Network Manager CLI

nmcli is a command line tool that you can use to query or set adapter information. There is even an interactive shell mode and a terse mode for scripting.

Here is a nmcli tutorial - https://www.techrepublic.com/article/how-to-use-the-nmcli-command-to-gather-network-device-information-on-linux/

As always on *nix systems, you can use the man page to look up commands and options – man nmcli and man nmcli-examples.

Just like on a Cisco or Aruba device you can abbreviate commands as soon as they are unique and use tab completion. You can use the -a switch and nmcli will stop and ask for any missing required arguments.

Aliases

Before I show examples of nmcli commands I am going to show the aliases I have created. The reason is that I have noticed most users don't create aliases. I have found aliases to be a great time saver and they are very easy to create.

If you are using BASH for your shell, just use

```
nano ~/bashrc
```

to open the file

If you are using ZSH, just use

```
nano ~/zshrc
```

to open the file.

Then add the following lines at the bottom. I started all my network manager aliases with "nm".

```
#show status of network manager
alias nmshrun="nmcli -t -f RUNNING general"

#show network manager state
alias nmshstate="nmcli -t -f STATE general"

#show network connection profiles. $1 is interface name
alias nmshprofiles='(){nmcli -a -f CONNECTIONS device show $1}'

#connect to an existing profile. $1 is the profile name
alias nmconnectprof='(){nmcli -p connection up "$1" ifname eth0}'

#show profile IPv4 settings. Profile must be active. $1 is profile name I.E. "Wired connection 1"
alias nmshipv4='(){nmcli -a -f IP4 connection show $1}'

#Show wifi properties
```

alias nmwifi='nmcli -f GENERAL,WIFI-PROPERTIES dev show $1'

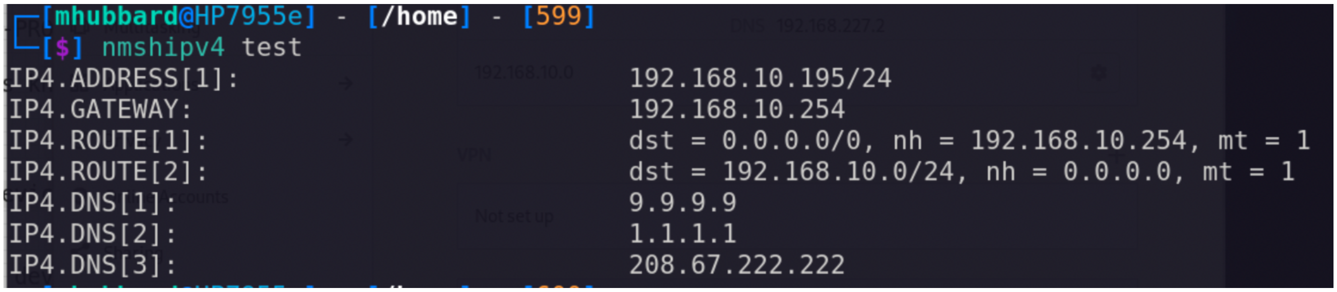
#list available Wi-Fi access points known to Network Manager
alias nmshap='nmcli dev wifi'

#Use nmcli to list lldp neighbors
alias nmlldp='(){sudo nmcli -a -p device lldp list ifname $1}'

#show wifi passwords
alias nmshwifi='(){sudo nmcli -a -p device wifi show-password ifname $1}'

