

Explore Docker Network

1. Running Docker without Networking (None Network Mode)

```
# docker image ls
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
centos-dbclient	latest	1d994bf7ca20	38 minutes ago	366 MB
docker.io/mariadb	latest	bea3d0aeb501	2 hours ago	357 MB
docker.io/wordpress	latest	895c3d7568db	5 days ago	540 MB
docker.io/httpd	latest	bdc169d27d36	6 days ago	166 MB
docker.io/centos	latest	470671670cac	3 months ago	237 MB

```
# docker network ls
```

NETWORK ID	NAME	DRIVER	SCOPE
b578ad519da3	bridge	bridge	local
889191759d76	host	host	local
acd8568a7a3e	none	null	local

1.1. Viewing Network Configuration inside the Container

```
# docker container run -it --name mycentos --network=none centos /bin/bash

[root@0af129ca16db /]# uname -h
af129ca16db

[root@0af129ca16db /]# ip a
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
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever

[root@0af129ca16db /]# ip r
[root@0af129ca16db /]# ip l

1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00

[root@0af129ca16db /]# more /etc/resolv.conf
# Generated by NetworkManager
search mydomain.com
nameserver 192.168.1.1

[root@0af129ca16db /]# cd /etc/sysconfig/network-scripts/

[root@0af129ca16db network-scripts]# ls
ifcfg-ens3

[root@0af129ca16db network-scripts]# cat ifcfg-ens3
# Generated by dracut initrd
NAME="ens3"
DEVICE="ens3"
ONBOOT="yes"
NETBOOT="yes"
UUID="22c5fd20-2314-4577-99d0-e71ee7684a14"
IPV6INIT="yes"
BOOTPROTO="dhcp"
TYPE="Ethernet"
PROXY_METHOD="none"
BROWSER_ONLY="no"
DEFROUTE="yes"
IPV4_FAILURE_FATAL="no"
IPV6_AUTOCONF="yes"
IPV6_DEFROUTE="yes"
IPV6_FAILURE_FATAL="no"
```

1.2. Viewing Network Configuration from Physical Host

```
# docker container ls
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS
0af129ca16db	centos	"/bin/bash"	2 minutes ago	Up 2 minutes	

