Flukeberry

A network endpoint measurement reporting tool

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What is Flukeberry?

Flukeberry is linux bash based networking tool, which has GUI too by gtkdialog software component.
By using this tool you can check your network endpoints to identify the network stack/switch unit number, port number, VLAN id and POE capability. On the switch side **CDP** or **LLDP** is required, so it wont work on simple switches used at home. It is possible to add additional features to this tool (some are already implemented), because it is based on linux shell scripting, that is why it could be very universal.

This is not a new method to measure endpoints like this, there are already devices on the market for the same purpose. A similar one is the Fluke LinkRunner AT1000, which costs around 1000 Euro + VAT. Flukeberry can run on any Linux system, you can use your own notebook too for endpoint checking, but a RaspberryPi could be more handy for this purpose (with a power bank + touchscreen).

Costs:

A DIY **Flukeberry** hardware **will cost you 100-200 Euro** with VAT included:

- RaspberryPi 2 / 3 board: 50-60 Euro
- 5000-10000 mAh PowerBank: 20-30 Euro
- min. 3.5 inch touchscreen: 20-80 Euro
- class10 / UHS-1 SD card or better: 10-30 Euro
- case + cables: 10-30 Euro

The software is using **tcpdump** to catch the first CDP and LLDP frames after the linking. It does not need to get an IP address for that, it is working in **Layer 2**. Optionally you can sync the results to a shared directory, but for this an IP address is needed on the wireless interface.

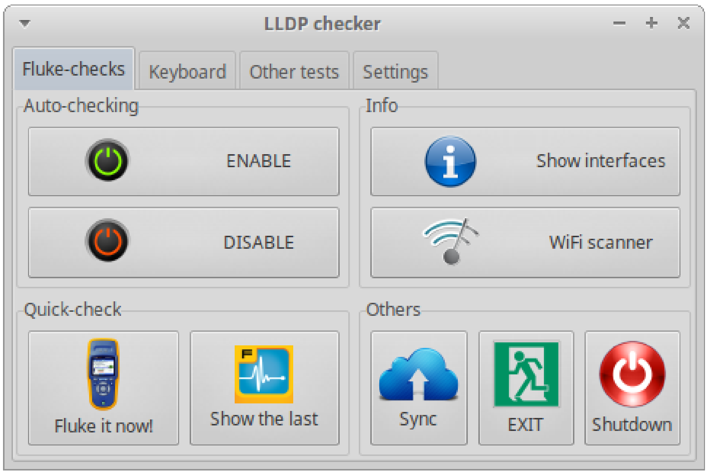
Software dependencies:

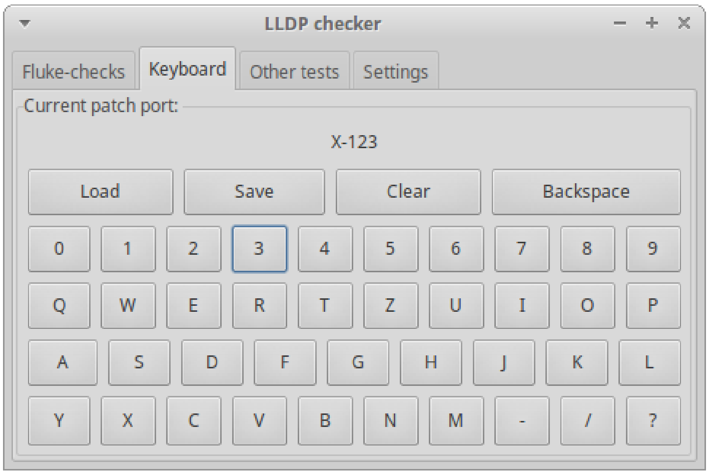
- gtkdialog (0.8.3 or newer version from source)
- libgtk2.0-dev (only for Rasbian)
- gtk+-2.0
- pkg-config
- imagemagick
- wkhtmltopdf
- tcpdump
- cifs-utils
- ethtool
- bc
- speedtest-cli

Tested network devices:

- Nortel (lldp)
- Avaya (lldp)
- Cisco (cdp)

