating a series of independent tests.

The basic operation of scheduler consists of configuring one or more emulation profiles by configuring the time for each profile to run by providing ***Start/End Time*** between each profile. This is also called as future simulation.

Note: *User has to specify manually or can enter duration in minute's ex- 40mins, so simulation will run that duration starting from start time*

Note: *Time has to be entered in 24 hour format*

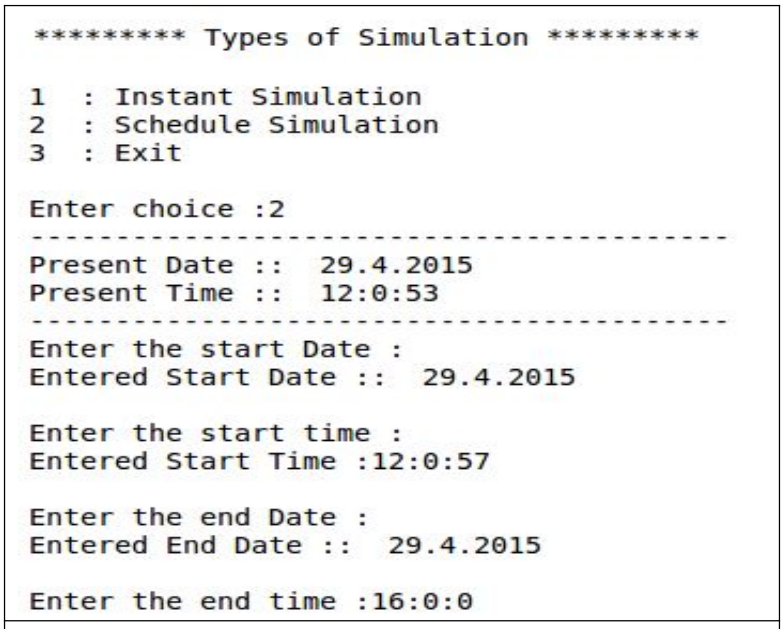

Figure 38 Schedule Simulation

11.3 Display Scheduled profile

This menu displays the detailed information of the scheduled profile.

- ✓ Profile name
- ✓ Status of the Profile (i.e. Running or Pending)
- ✓ Interface name
- ✓ Start date and Start time
- ✓ End date and End time

```
*************  PROFILE CONFIGURATION *************

  1    :    Add New Profile
  2    :    Delete Profile
  3    :    Edit Profile
  4    :    Stop Simulation
  5    :    Display Scheduled Profile
  6    :    Remove Profile from Scheduler
  7    :    Logs
  8    :    Exit
Enter Choice:5


************************************************************
1:  Profile Name :  test                < Running >
Ethernet Pair < eth0  > - <   eth1  >
DATE          Start date : < 29.4.2015 > End date : < 29.4.2015 >
Time          Start time : < 12:0:57 >   End time : < 16:0:0 >


************************************************************
```

Figure 39 Display Scheduled Profile

11.4 Remove profile from scheduler

It is used for removing scheduled profile. User can remove all scheduled profile at one instance or user can remove selected scheduled profile. While removing selected scheduled profile it asks for selection of interface pair once user select for one interface pair it displays all scheduled profile of that interface pair

Note: *This is only for removing profile from scheduler list; it will not delete that profile*

```
  1    :    Add New Profile
  2    :    Delete Profile
  3    :    Edit Profile
  4    :    Stop Simulation
  5    :    Display Scheduled Profile
  6    :    Remove Profile from Scheduler
  7    :    Logs
  8    :    Exit
Enter Choice:6

******* Select your choice ******
1.Remove Selected profile from scheduler
2.Remove all profile from scheduler
3.Exit

**********************************
Enter choice :1
-----------------------------------
1:INTERFACE PAIR < eth0 > : < eth1 >
-----------------------------------


Select the Interface pair from which profile has to be removed

Enter choice :1


&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&

1.Profile Name :test
DATE          Start date : < 29.4.2015 > End date : < 29.4.2015 >
Time     Start time : 12:0:57    End time : 16:0:0

&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&
```

Figure 40 Remove Profile

12 Log

Log feature is for individual profile. The number of bytes forwarded, number of bytes lost, delayed, duplicated along with profile name start date and start time can be recorded in log file.

