

# Lab 4: SNMP in Linux

NET311 - Computer Networks Management

Instructor: Dr. Mostafa Dahshan

## Objectives

1. Configure SNMP service in Linux Server.
2. Use a command line to interact with Linux SNMP agent.

## References

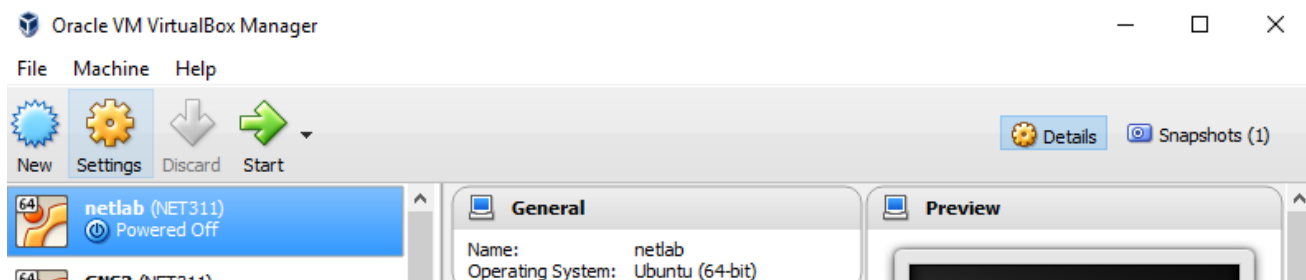
1. [net-snmp tutorials](#).
2. [snmpd examples](#).
3. [Installing net-snmp MIBs on Ubuntu and Debian](#).
4. [SNMP exercises, part I](#).

## Instructions

1. Read the lab instructions.
2. Provide question answers and screenshots in the supplied answer sheet.
3. After finishing the lab, upload your saved answer sheet to LMS.

## Part 1: Configure SNMP Service in Linux Server

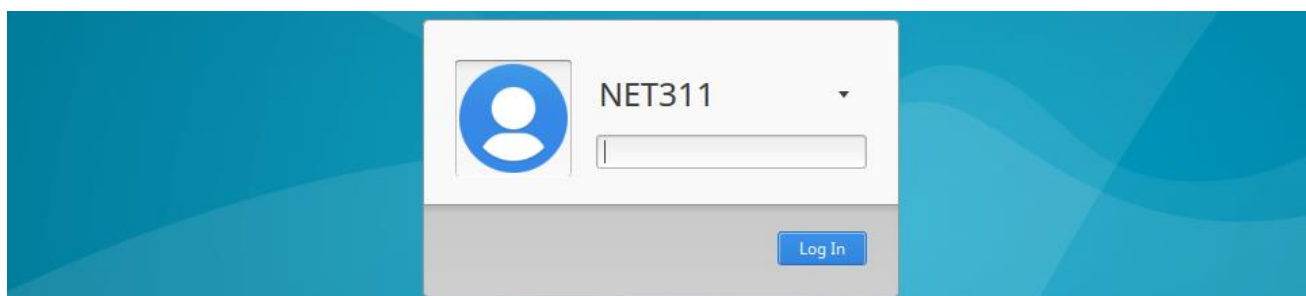
1. Start the netlab Linux virtual machine.



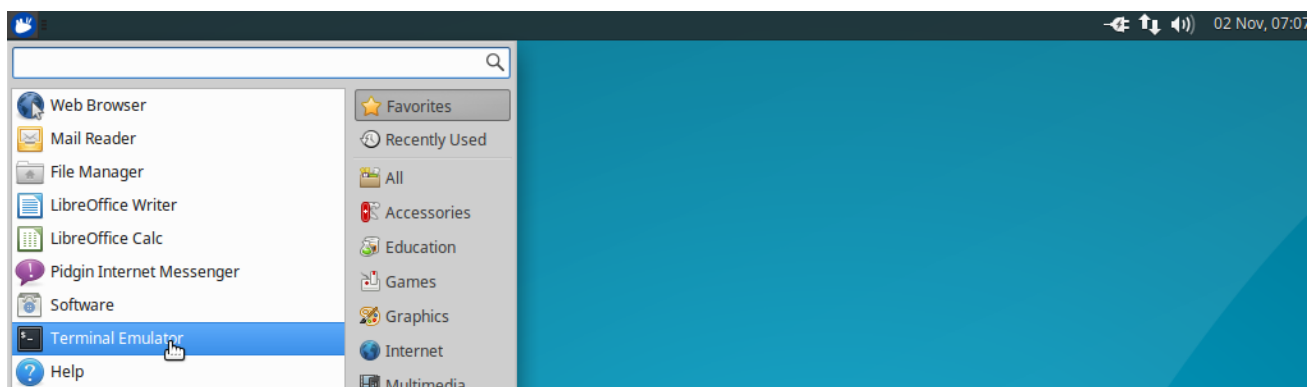
2. Login to the netlab Linux virtual machine.

