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Set up a static network connection in Linux

Learn the tools and commands to check for network connections and add a static network connection in CentOS.

21 May 2019 | [Bryant Son \(Red Hat, Correspondent\) \(/users/brson\)](#) | 114
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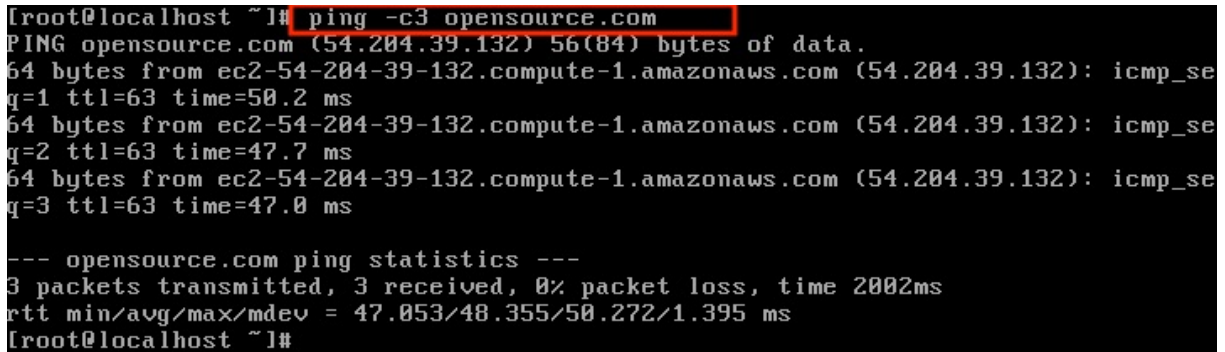
Configuring a network connection from a Linux machine can be challenging. Fortunately, many new Linux distributions come with some type of network management tool that can help you automatically connect to a wireless network. But wouldn't it be nice to be able to set up a static network connection from a Linux machine? This guide will show you how to use different Linux tools to check for network connections from a CentOS/RHEL machine and explain how to add a static network using the [nmcli](https://developer.gnome.org/NetworkManager/stable/nmcli.html) (<https://developer.gnome.org/NetworkManager/stable/nmcli.html>) tool.

Step 1: Check network connectivity

The [ping](https://linux.die.net/man/8/ping) (<https://linux.die.net/man/8/ping>) command is a well-known utility that quickly checks for a connection to an address. Enter the following on the command line:

```
ping -c3 opensource.com
```

where the **-c3** parameter option indicates you will call this domain name only three times.

A terminal window screenshot with a black background and white text. The command 'ping -c3 opensource.com' is entered and highlighted with a red box. The output shows three successful ping requests from an AWS instance to opensource.com, followed by a summary of the statistics.

```
[root@localhost ~]# ping -c3 opensource.com
PING opensource.com (54.204.39.132) 56(84) bytes of data.
64 bytes from ec2-54-204-39-132.compute-1.amazonaws.com (54.204.39.132): icmp_seq=1 ttl=63 time=50.2 ms
64 bytes from ec2-54-204-39-132.compute-1.amazonaws.com (54.204.39.132): icmp_seq=2 ttl=63 time=47.7 ms
64 bytes from ec2-54-204-39-132.compute-1.amazonaws.com (54.204.39.132): icmp_seq=3 ttl=63 time=47.0 ms

--- opensource.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2002ms
rtt min/avg/max/mdev = 47.053/48.355/50.272/1.395 ms
[root@localhost ~]#
```

If you are connected to the internet, you will get a data packet response like the one at the bottom of this screenshot.

Step 2: Check connection information

You can check network information using the **ip add** command.

```
[root@localhost ~]# ip add
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP
    group default qlen 1000
    link/ether [REDACTED] brd ff:ff:ff:ff:ff:ff
    inet [REDACTED] brd [REDACTED] scope global noprefixroute dynamic
        enp0s3
        valid_lft 1047sec preferred_lft 1047sec
    inet6 [REDACTED] scope link noprefixroute
        valid_lft forever preferred_lft forever
3: enp0s8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP
    group default qlen 1000
    link/ether [REDACTED] brd ff:ff:ff:ff:ff:ff
    inet [REDACTED] brd [REDACTED] scope global noprefixroute dynamic enp0s8
        valid_lft 85928sec preferred_lft 85928sec
    inet6 [REDACTED] scope link noprefixroute
        valid_lft forever preferred_lft forever
[root@localhost ~]# _
```

Running this command shows device information, the IP address, and more. You'll need some of this information, like the device info and IP address, later to set up a static connection, so go ahead and grab it.