12.1 Enable Logging

It can be enabled for individual profile. In log enabled profile number of bytes forwarded, number of bytes lost, delayed, duplicated etc can be recorded in every 10 sec

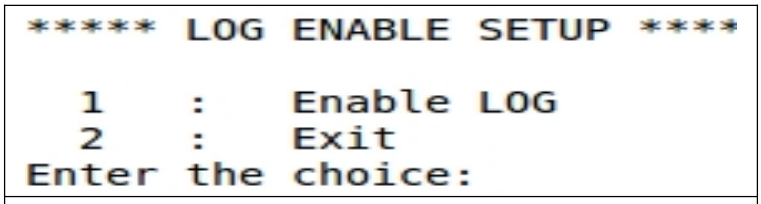

Figure 41 Log Enable Setup

12.2 Disable Logging

Log can be stopped for current running logs. User can view on which profiles data Logging enabled, user can stop the current running log on the specific profile. Once it is stopped by user, log file record is also stopped at that moment.

Note: *If user stopped current running logs, only log file record is stopped for that profile but profile simulation is still running*

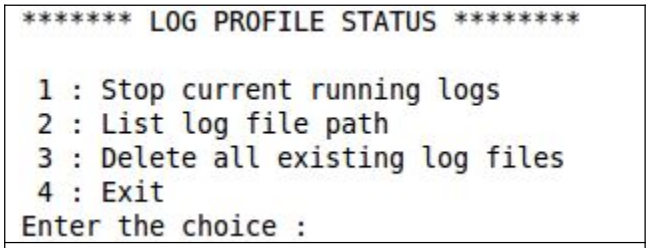

Figure 42 Log Enable Setup

12.3 View Logs

Every log file of particular profile is stored in predefined Hard Drive path for permanent storage. It can be viewed by ***List log File path Option***. Log file can be distinguished by its profile name and time. The entire existing log file can be deleted from Hard Drive

```
EDS 1/10-G
Version            : V0.2.2
Starting Time      : 18:19:28
profile name       : all
Mode               : bridge
  TIME     LAN    B/W     Delay  Loss   Reorder Duplicate   RxPCtr    RxBCtr      TxPCtr    TxBCtr     PktL   PktR   PktD
**********************************************************************************************************************************

18:19:38  eth0  10gbit  100ms   0.500   0.500   0.500           4       1360         1       590       1      0      0
18:19:38  eth1  10gbit  100ms   0.500   0.500   0.500           1         81         3      1261       0      0      1
18:19:48  eth0  10gbit  100ms   0.500   0.500   0.500           8       2720         1       590       3      0      0
18:19:48  eth1  10gbit  100ms   0.500   0.500   0.500           1         81         4      1851       0      0      1
18:19:58  eth0  10gbit  100ms   0.500   0.500   0.500           9       2810         1       590       3      0      0
18:19:58  eth1  10gbit  100ms   0.500   0.500   0.500           2        162         4      1851       1      0      1
18:20:8   eth0  10gbit  100ms   0.500   0.500   0.500          12       4080         1       590       4      0      0
18:20:8   eth1  10gbit  100ms   0.500   0.500   0.500           2        162         7      3621       1      0      2
18:20:18  eth0  10gbit  100ms   0.500   0.500   0.500          13       4670         1       590       5      0      0
18:20:18  eth1  10gbit  100ms   0.500   0.500   0.500           2        162         7      3621       1      0      2
18:20:28  eth0  10gbit  100ms   0.500   0.500   0.500          13       4670         1       590       5      0      0
18:20:28  eth1  10gbit  100ms   0.500   0.500   0.500           2        162         7      3621       1      0      2
18:20:38  eth0  10gbit  100ms   0.500   0.500   0.500          15       5850         1       590       5      0      0
18:20:38  eth1  10gbit  100ms   0.500   0.500   0.500           2        162        10      5391       1      0      3
18:20:48  eth0  10gbit  100ms   0.500   0.500   0.500          20       6710         1       590       6      0      0
18:20:48  eth1  10gbit  100ms   0.500   0.500   0.500           2        162        15      5691       1      0      5
18:20:58  eth0  10gbit  100ms   0.500   0.500   0.500          20       6710         1       590       6      0      0
18:20:58  eth1  10gbit  100ms   0.500   0.500   0.500           3        243        15      5691       2      0      5
18:21:8   eth0  10gbit  100ms   0.500   0.500   0.500          25       8108         3       710      11      0      1
18:21:8   eth1  10gbit  100ms   0.500   0.500   0.500           5        363        15      5691       3      0      5
18:21:18  eth0  10gbit  100ms   0.500   0.500   0.500          39       9858         9      1184      14      0      3
18:21:18  eth1  10gbit  100ms   0.500   0.500   0.500          16       1251        31      7713      10      0     10
18:21:28  eth0  10gbit  100ms   0.500   0.500   0.500          59      11818        27      2948      24      2      9
18:21:28  eth1  10gbit  100ms   0.500   0.500   0.500          35       3113        46      9183      17      2     15
18:21:38  eth0  10gbit  100ms   0.500   0.500   0.500          66      13488        33      3536      27      2     11
```