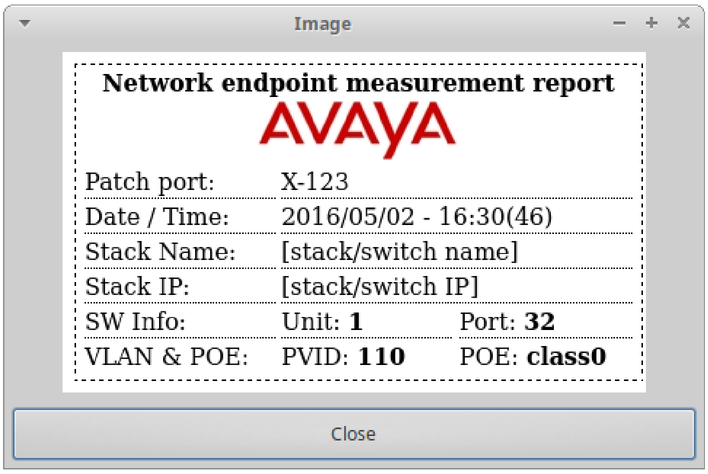
Screenshots





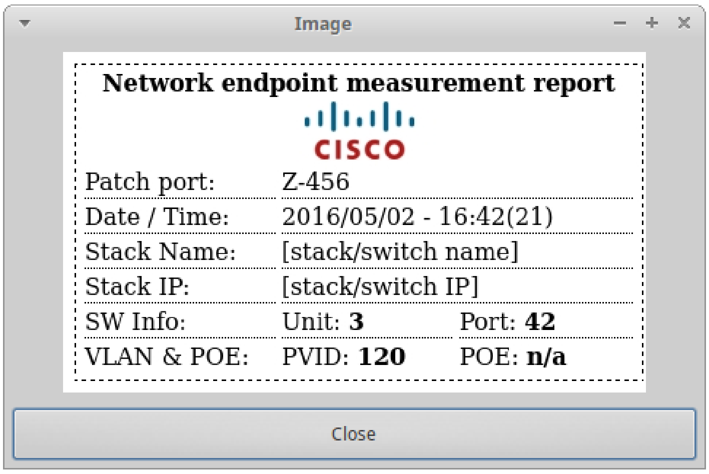
Current patch port:

X-123



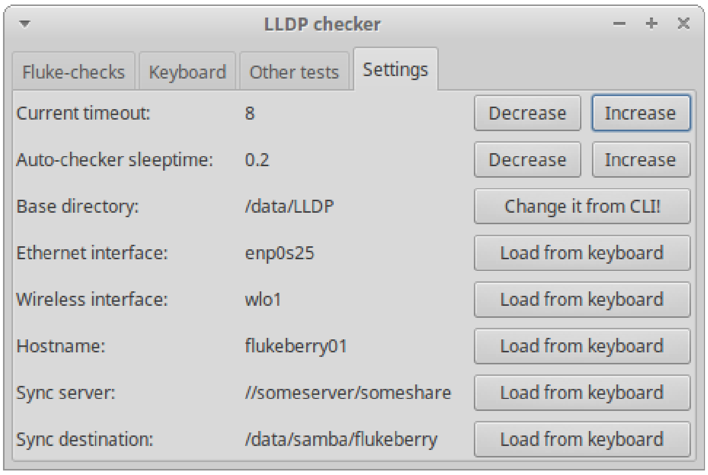
Network endpoint measurement report

Patch port:	X-123	
Date / Time:	2016/05/02 - 16:30(46)	
Stack Name:	[stack/switch name]	
Stack IP:	[stack/switch IP]	
SW Info:	Unit: **1**	Port: **32**
VLAN & POE:	PVID: **110**	POE: **class0**