login: **net311**

password: **abc.311**



3. Run the Terminal Emulator



4. Type the following commands to install SNMP server and tools:

```
sudo apt install snmp snmpd snmp-mibs-downloader
```

When asked for a password, always use: **abc.311**

This step can be skipped if the packages are already installed.

The snmp-mibs-downloader package allows us to use textual representation instead of numeric OIDs.

5. Backup the default **snmpd.conf** file using the command:

```
sudo mv /etc/snmp/snmpd.conf /etc/snmp/snmpd.conf.orig
```

When asked for a password, always use: **abc.311**

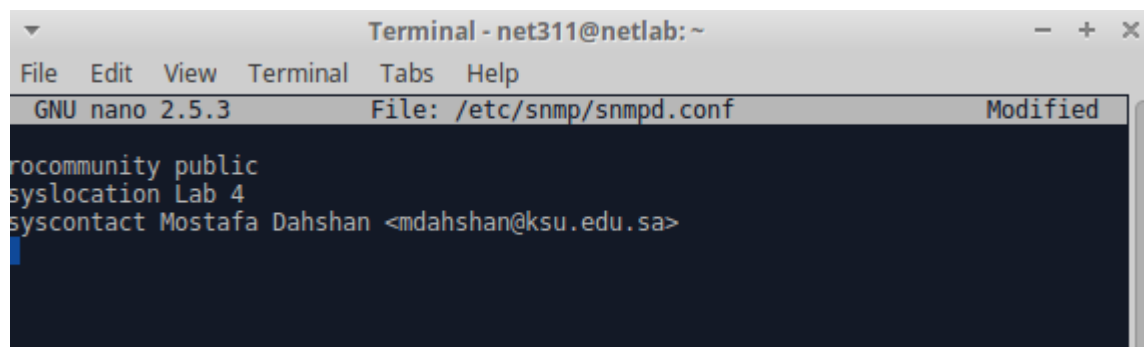
6. Use create a new **snmpd.conf** file.

```
sudo nano /etc/snmp/snmpd.conf
```

7. Add the following lines:

```
rocommunity public
syslocation Lab 4
syscontact Mostafa Dahshan <mdahshan@ksu.edu.sa>
```

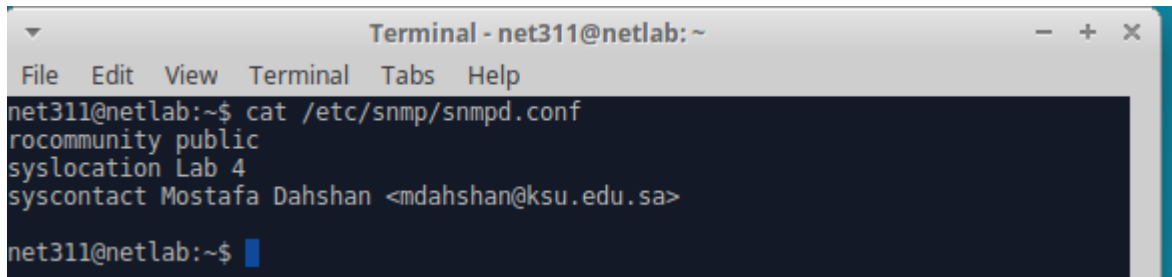
Use your own name and email address.



8. Press **CTRL-X** to exit. Type **Y** to save. Press **ENTER** to accept file name.

9. Verify the contents of the snmpd.conf file

```
sudo cat /etc/snmp/snmpd.conf
```

A screenshot of a terminal window titled "Terminal - net311@netlab: ~". The terminal shows the command "cat /etc/snmp/snmpd.conf" being executed, which displays the following configuration: "rocommunity public", "syslocation Lab 4", and "syscontact Mostafa Dahshan <mdahshan@ksu.edu.sa>". The prompt "net311@netlab:~\$" is visible at the bottom.

```
Terminal - net311@netlab: ~  
File Edit View Terminal Tabs Help  
net311@netlab:~$ cat /etc/snmp/snmpd.conf  
rocommunity public  
syslocation Lab 4  
syscontact Mostafa Dahshan <mdahshan@ksu.edu.sa>  
net311@netlab:~$
```

Lab sheet 1.1: Provide a screenshot showing the contents of the snmpd.conf file

10. Restart the snmpd service to use the new configuration file.

```
sudo service snmpd restart
```

## Part 2: Interaction with SNMP in Linux

In this part, we use some of the SNMP toolkit commands to interact with the SNMP agent that was installed and configured in Part 1.