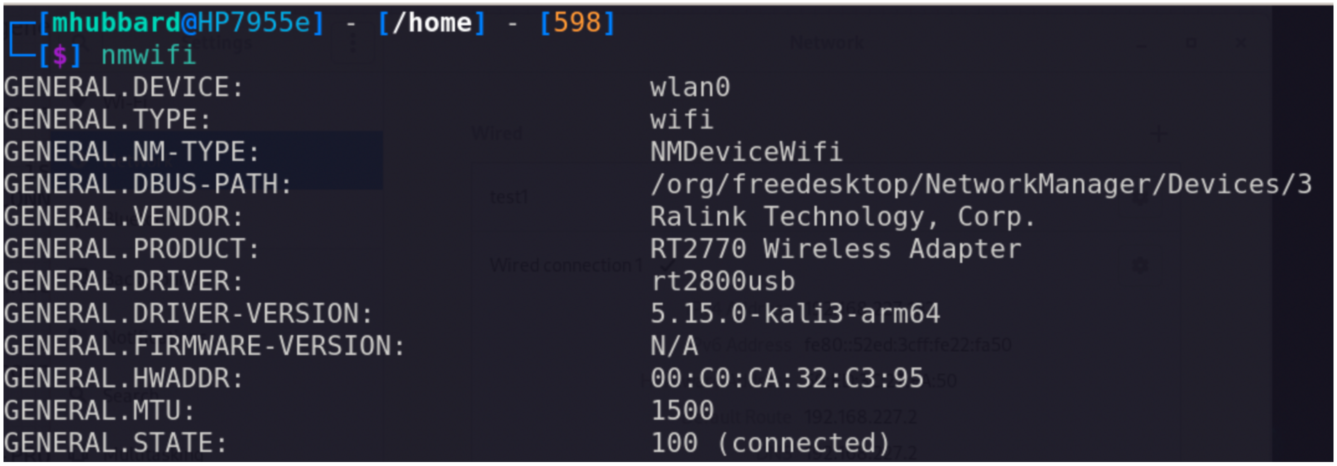
Then exit nano using ctrl+w, y, [enter]

Here is a screenshot of the nmshipv4 alias for the “test” ssid.



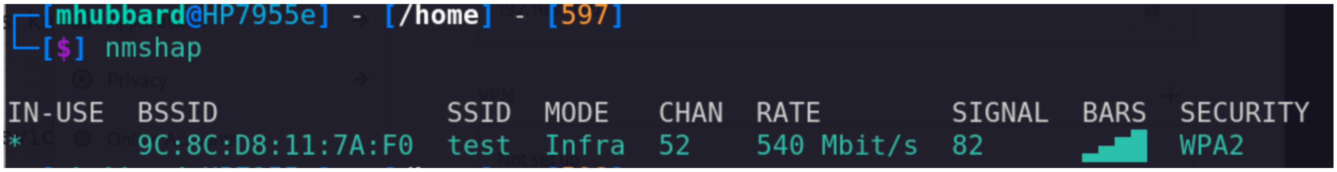
```
┌─[mhubbard@HP7955e] - [/home] - [599]
└─[$] nmshipv4 test
IP4.ADDRESS[1]:                         192.168.10.195/24
IP4.GATEWAY:                            192.168.10.254
IP4.ROUTE[1]:                           dst = 0.0.0.0/0, nh = 192.168.10.254, mt = 1
IP4.ROUTE[2]:                           dst = 192.168.10.0/24, nh = 0.0.0.0, mt = 1
IP4.DNS[1]:                             9.9.9.9
IP4.DNS[2]:                             1.1.1.1
IP4.DNS[3]:                             208.67.222.222
```

Here is a screenshot of the nmwifi alias



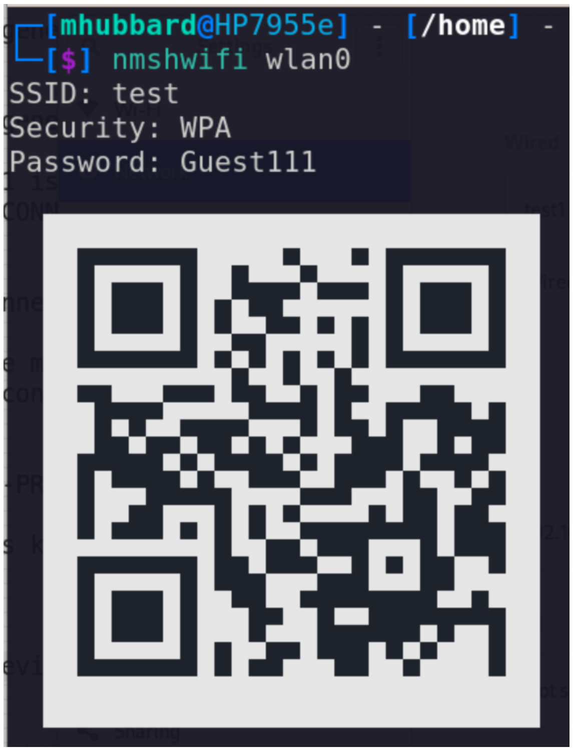
```
┌─[mhubbard@HP7955e] - [/home] - [598]
└─[$] nmwifi
GENERAL.DEVICE:                         wlan0
GENERAL.TYPE:                           wifi
GENERAL.NM-TYPE:                        NMDeviceWifi
GENERAL.DBUS-PATH:                      /org/freedesktop/NetworkManager/Devices/3
GENERAL.VENDOR:                         Ralink Technology, Corp.
GENERAL.PRODUCT:                        RT2770 Wireless Adapter
GENERAL.DRIVER:                         rt2800usb
GENERAL.DRIVER-VERSION:                 5.15.0-kali3-arm64
GENERAL.FIRMWARE-VERSION:               N/A
GENERAL.HWADDR:                         00:C0:CA:32:C3:95
GENERAL.MTU:                            1500
GENERAL.STATE:                          100 (connected)
```