Figure 43 View Logs

13 System setting

On selection of settings menu, user can perform Factory defaults and System Upgrade and some other system level settings

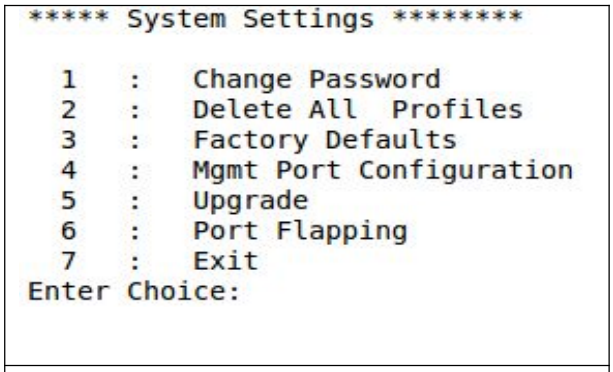

Figure 44 System Settings

13.1 Change password

User can change the password for login user accounts, on selection it prompted with new password option, after that the password is then encrypted and stored on the system.

13.2 Delete all profile

On deletion of all profiles current running profile simulations will be stopped and clears the statistics parameter

13.3 Factory default

It's known factory reset, is software restore the EDS-10G System to its original system state by erasing all of the information stored on the device in an attempt to restore the EDS-10G system software to its original manufacturer settings. Doing so will effectively erase all of the data, settings, and applications that were previously configured on the device, it will delete all profile and reset the password to default password (eds@10G)

13.4 Management port configuration

Management port IP address is used for accessing EDS emulator. EDS emulator supports two management ports physical interfaces. For configuring management port user should specify IP address, subnet mask, and gateway. User should enter IP address manually but for mask and gateway either it can be entered manually or user can press **Enter key** for default value

```
***** System Settings ********

  1   :   Change Password
  2   :   Delete All  Profiles
  3   :   Factory Defaults
  4   :   Mgmt Port Configuration
  5   :   Upgrade
  6   :   Port Flapping
  7   :   Exit
Enter Choice:4

************* Choose Port for Configuration *************

1. Port-1 Configuration
2. Port-2 Configuration
3. Exit

Enter Choice:1

Enter IP Address for Mgmt Port-1: 192.168.0.100

Enter Subnet mask for Mgmt Port-1: 255.255.255.0

Enter Gateway for Mgmt Port-1: 192.168.0.1

 *************** IP Address Configured Successfully for Mgmt port-1 **************
```

Figure 45 Management port configuration

13.5 Upgrade

It is used for replacing the software to newer or better version. It is used to bring the system up to date.

13.6 Port flapping

Port flap means that the Ethernet interface continually goes up and down in EDS-10G System on the user selected interface

```
******* PORT FLAPPING ********

1. Display Ports
2. Stop Flapping
3. exit
Select the option : 1
****** Choose Port to Flap *********
eth0
eth1
eth3
eth4
eth6
eth7
Select Port :
```

Figure 46 Port flapping

On **Scan Ethernet interface menu** (refer section 4) user can check the selected interface link status (up/down). On selection of port flapping the Ethernet link status will take approximately 10sec for up and down

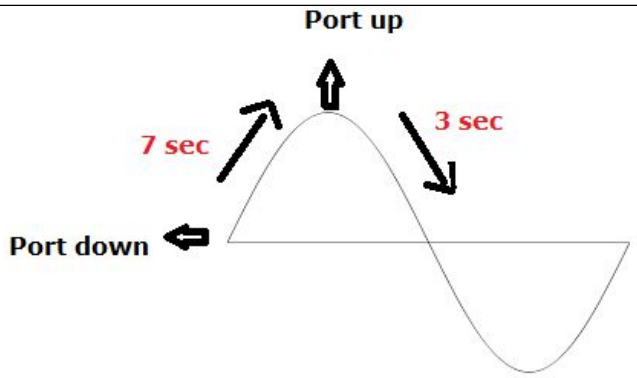

Figure 47 Time duration of port flapping

14 Example

14.1 Creating profile with Filtering

Follow with the below steps to create a new profile with filtering option.

Step 1: To Log-in to the EDS system (Refer Section 2 for login details)

Step 2: On successful log-in, you will get the main menu on console terminal (Refer Section 3 for main menu details).

Step 3: Select option 3 (**Profile Settings**) from the main menu to create profile configurations

Step 4: On selection of option 3 (**Profile Settings**), you will get the submenu for profile configurations on the console terminal (Refer Section 9 for submenu details).