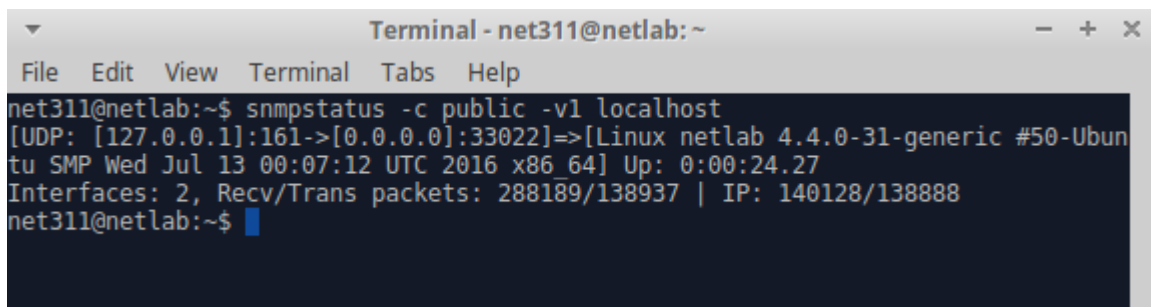
1. To verify that SNMP agent is working, run the `snmpstatus` command:

```
snmpstatus -c public -v1 localhost
```

You can also test for SNMPv2c

```
snmpstatus -c public -v2c localhost
```

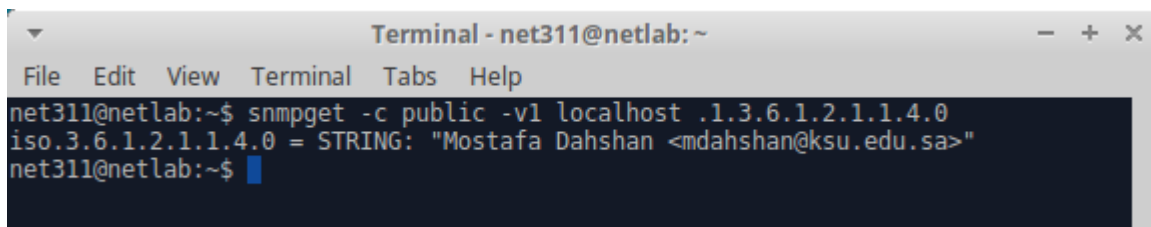
The output can look similar to the following:

A terminal window titled "Terminal - net311@netlab: ~" with a menu bar (File, Edit, View, Terminal, Tabs, Help). The command `snmpstatus -c public -v1 localhost` has been executed. The output is: `[UDP: [127.0.0.1]:161->[0.0.0.0]:33022]=>[Linux netlab 4.4.0-31-generic #50-Ubuntu SMP Wed Jul 13 00:07:12 UTC 2016 x86_64] Up: 0:00:24.27 Interfaces: 2, Recv/Trans packets: 288189/138937 | IP: 140128/138888`. The prompt is `net311@netlab:~$`.

2. Use `snmpget` to retrieve the `system.sysContact` information using numeric OID:

```
snmpget -c public -v1 localhost .1.3.6.1.2.1.1.4.0
```

The output can look similar to the following:

A terminal window titled "Terminal - net311@netlab: ~" with a menu bar (File, Edit, View, Terminal, Tabs, Help). The command `snmpget -c public -v1 localhost .1.3.6.1.2.1.1.4.0` has been executed. The output is: `iso.3.6.1.2.1.1.4.0 = STRING: "Mostafa Dahshan <mdahshan@ksu.edu.sa>"`. The prompt is `net311@netlab:~$`.

*The GET request is one of the basic operations of the SNMP protocol, retrieving the information associated with the specified OID from the target agent.*

*[Net-SNMP Wiki]*

Lab sheet 2.1: Provide a screenshot showing output of the `snmpget` command of this step.