Here is a screenshot of the nmshap alias. Very useful information indeed.



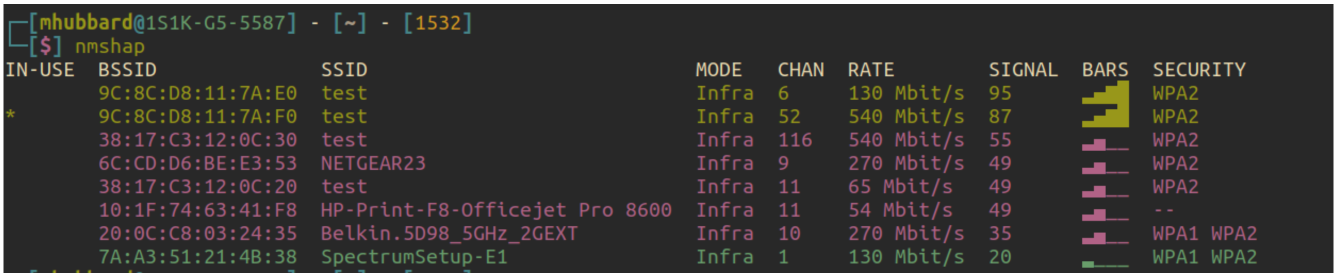
```
┌─[mhubbard@HP7955e] - [/home] - [597]
└─[$] nmshap

IN-USE  BSSID              SSID  MODE   CHAN  RATE        SIGNAL  BARS  SECURITY
*       9C:8C:D8:11:7A:F0  test  Infra  52    540 Mbit/s  82      ▂▄▆█  WPA2
```

Here is a screenshot of the nmshwifi alias. If you use your camera on the QR code it will offer to connect you to the SSID - test.



```
┌─[mhubbard@HP7955e] - [/home] -
└─[$] nmshwifi wlan0
SSID: test
Security: WPA
Password: Guest111
```

Here is a screenshot of nmshap. This one is very useful when you are new to an environment and want to see the wireless environment.



```
┌─[mhubbard@1S1K-G5-5587] - [~] - [1532]
└─[$] nmshap
IN-USE  BSSID              SSID                            MODE   CHAN  RATE        SIGNAL  BARS  SECURITY
        9C:8C:D8:11:7A:E0  test                            Infra  6     130 Mbit/s  95      ▂▄▆█  WPA2
*       9C:8C:D8:11:7A:F0  test                            Infra  52    540 Mbit/s  87      ▂▄▆█  WPA2
        38:17:C3:12:0C:30  test                            Infra  116   540 Mbit/s  55      ▂▄__  WPA2
        6C:CD:D6:BE:E3:53  NETGEAR23                       Infra  9     270 Mbit/s  49      ▂▄__  WPA2
        38:17:C3:12:0C:20  test                            Infra  11    65 Mbit/s   49      ▂▄__  WPA2
        10:1F:74:63:41:F8  HP-Print-F8-Officejet Pro 8600  Infra  11    54 Mbit/s   49      ▂▄__  --
        20:0C:C8:03:24:35  Belkin.5D98_5GHz_2GEXT          Infra  10    270 Mbit/s  35      ▂▄__  WPA1 WPA2
        7A:A3:51:21:4B:38  SpectrumSetup-E1                Infra  1     130 Mbit/s  20      ▂___  WPA1 WPA2
```

Examples:

All these examples are from the man pages. I used "man nmcli" to display it. I modified some of the descriptions to be more consistent with this tutorial, but all of the information is from the man pages. I used "man nmcli-examples" to get additional examples.