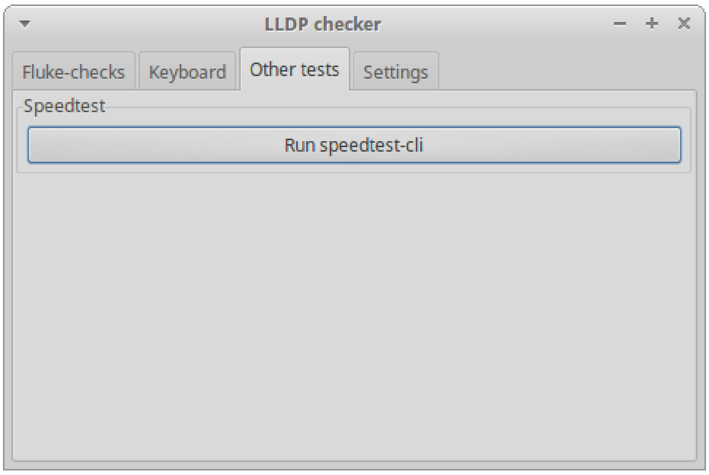


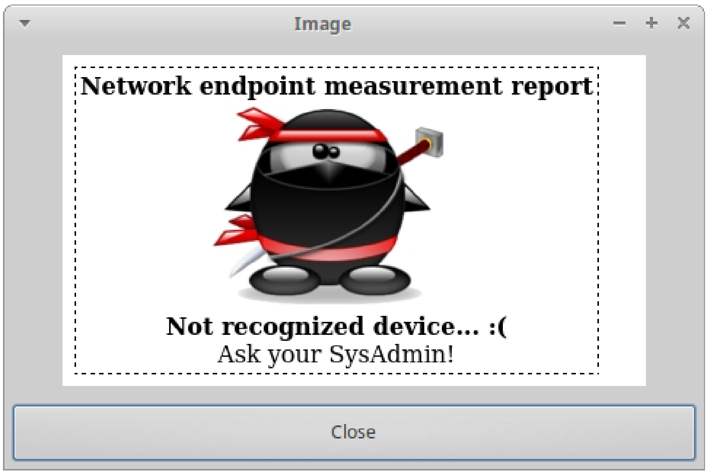
Network endpoint measurement report

Patch port:	Z-456	
Date / Time:	2016/05/02 - 16:42(21)	
Stack Name:	[stack/switch name]	
Stack IP:	[stack/switch IP]	
SW Info:	Unit: **3**	Port: **42**
VLAN & POE:	PVID: **120**	POE: **n/a**



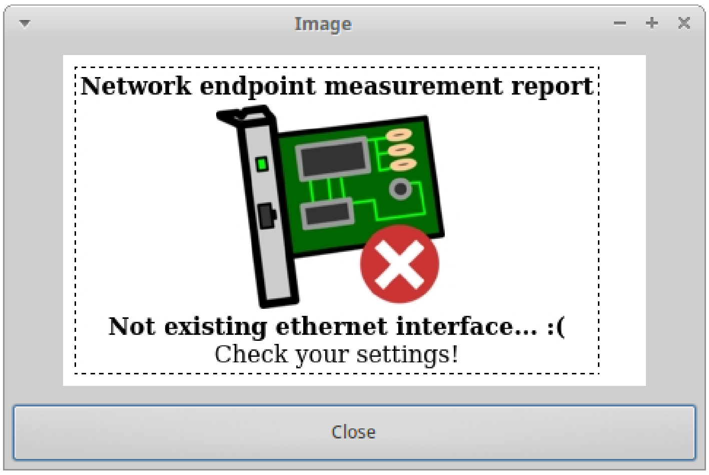
Current timeout:	8	Decrease	Increase
Auto-checker sleeptime:	0.2	Decrease	Increase
Base directory:	/data/LLDP	Change it from CLI!	
Ethernet interface:	enp0s25	Load from keyboard	
Wireless interface:	wlo1	Load from keyboard	
Hostname:	flukeberry01	Load from keyboard	
Sync server:	//someserver/someshare	Load from keyboard	
Sync destination:	/data/samba/flukeberry	Load from keyboard	