mycentos

```
# docker container inspect mycentos
[
  {
    "Id": "0af129ca16dbe10fc28fc3a5b676f97a23c3c8ca58dfe70ac6814ab5361d493c",
    "Created": "2020-04-23T01:58:42.805298337Z",
    "Path": "/bin/bash",
    "Args": [],
```

```
"State": {
  "Status": "running",
  "Running": true,
  "Paused": false,
  "Restarting": false,
  "OOMKilled": false,
  "Dead": false,
  "Pid": 5787,
  "ExitCode": 0,
  "Error": "",
  "StartedAt": "2020-04-23T01:58:43.06217747Z",
  "FinishedAt": "0001-01-01T00:00:00Z"
},
"Image": "sha256:470671670cac686c7cf0081e0b37da2e9f4f768ddc5f6a26102ccd1c6954c1ee",
"ResolvConfPath":
"/var/lib/docker/containers/0af129ca16dbe10fc28fc3a5b676f97a23c3c8ca58dfe70ac6814ab5361d493c/resolv.conf",
"HostnamePath":
"/var/lib/docker/containers/0af129ca16dbe10fc28fc3a5b676f97a23c3c8ca58dfe70ac6814ab5361d493c/hostname",
"HostsPath":
"/var/lib/docker/containers/0af129ca16dbe10fc28fc3a5b676f97a23c3c8ca58dfe70ac6814ab5361d493c/hosts",
"LogPath": "",
"Name": "/mycentos",
"RestartCount": 0,
"Driver": "overlay2",
"MountLabel": "system_u:object_r:svirt_sandbox_file_t:s0:c109,c296",
"ProcessLabel": "system_u:system_r:svirt_lxc_net_t:s0:c109,c296",
"AppArmorProfile": "",
"ExecIDs": null,
"HostConfig": {
  "Binds": null,
  "ContainerIDFile": "",
  "LogConfig": {
    "Type": "journald",
    "Config": {}
  },
  "NetworkMode": "none",
  "PortBindings": {},
  "RestartPolicy": {
    "Name": "no",
    "MaximumRetryCount": 0
  },
  "AutoRemove": false,
  "VolumeDriver": "",
  "VolumesFrom": null,
  "CapAdd": null,
  "CapDrop": null,
  "Dns": [],
  "DnsOptions": [],
  "DnsSearch": [],
  "ExtraHosts": null,
  "GroupAdd": null,
  "IpcMode": "",
  "Cgroup": "",
  "Links": null,
  "OomScoreAdj": 0,
  "PidMode": "",
  "Privileged": false,
  "PublishAllPorts": false,
  "ReadonlyRootfs": false,
  "SecurityOpt": null,
  "UTSMode": "",
  "UsernsMode": "",
  "ShmSize": 67108864,
  "Runtime": "docker-runc",
  "ConsoleSize": [
    0,
    0
  ],
  "Isolation": "",
  "CpuShares": 0,
  "Memory": 0,
  "NanoCpus": 0,
  "CgroupParent": "",
  "BlkioWeight": 0,
  "BlkioWeightDevice": null,
  "BlkioDeviceReadBps": null,
  "BlkioDeviceWriteBps": null,
  "BlkioDeviceReadIOps": null,
  "BlkioDeviceWriteIOps": null,
  "CpuPeriod": 0,
  "CpuQuota": 0,
  "CpuRealtimePeriod": 0,
  "CpuRealtimeRuntime": 0,
  "CpusetCpus": "",
  "CpusetMems": "",
  "Devices": [],
  "DiskQuota": 0,
```

```
    "KernelMemory": 0,
    "MemoryReservation": 0,
    "MemorySwap": 0,
    "MemorySwappiness": -1,
    "OomKillDisable": false,
    "PidsLimit": 0,
    "Ulimits": null,
    "CpuCount": 0,
    "CpuPercent": 0,
    "IOMaximumIOps": 0,
    "IOMaximumBandwidth": 0
  },
  "GraphDriver": {
    "Name": "overlay2",
    "Data": {
      "LowerDir": "/var/lib/docker/overlay2/f0dd92def549c8af84d19fd7f9836687322c3fe6b9aafcef2f3aad5eba139de5-init/diff:/var/lib/docker/overlay2/43964e441a8da0a71b86e177d8895fa24a38715b2e352ba7f275717545be1bb8/diff",
      "MergedDir":
"/var/lib/docker/overlay2/f0dd92def549c8af84d19fd7f9836687322c3fe6b9aafcef2f3aad5eba139de5/merged",
      "UpperDir":
"/var/lib/docker/overlay2/f0dd92def549c8af84d19fd7f9836687322c3fe6b9aafcef2f3aad5eba139de5/diff",
      "WorkDir":
"/var/lib/docker/overlay2/f0dd92def549c8af84d19fd7f9836687322c3fe6b9aafcef2f3aad5eba139de5/work"
    }
  },
  "Mounts": [],
  "Config": {
    "Hostname": "0af129ca16db",
    "Domainname": "",
    "User": "",
    "AttachStdin": true,
    "AttachStdout": true,
    "AttachStderr": true,
    "Tty": true,
    "OpenStdin": true,
    "StdinOnce": true,
    "Env": [
      "PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"
    ],
    "Cmd": [
      "/bin/bash"
    ],
    "Image": "centos",
    "Volumes": null,
    "WorkingDir": "",
    "Entrypoint": null,
    "OnBuild": null,
    "Labels": {
      "org.label-schema.build-date": "20200114",
      "org.label-schema.license": "GPLv2",
      "org.label-schema.name": "CentOS Base Image",
      "org.label-schema.schema-version": "1.0",
      "org.label-schema.vendor": "CentOS",
      "org.opencontainers.image.created": "2020-01-14 00:00:00-08:00",
      "org.opencontainers.image.licenses": "GPL-2.0-only",
      "org.opencontainers.image.title": "CentOS Base Image",
      "org.opencontainers.image.vendor": "CentOS"
    }
  },
  "NetworkSettings": {
    "Bridge": "",
    "SandboxID": "e947c020d3d2e8e7a8fd17cb171ed7ccd7cb5e09683e4ec16ecbdbaaeeae09ae",
    "HairpinMode": false,
    "LinkLocalIPv6Address": "",
    "LinkLocalIPv6PrefixLen": 0,
    "Ports": {},
    "SandboxKey": "/var/run/docker/netns/e947c020d3d2",
    "SecondaryIPAddresses": null,
    "SecondaryIPv6Addresses": null,
    "EndpointID": "",
    "Gateway": "",
    "GlobalIPv6Address": "",
    "GlobalIPv6PrefixLen": 0,
    "IPAddress": "",
    "IPPrefixLen": 0,
    "IPv6Gateway": "",
    "MacAddress": "",
    "Networks": {
      "none": {
        "IPAMConfig": null,
        "Links": null,
        "Aliases": null,
        "NetworkID": "acd8568a7a3e5da0bc66e86ea402e6ad9be0e6d6ccd5670be42a9a84e3191dc9",
        "EndpointID": "12a0fc1762c6073669bcb699682607e43a413ec166ff3a8e4ef88e40fa5dfbc7",
        "Gateway": "",
        "IPAddress": "",
        "IPPrefixLen": 0,