Step 3: Check network information

Network information can be found inside the **/etc/sysconfig/network-scripts** directory by entering:

```
ls /etc/sysconfig/network-scripts
```

```
[root@localhost ~]# ls /etc/sysconfig/network-scripts/
ifcfg-enp0s3      ifdown-Team      ifup-post
ifcfg-lo          ifdown-TeamPort  ifup-ppp
ifdown            ifdown-tunnel    ifup-routes
ifdown-bnep      ifup              ifup-sit
ifdown-eth        ifup-aliases     ifup-Team
ifdown-ippv       ifup-bnep        ifup-TeamPort
ifdown-ipv6       ifup-eth         ifup-tunnel
ifdown-isdn       ifup-ippv        ifup-wireless
ifdown-post       ifup-ipv6        init.ipv6-global
ifdown-ppp        ifup-isdn        network-functions
ifdown-routes     ifup-plip        network-functions-ipv6
ifdown-sit        ifup-plusb
```

For example, this screenshot shows **ifcfg-enp0s3** and **ifcfg-lo**, but this will vary depending on where you are running Linux and how your device is set up.

Step 4: Show available connections

The **nmcli** tool shows the available connections currently used to connect to the network. Enter the following command:

```
nmcli con show
```

```
[root@localhost ~]# nmcli con show
NAME                                UUID                                TYPE    DEVICE
Wired connection 1                 39fa347c-a605-32fd-a359-985bd8fe5cd2 ethernet enp0s8
Wired connection 2                 d5e21a18-ba98-384c-94a5-746a00cb883a ethernet enp0s3
[root@localhost ~]# _
```

This screenshot shows two devices are active: **enp0s8** and **enp0s3**, and they are called **Wired Connection 1** and **2**. But this can be different, depending on how your Linux environment is set up.

Step 5: Check that the network connection is on

You used the **ping** command above to check that you can receive data packets, but now use the **systemctl** command for **network** to monitor, update, and troubleshoot the network. The command is:

```
systemctl status network
```

```
[root@localhost ~]# systemctl status network
■ network.service - LSB: Bring up/down networking
   Loaded: loaded (/etc/rc.d/init.d/network; bad; vendor preset: disabled)
   Active: active (exited) since Sat 2019-05-11 16:33:01 CDT; 7min ago
     Docs: man:systemd-sysv-generator(8)
  Process: 4452 ExecStop=/etc/rc.d/init.d/network stop (code=exited, status=0/SUCCESS)
  Process: 4617 ExecStart=/etc/rc.d/init.d/network start (code=exited, status=0/SUCCESS)

May 11 16:33:00 localhost.localdomain systemd[1]: Stopped LSB: Bring up/down ...
May 11 16:33:00 localhost.localdomain systemd[1]: Starting LSB: Bring up/down...
May 11 16:33:01 localhost.localdomain network[4617]: Bringing up loopback int...
May 11 16:33:01 localhost.localdomain network[4617]: Bringing up interface en...
May 11 16:33:01 localhost.localdomain systemd[1]: Started LSB: Bring up/down ...
Hint: Some lines were ellipsized, use -l to show in full.
[root@localhost ~]#
```

If the network utility has no issues, you will see the status as **active** when you run this command.

Step 6: Add the static connection

Now you're ready to add a static connection. Using the device name you grabbed from **ip add** in Step 2, modify and enter the following command to add a new connection:

```
nmcli con add con-name "SomeName" ifname YOUR_DEVICE autoconnect yes
```

Change **SomeName**, **YOUR_DEVICE**, and **YOUR_CONNECTION_TYPE** based on your configuration.

```
[root@localhost ~]# nmcli con add con-name "MyFavoriteCafe" ifname enp0s3 autoco
nnect yes type ethernet
Connection 'MyFavoriteCafe' (369e4517-d68e-4335-be2e-e80c91ee312a) successfully
added.
[root@localhost ~]#
```

Step 7: Verify the connection is added to the network-scripts path

There are two ways to modify the new connection info using the **nmcli** tool. One is by using the following command:

```
nmcli con mod
```

This command essentially modifies the network configuration scripts under the **/etc/sysconfig/network-scripts** directory, which is the other way to modify connection information. Choose the option to modify the connection directly.

Look into the **/etc/sysconfig/network-scripts** path again by entering:

```
ls /etc/sysconfig/network-scripts
```



```
[root@localhost ~]# ls /etc/sysconfig/network-scripts/
ifcfg-enp0s3      ifdown-sit        ifup-plusb
ifcfg-lo          ifdown-Team       ifup-post
ifcfg-MyFavoriteCafe  ifdown-TeamPort   ifup-ppp
ifdown            ifdown-tunnel     ifup-routes
ifdown-bnep       ifup               ifup-sit
ifdown-eth        ifup-aliases      ifup-Team
ifdown-ippv       ifup-bnep          ifup-TeamPort
ifdown-ipv6       ifup-eth           ifup-tunnel
ifdown-isdn       ifup-ippv          ifup-wireless
ifdown-post       ifup-ipv6          init.ipv6-global
ifdown-ppp        ifup-isdn          network-functions
ifdown-routes     ifup-plip          network-functions-ipv6
[root@localhost ~]# ls /etc/sysconfig/network-scripts/
```

You can see that the connection **ifcfg-MyFavoriteCafe** was added.