Step 5: Select option 1 (**Add New Profile**) from the submenu to enter add new profile section.

Step 6: On selection of option 1 (**Add New Profile**), you will get the "Profile Setup" details on the console terminal (Refer Section 9.1 for profile setup details).

Step 7: Now you can create new profile by entering the respective fields under the "**Profile Setup**" (Refer Section 9.1)

Note: *3 things are mandatory (**1/ profile name 2/ mode (Bridge/Route) 3/ interface name (eth0, eth1 etc)**)*

Step 8: Filtering option will appear on selection of option 5 (**Traffic Config Settings**) of "**Profile Setup**" menu (Refer Section 9.1_3).

Step 9: On selection of **filtering** menu following submenu will displayed (Refer Section 8.1)

Step 10: You can choose any of the **Filtering** type

Step 11: Here we are taking an example of **IP-PORT Filtering**, on selection of IP-Port Filtering following submenu will displayed (Refer Section 8.1_6)

Step 12: Now provide source/destination port and source/destination IP address along with any emulating parameter

Step 13: After configuring go back to **Profile Setup** menu (Refer Section 9.1)

Step 14: Save the configured profile using option **Save Profile** option, after all necessary fields are filled (Refer Section 9.1_4)

Step 15: Now you can **Apply/Load** the simulation by selection **Apply/Load Profile** option (Refer Section 9.1_5)

Flow of the Profile creation:

Login to the EDS system → Profile Settings → Add New Profile → Profile Name → Mode → Port 1 Name → Port 2 Name → Traffic Config Settings →Filtering → Save →Apply/Load profile →Instant/Scheduled simulation

14.2 Creating profile with Non Filtering

Follow below steps to create a new profile with non filtering option

Step 1: To log-in to the EDS system (Refer Section 2 for login details)

Step 2: On successful log-in, you will get the main menu on console terminal (Refer Section 3 for main menu details)

Step 3: Select option 3 (**Profile Settings**) from the main menu to configure profile configurations

Step 4: On selection of option 3 (**Profile Settings**), you will get the submenu for profile configurations on the console terminal (Refer Section 9 for submenu details).

Step 5: Select option 1 (**Add New Profile**) from the submenu to enter add new profile section.

Step 6: On selection of option 1 (**Add New Profile**), you will get the "Profile Setup" details on the console terminal (Refer Section 9.1 for profile setup details).

Step 7: Now you can create new profile by entering the respective fields asked under the "**Profile Setup**" (Refer Section 9.1).

Note: *3 things are mandatory (**1/ profile name 2/ mode (Bridge/Route) 3/ interface name (eth0, eth1 etc)**)*

Step 8: Non Filtering option will appear on selection of option 5 (**Traffic Config Settings**) of "**Profile Setup**" menu (Refer Section 9.1_3).

Step 9: On selection of **Non filtering** menu following submenu will displayed (Refer Section 8.2).

Step 10: It will ask for delay type. Here we are taking example of constant delay

Step 11: Now provide value of emulating parameters on any interface setting

Step 12: After configuring go back to **Profile Setup** menu. (Refer Section 9.1)

Step 13: Save the configured profile using **Save Profile** option, after all necessary fields are filled (Refer Section 9.1_4)

Step 14: Now you can **Apply/Load** the simulation by selection **Apply/Load Profile** option (Refer Section 9.1_5)

Flow of the Profile creation:

Login to the EDS system → Profile Settings → Add New Profile → Profile Name → Mode → Port 1 Name → Port 2 Name → Traffic Config Settings →Filtering → Save →Apply/Load profile →Instant/Scheduled simulation

14.3 Creating profile with scheduling simulation

On successful creation of new profile (Refer above section for profile creation), save the profile and run the simulation. While running the scheduled simulation it will ask for time (Refer Section 10.2). You need to specify manually or can enter duration in minute's ex-40mins, so simulation will run that duration starting from start time

Then at that, particular date and time profile will run the simulation. For seeing, the statuses of the scheduled profile go to the **Profile setup menu** and select **Display scheduled profile** submenu (Refer Section 10.3)

If you want to remove that profile from scheduler list, go to **profile setting** menu and select **Remove profile from scheduler** (Refer Section 10.4)

Note: *Start date, start time, end date can be entered manually or user can also be used **enter key** for current date and current time*

Flow of the Profile creation:

Login to the EDS system → Profile Settings → Add New Profile → Profile Name → Mode → Port 1 Name → Port 2 Name → Traffic Config Settings →Filtering → Save →Apply/Load profile →Scheduled simulation →Start Date → Start Time →End Date →End Time

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