3. Use the `snmpgetnext` to retrieve the same information with less exact OID:

```
snmpgetnext -c public -v1 localhost .1.3.6.1.2.1.1.4
```

*The other main SNMP operation for retrieving information is the GETNEXT request - a "fuzzy-matching" version of GET, and is implemented by the `snmpgetnext` tool.*

*[Net-SNMP Wiki]*

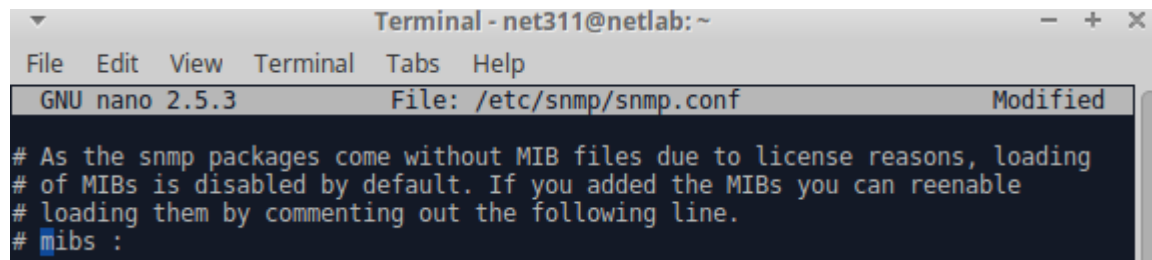
As you see, it is difficult to remember the numeric value for each OID.

You need to enable loading MIBs (downloaded using `snmp-mibs-downloader`) by editing the file `/etc/snmp/snmp.conf`.

4. Edit the `/etc/snmp/snmp.conf` file

```
sudo nano /etc/snmp/snmp.conf
```

5. Add “#” at the beginning of the line containing “mibs :” to comment this line.



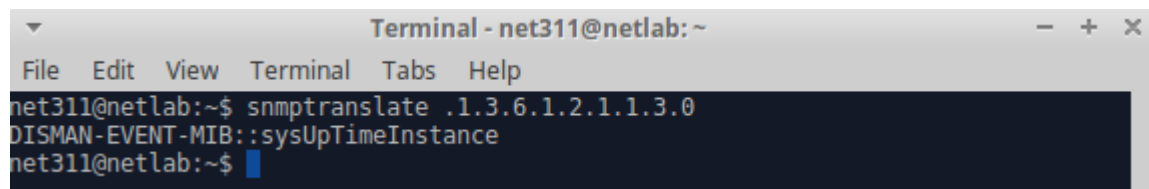
```
Terminal - net311@netlab: ~
File Edit View Terminal Tabs Help
GNU nano 2.5.3 File: /etc/snmp/snmp.conf Modified
# As the snmp packages come without MIB files due to license reasons, loading
# of MIBs is disabled by default. If you added the MIBs you can reenale
# loading them by commenting out the following line.
# mibs :
```

6. Press **CTRL-X** to exit. Type **Y** to save. Press **ENTER** to accept file name.

Now you can use `snmptranslate` command to translate between numeric OID and textual MIB name.

7. Use the `snmptranslate` command to find the MIB name of `.1.3.6.1.2.1.1.3.0`

```
snmptranslate .1.3.6.1.2.1.1.3.0
```

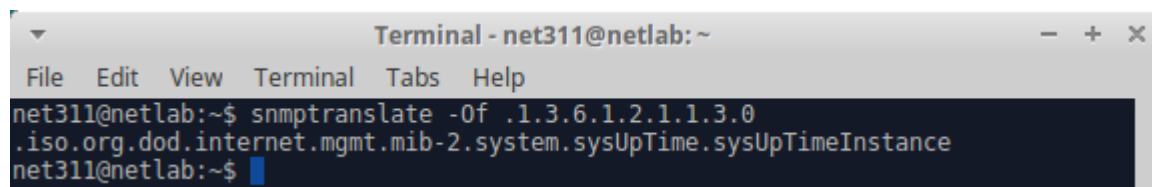


```
Terminal - net311@netlab: ~
File Edit View Terminal Tabs Help
net311@netlab:~$ snmptranslate .1.3.6.1.2.1.1.3.0
DISMAN-EVENT-MIB::sysUpTimeInstance
net311@netlab:~$
```

You can show the full list of MIB sub identifier by adding `-Of` flag

8. Use the `snmptranslate` command to find the full MIB name of `.1.3.6.1.2.1.1.3.0`

```
snmptranslate -Of .1.3.6.1.2.1.1.3.0
```



