

# Tools for Networkers v3.2

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# Introduction

## ➤ Intro

While working as a Network engineer, I've experienced some common needs. It's about small programs which helpful & convenient at a practical usage perspective. This is to help others who are not good at operating Juniper router product or troubleshooting.

- 1) How to collect system outputs continuously without using shell script.
- 2) What/how to collect syslog log messages at a production, when problem occurred.
- 3) How to simulate packets to troubleshoot
- 4) .....various reasons

## ➤ Building Environment.

- Based on Juniper Router products.(MX/T/PTX series). Other vendor's would not work properly.
- Building environment : You have to have installed python 3.7.2, pyqt5, and scapy module
  - 1) Install python 3.7.2 or higher version. Then set PATH env properly.
  - 2) In the directory, install pyqt5 and scapy module  
Move into the directory where all files are exist.  
#cd C:\Python37\studyroutm\project\Tools for networks\_V2

```
PS C:\Python37\studyroutm\project\Tools for networks_V2> pip3 install pyqt5
PS C:\Python37\studyroutm\project\Tools for networks_V2> pip3 install scapy
```

- Download : <https://github.com/HyungKwangChoi/My-programing>
- Released 4 files
  - 1) **"Tools for networkers\_v3.2.py"**
  - 2) **"Window\_ui.zip"** (GUI application designed with PYQT5)
  - 3) **"Lab Topology.zip"**
  - 4) **"Release\_note\_v3.2"**

```
C:\EY기술\language\GitHub\My Programing\My-programing\Tools for networks\version 3.2
2020-02-21 오전 10:11 <DIR> .
2020-02-21 오전 10:11 <DIR> ..
2020-02-21 오전 10:09          92,360 Lab Topology.zip
2020-02-21 오전 09:58        258,786 release_note_v3.2.docx
2020-02-18 오후 08:11         37,193 Tools for Networkers_v3.2.py
2020-02-21 오전 10:11          4,781 Window.zip
```

- How to Run  
To run it, you need 3 files exist in the same dir **"Tools for Networkers\_v3.2 , Window.ui and Lab Topology"**.

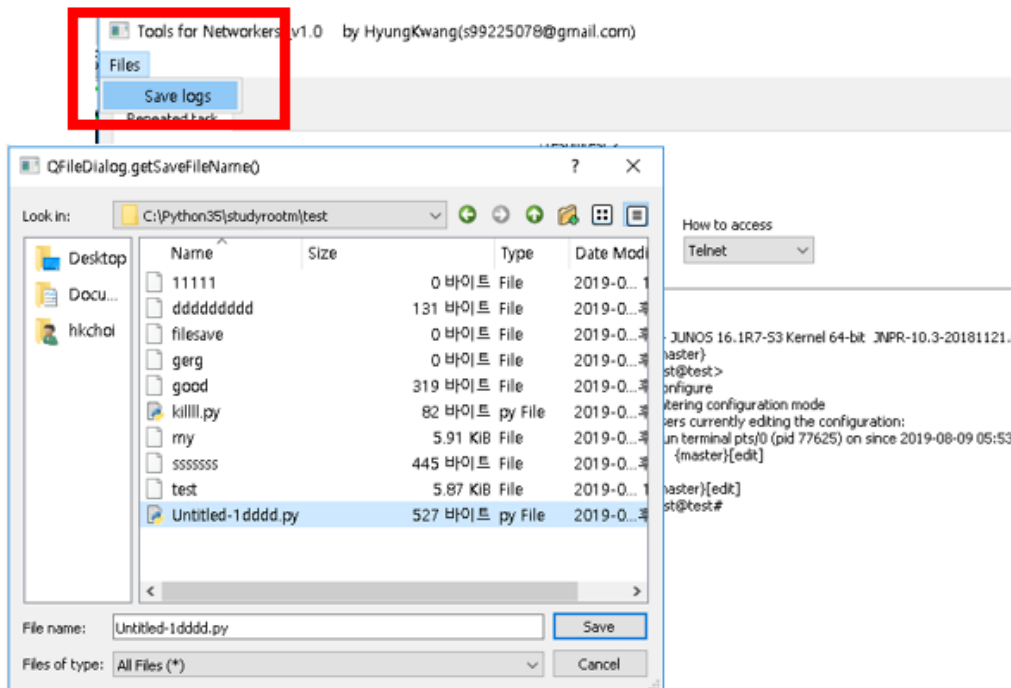
```
C:\EY기술\language\GitHub\My Programing\My-programing\Tools for networks\version 3.2>python "Tools for Networkers_v3.2.py"
```

