```
[node1] (local) root@192.168.0.68 ~
$ docker network


Usage:  docker network COMMAND


Manage networks


Commands:
  connect     Connect a container to a network
  create      Create a network
  disconnect  Disconnect a container from a network
  inspect     Display detailed information on one or more networks
  ls          List networks
  prune       Remove all unused networks
  rm          Remove one or more networks
```

```
[node1] (local) root@192.168.0.68 ~
$ docker network ls
NETWORK ID          NAME                DRIVER              SCOPE
5ddcf7f2fb85        bridge              bridge              local
0a4e5d2f87dc        host                host                local
4ceb8d4d0ca2        none                null                local
```

```
[node1] (local) root@192.168.0.68 ~
$ docker network inspect bridge
[
    {
        "Name": "bridge",
        "Id": "5ddcf7f2fb850a1c41db5ab262943ac9ea899ec064ad1e7d1263d2e6050479dc",
        "Created": "2018-12-03T19:31:39.00008196Z",
        "Scope": "local",
        "Driver": "bridge",
        "EnableIPv6": false,
        "IPAM": {
            "Driver": "default",
            "Options": null,
            "Config": [
                {
```

```
                    "Subnet": "172.17.0.0/16"
                }
            ]
        },
        "Internal": false,
        "Attachable": false,
        "Ingress": false,
        "ConfigFrom": {
            "Network": ""
        },
        "ConfigOnly": false,
        "Containers": {},
        "Options": {
            "com.docker.network.bridge.default_bridge": "true",
            "com.docker.network.bridge.enable_icc": "true",
            "com.docker.network.bridge.enable_ip_masquerade": "true",
```

```
            "com.docker.network.bridge.host_binding_ipv4": "0.0.0.0",
            "com.docker.network.bridge.name": "docker0",
            "com.docker.network.driver.mtu": "1500"
        },
        "Labels": {}
    }
]
```

```
$ docker info
Containers: 0
 Running: 0
 Paused: 0
 Stopped: 0
Images: 0
Server Version: 18.06.1-ce
Storage Driver: overlay2
 Backing Filesystem: xfs
 Supports d_type: true
 Native Overlay Diff: true
Logging Driver: json-file
Cgroup Driver: cgroupfs
Plugins:
 Volume: local
 Network: bridge host ipvlan macvlan null overlay
```

```
$ docker network ls
NETWORK ID          NAME                DRIVER              SCOPE
5ddcf7f2fb85        bridge              bridge              local
0a4e5d2f87dc        host                host                local
4ceb8d4d0ca2        none                null                local
$ apk update
fetch http://dl-cdn.alpinelinux.org/alpine/v3.8/main/x86_64/APKINDEX.tar.gz
fetch http://dl-cdn.alpinelinux.org/alpine/v3.8/community/x86_64/APKINDEX.tar.gz
v3.8.1-115-ge3ed6b4e31 [http://dl-cdn.alpinelinux.org/alpine/v3.8/main]
v3.8.1-112-g45bdd0edfb [http://dl-cdn.alpinelinux.org/alpine/v3.8/community]
OK: 9555 distinct packages available
[node1] (local) root@192.168.0.68 ~
$ apk add bridge
(1/1) Installing bridge (1.5-r3)
OK: 302 MiB in 111 packages
```

```
$ brctl show
bridge name     bridge id          STP enabled     interfaces
docker0         8000.0242509628cb  no
```

```
$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1
    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: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN
    link/ether 02:42:50:96:28:cb brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
       valid_lft forever preferred_lft forever
1563: eth0@if1564: <BROADCAST,MULTICAST,UP,LOWER_UP,M-DOWN> mtu 1500 qdisc noqueue
state UP
    link/ether e6:e3:e1:bf:af:75 brd ff:ff:ff:ff:ff:ff
    inet 192.168.0.68/23 scope global eth0
       valid_lft forever preferred_lft forever
1571: eth1@if1572: <BROADCAST,MULTICAST,UP,LOWER_UP,M-DOWN> mtu 1500 qdisc noqueue
```

```
$ docker run -dt ubuntu sleep infinity
Unable to find image 'ubuntu:latest' locally
latest: Pulling from library/ubuntu
32802c0cfa4d: Pull complete
da1315cffa03: Pull complete
fa83472a3562: Pull complete
f85999a86bef: Pull complete
Digest: sha256:6d0e0c26489e33f5a6f0020edface2727db9489744ecc9b4f50c7fa671f23c49
Status: Downloaded newer image for ubuntu:latest
9860d16391855310018d3c10c439d50e05fec47f44a30b1588ab65045ca4897b
$ docker ps
CONTAINER ID        IMAGE                   COMMAND              CREATED            STA
TUS                 PORTS                   NAMES
9860d1639185        ubuntu                  "sleep infinity"     14 seconds ago     Up
14 seconds                                  loving_beaver
$ brctl show
bridge name         bridge id                STP enabled       interfaces
docker0             8000.0242509628cb        no                veth561c7a5
```

```
$ docker network inspect bridge
[
    {
        "Name": "bridge",
        "Id": "5ddcf7f2fb850a1c41db5ab262943ac9ea899ec064ad1e7d1263d2e6050479dc",
        "Created": "2018-12-03T19:31:39.00008196Z",
        "Scope": "local",
        "Driver": "bridge",
        "EnableIPv6": false,
        "IPAM": {
            "Driver": "default",
            "Options": null,
            "Config": [
                {
                    "Subnet": "172.17.0.0/16"
```

```
$ docker ps
CONTAINER ID        IMAGE           COMMAND            CREATED             ST
ATUS                PORTS           NAMES
9860d1639185        ubuntu           "sleep infinity"    About a minute ago    Up
 About a minute                     loving_beaver
```

```
[node1] (local) root@192.168.0.68 ~
$ docker exec -it 9860d1639185 /bin/bash
root@9860d1639185:/# apt-get update && apt-get install -y iputils-ping
Get:1 http://security.ubuntu.com/ubuntu bionic-security InRelease [83.2 kB]
Get:2 http://archive.ubuntu.com/ubuntu bionic InRelease [242 kB]
Get:3 http://security.ubuntu.com/ubuntu bionic-security/main amd64 Packages [270 kB
]
Get:4 http://archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:5 http://archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:6 http://archive.ubuntu.com/ubuntu bionic/universe amd64 Packages [11.3 MB]
Get:7 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [12
2 kB]
Get:8 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 Packages [
```

```
PING github.com (192.30.253.112) 56(84) bytes of data.