Network endpoint measurement report

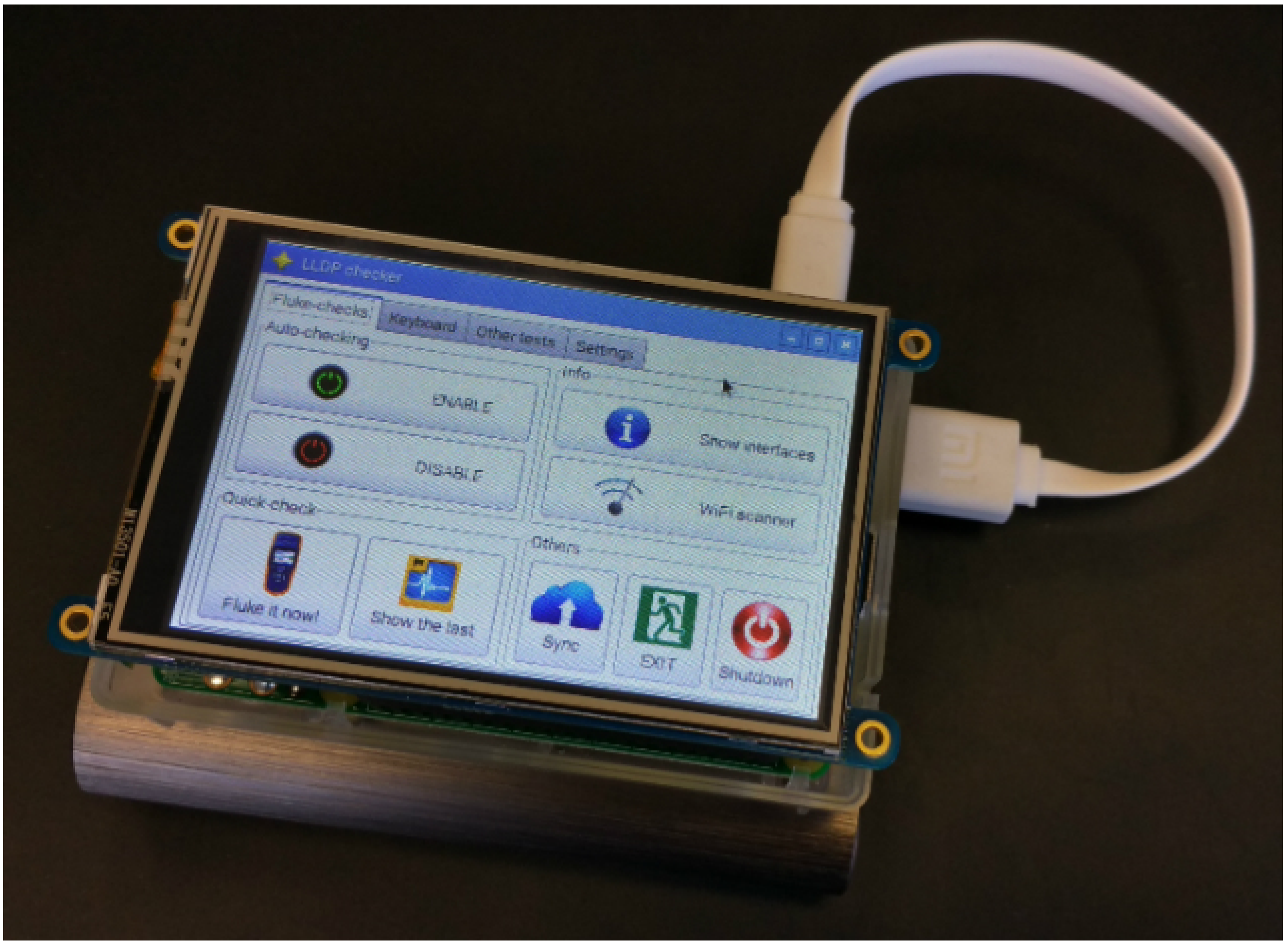
Not recognized device... :(
Ask your SysAdmin!



Network endpoint measurement report

Not existing ethernet interface... :(
Check your settings!

Current appearance:



Planned appearance with a normal case:

(+ a power bank to it's bottom)

Time and money savings

How can you spare worktime by Flukeberry?

Checking method	Follow-the-cable	Fluke Linkrunner AT1000	Flukeberry
Time / endpoint checking (without getting there)	30sec – 180 sec	10 – 20 sec	10 – 20 sec
Cost (without VAT)	A lot of time + chance for network interruption	~1000 Euro / device	100-150 Euro / device or NONE just for SW
Disadvantages	very time consuming	expensive	Can not check POE physically
Main advantage	-	It just works!	Universal

Additional advantages by Flukeberry:

- You can give 1 or more device to each department, because it is cheap. In this way the „getting there" time can be reduced significantly.
- Finding a user by MAC address could take time and he/she need to be connected. If such a device is within a short distance, he/she can check the endpoint and send the exact information to the IT guy or just sync it to the prepared network drive.