# Tools

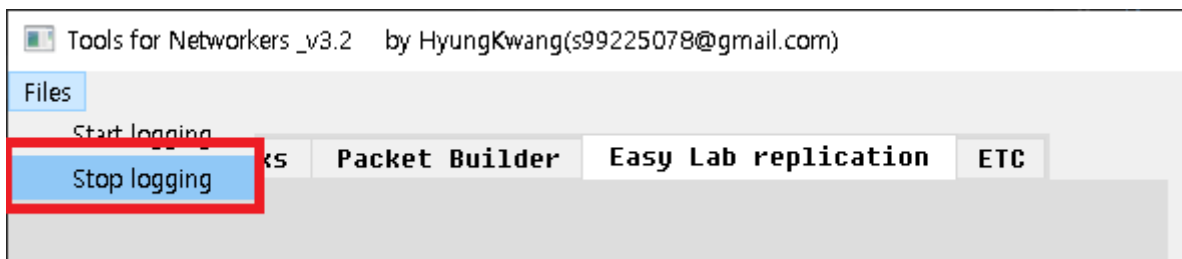
## ➤ How to save logs

Go to 'Files' -> 'Save logs'.

- Logs are being saved on the display right screen.



## ➤ How to stop logging



## ➤ Repetitive Tasks

- To help someone who feels hard to create a Shell script or other scripts to run commands repetitively or tasks.
- (Current Version) Task performed via Telnet access

Repetitive Tasks

Packet Builder

1. Establish Connection

Put an ip address

ID

PW

How to access

1

172.27.122.224

jun

jun2per

Telnet

2

Connect

2. Running test

1). Commands to execute (for multiple commands, append ";". Please refer to Manual for details.)

3

run show version | no-more;run show chassis hardware | no-more

2). Time sleep (sec) Interleaving between commands (default 1sec)