Display NetworkManager status

```
nmcli -t -f RUNNING general
running
```

Display the general status of Network Manager

```
nmcli -t -f STATE general
connected
```

To shut down or bring up an interface:

```
nmcli connection down wlp0s20f3
nmcli connection up wlp0s20f3
```

Turn Wi-Fi radio off

```
nmcli radio wifi off
```

Activate the connection profile "Wired connection 1" on interface enp60s0

The -p option makes nmcli show progress of the activation.

```
nmcli -p connection up "Wired connection 1" ifname enp60s0
```

This is a great command if you use a few different USB Ethernet adapters. You can quickly activate a connection profile on a different device.

Note: This connection profile has spaces in the name. You must enclose it in double quotes or escape the spaces. I recommend not using spaces in connection profile names.

nmcli -p connection show Wired connection 1

```
Error: Wired - no such connection profile.
```

If you want to escape the spaces instead of double quotes use

```
nmcli -p connection show Wired\ connection\ 1
```

List all connection profiles.

```
nmcli connection show
```

List all configured connections in multi-line mode

```
nmcli -p -m multiline -f all connection show
```

Show the status for all devices

```
nmcli device status
```

To list all devices (physical interfaces) enter "nmcli -p dev sho" which is device show with the “pretty” flag. It lists all the devices on your system and their current settings in a "pretty" table. Notice that wireless interfaces are listed as wifi and wired as ethernet.

nmcli -p device show

```
===============================================================================
        Device details (wlp0s20f3)
===============================================================================
GENERAL.DEVICE:           wlp0s20f3
-------------------------------------------------------------------------------
GENERAL.TYPE:             wifi
-------------------------------------------------------------------------------
GENERAL.HWADDR:           3C:6A:A7:3A:E3:E6
-------------------------------------------------------------------------------
GENERAL.MTU:              1500
-------------------------------------------------------------------------------
GENERAL.STATE:            100 (connected)
-------------------------------------------------------------------------------
GENERAL.CONNECTION:       test
-------------------------------------------------------------------------------
GENERAL.CON-PATH:         /org/freedesktop/NetworkManager/ActiveConnection/1
-------------------------------------------------------------------------------
IP4.ADDRESS[1]:  192.168.10.183/24
IP4.GATEWAY:     192.168.10.254
IP4.ROUTE[1]:    dst = 0.0.0.0/0, nh = 192.168.10.254, mt = 600
IP4.ROUTE[2]:    dst = 192.168.10.0/24, nh = 0.0.0.0, mt = 600
IP4.ROUTE[3]:    dst = 169.254.0.0/16, nh = 0.0.0.0, mt = 1000
IP4.DNS[1]:      192.168.10.221
-------------------------------------------------------------------------------
IP6.ADDRESS[1]:       fe80::b05c:adfa:b145:a837/64
IP6.GATEWAY:     --
IP6.ROUTE[1]:    dst = ff00::/8, nh = ::, mt = 256, table=255
IP6.ROUTE[2]:    dst = fe80::/64, nh = ::, mt = 256
IP6.ROUTE[3]:    dst = fe80::/64, nh = ::, mt = 600
```

```
===============================================================================
    Device details (enp60s0)
===============================================================================
GENERAL.DEVICE:       enp60s0
-------------------------------------------------------------------------------
GENERAL.TYPE:             ethernet
-------------------------------------------------------------------------------
GENERAL.HWADDR:           54:BF:64:3B:9C:68
-------------------------------------------------------------------------------
GENERAL.MTU:              1500
-------------------------------------------------------------------------------
GENERAL.STATE:            100 (connected)
-------------------------------------------------------------------------------
GENERAL.CONNECTION:       Static
-------------------------------------------------------------------------------
```

```
GENERAL.CON-PATH:         /org/freedesktop/NetworkManager/ActiveConnection/9
-------------------------------------------------------------------------------
WIRED-PROPERTIES.CARRIER: on
-------------------------------------------------------------------------------
IP4.ADDRESS[1]:           204.100.254.205/29
IP4.GATEWAY:              --
IP4.ROUTE[1]:             dst = 204.100.254.200/29,       nh = 0.0.0.0, mt = 100
IP4.ROUTE[2]:             dst = 169.254.0.0/16,           nh = 0.0.0.0, mt = 1000
-------------------------------------------------------------------------------
IP6.ADDRESS[1]:       fe80::e1db:4855:2a9b:e590/64
IP6.GATEWAY:      --
IP6.ROUTE[1]:     dst = ff00::/8,       nh = ::, mt = 256, table=255
IP6.ROUTE[2]:     dst = fe80::/64,      nh = ::, mt = 256
IP6.ROUTE[3]:     dst = fe80::/64,      nh = ::, mt = 100
-------------------------------------------------------------------------------
```