64 bytes from lb-192-30-253-112-iad.github.com (192.30.253.112): icmp_seq=1 ttl=49
time=1.72 ms
64 bytes from lb-192-30-253-112-iad.github.com (192.30.253.112): icmp_seq=2 ttl=49
time=1.82 ms
64 bytes from lb-192-30-253-112-iad.github.com (192.30.253.112): icmp_seq=3 ttl=49
time=1.79 ms
64 bytes from lb-192-30-253-112-iad.github.com (192.30.253.112): icmp_seq=4 ttl=49
time=1.88 ms
64 bytes from lb-192-30-253-112-iad.github.com (192.30.253.112): icmp_seq=5 ttl=49
time=1.83 ms

--- github.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4006ms
rtt min/avg/max/mdev = 1.720/1.810/1.882/0.053 ms
```

```
$ docker run --name web1 -d -p 8080:80 nginx
Unable to find image 'nginx:latest' locally
latest: Pulling from library/nginx
a5a6f2f73cd8: Pull complete
1ba02017c4b2: Pull complete
33b176c904de: Pull complete
Digest: sha256:5d32f60db294b5deb55d078cd4feb410ad88e6fe77500c87d3970eca97f54dba
Status: Downloaded newer image for nginx:latest
af6dd074e3d273d1a8ba7bacc1287f250541a144e3b0f409f5276d5e9dcfd376
```

```
$ docker ps
CONTAINER ID        IMAGE           COMMAND              CREATED
  STATUS              PORTS                NAMES
af6dd074e3d2        nginx           "nginx -g 'daemon of…"  13 seconds ago
  Up 13 seconds       0.0.0.0:8080->80/tcp    web1
9860d1639185        ubuntu           "sleep infinity"      4 minutes ago
  Up 4 minutes                          loving_beaver
```

```
$ curl 127.0.0.1:8080
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
    body {
        width: 35em;
        margin: 0 auto;
        font-family: Tahoma, Verdana, Arial, sans-serif;
    }
</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
```

```
$ docker swarm init --advertise-addr $(hostname -i)
Swarm initialized: current node (vo1mb64ckojfc39c373f8zee3) is now a manager.

To add a worker to this swarm, run the following command:

    docker swarm join --token SWMTKN-1-25aeslf2d03tub557bkzl0flzxo0sp6n0u1022uyb5ny
4281kr-dvl5bgauaxtybcvdgc48q8rtw 192.168.0.68:2377

To add a manager to this swarm, run 'docker swarm join-token manager' and follow th
e instructions.
```

```
$ docker node ls
ID                              HOSTNAME          STATUS          AVAILABILITY
       MANAGER STATUS       ENGINE VERSION
vo1mb64ckojfc39c373f8zee3 *   node1             Ready           Active
       Leader               18.06.1-ce
```

```
$ docker network create -d overlay overnet
jydfh0y7bzgmon0j4d8561bbi
$ docker network ls
NETWORK ID          NAME               DRIVER          SCOPE
5ddcf7f2fb85        bridge             bridge          local
61c5e44ad155        docker_gwbridge    bridge          local
0a4e5d2f87dc        host               host            local
cotkrh7zphmu        ingress            overlay         swarm
4ceb8d4d0ca2        none               null            local
jydfh0y7bzgm        overnet            overlay         swarm
```

```
NETWORK ID          NAME                DRIVER              SCOPE
c288af4cd2fa        bridge              bridge              local
7ac6dce91eaa        host                host                local
1cdc7d2ef8f3        none                null                local
```

```
$ docker network inspect overnet
[
    {
        "Name": "overnet",
        "Id": "jydfh0y7bzgmon0j4d856lbbi",
        "Created": "2018-12-03T19:44:23.840282572Z",
        "Scope": "swarm",
        "Driver": "overlay",
        "EnableIPv6": false,
        "IPAM": {
            "Driver": "default",
```

```
$ docker service create --name myservice \
> --network overnet \
> --replicas 2 \
> ubuntu sleep infinity
uew46i6m7s4y25lr61d50im5e
overall progress: 2 out of 2 tasks
1/2: running
2/2: running
verify: Waiting 2 seconds to verify that tasks are stable...
