Packet Generator User Guider V0.1

Based on DeanSys Pktgen-0.0.4

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Contents

Chapter 1. Abstract

User Interface (UI) of this packet generator is designed following the format of switch. User can type in commands in the same way what they are doing on the switch. They can type '?' anywhere to get help messages about the commands, can type 'tab' to complete the rest command automatically. And it offers auto-building functions that they can build well known protocol packets with some parameters automatically. User also can set the raw packets with different configuration file with a simple command.

It can only work under UNIX/Linux system. Redhat Linux 9.0 is the best choice. And Redhat Linux ES/AS version is also acceptable. Make sure that you have got one Ethernet interface card at least.

Multi users can use this packets generator at the same time. And the multi processed function is not supported in this version right now. More function will be available in the next version. The current version of DeanSys packet generator and analysis is v0.0.4.

This is a temporary version of CLI Specification. More details will be available in the next version. Please send mail to me if you have found some bugs or have some suggestion. My mail box is dean@deansys.com .

Design different system solutions for different usages.

Chapter 2. How to install it?

2.1 Get the Latest Release

Go to our website www.deansys.com and download the tar ball from our website and type the following command on your linux system to install it:

[root@DeanOS main]#tar –xzvf pktgen-X.X.X.tar.gz

Then it is available for you.

2.2 System Requirement

We recommend the system as following description:

Item	Requirement	Best Choice
CPU	1GHz	>2.0G
Memory	256M	>512M
Disk	20M	>50M
NIC	10M/100M	10M/100M/1000M
OS	Unix/Linux	Linux-2.4.31

2.3 The way to build a packet

(1). Select the packet type you want.

A. Raw packet from configuration file.

B. Well-known protocols with the packet building function.

(2). Set the interface name, number of packet and pause time between packets. Or just skip them to keep the default.

(3). Send the packets.

(4). Check the result.

The first and second steps can be exchanged with each other. You decide the order.

Note: You must be able to access the interface! ‘root’ is the recommend user group.

Chapter 3. Command description

There are three modes in the packet generator at now. They are
1. global mode
2. configuration mode
3. build mode.

Global mode contains the basic commands for packet generator, such like ‘show’ to show current system status, ‘send’ to send packet out and other commands to change modes such as ‘configure’.

Configuration mode contains all the commands to make system settings. You can set the packets number, length and pause time between packets. You also can select which network interface card you want to use.

Build mode contains all the function to build a well-known protocol packet such as ‘OSPF HELLO’. Packet also can be built up with a defined configuration file. What you need to do is to make your choice and type the right commands into system.

All the commands can be listed by typing ‘?’ or ‘help’. And all the commands can be completed automatically by type ‘tab’. Short and uncompleted commands are also available.

Colors will be used to make the messages more easy-reading.
Error and warning messages will be printed with **red color**.
Status and help messages will use **green** **or** **yellow**.

Chapter 4. Global Mode Commands

Run the program and you will enter into the global mode:

```
[root@DeanOS main]# ./pktgen
pktgen#
```

Global mode contains the basic commands of this packet generator.

Type '?' to get the command list as :

```
pktgen#?
  build          Change to build mode to build packet automatically.
  clear          Clear the data value in buffer.
  configure      Change to configure mode to modify the settings.
  edit           Edit the data value in buffer.
  end            Back to global mode automatically.
  exit           Exit current mode and down to previous mode
  help           Print command help messages.
  list           Print command list
  send           Send the packet in buffer.
  show           Show information.
pktgen#
```

Type 'list' to get command list:

```
pktgen#list
  build
  clear
  configure
  edit [0-1517] [0-0xff]
  end
  exit
  help
  list
  send
  show buffer
  show interface [IFNAME]
  show netstat
  show packet counter [IFNAME]
  show router
  show system
  show version
pktgen#
```

Following is the table of commands description.

Table 1

Command	Description
Build	Change into build mode to build the well-known type of packets with the help of this packet generator.
clear	Clear the data value in buffer. Set the buffer to zero.
configure	Change into the configuration mode to configure the parameters of this packet generator. The parameters will contains: 1. Number of packet 2. Length of packet 3. Pause time between packets 4. Interface name
edit	Edit the data of the packet in buffer.
end	Back to global mode.
exit	Logoff from packet generator.
help	Get help message about commands
list	Print command list.
send	Send the packet in buffer with assured interface, number, length and data.
show	Show packet generator status information.
?	Same with help. Get help message about commands
'\t'	Complete the command.