Step 8: Confirm you can see the connection

The Linux Terminal

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- [Linux command line tutorials \(https://opensource.com/tags/command-](https://opensource.com/tags/command-)

[line?intcmp=7016000000127cYAAQ\)](#)

Check that MyFavoriteCafe is visible as the available connection. Use the following command to bring the connection up. Please note that `SOME_CONNECTION_NAME` is the name of your connection (it is MyFavoriteCafe in this example).

```
nmcli con up SOME_CONNECTION NAME
```

or bring it down using the following command:

```
nmcli con down SOME_CONNECTION NAME
```

When you added the new connection, **autoconnect** was set to be true, so it will automatically start if you restart the network utility.

So far, so good. The connection shows up when you run the following command:

```
[root@localhost ~]# nmcli con show
NAME                                UUID                                TYPE    DEVICE
Wired connection 1                 39fa347c-a605-32fd-a359-985bd8fe5cd2 ethernet enp0s8
Wired connection 2                 d5e21a18-ba98-384c-94a5-746a00cb883a ethernet enp0s3
MyFavoriteCafe                     369e4517-d68e-4335-be2e-e80c91ee312a ethernet --
[root@localhost ~]# _
```

Step 9: Modify the connection to be static

Open the file `/etc/sysconfig/network-scripts/ifcfg-SOME_CONNECTION_NAME` (it is `MyFavoriteCafe` in this example), using a text editor, such as Vim, Emacs, or Nano. (If you want a quick introduction to Vi or Vim, check out my intro guide, "[Getting started with Vim: The basics](https://opensource.com/article/19/3/getting-started-vim)" (<https://opensource.com/article/19/3/getting-started-vim>)).")

To make the connection static, modify one parameter and add three parameters:

1. Modify **BOOTPROTO** to be static.
2. Add **IPADDR**. This can be found from the **ip add** command or your connected network.
3. Add **NETMASK**. This can be found from the **ip add** command or your connected network.
4. Add **GATEWAY**. This can be found from the **ip add** command or your connected network.

You might also need to add **DNS**, **PREFIX**, or other information, depending on how your network and the machine are set up.

```
TYPE=Ethernet
PROXY_METHOD=none
BROWSER_ONLY=no
DEFROUTE=yes
IPV4_FAILURE_FATAL=no
IPV6INIT=yes
IPV6_AUTOCONF=yes
IPV6_DEFROUTE=yes
IPV6_FAILURE_FATAL=no
IPV6_ADDR_GEN_MODE=stable-privacy
NAME=MyFavoriteCafe
UUID=369e4517-d68e-4335-be2e-e80c91ee312a
DEVICE=enp0s3
BOOTPROTO=static
GATEWAY=
IPADDR=
NETMASK=
ONBOOT=yes

<tc/sysconfig/network-scripts/ifcfg-MyFavoriteCafe" 18L, 355C 17,1 All
```

Once you've done this, save the file. Restart the network with the following command:

```
systemctl restart network
```

Check the status with:

```
systemctl status network
```

Step 10: Confirm the new connection is active

That should do it! But make sure by checking if the new connection is working. Run the **nmcli con show** command again to start the new connection.

```
[root@localhost ~]# nmcli con show
NAME                                UUID                                TYPE    DEVICE
myFavoriteCafe                     369e4517-d68e-4335-be2e-e80c91ee312a ethernet enp0s3
wired connection 1                  39fa347c-a685-321d-a359-965ba8fe5cd2 ethernet enp0s8
Wired connection 2                  d5e21a18-ba98-384c-94a5-746a00cb883a ethernet --
[root@localhost ~]#
```

You can also ping a website address to verify that the connection is working.

```
[root@localhost ~]# ping -c3 opensource.com
PING opensource.com (54.204.39.132) 56(84) bytes of data.
64 bytes from ec2-54-204-39-132.compute-1.amazonaws.com (54.204.39.132): icmp_seq=1 ttl=63 time=53.2 ms
64 bytes from ec2-54-204-39-132.compute-1.amazonaws.com (54.204.39.132): icmp_seq=2 ttl=63 time=44.8 ms
64 bytes from ec2-54-204-39-132.compute-1.amazonaws.com (54.204.39.132): icmp_seq=3 ttl=63 time=201 ms

--- opensource.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2002ms
rtt min/avg/max/mdev = 44.805/99.919/201.697/72.050 ms
[root@localhost ~]# _
```