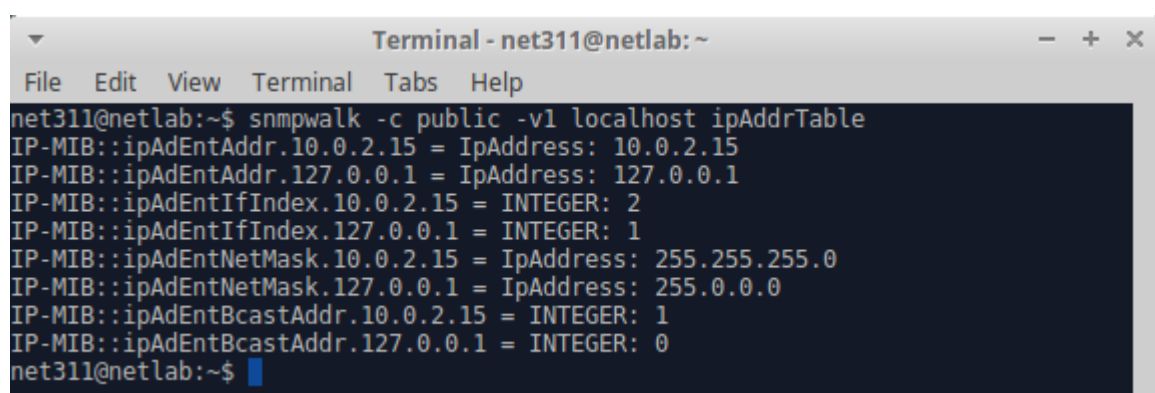
```
Terminal - net311@netlab: ~
File Edit View Terminal Tabs Help
net311@netlab:~$ snmptranslate -Of .1.3.6.1.2.1.1.3.0
.iso.org.dod.internet.mgmt.mib-2.system.sysUpTime.sysUpTimeInstance
net311@netlab:~$
```

Lab sheet 2.2: Provide a screenshot showing output of the `snmptranslate` command of this step.

We can use **snmpwalk** command to perform a sequence of chained GETNEXT requests, rather than using multiple `snmpgetnext` commands.

9. Use the **snmpwalk** command to list all the results which lie within the subtree rooted on this OID:

```
snmpwalk -c public -v1 localhost ipAddrTable
```



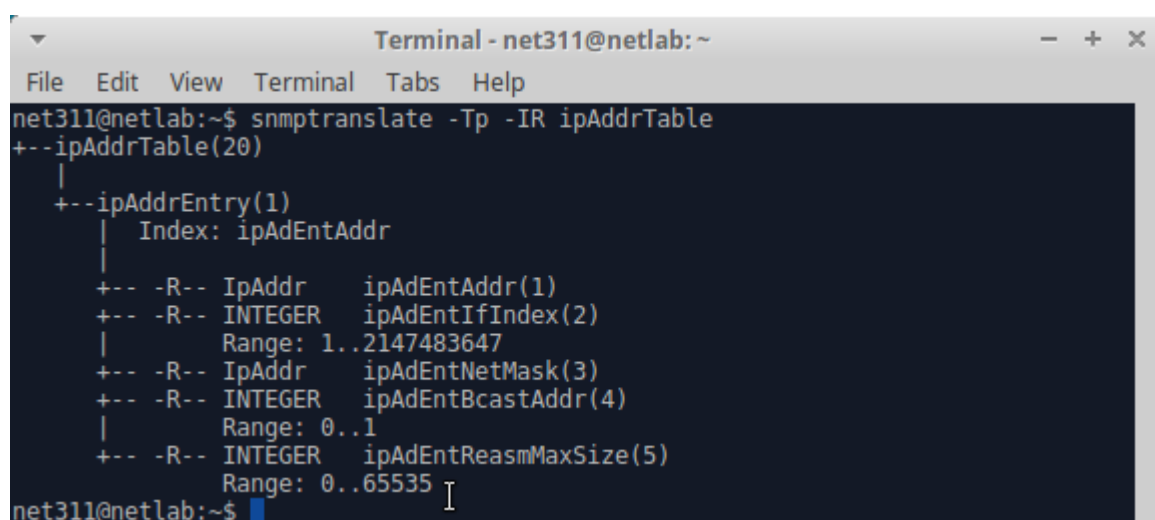
```
Terminal - net311@netlab: ~
File Edit View Terminal Tabs Help
net311@netlab:~$ snmpwalk -c public -v1 localhost ipAddrTable
IP-MIB::ipAdEntAddr.10.0.2.15 = IpAddress: 10.0.2.15
IP-MIB::ipAdEntAddr.127.0.0.1 = IpAddress: 127.0.0.1
IP-MIB::ipAdEntIfIndex.10.0.2.15 = INTEGER: 2
IP-MIB::ipAdEntIfIndex.127.0.0.1 = INTEGER: 1
IP-MIB::ipAdEntNetMask.10.0.2.15 = IpAddress: 255.255.255.0
IP-MIB::ipAdEntNetMask.127.0.0.1 = IpAddress: 255.0.0.0
IP-MIB::ipAdEntBcastAddr.10.0.2.15 = INTEGER: 1
IP-MIB::ipAdEntBcastAddr.127.0.0.1 = INTEGER: 0
net311@netlab:~$
```