Real scenarios

Lets say every endpoint checking takes 10 minutes or sometimes more, because the endpoint could be far away (in another building, or just on the other side). In our example it will be just 10 minutes.

Every day we need to do 3 checks in average.
There are ~250 workdays / year.
Summarizing these will be 125 hours of checking / year.

Using only 1 Flukeberry will not change anything, but if we give 1 or more to every department, then others can get this device from an assigned office and do the measurements immediately, that could save some time, because this person is closer to the endpoint. Flukeberry is easy to use, you can learn it's usage in seconds.
This will not work in every scenario, but it will once or twice from 3 cases.

Of course it will cause the user 1-2 minutes more work to do, but then the connectivity issue can be resolved faster and finally this is the main goal.

At lease once a year we need to rebuild a distribution point, which has 200–500 endpoints. Using the „follow-the-cable" method makes very difficult this scenario, but still with a Fluke Linkrunner device you still need document every measurement in an Excel file and for that you need a computer or a tablet. This will make slower the whole procedure. Flukeberry saves every measurement to a CSV file by default and before the measuring you can define the particular patch port. To speed up this there are already a save prefix function on the keyboard. In this way you can save only a 1-2 hours, but usually this kind of work are done on weekends or late hours.

Using more Flukeberry can save **up to 50%** of the needed time for endpoint checking, which could be **50-60 hours / year**. Extending this to multiple locations could make big difference and help all local IT, where the networking is not outsourced to an external company. Of course this tool could be useful for them too, and any IT guy around the world.

Additionally you can save more than **850 Euro / device** if you choose Flukeberry instead of a Fluke device.

Recommended hardware

Base boards

- Raspberry Pi 2
- Raspberry Pi 3
- Other boards should be okay as well

Tested displays

- **PiTFT Plus 480x320 3.5"** TFT+Touchscreen for Raspberry Pi - Pi 2 and Model A+ / B+
  PRODUCT ID: 2441
  https://www.adafruit.com/products/2441
  to config.txt: `dtoverlay=pitft35r,rotate=90,speed=42000000,fps=20`
- **3.5 Inch TFT LCD Display** + DIY Acrylic Case For Raspberry Pi 2/B+
  http://www.banggood.com/3_5-Inch-TFT-LCD-Display-DIY-Acrylic-Case-For-Raspberry-Pi-BB-p-960194.html
  to config.txt: `dtoverlay=piscreen,rotate=90,speed=24000000`

Power bank

Raspberry Pi 3 have relative high power consumption, that is why you should choose a power bank between 5000 and 10000 mAh capacity with at lease one 1.5A capable USB port.

More info here: https://www.raspberrypi.org/magpi/raspberry-pi-3-specs-benchmarks/

USB cable

This is a very important part of the set! Usually a cheap cable transmits only 500-1000 mA, which is insufficient or could cause random crashes. You should use a 1.5A or more capable one.

MicroSD card

Any Class10 / UHS-1 or better 8GB microSD card.

Case

Not relevant

*** A HOWTO for **Jessie-based Rasbian** image ***

### DOWNLOAD & BURN

https://learn.adafruit.com/adafruit-pitft-3-dot-5-touch-screen-for-raspberry-pi/easy-install
Download Jessie-based PiTFT 3.5" Resistive Image for Pi 1, Pi 2 and Pi 3 (March 25, 2015)
Unzip & use Win32DiskImager (or dd) to burn the iso to 8+ GB Class10 or better sd-card.

default username: **pi**
default password: **raspberry**

### RESIZING THE SYSTEM PARTITION

*** IMPORTANT ***
Before doing any installing you need to resize your system partition,
because only ~100 MB space is free by default.

sfdisk -d /dev/mmcblk0 > partitions.sfdisk && cat partitions.sfdisk && rm partitions.sfdisk
This will show you something like this:

```
/dev/mmcblk0p1 : start=   8192, size=  122880, Id=  c
/dev/mmcblk0p2 : start= 131072, size= 8257536, Id= 83
/dev/mmcblk0p3 : start=      0, size=       0, Id=  0
/dev/mmcblk0p4 : start=      0, size=       0, Id=  0
```