```

```

        "IPv6Gateway": "",
        "GlobalIPv6Address": "",
        "GlobalIPv6PrefixLen": 0,
        "MacAddress": ""
    }
}
}
]

# ip l
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP mode DEFAULT group default qlen 1000
    link/ether 00:0c:29:03:84:3d brd ff:ff:ff:ff:ff:ff
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
4: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc pfifo_fast master virbr0 state DOWN mode DEFAULT group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
5: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default
    link/ether 02:42:c9:01:55:0a brd ff:ff:ff:ff:ff:ff

# brctl show
bridge name      bridge id        STP enabled      interfaces
docker0          8000.0242c901550a    no
virbr0           8000.525400ec7f50    yes              virbr0-nic

# ln -s /var/run/docker/netns /var/run/netns

# ip netns show
6f9b58a00021
default

# ip netns exec 6f9b58a00021 ip l
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00

# ip netns exec 6f9b58a00021 ip a
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
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever

# ip netns exec 6f9b58a00021 ip r

# ip netns exec 6f9b58a00021 uname -n
myserver3.mydomain.com

```

1.3. Viewing the contents of /var/lib/docker/containers

```
# pwd
/var/lib/docker

# ls
containers  image  network  overlay2  plugins  swarm  tmp  trust  volumes

# ls -FR containers/
containers/:
3f00b5169b930769edd98ce765f0741ff680864067f6c50bd08ea42170c97e19/

containers/3f00b5169b930769edd98ce765f0741ff680864067f6c50bd08ea42170c97e19:
checkpoints/  config.v2.json  hostconfig.json  hostname  hosts  resolv.conf  resolv.conf.hash  secrets/  shm/

containers/3f00b5169b930769edd98ce765f0741ff680864067f6c50bd08ea42170c97e19/checkpoints:

containers/3f00b5169b930769edd98ce765f0741ff680864067f6c50bd08ea42170c97e19/secrets:

containers/3f00b5169b930769edd98ce765f0741ff680864067f6c50bd08ea42170c97e19/shm:

# cd containers/3f00b5169b930769edd98ce765f0741ff680864067f6c50bd08ea42170c97e19/

# ls
checkpoints  config.v2.json  hostconfig.json  hostname  hosts  resolv.conf  resolv.conf.hash  secrets  shm

# more *

*** checkpoints: directory ***

:::::::::::::
config.v2.json
:::::::::::::
{"StreamConfig":{}, "State":{"Running":true, "Paused":false, "Restarting":false, "OOMKilled":false, "RemovalInProgress":false, "Dead":false, "Pid":9462, "ExitCode":0, "Error":"","StartedAt":
```

```
"2020-04-23T05:05:01.034771703Z", "FinishedAt": "0001-01-01T00:00:00Z", "Health": null, "ID": "3f00b5169b930769edd98ce765f0741ff680864067f6c50bd08ea42170c97e19", "Created": "2020-04-23T05:05:00.831012158Z", "Managed": false, "Path": "/bin/bash", "Args": [], "Config": {"Hostname": "3f00b5169b93", "Domainname": "", "User": "", "AttachStdin": true, "AttachStdout": true, "AttachStderr": true, "Tty": true, "OpenStdin": true, "StdinOnce": true, "Env": ["PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"], "Cmd": ["/bin/bash"], "Image": "centos", "Volumes": null, "WorkingDir": "", "Entrypoint": null, "OnBuild": null, "Labels": {"org.label-schema.build-date": "20200114", "org.label-schema.license": "GPLv2", "org.label-schema.name": "CentOS Base Image", "org.label-schema.schema-version": "1.0", "org.label-schema.vendor": "CentOS", "org.opencontainers.image.created": "2020-01-14 00:00:00-08:00", "org.opencontainers.image.licenses": "GPL-2.0-only", "org.opencontainers.image.title": "CentOS