4

1

3). How many times running

5

1

4). Running Schedule between (if not specified, skipping) <== options

> Beginning

> End

2000-01-01 00:00:00

2000-01-01 00:00:00

6

Running or Enter key

Stop or Ctrl+c

```

jun@jun2per
run show chassis hardware | no-more
Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis
Midplane      REV 03    710-013698   TR0148         MX960
FPM Board     REV 03    710-014974   J22166         MX960 Backplane
Display
PDH           Rev 03    740-013110   QCS1103502J    Power Distribution
Module
PEM 0         Rev 03    740-013683   QCS11047038    DC Power Entry
Module
PEM 1         Rev 03    740-013683   QCS1104706E    DC Power Entry
Routing Engine 0 REV 10    740-031116   9009224878     RE-S-1800x4
CB 0          REV 07    750-055976   CAFE4191       Enhanced MX SCB 2
FPC 3         REV 15    750-038491   CAB26776       MPC Type 2 3D
CPU           REV 06    711-038484   CACD3901       MPC PMB 2G
MIC 0         REV 22    750-028392   YB7397         3D 20x 1GE(LAN)
SFP
PIC 0         BUILTIN   BUILTIN       10x 1GE(LAN) SFP
Xcvr 0       s         NON-JNPR      HT134301F6     SFP-T
PIC 1         BUILTIN   BUILTIN       10x 1GE(LAN) SFP
Xcvr 6       REV 01    740-022613   HA10399500442  SFP-SX
FPC 7         REV 16    750-031089   YH4496         MPC Type 2 3D
CPU           REV 06    711-030884   YH9374         MPC PMB 2G
MIC 0         REV 18    750-028392   YB7290         3D 20x 1GE(LAN)
SFP
PIC 0         BUILTIN   BUILTIN       10x 1GE(LAN) SFP
PIC 1         BUILTIN   BUILTIN       10x 1GE(LAN) SFP
Xcvr 0       NON-JNPR      AA0743S15J4    SFP-SX
Xcvr 7       NON-JNPR      01895082       SFP-SX
FPC 11        REV 39    750-028467   CACD7645       MPC 3D 16x 10GE
CPU           REV 13    711-029089   CACA3260       AMPC PMB
PIC 0         BUILTIN   BUILTIN       4x 10GE(LAN) SFP+
Xcvr 1       NON-JNPR      OPB1508201006  SFP+-10G-LR
Xcvr 2       NON-JNPR      OPB1508201045  SFP+-10G-LR
PIC 1         BUILTIN   BUILTIN       4x 10GE(LAN) SFP+
Xcvr 0       REV 01    740-021308   AD1609301N6    SFP+-10G-SR
PIC 2         BUILTIN   BUILTIN       4x 10GE(LAN) SFP+
PIC 3         BUILTIN   BUILTIN       4x 10GE(LAN) SFP+
Xcvr 3       REV 01    740-021309   UFN0080        SFP+-10G-LR
Fan Tray 0    REV 06    740-031521   ACAC2865       Enhanced Fan Tray
Fan Tray 1    REV 06    740-031521   ACAC2866       Enhanced Fan Tray

[edit]
jun@test#

```

## How to run (follow the red sequence)

### 1. Once the Tool popped-up, Put ip & id & pw

- Telnet connection Timeout = 3
- In my source-code, login/Password prompts are “login”, “Password” coded.  
So If your device doesn't return the Char as “login”, “Password”, please modify my source-code.

### 2~3. If connection successful, go to '2. Running a test'

- Take a look at “1). commands to execute (for multiple command, append “;”)  
If you want to run several commands, you have to add “;” among commands

Ex) set interface ge-0/0/0 mtu 9000; commit; delete interface ge-0/0/0 mtu 9000;run show interface terse | match ge-0/0/0

4 | Page

-If possible, try to append 'no-more' after commands. To avoid logs are stuck in buffer just like the same as Telnet session.

Ex) show version | **no-more**, show log messages | **no-more**

4. please put the time-sleep which is time interval between commands executed.

5. put the number at "how many time to run". This is a kind of loop.

6. "Running"

## How to login system and execute shell or cli commands.

-As this 'Repetitive Tasks' works on Telnet session, you can do the same thing as what you do in Telnet. (**Accessing to System, and executing shell command or whatever**)

Ex)

0). "1).commands to execute", in case, your system root pw is 'juniper'

1). **"start shell user root;juniper"**, if you login to the system successfully, then put the commands/ execute again

2). **"/usr/sbin/cli -c "set cli timestamp"** and so on

The screenshot displays the 'Repetitive Tasks' configuration window with two tabs: 'Repetitive Tasks' and 'Packet Builder'. The 'Repetitive Tasks' tab is active, showing a configuration for a Telnet session.

