

These are the steps to add TAP+Bridge to Ubuntu, using `nmcli`.

```
$ nmcli
enp0s3: connected to Wired connection 1
"Intel 82540EM"
ethernet (e1000), 08:00:27:14:5C:13, hw, mtu 1500
ip4 default
inet4 192.168.4.52/16
route4 192.168.0.0/16 metric 100
route4 default via 192.168.0.1 metric 100

lo: connected (externally) to lo
"lo"
loopback (unknown), 00:00:00:00:00:00, sw, mtu 65536
inet4 127.0.0.1/8
inet6 ::1/128

DNS configuration:
servers: 192.168.0.12 192.168.4.51 1.1.1.1
interface: enp0s3

$ nmcli device show
GENERAL.DEVICE:                enp0s3
GENERAL.TYPE:                   ethernet
GENERAL.HWADDR:                 08:00:27:14:5C:13
GENERAL.MTU:                    1500
GENERAL.STATE:                  100 (connected)
GENERAL.CONNECTION:             Wired connection 1
GENERAL.CON-PATH:               /org/freedesktop/NetworkManager/ActiveConnection/2
WIRED-PROPERTIES.CARRIER:     on
IP4.ADDRESS[1]:                 192.168.4.52/16
IP4.GATEWAY:                    192.168.0.1
IP4.ROUTE[1]:                   dst = 192.168.0.0/16, nh = 0.0.0.0, mt = 100
IP4.ROUTE[2]:                   dst = 0.0.0.0/0, nh = 192.168.0.1, mt = 100
IP4.DNS[1]:                     192.168.0.12
IP4.DNS[2]:                     192.168.4.51
IP4.DNS[3]:                     1.1.1.1
IP6.GATEWAY:                    --

GENERAL.DEVICE:                lo
GENERAL.TYPE:                   loopback
GENERAL.HWADDR:                 00:00:00:00:00:00
GENERAL.MTU:                    65536
GENERAL.STATE:                  100 (connected (externally))
GENERAL.CONNECTION:             lo
GENERAL.CON-PATH:               /org/freedesktop/NetworkManager/ActiveConnection/1
IP4.ADDRESS[1]:                 127.0.0.1/8
IP4.GATEWAY:                    --
IP6.ADDRESS[1]:                 ::1/128
IP6.GATEWAY:                    --

$ nmcli connection show
NAME                UUID                                TYPE    DEVICE
Wired connection 1  5bdb0081-2cc7-3dfd-9c05-16ea1c0bc6c9 ethernet enp0s3
lo                  f53e94c0-2516-4111-b1e2-0adcdcb97b01 loopback  lo
$
$ sudo nmcli connection add type bridge con-name bridge0 ifname bridge0
Connection 'bridge0' (83547c4a-72a1-46f6-9e54-5a23c4cb8c40) successfully added.

nmcli connection add type bridge-slave ifname <ethernet_device> master <bridge_name>
$ nmcli con show
NAME                UUID                                TYPE    DEVICE
Wired connection 1  2a0d0381-64e0-448d-9c07-9d29436b8110 ethernet enp0s3
bridge0             5cca71a2-f875-4d47-b795-74a471b056e5 bridge   bridge0
lo                  4679c91b-9308-4d99-877d-30dc4ac6042b loopback  lo

$ sudo nmcli connection modify 'Wired connection 1' master bridge0

$ nmcli conn show
NAME                UUID                                TYPE    DEVICE
Wired connection 1  2a0d0381-64e0-448d-9c07-9d29436b8110 ethernet enp0s3
bridge0             5cca71a2-f875-4d47-b795-74a471b056e5 bridge   bridge0
lo                  4679c91b-9308-4d99-877d-30dc4ac6042b loopback  lo
```

```
$ sudo nmcli connection modify bridge0 stp yes
$ sudo nmcli connection modify bridge0 ipv6.method disabled
$ sudo nmcli connection modify bridge0 ipv4.addresses '192.168.4.52/16'
$ sudo nmcli connection modify bridge0 ipv4.gateway '192.168.0.1'
$ sudo nmcli connection modify bridge0 ipv4.dns '192.168.0.12', '192.168.4.51', '1.1.1.1'
$ sudo nmcli connection modify bridge0 ipv4.dns-search 'c3cyphers.com'
$ sudo nmcli connection modify bridge0 connection.autoconnect-slaves 1
$
```

```
$ sudo nmcli connection up bridge0
Connection successfully activated (master waiting for slaves) (D-Bus active path:
/org/freedesktop/NetworkManager/ActiveConnection/9)
$
```

```
$ nmcli connection show
NAME                                UUID                                TYPE    DEVICE
bridge0                            5cca71a2-f875-4d47-b795-74a471b056e5 bridge  bridge0
bridge-slave-enp0s3                 56346fb1-cad6-4bb2-a331-a6c4109684b0 ethernet enp0s3
lo                                  4679c91b-9308-4d99-877d-30dc4ac6042b loopback lo
Wired connection 1                  2a0d0381-64e0-448d-9c07-9d29436b8110 ethernet --
```

```
$ sudo nmcli conn add type tun con-name tap0-kanga ifname tap0 mode tap owner 0 ip4 0.0.0.0/16
Connection 'tap0-kanga' (838777c5-305a-401a-887c-8cd090838afa) successfully added.
$ sudo nmcli conn add type tun con-name tap1-roo ifname tap1 mode tap owner 0 ip4 0.0.0.0/16
Connection 'tap1-roo' (60ff6f9c-6fca-4773-8e09-9813a5504c0b) successfully added.
$ sudo nmcli conn add type tun con-name tap2-tigger ifname tap2 mode tap owner 0 ip4 0.0.0.0/16
Connection 'tap2-tigger' (47500cec-a2f6-41fe-929d-268279bf0709) successfully added.
$ sudo nmcli conn add type tun con-name tap3 ifname tap3 mode tap owner 0 ip4 0.0.0.0/16
Connection 'tap3' (16a87363-8f0d-47f4-975f-0b9dff1ad2ed) successfully added.
```

```
$ sudo nmcli connection modify bridge0 ipv6.method disabled
$ sudo nmcli connection modify tap0-kanga ipv6.method disabled
$ sudo nmcli connection modify tap1-roo ipv6.method disabled
$ sudo nmcli connection modify tap2-tigger ipv6.method disabled
$ sudo nmcli connection modify tap3 ipv6.method disabled
$
```

```
$ nmcli conn show
NAME                                UUID                                TYPE    DEVICE
Wired connection 1                  2a0d0381-64e0-448d-9c07-9d29436b8110 ethernet enp0s3
bridge0                            5cca71a2-f875-4d47-b795-74a471b056e5 bridge  bridge0
tap0-kanga                          838777c5-305a-401a-887c-8cd090838afa tun      tap0
tap1-roo                            60ff6f9c-6fca-4773-8e09-9813a5504c0b tun      tap1
tap2-tigger                         47500cec-a2f6-41fe-929d-268279bf0709 tun      tap2
tap3                                16a87363-8f0d-47f4-975f-0b9dff1ad2ed tun      tap3
lo                                  3ed32856-0d54-46fa-8aa4-ebf398b31cb0 loopback lo
```

```
$ nmcli connection up bridge0
Connection successfully activated (master waiting for slaves) (D-Bus active path:
/org/freedesktop/NetworkManager/ActiveConnection/12)
```