Now you can see the start sector of the 2nd partition is: **131072**
And the current last used sector is 8257536 (which is around 4GB)
For the new last sector **12345678** is perfect, because that means 5.8GB for the 2nd partition.
(Later you can remove the unwanted builtin applications and shrink the partition)

```
fdisk /dev/mmcblk0
Command (m for help): p
Command (m for help): d
Partition number (1,2, default 2): 2
Command (m for help): n
Select (default p): p
Partition number (2-4, default 2): 2
First sector (2048-31116287, default 2048): 131072
Last sector, +sectors or +size{K,M,G,T,P} (131072-31116287, default 31116287): 12345678
Command (m for help): w
```

shutdown -r now
resize2fs /dev/mmcblk0p2 # this is needed after reboot to applying the new part size!

### INSTALLING DEPENDENCIES

```
apt-get update
apt-get dist-upgrade
apt-get autoremove
apt-get install gtk+-2.0
apt-get install pkg-config
apt-get install libgtk2.0-dev
apt-get install imagemagick
apt-get install wkhtmltopdf
apt-get install tcpdump
apt-get install cifs-utils
apt-get install ethtool
apt-get install bc
apt-get install speedtest-cli
```

```
cd /opt
wget https://gtkdialog.googlecode.com/files/gtkdialog-0.8.3.tar.gz ### or
newer version
tar -xvf gtkdialog-0.8.3.tar.gz
cd gtkdialog-0.8.3/
./configure
make
make install
```

### APPEARANCE & USAGE RELATED CHANGES

Menu -> Preferences -> Appearance Settings

```
Menu Bar       Size: Medium
System         Font size: 10
```

File Manager (PCManFM on your panel) -> Edit -> Preferences

```
General | Behaviour:
[x] Open files with a single click
```

Panel -> Panel Preferences -> Advanced

```
[x] Minimise panel when not in use
Size when minimised: 1 pixels
```

### DEPLOYING FLUKEBERRY SW

```
mkdir /data/
cd /data
git clone https://github.com/volanszki/Flukeberry.git
chown pi:users /data/Flukeberry/ -R
chmod 775 /data/Flukeberry/ -R
```

The following line to /etc/sudoers

```
----------------------------------------------------
# User privilege specification
pi      ALL=(ALL:ALL) ALL
----------------------------------------------------
```

### SET AUTOSTART & DESKTOP ICON

Add the following line to the end of
/home/pi/.config/lxsession/LXDE-pi/autostart

```
----------------------------------------------------
@/data/Flukeberry/flukeberry-gui
----------------------------------------------------
```

create /home/pi/Desktop/Flukeberry-GUI with the following content

```
----------------------------------------------------
[Desktop Entry]
Name=FLUKEBERRY
Version=1.0
Comment=Launches application
Exec=/data/Flukeberry/flukeberry-gui
Icon=/data/Flukeberry/icons/fluke.png
Terminal=false
Type=Application
Categories=Network
----------------------------------------------------
```

### SET STATIC IP FOR WIRELESS INTERFACE

In case if you want you use your wireless connection
Add the following lines to

/etc/network/interfaces

```
----------------------------------------------------
allow-hotplug wlan0

iface wlan0 inet static
        address XXX.XXX.XXX.XXX
        netmask YYY.YYY.YYY.YYY
        gateway ZZZ.ZZZ.ZZZ.ZZZ
        wpa-conf /etc/wpa_supplicant/wpa_supplicant.conf
----------------------------------------------------
```

Then you need to customize the following file:

/etc/wpa_supplicant/wpa_supplicant.conf (example below)

```
----------------------------------------------------
country=HU
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1

network={
ssid="some_ssid_you_want_to_connect"
psk="some_cleartext_pass"
proto=WPA
key_mgmt=WPA-PSK
pairwise=TKIP
auth_alg=OPEN
}
----------------------------------------------------
```

### TROUBLESHOOTING

```
export XAUTHORITY=/home/pi/.Xauthority
export DISPLAY=:0.0
```

/data/Flukeberry/flukeberry-gui

and watch the console messages...

Get involved & contact me:

If you would like to participate in this project, share some ideas, write new modules or just report a bug, then feel free to contact me:

E-mail: volanszki@gmail.com
LinkedIn: https://www.linkedin.com/in/volanszki
Facebook: https://www.facebook.com/volanszki.mik

Tibor Volánszki