4.1 Build Command:

Type ‘build’ to enable build mode. Then you will get the commands to build a well-known protocol packet.

```
pktgen#build
    Enter to build mode!
pktgen(build)#
```

4.2 Clear Command:

This command is used to reset the value in buffer. The default value is zero.

```
pktgen#clear
   Clear the data in buffer.
pktgen#
```

4.3 Config Command:

Type config to enable configuration mode.

```
pktgen#configure
   Enter to config mode!
pktgen(config)#
```

4.4 Edit Command:

Type ‘edit [0-1517] [0-0xff]’ to modify the value in buffer. You can use ‘show’ first to verify the value in buffer. The packet units is from 0 to 1517

```
pktgen#edit ?
   [0-1517]    Position in buffer.
pktgen#edit 0 ?
   [0-0xff]    The value you want to set.
pktgen#edit 0 aa ?
   <cr>
pktgen#edit 0 aa
pktgen#
```

4.5 Send Command:

Type ‘send’ command to send the packet in buffer with the configuration value.

```
pktgen#send
Packet Number :1    Length :60    Device :eth0
Wrote 60 bytes packet; check the wire.
```

4.6 Show Command:

‘show ’ command is used to show the packet generator status. It contains data in buffer, configuration values and system status.

```
pktgen#show ?
   buffer        Show buffer information.
   interface     Interface status and configuration
   netstat       Network status and configuration
   packet        Packet status and configuration
   router        Local router status and configuration
   system        Displays system status
   version       Displays pktgen version
pktgen#
```

4.6.1 Show Buffer Command:

This command is used to check the data in buffer. The size of content depends on the length of packet.

```
pktgen#show buffer
Packet Generator Status:
   Device: eth0, Length: 60 byte, Number: 1, Pause: 0 s
   Data from Configuration file.
   aa 00 00 00 00 00 00 00    00 00 00 00 00 00 00 00
   00 00 00 00 00 00 00 00    00 00 00 00 00 00 00 00
   00 00 00 00 00 00 00 00    00 00 00 00 00 00 00 00
   00 00 00 00 00 00 00 00    00 00 00 00
pktgen#
```

4.6.2 Show Interface Command

This command is used to show network interface cards status on this system.

```
pktgen#show interface ?
   [IFNAME]    Inteface name
pktgen#show interface
```

```
eth0      Link encap:Ethernet  HWaddr 00:0C:29:43:5F:A0
          inet addr:192.168.110.98  Bcast:192.168.110.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:59754 errors:0 dropped:0 overruns:0 frame:0
          TX packets:5927 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:100
          RX bytes:6085464 (5.8 Mb)  TX bytes:2995771 (2.8 Mb)
          Interrupt:10 Base address:0x1080

eth1      Link encap:Ethernet  HWaddr 00:0C:29:43:5F:AA
          BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:5 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:100
          RX bytes:728 (728.0 b)  TX bytes:0 (0.0 b)
          Interrupt:9 Base address:0x1400

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:34 errors:0 dropped:0 overruns:0 frame:0
          TX packets:34 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:4196 (4.0 Kb)  TX bytes:4196 (4.0 Kb)

pktgen#
```