```

```
$ docker service ls
ID                  NAME                MODE                REPLICAS            IMA
GE              PORTS
uew46i6m7s4y        myservice           replicated          2/2                 ubu
ntu:latest
$ docker service ps myservice
ID                  NAME                IMAGE               NODE                DES
IRED STATE          CURRENT STATE        ERROR               PORTS
43ii8ksbtd2i        myservice.1         ubuntu:latest       node1               Run
ning                Running 26 seconds ago
oex88bve7gfw        myservice.2         ubuntu:latest       node1               Run
ning                Running 26 seconds ago
```

```
$ docker network ls
NETWORK ID          NAME              DRIVER            SCOPE
c288af4cd2fa        bridge            bridge            local
7ac6dce91eaa        host              host              local
1cdc7d2ef8f3        none              null              local
```

```
$ docker network inspect overnet
[
    {
        "Name": "overnet",
        "Id": "jydfh0y7bzgmon0j4d856lbbi",
        "Created": "2018-12-03T19:46:04.244762094Z",
        "Scope": "swarm",
        "Driver": "overlay",
        "EnableIPv6": false,
        "IPAM": {
            "Driver": "default",
            "Options": null,
            "Config": [
                {
                    "Subnet": "10.0.0.0/24",
```

```
$ docker ps
CONTAINER ID        IMAGE             COMMAND             CREATED
  STATUS              PORTS                 NAMES
036fd6319367        ubuntu:latest     "sleep infinity"      2 minutes ago
  Up 2 minutes                            myservice.1.43ii8ksbtd2ivoenhoeckwrjc
a11283f7159d        ubuntu:latest     "sleep infinity"      2 minutes ago
  Up 2 minutes                            myservice.2.oex88bve7gfwj994wza1g1ail
af6dd074e3d2        nginx             "nginx -g 'daemon of…"  5 minutes ago
  Up 5 minutes        0.0.0.0:8080->80/tcp   web1
9860d1639185        ubuntu            "sleep infinity"      9 minutes ago
  Up 9 minutes                            loving_beaver
```

```
$ docker exec -it 036fd6319367 /bin/bash
root@036fd6319367:/# apt-get update && apt-get install -y iputils-ping
Get:1 http://security.ubuntu.com/ubuntu bionic-security InRelease [83.2 kB]
Get:2 http://archive.ubuntu.com/ubuntu bionic InRelease [242 kB]
Get:3 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 Packages [
1364 B]
Get:4 http://archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:5 http://security.ubuntu.com/ubuntu bionic-security/main amd64 Packages [270 kB
]
Get:6 http://archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
```

```
PING 10.0.0.3 (10.0.0.3) 56(84) bytes of data.
64 bytes from 10.0.0.3: icmp_seq=1 ttl=64 time=0.195 ms
64 bytes from 10.0.0.3: icmp_seq=2 ttl=64 time=0.061 ms
64 bytes from 10.0.0.3: icmp_seq=3 ttl=64 time=0.052 ms
64 bytes from 10.0.0.3: icmp_seq=4 ttl=64 time=0.069 ms
64 bytes from 10.0.0.3: icmp_seq=5 ttl=64 time=0.102 ms

--- 10.0.0.3 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 3997ms
rtt min/avg/max/mdev = 0.052/0.095/0.195/0.053 ms
```

```
$ docker service inspect myservice
[
    {
        "ID": "uew46i6m7s4y25lr61d50im5e",
        "Version": {
            "Index": 15
        },
        "CreatedAt": "2018-12-03T19:46:04.085508904Z",
        "UpdatedAt": "2018-12-03T19:46:04.086315409Z",
        "Spec": {
            "Name": "myservice",
            "Labels": {},
            "TaskTemplate": {
                "ContainerSpec": {
```

```
$ docker service rm myservice
myservice
```

```
$ docker ps
CONTAINER ID        IMAGE              COMMAND              CREATED
  STATUS              PORTS                NAMES
036fd6319367        ubuntu:latest      "sleep infinity"        4 minutes ago
  Up 4 minutes                            myservice.1.43ii8ksbtd2ivoenhoeckwrjc
a11283f7159d        ubuntu:latest      "sleep infinity"        4 minutes ago
  Up 4 minutes                            myservice.2.oex88bve7gfwj994wza1g1ail
af6dd074e3d2        nginx              "nginx -g 'daemon of…"  7 minutes ago
  Up 7 minutes         0.0.0.0:8080->80/tcp   web1
9860d1639185        ubuntu             "sleep infinity"        12 minutes ago
  Up 12 minutes                           loving_beaver
```

```
$ docker swarm leave --force
Node left the swarm.
```