**1. Establish Connection**

- Put an ip address: 172.27.122.224
- ID: jun
- PW: jun2per
- How to access: Telnet
- Connect button

**2. Running test**

1). Commands to execute (for multiple commands, append ";") Please refer to Manual for details.)

start shell user root;juniper

**2. Running test**

1). What commands to execute

/usr/sbin/cli -c "set cli timestamp"

2). Time sleep (sec) Interleaving between commands (default 1sec)

1

3). How many times running

1

4). Running Schedule between (if not specified, skipping)

> Beginning: 2000-01-01 00:00:00

> End: 2000-01-01 00:00:00

Running or Enter key

Stop or Ctrl+c

**Terminal Output:**

```
Last login: Fri Jan 3 13:55:19 from 172.27.15.50
--- JUNOS 16.1R7-S3 Kernel 64-bit JNPR-10.3-20181121.8f5ba50_buil
jun@test>
start shell user root
Password:
root@test:/var/home/jun #
```

**Configuration Log:**

```
delete interfaces ge-0/0/0 description
commit complete
{master}[edit]
test@test# delete *interfaces ge-0/0/0 description
{master}[edit]
test@test#
{master}[edit]
test@test#
run start shell user root
Password:
su: Sorry
{master}[edit]
test@test#
run start shell user root
Password:
root@test:/var/home/test #
/usr/sbin/cli -c "set cli timestamp"
Aug 13 17:21:13
CLI timestamp set to: %b %d %T
root@test:/var/home/test #
whoami
root
root@test:/var/home/test #
date
Tue Aug 13 17:21:33 KST 2019
root@test:/var/home/test #
/usr/sbin/cli -c "set cli timestamp"
Aug 13 17:22:20
CLI timestamp set to: %b %d %T
root@test:/var/home/test #
```

## ➤ Packet Builder

### How to run (follow the red sequence)

1. Once the Tool popped-up, "Loading PCAP" file
  - It must load only PCAP file, which you want to simulate.
  - PCAP files will be displayed on the screen right.
2. Modify packets items.
3. You must run 'CheckSum'. After checksum done, new modify packet would be refreshed on the right screen.
4. put how many packets you want to send
5. put 'PPS'
  - if you put '0', it means infinity flood
6. Running
7. Stopping.

Repetitive Tasks

Packet builder

1. Browse a PCAP file to load

1 Loading PACP

2. Running test (Modifying & Sending)

2 1).Modify packets which you want to build

Ether(dst='00:00:5e:00:01:0f', src='94:b8:6d:96:1d:dd', type=2048)/IP(version=4, ihl=5, tos=0, len=60, id=43783, flags=0, frag=0, ttl=128, proto=1, chksum=44400, src='172.27.15.50', dst='172.27.122.224')/ICMP(type=8, code=0, chksum=17800, id=1, seq=2003, ts\_ori=None, ts\_rx=None, ts\_tx=None, gw=None, ptr=None, reserved=None, length=None, addr\_mask=None, nexthopmtu=None, unused=None)/Raw(load=b'abcdefghijklmnpqrstuvwabcdefghi')

2). Please run a 'CheckSum' if you modified. If not just skip

3 Running 'CheckSum'

Saving modified packets as to PCAP

3). The number of packets to send

4 1 (ex 1,2,300,4000000....)

4). PPS

5 1 (ex 1 = 1 pps, 20 = 20 pps, 100 = 100 pps, "0 = infinity flood")

6 Running

7 Stop

```
###[ Ethernet ]###
dst      = 00:00:5e:00:01:0f
src      = 94:b8:6d:96:1d:dd
type     = IPv4
###[ IP ]###
version  = 4
ihl      = 5
tos      = 0x0
len      = 60
id       = 43783
flags    =
frag     = 0
ttl      = 128
proto    = icmp
chksum   = 0xad70
src      = 172.27.15.50
dst      = 172.27.122.224
\options \
###[ ICMP ]###
type     = echo-request
code     = 0
chksum   = 0x4588
id       = 0x1
seq      = 0x7d3
###[ Raw ]###
load     = 'abcdefghijklmnpqrstuvwabcdefghi'
```

## ➤ Easy Lab Replication

### - Aims :

- 1) To help easy lab replication with only one Router Box, in case with juniper router.
- 2) With 30 x lab scenario, you can study various routing protocols & features.