Finally, you can check the device info using the following command:

```
nmcli dev show DEVICE_NAME
```

where **DEVICE_NAME** is the name of your network device.

```
[root@localhost ~]# nmcli dev show enp0s3
GENERAL.DEVICE:           enp0s3
GENERAL.TYPE:             ethernet
GENERAL.HWADDR:           [REDACTED]
GENERAL.MTU:              1500
GENERAL.STATE:            100 (connected)
GENERAL.CONNECTION:       MyFavoriteCafe
GENERAL.CON-PATH:         /org/freedesktop/NetworkManager/ActiveCo
WIRED-PROPERTIES.CARRIER: on
IP4.ADDRESS[1]:           [REDACTED]
IP4.GATEWAY:              [REDACTED]
IP4.ROUTE[1]:             dst = [REDACTED], nh = 0.0.0.0, mt =
IP4.ROUTE[2]:             dst = 10.128.1.0/24, nh = 0.0.0.0, mt =
IP4.ROUTE[3]:             dst = 0.0.0.0/0, [REDACTED], mt =
IP6.ADDRESS[1]:           [REDACTED]
IP6.GATEWAY:              --
IP6.ROUTE[1]:             dst = fe80::/64, nh = ::, mt = 102
IP6.ROUTE[2]:             dst = ff00::/8, nh = ::, mt = 256, table
lines 1-17/17 (END)
```

If you have any questions or feedback, please leave them in the comments.

Topics : [Linux \(/tags/linux\)](/tags/linux) [Command line \(/tags/command-line\)](/tags/command-line)



[\(/users/brson/\)](/users/brson/)

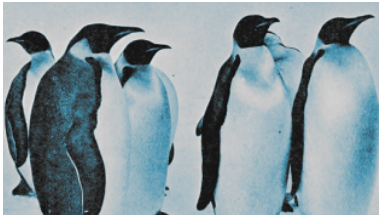
About the author

Bryant Son - Bryant Jimin Son is a Senior Consultant at Red Hat, a technology company known for its Linux server and opensource contributions. At work, he is working on building the technology for clients leveraging the Red Hat technology stacks like BPM, PAM, Openshift, Ansible, and full stack development using Java, Spring Framework, AngularJS, Material design. Prior to joining Red Hat, Bryant was at Citi Group's Citi Cloud team, building the private Infrastructure as a Service

(IaaS) cloud platform...

• [More about me \(/users/brson\)](#).

Recommended reading



[Manage your SSH connections with this open source tool \(/article/20/9/ssh-connection-manager?utm_campaign=intrel\)](#)



[A beginner's guide to SSH for remote connection on Linux \(/article/20/9/ssh?utm_campaign=intrel\)](#)



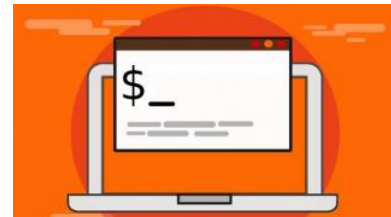
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8 Comments



[fgiudici \(/users/fgiudici\)](/users/fgiudici) on 22 May 2019

3

Hi Bryant,

thanks for the nice article.

You can use nmcli to edit static network configuration instead of editing ifcfg files by hand:

```
nmcli conn modify SOME_CONNECTION_NAME ipv4.method manual ipv4.address  
YOUR_IP_ADDRESS/NETMASK ipv4.gateway YOUR_IP_GATEWAY
```

nmcli can be an alternative in checking network interfaces too:

```
nmcli device
```

or to check the overall network status:

```
nmcli
```



[Bryant Son \(/users/brson\)](/users/brson) on 24 May 2019

1

Thank you for your feedback. Yes, that is also a great option to quickly edit the network configuration.



[Eric'sDmith \(/users/ericdsmith\)](/users/ericdsmith) on 23 May 2019

2

Nice Article!



[Bryant Son \(/users/brson\)](/users/brson) on 24 May 2019

1

Thank you!



[Breanne Rippin \(/users/breannerippin\)](/users/breannerippin) on 23 May 2019

1

learning this tool and get best out of it.



[Bryant Son \(/users/brson\)](/users/brson) on 24 May 2019

0

Thank you!



Luuk Dae on 25 May 2019

1

Nice article, thank you.

However, never make a connection static.

If the network is managed by DHCP, don't set your connection to static, it will result in duplicate IP addresses and angry network admins. If you require a static IP, set a DHCP reservation.

In case the network is not managed by DHCP, ip add will not return valid network settings.



[Bryant Son \(/users/brson\)](/users/brson) on 28 May 2019

0

Thanks for the comment, but there are some cases where you need to make the static connection.



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