Tap connections will come up once SIMH connects to them

```
$ sudo touch /etc/systemd/system/bridge-promisc.service
$ sudo nano /etc/systemd/system/bridge-promisc.service
[Unit]
Description=Make Tap interfaces run in promiscuous mode at boot
After=network-online.target
```

```
[Service]
Steve Cyphers
```

```
ExecStart=/usr/bin/ip link set dev tap0 promisc on
ExecStart=/usr/bin/ip link set dev tap1 promisc on
ExecStart=/usr/bin/ip link set dev tap2 promisc on
ExecStart=/usr/bin/ip link set dev tap3 promisc on
TimeoutStartSec=0
RemainAfterExit=yes
```

```
[Install]
WantedBy=default.target
```

```
$
$ sudo systemctl enable bridge-promisc
Created symlink /etc/systemd/system/default.target.wants/bridge-promisc.service → /etc/systemd/system/bridge-promisc.service.
```

==== reboot =====

\$ nmcli connection show

NAME	UUID	TYPE	DEVICE
bridge0	5cca71a2-f875-4d47-b795-74a471b056e5	bridge	bridge0
bridge-slave-enp0s3	56346fb1-cad6-4bb2-a331-a6c4109684b0	ethernet	enp0s3
tap0-kanga	838777c5-305a-401a-887c-8cd090838afa	tun	tap0
tap1-roo	60ff6f9c-6fca-4773-8e09-9813a5504c0b	tun	tap1
tap2-tigger	47500cec-a2f6-41fe-929d-268279bf0709	tun	tap2
tap3	16a87363-8f0d-47f4-975f-0b9dfff1ad2ed	tun	tap3
lo	abce0966-18b9-4747-aba0-69980052674b	loopback	lo
Wired connection 1	2a0d0381-64e0-448d-9c07-9d29436b8110	ethernet	--

\$ ip address

```
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    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
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel master bridge0 state UP group
    default qlen 1000 link/ether 08:00:27:14:5c:13 brd ff:ff:ff:ff:ff:ff
3: bridge0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen
    1000 link/ether 42:82:83:ef:cf:41 brd ff:ff:ff:ff:ff:ff
    inet 192.168.4.52/16 brd 192.168.255.255 scope global noprefixroute bridge0
        valid_lft forever preferred_lft forever
4: tap3: <NO-CARRIER,BROADCAST,MULTICAST,PROMISC,UP> mtu 1500 qdisc fq_codel state DOWN group
    default qlen 1000 link/ether 06:a5:29:62:2f:99 brd ff:ff:ff:ff:ff:ff
5: tap2: <NO-CARRIER,BROADCAST,MULTICAST,PROMISC,UP> mtu 1500 qdisc fq_codel state DOWN group
    default qlen 1000 link/ether 4e:65:ca:e2:d6:25 brd ff:ff:ff:ff:ff:ff
6: tap1: <NO-CARRIER,BROADCAST,MULTICAST,PROMISC,UP> mtu 1500 qdisc fq_codel state DOWN group
    default qlen 1000 link/ether b6:d7:80:a1:9f:34 brd ff:ff:ff:ff:ff:ff
7: tap0: <NO-CARRIER,BROADCAST,MULTICAST,PROMISC,UP> mtu 1500 qdisc fq_codel state DOWN group
    default qlen 1000 link/ether b2:c9:03:ef:11:46 brd ff:ff:ff:ff:ff:ff
```