### - Total 30 Lab scenario.

MPLS L3VPN : 14

MPLS L2VPN : 2

MPLS VPLS : 2

Multicast : 5

6PE : 1

6VPE : 1

INTRA-AS VPN : 3

Various scenario: 2

### - In details

Main Feature	Subset
<b>MPLS L3VPN</b>	IGP-OSPF # MPLS RSVP LSP # NO PE-CE Protocol
	IGP-OSPF # MPLS RSVP LSP # PE-CE Protocol OSPF # NO RR
	IGP-OSPF # MPLS RSVP LSP # PE-CE Protocol BGP # NO RR
	IGP-OSPF # MPLS RSVP LSP # PE-CE Protocol OSPF # SINGLE RR
	IGP-OSPF # MPLS RSVP LSP # PE-CE Protocol BGP # SINGLE RR
	IGP-OSPF # MPLS RSVP LSP # PE-CE Protocol OSPF # DUAL RR
	IGP-OSPF # MPLS RSVP LSP # PE-CE Protocol BGP # DUAL RR
	IGP-OSPF # MPLS LDP # NO PE-CE Protocol
	IGP-OSPF # MPLS LDP # PE-CE Protocol OSPF # NO RR
	IGP-OSPF # MPLS LDP # PE-CE Protocol BGP # NO RR
	IGP-OSPF # MPLS LDP # PE-CE Protocol OSPF # SINGLE RR
	IGP-OSPF # MPLS LDP # PE-CE Protocol BGP # SINGLE RR
	IGP-OSPF # MPLS LDP # PE-CE Protocol OSPF # DUAL RR
	IGP-OSPF # MPLS LDP # PE-CE Protocol BGP # DUAL RR
<b>MPLS L2VPN</b>	MPLS L2VPN - IGP-OSPF # MPLS RSVP LSP # SINGLE RR [3 loops Required]
	MPLS L2VPN - IGP-OSPF # MPLS LDP # SINGLE RR [3 loops Required]
<b>MPLS VPLS</b>	VPLS [3 CE] - IGP OSPF # MPLS RSVP LSP # SINGLE RR [4 loops Required]
	VPLS [3 CE] - IGP OSPF # MPLS LDP # SINGLE RR [4 loops Required]
<b>Multicast</b>	PLAIN MULTICAST # PIM - SPARSE MODE # STATIC RP CONFIGURED # ASM
	PLAIN MULTICAST # PIM - DENCE MODE
	PLAIN MULTICAST # PIM - SPARSE MODE # NO RP CONFIGURED # SSM
	NG-MVPN # MBGP Multicast VPN with PIM SSM as PE-CE Protocol
	NG-MVPN # MBGP Multicast VPN with PIM ASM as PE-CE Protocol # RPT-SPT

<b>6PE</b>	6PE - IGP-OSPF # MPLS RSVP LSP # PE-CE Protocol BGP # SINGLE RR
<b>6VPE</b>	6VPE - IGP-OSPF # MPLS RSVP LSP # PE-CE Protocol BGP # SINGLE RR
<b>INTER-AS VPN</b>	INTER-AS L3VPN OPTION-A IGP-OSPF # MPLS LDP # PE-CE Protocol EBGp
	INTER-AS L3VPN OPTION-B IGP-OSPF # MPLS LDP # PE-CE Protocol EBGp
	INTER-AS L3VPN OPTION-C IGP-OSPF # MPLS LDP # PE-CE Protocol EBGp
<b>Various scenario</b>	IGP-OSPF -- MULTI-AREA - STUB - NSSA -TSA -ALL P2MP LINKS [1 loop]
	IGP-OSPF -- MULTI-AREA - STUB - NSSA -TSA -ALL P2P LINKS [1 loop]

## - How to run

- 1) Just follow the sequential number
- 2) First select lab topo and template.
- 3) When you selected done, simple lab template will pop-up.
- 4) If you think that's the lab you are using, then put the interface number correctly.  
\*\*It's implemented only in Router Box, so in according to your interface number put, you have to do physical cable connection as a loop direct connection\*\*
- 5) After you put the interface name correctly, window pop-up will be refreshed displaying it's interface name on the template.  
Then it will give you configurations on the right display box.
- 6) (OPTIONS) it's all done.  
But if you want to upload the configurations to your Router, if you add IP, ID, Password, it will try to upload it to your Router via Telnet.  
So to use it, you have to make sure that enabling 'telnet' service at your Router before that.