List WiFi details

This command will list the connected wireless interface's SSID, Mode, Channel, Rate, Signal Strength and security.

```
nmcli dev wifi
IN-USE       SSID   MODE   CHAN   RATE         SIGNAL       BARS   SECURITY
*            test   Infra  100   405 Mbit/s    76           ▂▄▆_   WPA2
```

List all devices on the system

```
nmcli device
DEVICE     TYPE        STATE       CONNECTION
wlp0s20f3  wifi       connected    test
docker0    bridge     connected    docker0
enp60s0    ethernet   unavailable  --
vmnet1     ethernet   unmanaged    --
vmnet8     ethernet   unmanaged    --
lo         loopback   unmanaged    --
```

List details for one Interface

Now that you have the interface names, you can list all the details for one interface:

```
nmcli dev sho wlp0s20f3
GENERAL.DEVICE:     wlp0s20f3
GENERAL.TYPE:       wifi
GENERAL.HWADDR:     3C:6A:A7:3A:E3:E6
GENERAL.MTU:        1500
GENERAL.STATE:      100 (connected)
GENERAL.CONNECTION: test
GENERAL.CON-PATH:   /org/freedesktop/NetworkManager/ActiveCo
IP4.ADDRESS[1]:     192.168.10.183/24
IP4.GATEWAY:        192.168.10.254
```

```
IP4.ROUTE[1]:       dst = 0.0.0.0/0, nh = 192.168.10.254, mt
IP4.ROUTE[2]:       dst = 192.168.10.0/24, nh = 0.0.0.0, mt
IP4.ROUTE[3]:       dst = 169.254.0.0/16, nh = 0.0.0.0, mt =
IP4.DNS[1]:         1.1.1.1
IP4.DNS[2]:         208.67.222.222
IP6.ADDRESS[1]:     fda8:6c3:ce53:a890:2e32:7cfa:490d:2585/1
IP6.ADDRESS[2]:     fe80::b05c:adfa:b145:a837/64
IP6.GATEWAY:      --
IP6.ROUTE[1]:       dst = ff00::/8, nh = ::, mt = 256, table
IP6.ROUTE[2]:       dst = fe80::/64, nh = ::, mt = 256
IP6.ROUTE[3]:       dst = fda8:6c3:ce53:a890:2e32:7cfa:490d:
IP6.ROUTE[4]:       dst = fe80::/64, nh = ::, mt = 600
```

If you are looking for specific items, you can use grep and the "or" operator. Remember that Linux is case sensitive. To list just ipv4 details use "IP4" instead of "DNS|GA".

```
nmcli device show eth0 | grep -E "DNS|GA"
IP4.GATEWAY:                    192.168.227.2
IP4.DNS[1]:                     192.168.227.2
IP6.GATEWAY:                    --
```

List all currently active connections

```
nmcli connection show --active
NAME                 UUID                                  TYPE      DEVICE
Wired connection 1   9654ef4c-2494-4e7b-9e58-6d58dec3e964  ethernet   eth0
```