4.6.3 Show Netstat Command

This command is used to show network status on this system.

```
pktgen#show netstat
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 *:32768                 *:*                     LISTEN
tcp        0      0 DeanOS:32769            *:*                     LISTEN
tcp        0      0 *:cvspserver            *:*                     LISTEN
tcp        0      0 *:sunrpc                *:*                     LISTEN
tcp        0      0 *:ftp                   *:*                     LISTEN
tcp        0      0 *:ssh                   *:*                     LISTEN
tcp        0      0 DeanOS:ipp              *:*                     LISTEN
tcp        0      0 DeanOS:smtp             *:*                     LISTEN
tcp        0      0 192.168.110.98:ssh      dean:3949               ESTABLISHED
tcp        0      0 192.168.110.98:ssh      dean:3950               ESTABLISHED
```

```
udp        0      0 *:32768                 *:*
udp        0      0 *:906                   *:*
udp        0      0 *:sunrpc                *:*
udp        0      0 *:631                   *:*
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags       Type       State         I-Node Path
unix  10     [ ]         DGRAM                    1297   /dev/log
unix  2      [ ACC ]     STREAM     LISTENING     1827   /dev/gpmctl
unix  2      [ ACC ]     STREAM     LISTENING     1957
/tmp/.font-unix/fs7100
unix  2      [ ]         DGRAM                    2007
unix  2      [ ]         DGRAM                    1838
unix  2      [ ]         DGRAM                    1803
unix  2      [ ]         DGRAM                    1789
unix  2      [ ]         DGRAM                    1731
unix  2      [ ]         DGRAM                    1495
unix  2      [ ]         DGRAM                    1347
unix  2      [ ]         DGRAM                    1312
pktgen#
```

4.6.4 Show Packet Counter Command

This command is used to check the packet counters on specified interface.

```
pktgen#show packet ?
  counter    Packet counter
pktgen#show packet counter ?
  [IFNAME]   Interface name
pktgen#show packet counter
Iface MTU Met RX-OK RX-ERR RX-DRP RX-OVR TX-OK TX-ERR TX-DRP TX-OVR
eth0  1500  0  60073      0      0      0   5962      0      0      0 BMRU
eth1  1500  0      5      0      0      0      0      0      0      0 BM
lo   16436  0     34      0      0      0     34      0      0      0 LRU
pktgen#show packet counter
  [IFNAME]   Interface name
pktgen#
```

4.6.5 Show Router Command

This command is used to show router information on system.

```
pktgen#show router
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
192.168.110.0   *               255.255.255.0   U     0      0        0 eth0
169.254.0.0     *               255.255.0.0     U     0      0        0 eth0
```

```
127.0.0.0       *               255.0.0.0       U     0      0        0 lo
default         gateway         0.0.0.0         UG    0      0        0 eth0
pktgen#
```

4.6.6 Show System Command

This command is used to check the system status.

```
pktgen#show system
System status:
   Interface:       eth0
   MAC address:    00:0c:29:43:5f:a0
   IP   address:    192.168.110.98
pktgen#
```

4.6.7 Show Version Command:

This command is used to get version information.

```
pktgen#show version
---------------------------------------------
Packet Generator Version Information
   Name    : Packet Generator 0.0.4
   Author: Dean Ding
   Date    : July.25,2006
   Note    : Based on GNU Linux System
           : www.DeanSys.com
---------------------------------------------
pktgen#
```

Chapter 5. Build Mode Commands

Type ‘build’ to change to build mode. Then you will get the commands to build well-known protocol packets.

```
pktgen#build
pktgen(build)#
```

Type ‘?’ to get commands help message:

```
pktgen(build)#
  arp       Build ARP packet automatically.
  bgp       Build BGP4 packet automatically.
  cdp       Build CDP packet automatically.
  dhcp      Build DHCP packet automatically.
  dns       Build DNS packet automatically.
  dot1x     Build Dot1x packet automatically.
  end       Back to global mode automatically.
  exit      Exit current mode and down to previous mode
  gre       Build GRE packet automatically.
  help      Print command help messages.
  icmp      Build ICMP PING OF DEATH packet automatically.
  ieee      Build IEEE802.2 packet automatically.
  igmp      Build IGMP_MEMBERSHIP_QUERY packet automatically.
  isl       Build ISL packet automatically.
  list      Print command list
  mpls      Build MPLS packet automatically.
  ospf      Build OSPF packet automatically.Type: IBI/MBIT/MSBIT.
  pim       Build PIM packet automatically.
  raw       Build packet from configuration file automatically.
  rip       Build RIP packet automatically.
  stp       Build STP packet automatically.
  tcp       Build TCP packet automatically.
  udp       Build UDP packet automatically.
pktgen(build)#
```