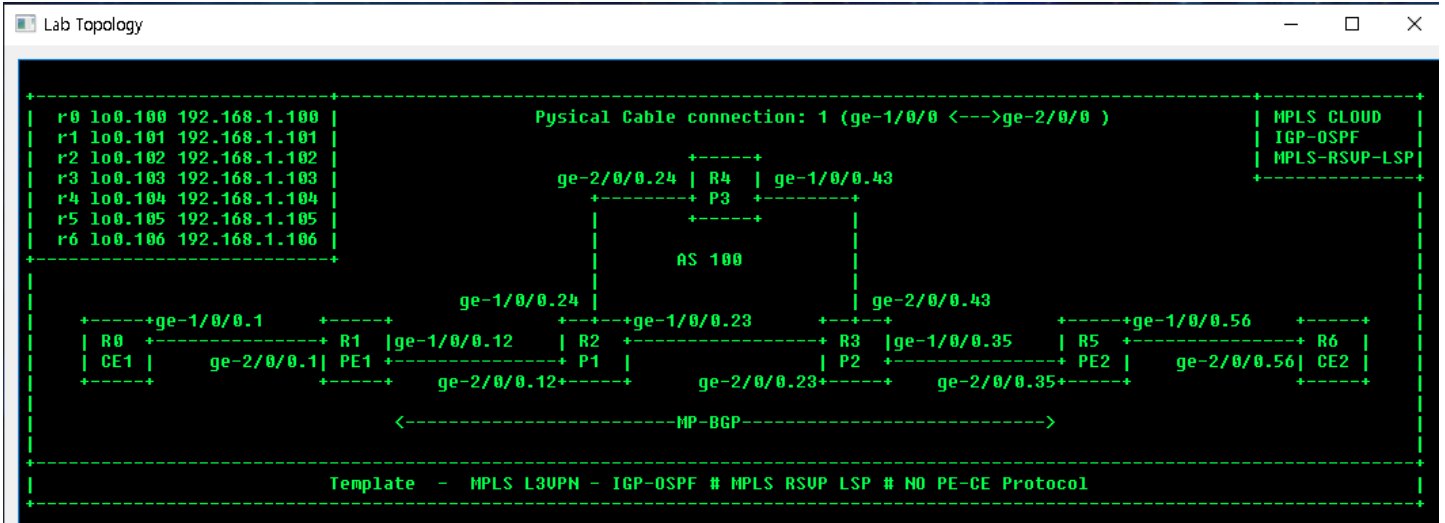
## - ETC :

This feature works only in Juniper Router product, which supports 'Logical Router' feature.

-



- Display



Tools for Networkers\_v3.2

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Files

Repetitive Tasks

Packet Builder

Easy Lab replication

ETC

1. Select Topology & Template

MPLS L3VPN

IGP+OSPF # MPLS RSVP LSP # NO PE-CE Protocol

2. put interface name (direct cable connection required)

ex) ge-2/0/0 <---cable connection--> ge-2/0/1

ge-1/0/0

ge-2/0/0

3.[Notice] if applicable

MPLS L3VPN

4.Running

Done

Download Topology and Configuration

5. [option] Uploading & Committing the config to your lab Router.