Base Image", "org.opencontainers.image.vendor": "CentOS"}}, "Image": "sha256:470671670cac686c7cf0081e0b37da2e9f4f768ddc5f6a26102ccd1c6954c1ee", "NetworkSettings": {"Bridge": "", "SandboxID": "19809752c5d236657935953218326411bc540d55a6dbe77eb8ffa3a4ff134b75", "HairpinMode": false, "LinkLocalIPv6Address": "", "LinkLocalIPv6PrefixLen": 0, "Networks": {"none": {"IPAMConfig": null, "Links": null, "Aliases": null, "NetworkID": "acd8568a7a3e5da0bc66e86ea402e6ad9be0e6d6ccd5670be42a9a84e3191dc9", "EndpointID": "d114080e91f7d752a940ed8783a8d1ce7bc250ef3aebf7b6872f5b9050de6c94", "Gateway": "", "IPAddress": "", "IPPrefixLen": 0, "IPv6Gateway": "", "GlobalIPv6Address": "", "GlobalIPv6PrefixLen": 0, "MacAddress": "", "IPAMOperational": false}}, "Service": null, "Ports": {}, "SandboxKey": "/var/run/docker/netns/19809752c5d2", "SecondaryIPAddresses": null, "SecondaryIPv6Addresses": null, "IsAnonymousEndpoint": false, "HasSwarmEndpoint": false}, "LogPath": "", "Name": "/mycentos", "Driver": "overlay2", "MountLabel": "system_u:object_r:svirt_sandbox_file_t:s0:c237,c510", "ProcessLabel": "system_u:system_r:svirt_lxc_net_t:s0:c237,c510", "RestartCount": 0, "HasBeenStartedBefore": true, "HasBeenManuallyStopped": false, "MountPoints": {}, "SecurityReferences": null, "AppArmorProfile": "", "HostnamePath": "/var/lib/docker/containers/3f00b5169b930769edd98ce765f0741ff680864067f6c50bd08ea42170c97e19/hostname", "HostsPath": "/var/lib/docker/containers/3f00b5169b930769edd98ce765f0741ff680864067f6c50bd08ea42170c97e19/hosts", "ShmPath": "/var/lib/docker/containers/3f00b5169b930769edd98ce765f0741ff680864067f6c50bd08ea42170c97e19/shm", "ResolvConfPath": "/var/lib/docker/containers/3f00b5169b930769edd98ce765f0741ff680864067f6c50bd08ea42170c97e19/resolv.conf", "SeccompProfile": "", "NoNewPrivileges": false}

hostconfig.json

{"Binds": null, "ContainerIDFile": "", "LogConfig": {"Type": "journald", "Config": {}}, "NetworkMode": "none", "PortBindings": {}, "RestartPolicy": {"Name": "no", "MaximumRetryCount": 0}, "AutoRemove": false, "VolumeDriver": "", "VolumesFrom": null, "CapAdd": null, "CapDrop": null, "Dns": [], "DnsOptions": [], "DnsSearch": [], "ExtraHosts": null, "GroupAdd": null, "IpcMode": "", "Cgroup": "", "Links": [], "OomScoreAdj": 0, "PidMode": "", "Privileged": false, "PublishAllPorts": false, "ReadonlyRootfs": false, "SecurityOpt": null, "UTSMode": "", "UsernsMode": "", "ShmSize": 67108864, "Runtime": "docker-runc", "ConsoleSize": [0, 0], "Isolation": "", "CpuShares": 0, "Memory": 0, "NanoCpus": 0, "CgroupParent": "", "BlkioWeight": 0, "BlkioWeightDevice": null, "BlkioDeviceReadBps": null, "BlkioDeviceWriteBps": null, "BlkioDeviceReadIOps": null, "BlkioDeviceWriteIOps": null, "CpuPeriod": 0, "CpuQuota": 0, "CpuRealtimePeriod": 0, "CpuRealtimeRuntime": 0, "CpusetCpus": "", "CpusetMems": "", "Devices": [], "DiskQuota": 0, "KernelMemory": 0, "MemoryReservation": 0, "MemorySwap": 0, "MemorySwappiness": -1, "OomKillDisable": false, "PidsLimit": 0, "Ulimits": null, "CpuCount": 0, "CpuPercent": 0, "IOMaximumIOps": 0, "IOMaximumBandwidth": 0}

hostname

3f00b5169b93

hosts

127.0.0.1 localhost
::1 localhost ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters

resolv.conf

# Generated by NetworkManager
search mydomain.com
nameserver 192.168.1.1

resolv.conf.hash

sha256:4d89a4d575757aaa96a714e930ace8556a856a0c87a116a63a1b8c4e4b1e7f27

*** secrets: directory ***

*** shm: directory ***
```