Type ‘list’ to get command list:

```
pktgen(build)#list
  arp
  bgp hdr [A.B.C.D] [A.B.C.D] [type]
  bgp notification [dest_ip] [src_ip] [errcode] [subcode]
  bgp open
  bgp update [dest_ip] [src_ip] [withdraw_rt] [update_attr] [update_info]
  cdp [switchname]
```

```
    dhcp
    dns [dest_ip] [src_ip] [query] [type]
    dot1x
    end
    exit
    gre [dest_ip] [src_ip] [gre_dest_ip] [gre_src_ip] [route_info]
    help
    icmp [dest]
    ieee [dest_ip] [src_ip]
    igmp [group_ip] [source_ip]
    isl [dest_ip]
    list
    mpls [dest_ip] [dest_port] [src_ip] [src_port]
    ospf dbd [dest_ip] [src_ip] [type]
    ospf hello [dest_ip] [src_ip] [neighbor_ip]
    ospf lsa [dest_ip] [src_ip]
    pim hello [dest_ip] [src_ip]
    raw
    raw [filename]
    rip [rip_add] [rip_netmask] [next_hop] [dest_ip]
    stp [dest_ip] [src_ip]
    tcp [dest_ip] [dest_port] [src_ip] [src_port]
    udp [dest_ip] [dest_port] [src_ip] [src_port]
pktgen(build)#
```

Table 2

Command	Description
arp	Build ARP packet.
bgp	Build BGPv4 packet. (**OPEN, UPDATE, NOTIFICATION, KEEPALIVE**)
cdp	Build CDP packet.
dhcp	Build DHCP packet. (**REQUEST, REPLY**)
dns	Build DNS packet.
dot1x	Build 802.1x EAP packet. (**START, LOGOFF, EAP PACKET**)
end	Back to global mode.
exit	Exit to global mode.
gre	Build GRE packet.
help	Print command help message.
icmp	Build ICMP packet.
ieee	Build IEEE 802.2/802.3 packet
isl	Build ISL packet.
igmp	Build IGMP packet.

	(**MEMBERSHIP_QUERY**, **MEMBERSHIP_REPORT**, **LEAVE_GROUP**)
list	Print commands list.
mpls	Build MPLS packet.
ospf	Build OSPF packet. (**HELLO, UMD, LSA, DBD, LSR, LSU**)
pim	Build PIM packet
raw	Build raw packets with configuration file.
rip	Build RIP packet. (**REQUEST, RESPONSE, TRACEON, TRACEOFF, POLL, POLLENTRY, MAX**)
stp	Build STP packet.
tcp	Build TCP packet.
udp	Build UDP packet.
?	Get help message

At right now ‘auto-building’ only supports few type packets comparing with all of the Ethernet packets. More support will be available in the future. Please send mail to dean@deansys.com when you find any bugs and want to share your ideas with us.

5.1 OSPF Commands:

Type in ‘ospf ?‘ in build mode, then you will find the types of OSPF.

```
pktgen(build)#ospf ?
   dbd       OSPF DBD packet.
   hello     OSPF Hello packet.
   lsa       OSPF LSA packet.
pktgen(build)#
```

The OSPF command list is :

ospf dbd [dest_ip] [src_ip] [type]
ospf hello [dest_ip] [src_ip] [neighbor_ip]
ospf lsa [dest_ip] [src_ip]

5.1.1 OSPF DBD command

The DBD type is : IBI/MBIT/MSBIT

```
pktgen(build)#ospf dbd ?
   A.B.C.D    Destination IP address.
pktgen(build)#ospf dbd 192.168.110.1 ?
   A.B.C.D    Source IP address.
pktgen(build)#ospf dbd 192.168.110.1 192.168.110.99 ?
   [type]    OSPF DBD type : IBI/MBIT/MSBIT.
pktgen(build)#ospf dbd 192.168.110.1 192.168.110.99 ibi ?
   <cr>
pktgen(build)#ospf dbd 192.168.110.1 192.168.110.99 ibi
Src:192.168.110.99, Dst:192.168.110.1,
pktgen(build)#
```

5.1.2 OSPF HELLO command

An expmale is:

```
pktgen(build)#ospf hello 192.168.110.254 192.168.110.2 192.168.110.23
```

5.1.3 OSPF LAS Command

```
pktgen(build)#ospf lsa ?
   A.B.C.D    Deastination IP address.
pktgen(build)#ospf lsa 192.168.110.110 ?
   A.B.C.D    Source IP address.
pktgen(build)#ospf lsa 192.168.110.110 192.168.110.99 ?
```