List all connection profile names and their auto-connect property

```
nmcli -f name,autoconnect c s (connection show)
NAME                AUTOCONNECT
Wired connection 1  yes
192.168.10.0        yes
test                yes
```

Lists all details for the "Wired connection 1" connection profile

```
nmcli -p connection show "Wired connection 1"
```

Note: shows all properties even if the connection profile isn't applied to an interface

List details for the "Wired connection 1" active connection, like IP, DHCP information, etc.

```
nmcli -f active connection show "Wired connection 1"
```

Note: This will only return data for active connections. DHCP options from the server are listed. For example:

DHCP4.OPTION[3]:   dhcp_server_identifier = 192.168.227.254

-f means "field". Valid fields are 6lowpan,802-11-olpc-mesh,802-11-wireless,802-11-wireless-security,802-1x,802-3-ethernet,adsl,bluetooth,bond,bond-port,bridge,bridge-port,cdma,connection,dcb,dummy,ethtool,generic,gsm,hostname,infiniband,ip-tunnel,ipv4,ipv6,macsec,macvlan,match,ovs-bridge,ovs-dpdk,ovs-external-ids,ovs-interface,ovspatch,ovs-port,ppp,pppoe,proxy,serial,sriov,tc,team,team-port,tun,user,veth,vlan,vpn,vrf,vxlan,wifi-p2p,wimax,wireguard,wpan and GENERAL,IP4,DHCP4,IP6,DHCP6,VPN, or profile,active.

List static configuration details of the connection profile "Wired connection 1"

```
nmcli -f profile connection show "Wired connection 1"
```

Note: -f profile returned 96 rows on my laptop.

List All Connection Profiles

To see all connections, use the connection option. Notice it returns all the wifi SSIDs that my laptop has connected to over time. There is a bash shell script that can use that information to fingerprint your laptop. You can find it here: Show me your SSID’s, I’ll Tell Who You Are!

```
nmcli connection
NAME                UUID                                  TYPE       DEVICE
docker0             224e7634-38ef-4ad9-8a4d-273baab05f65  bridge     docker0
test                f9620460-92c5-4dfb-9b01-efa8c0372df1  wifi       wlp0s20f3
1S1K-phone          d259ea15-0549-44a2-b818-d0b5b0916ed6  wifi       --
AirConsole          7f103423-e068-476f-895e-9aef413818fd  wifi       --
BGHS                914e7da0-3b24-4a93-b4af-e3d8efa37e80  ethernet   --
BGHS                aece44c6-55e8-4f18-af43-e90c8bd089cc  ethernet   --
DHCP                76ee6a5c-9581-4b29-997e-8b2ffd941c8e  ethernet   --
MOTOTRBO            42da0d72-2ec9-4cdc-b7b4-7dd9001ecca0  wifi       --
RoTW                7175654c-a88e-4c8e-b18d-d390b741af6d  vpn        --
SBCUSD_ATV          f42c9d3a-7749-4639-9ea1-420d665d5ab2  wifi       --
Static              67eb952f-350a-4f55-8141-57c564795a0b  ethernet   --
Wired connection 1  eabb14c6-a3b7-3e25-ade4-098691196efa  ethernet   --
hhonors_Hampton     9520e0b4-343c-48ef-8bac-6b76dad2c9d2  wifi       --
```

As always, you can pipe the output to grep.

```
nmcli connection | grep eth
```

To see only connection profiles for ethernet interfaces.

Show details for the "test" connection profile with all passwords.
Note: without --show-secrets option, secrets would not be displayed.

```
nmcli --show-secrets connection show "test"
```

If you are looking for a PSK password, you can add a grep to the end

```
nmcli --show-secrets connection show test | grep security.psk
```

802-11-wireless-security.psk: SuperSecretPasswd

List all available connection profiles for your Wi-Fi interface wlp0s20f3.

```
nmcli -f CONNECTIONS device show wlp3s0
```

List only GENERAL and WIFI-PROPERTIES sections for wlp0s20f3

```
nmcli -f GENERAL,WIFI-PROPERTIES dev show wlan0
```