Lab sheet 2.3: Provide a screenshot showing output of the `snmpwalk` command of this step.

You can view the MIB tree using the `-Tp` with the `-IR` option

10. Type the following command to get the tree of the `ipAddrTable`:

```
snmptranslate -Tp -IR ipAddrTable
```

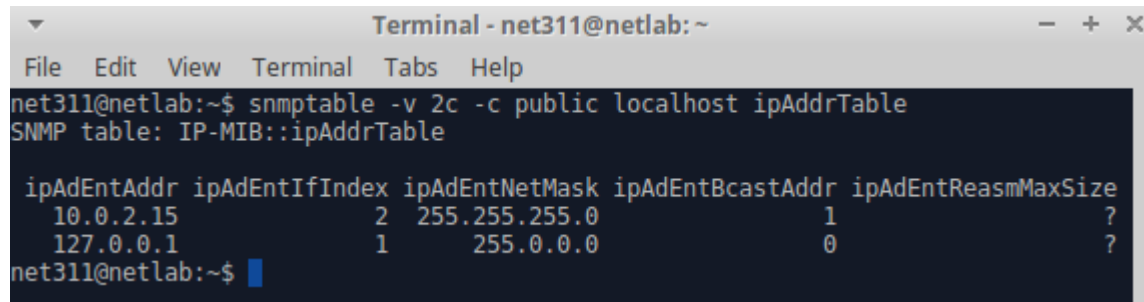


```
Terminal - net311@netlab: ~
File Edit View Terminal Tabs Help
net311@netlab:~$ snmptranslate -Tp -IR ipAddrTable
+--ipAddrTable(20)
|
+--ipAddrEntry(1)
|   Index: ipAdEntAddr
|   |
|   +-- -R-- IpAddr      ipAdEntAddr(1)
|   +-- -R-- INTEGER    ipAdEntIfIndex(2)
|   |       Range: 1..2147483647
|   +-- -R-- IpAddr      ipAdEntNetMask(3)
|   +-- -R-- INTEGER    ipAdEntBcastAddr(4)
|   |       Range: 0..1
|   +-- -R-- INTEGER    ipAdEntReasmMaxSize(5)
|   |       Range: 0..65535
net311@netlab:~$
```

Lab sheet 2.4: Provide a screenshot showing the output of the `snmptranslate -Tp -IR` command.

11. Type the following command to get a tabular representation of the ipAddrTable:

```
snmptable -v 2c -c public localhost ipAddrTable
```



A terminal window titled "Terminal - net311@netlab: ~" with a menu bar (File, Edit, View, Terminal, Tabs, Help). The terminal shows the command `net311@netlab:~$ snmptable -v 2c -c public localhost ipAddrTable` and its output. The output indicates the SNMP table is IP-MIB::ipAddrTable and displays a table with five columns: ipAdEntAddr, ipAdEntIfIndex, ipAdEntNetMask, ipAdEntBcastAddr, and ipAdEntReasmMaxSize. Two rows of data are shown: one for 10.0.2.15 and another for 127.0.0.1. The prompt `net311@netlab:~$` is visible at the bottom.

```
net311@netlab:~$ snmptable -v 2c -c public localhost ipAddrTable
SNMP table: IP-MIB::ipAddrTable

ipAdEntAddr ipAdEntIfIndex ipAdEntNetMask ipAdEntBcastAddr ipAdEntReasmMaxSize
10.0.2.15      2 255.255.255.0      1 ?
127.0.0.1      1 255.0.0.0          0 ?
net311@netlab:~$
```

Lab sheet 2.5: Provide a screenshot showing the output of the snmptable command.



## Extra Tasks

Familiarize yourself with more SNMP commands. You can try the following examples:

```
snmptranslate -Of -IR ipAddrTable  
snmptranslate -Tp -IR system  
snmptranslate -v 2c -c public -Os localhost sysORTable
```