Put an ip address

ID

PW

How to access

172.27.122.224

jun

jun2per

telnet

Connect n Upload

Stop n Exit

```
logical-systems {
  r0 {
    interfaces {
      ge-1/0/0 {
        unit 1 {
          vlan-id 1;
          family inet {
            address 1.1.1.1/30;
          }
          family mpls;
        }
      }
      lo0 {
        unit 100 {
          family inet {
            address 192.168.1.100/32;
          }
        }
      }
    }
  }
  r1 {
    interfaces {
      ge-1/0/0 {
        unit 12 {
          vlan-id 12;
          family inet {
            address 1.1.12.1/30;
          }
          family mpls;
        }
      }
      ge-2/0/0 {
        unit 1 {
          vlan-id 1;
          family inet {
            address 1.1.1.2/30;
          }
          family mpls;
        }
      }
      lo0 {
        unit 101 {
          family inet {
            address 192.168.1.101/32;
          }
        }
      }
    }
  }
}
protocols {
```




# Error

- “ImportError : cannot import name ‘qtwidgets’ from ‘PyQt5’ (unknown location)”
  - While you are running the script, if you meet the error like that, PYQT5 is not installed properly with a right PATH. So please check path environment set properly.

```
Traceback (most recent call last):
  File "c:\Users\hkchoi\.vscode\extensions\ms-python.python-2019.10.41019\pythonFiles\ptvsd_launcher.py", line 43, in <module>
    main(ptvsdArgs)
  File "c:\Users\hkchoi\.vscode\extensions\ms-python.python-2019.10.41019\pythonFiles\lib\python\old_ptvsd\ptvsd\_main_.py", line 432, in main
    run()
  File "c:\Users\hkchoi\.vscode\extensions\ms-python.python-2019.10.41019\pythonFiles\lib\python\old_ptvsd\ptvsd\_main_.py", line 316, in run_file
    runpy.run_path(target, run_name='__main__')
  File "C:\Python37\lib\runpy.py", line 263, in run_path
    pkg_name=pkg_name, script_name=fname)
  File "C:\Python37\lib\runpy.py", line 96, in _run_module_code
    mod_name, mod_spec, pkg_name, script_name)
  File "C:\Python37\lib\runpy.py", line 85, in _run_code
    exec(code, run_globals)
  File "c:\Python37\studyr00tm\project\Tools for networks_v2\new candidate.py", line 1, in <module>
    from PyQt5 import QtWidgets, QtGui, QtCore
ImportError: cannot import name 'QtWidgets' from 'PyQt5' (unknown location)
```

- How to resolve
  - Move to the directory which “Window.ui” and the script located.
  - And install pyqt5 under the directory.

Windows (C:) > Python37 > studyr00tm > project > Tools for networks\_v2

이름	수정한 날짜	유형	크기
 Tools for Networkers_v2.1	2019-12-29 오후...	Python File	14KB
 release_note_v2.1	2019-12-29 오후...	Microsoft Word ...	510KB
 Window.ui	2019-12-29 오후...	UI 파일	21KB

```
PS C:\Python37\studyr00tm\project> cd '.\Tools for networks_v2\'
PS C:\Python37\studyr00tm\project\Tools for networks_v2> pip3 install pyqt5==5.13.0
```

# Future Release

1. ‘Mib Browser’ expected on Q2 2020
2. ‘DHCP Shooter\_v1’ expected on Q2 2020
3. ‘Collecting system outputs’ expected on Q3 2020

# Revision History

- v1.1 : Modified some Telnet bug at ‘Repetitive Tasks’ (12.2019)
- v2.1 : New feature added naming ‘Packet Builder’ (01.2020)
- v2.2 : Auto scroll down feature added on the right display screen of the Tool. (02.2020)
- v3.2 : New feature added naming ‘Easy Lab Replication’ (02.2020)

# Contributor

> Rengaramalingam A (rengahcl@gmail.com)

Contributed to the feature of "Easy Lab Replication", which originated from his shell script "scriptit.sh"