<cr>
pktgen(build)#ospf lsa 192.168.110.110 192.168.110.99
pktgen(build)#

5.2 RIP Commands:

RIP command format is :
rip [rip_add] [rip_netmask] [next_hop] [dest_ip]

pktgen(build)#rip 192.168.110.98 255.255.255.0 192.168.110.9 192.168.110.254

5.3 PIM Commands:

Type pim in build mode, then you will be asked for source and destination IP address. It just support PIMv2 HELLO packet right now.

pktgen(build)# pim hello 192.167.110.1 19.168.11.1

5.4 RAW Commands:

Type in raw command in build mode to select an existed configuration file to load the packet data from. The default configuration file is ‘packet.conf’. Default will be selected if you just type raw without any parameter.

For example, if you want to use the default configuration file, then just type ‘raw’:

pktgen(build)#raw
Select packet.conf as the default config file.

If you want to use another file, just type ‘raw filename’

pktgen(build)#raw test.conf
Select test.conf as the default config file.

Make sure the file you have selected is in the same fold and it should be filled with correct format. An example file will look like:

```
loada:ffffffffffff0001 02030405888e0101
loadb:0000000000000000 0000000000000000
loadc:0000000000000000 0000000000000000
loadd:0000000000000000 0000000000000000
loade:0000000000000000 0000000000000000
```

```
loadf:0000000000000000 0000000000000000
loadg:0000000000000000 0000000000000000
```

At present, the max length is 112 bytes. You can use ‘length’ command in configuration mode to modify the length. The default length is 60 bytes. If you want to use lager packet, please tell me that. And I will make it lager.

5.5 IGMP Command:

An example is:

pktgen(build)#igmp 224.0.0.1 192.168.110.1

Chapter 6. Configuration Mode Commands

Type in 'config' to change to configuration mode to modify the configuration values. The configuration options will be: number, length, interface and pause time. You can just skip this step to keep the default value. The default value will be:

Interface	eth0
Length	60bytes
Number	1
Pause time	0 second

Commands look like:

```
pktgen#config
   Enter to config mode!
pktgen(config)#?
pktgen(config)#
   end            Back to global mode automatically.
   exit           Exit current mode and down to previous mode
   help           Print command help messages.
   interface      Select interface to send packets.
   length         Set packet length.
   list           Print command list
   number         Set packets number.
   time           Set pause time between packets.
pktgen(config)#
```

Command list is :

```
pktgen(config)#list
   end
   exit
   help
   interface [eth0]
   length [14-1518]
   list
   number [1-65535]
   time [0-3600]
pktgen(config)#
```

Table 3

Command	Description
end	Back to global mode
exit	Back to global mode

help	Get help message about commands
interface <name>	Select the interface you want to use.
number <1-65535>	Set the number of packets
length <16-1518>	Set the length of packet.
list	Get command list message.
Time <0-3600>	Value of seconds between packets. '0' means there is no pause.
?	Get help message.

6.1 Interface Command:

Type in interface command to select a Network Interface Card (NIC) to send your packet. Default value is eth0.

```
pktgen(config)#interface eth0
      Device is eth0
pktgen(config)#
```

Make sure that the name of the card is correct. Otherwise you will get error messages.

6.2 Number Command:

Type number command to set the number of packets you want to build and send out. The range is 1 - 65535. Default value is 1.

```
pktgen(config)#number 10
   Packet number is 10
pktgen(config)#
```

6.3 Length Command:

Type length command to set the value of packet length. The range is 16-1518. Default value is 60.

```
pktgen(config)#length 64
   Length is 64bytes
pktgen(config)#
```

6.4 Time Command:

Type time command to set the pause seconds between every two packets. The range is 0-3600. Default value is 0 (no pause).

pktgen(config)#time 1

Pause time is 1 second.

pktgen(config)#

Chapter 7. Notes

This is an unfinished version. Extra details will be added in the future. And if you have any suggestions or ideas, please share them with me. My mail-box is dean@deansys.com .

This version specification is based on packet generator v0.0.4.

8. THANKS

Thank for all the guys who share me with their ideas and suggestions.

Design different system solutions for different usages.