\$ nmcli device show

GENERAL.DEVICE:	bridge0
GENERAL.TYPE:	bridge
GENERAL.HWADDR:	42:82:83:EF:CF:41
GENERAL.MTU:	1500
GENERAL.STATE:	100 (connected)
GENERAL.CONNECTION:	bridge0
GENERAL.CON-PATH:	/org/freedesktop/NetworkManager/ActiveConnection/12
IP4.ADDRESS[1]:	192.168.4.52/16
IP4.GATEWAY:	192.168.0.1
IP4.ROUTE[1]:	dst = 192.168.0.0/16, nh = 0.0.0.0, mt = 425
IP4.ROUTE[2]:	dst = 0.0.0.0/0, nh = 192.168.0.1, mt = 425
IP4.DNS[1]:	192.168.0.12
IP4.DNS[2]:	192.168.4.51
IP4.DNS[3]:	1.1.1.1
IP6.GATEWAY:	--
GENERAL.DEVICE:	enp0s3
GENERAL.TYPE:	ethernet
GENERAL.HWADDR:	08:00:27:14:5C:13
GENERAL.MTU:	1500
GENERAL.STATE:	100 (connected)
GENERAL.CONNECTION:	Wired connection 1
GENERAL.CON-PATH:	/org/freedesktop/NetworkManager/ActiveConnection/13
WIRED-PROPERTIES.CARRIER:	on
IP4.GATEWAY:	--
IP6.GATEWAY:	--
GENERAL.DEVICE:	tap0
GENERAL.TYPE:	tun
GENERAL.HWADDR:	B2:C9:03:EF:11:46
GENERAL.MTU:	1500
GENERAL.STATE:	70 (connecting (getting IP configuration))
GENERAL.CONNECTION:	tap0-kanga
GENERAL.CON-PATH:	/org/freedesktop/NetworkManager/ActiveConnection/7
IP4.GATEWAY:	--
IP6.GATEWAY:	--
GENERAL.DEVICE:	tap1
GENERAL.TYPE:	tun
GENERAL.HWADDR:	B6:D7:80:A1:9F:34
GENERAL.MTU:	1500
GENERAL.STATE:	70 (connecting (getting IP configuration))
GENERAL.CONNECTION:	tap1-roo
GENERAL.CON-PATH:	/org/freedesktop/NetworkManager/ActiveConnection/6
IP4.GATEWAY:	--
IP6.GATEWAY:	--
GENERAL.DEVICE:	tap2
GENERAL.TYPE:	tun

```
GENERAL.HWADDR: 4E:65:CA:E2:D6:25
GENERAL.MTU: 1500
GENERAL.STATE: 70 (connecting (getting IP configuration))
GENERAL.CONNECTION: tap2-tigger
GENERAL.CON-PATH: /org/freedesktop/NetworkManager/ActiveConnection/5
IP4.GATEWAY: --
IP6.GATEWAY: --
```

```
GENERAL.DEVICE: tap3
GENERAL.TYPE: tun
GENERAL.HWADDR: 06:A5:29:62:2F:99
GENERAL.MTU: 1500
GENERAL.STATE: 70 (connecting (getting IP configuration))
GENERAL.CONNECTION: tap3
GENERAL.CON-PATH: /org/freedesktop/NetworkManager/ActiveConnection/4
IP4.GATEWAY: --
IP6.GATEWAY: --
```

```
GENERAL.DEVICE: lo
GENERAL.TYPE: loopback
GENERAL.HWADDR: 00:00:00:00:00:00
GENERAL.MTU: 65536
GENERAL.STATE: 100 (connected (externally))
GENERAL.CONNECTION: lo
GENERAL.CON-PATH: /org/freedesktop/NetworkManager/ActiveConnection/1
IP4.ADDRESS[1]: 127.0.0.1/8
IP4.GATEWAY: --
IP6.GATEWAY: --
```

```
$ nmcli -f bridge connection show bridge0
```

```
bridge.mac-address: --
bridge.stp: yes
bridge.priority: 32768
bridge.forward-delay: 15
bridge.hello-time: 2
bridge.max-age: 20
bridge.ageing-time: 300
bridge.group-forward-mask: 0
bridge.multicast-snooping: yes
bridge.vlan-filtering: no
bridge.vlan-default-pvid: 1
bridge.vlans: --
```