2. Running Docker with Host Network Mode

2.1. Viewing Network Configuration inside the Container

```
# docker container run -it --name mycentos --network=host centos /bin/bash

[root@myserver3 /]# uname -n
myserver3.mydomain.com

[root@myserver3 /]# ip l
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP mode DEFAULT group default qlen 1000
    link/ether 00:0c:29:03:84:3d brd ff:ff:ff:ff:ff:ff
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
4: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc pfifo_fast master virbr0 state DOWN mode DEFAULT group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
5: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default
    link/ether 02:42:c9:01:55:0a brd ff:ff:ff:ff:ff:ff

[root@myserver3 /]# ip a
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
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 00:0c:29:03:84:3d brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.8/24 brd 192.168.1.255 scope global dynamic noprefixroute ens33
        valid_lft 79116sec preferred_lft 79116sec
    inet6 fe80::fbcd:9191:cf63:e1c2/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.1/24 brd 192.168.122.255 scope global virbr0
        valid_lft forever preferred_lft forever
4: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc pfifo_fast master virbr0 state DOWN group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
5: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default
    link/ether 02:42:c9:01:55:0a brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 scope global docker0
        valid_lft forever preferred_lft forever
    inet6 fe80::42:c9ff:fe01:550a/64 scope link
        valid_lft forever preferred_lft forever

[root@myserver3 /]# ip r
default via 192.168.1.1 dev ens33 proto dhcp metric 100
172.17.0.0/16 dev docker0 proto kernel scope link src 172.17.0.1
192.168.1.0/24 dev ens33 proto kernel scope link src 192.168.1.8 metric 100
192.168.122.0/24 dev virbr0 proto kernel scope link src 192.168.122.1

[root@myserver3 /]# cat /etc/resolv.conf
# Generated by NetworkManager
search mydomain.com
nameserver 192.168.1.1
nameserver fe80::1%ens33
```

2.2. Viewing Network Configuration from Physical Host

```
# docker container ls
CONTAINER ID      IMAGE      COMMAND      CREATED      STATUS      PORTS
d5a4ad3a417f     centos     "/bin/bash"  3 minutes ago    Up 3 minutes
mycentos

# docker container inspect mycentos
[
  {
    "Id": "d5a4ad3a417f6f589c08a17f0a58d310a2ce320c2a38d527cc47fc61d202b925",
    "Created": "2020-04-23T02:54:54.472781528Z",
    "Path": "/bin/bash",
    "Args": [],
    "State": {
      "Status": "running",
      "Running": true,
      "Paused": false,
      "Restarting": false,
      "OOMKilled": false,
      "Dead": false,
      "Pid": 6845,
      "ExitCode": 0,
```

```
    "Error": "",
    "StartedAt": "2020-04-23T02:54:54.652120463Z",
    "FinishedAt": "0001-01-01T00:00:00Z"
  },
  "Image": "sha256:470671670cac686c7cf0081e0b37da2e9f4f768ddc5f6a26102ccd1c6954c1ee",
  "ResolvConfPath":
"/var/lib/docker/containers/d5a4ad3a417f6f589c08a17f0a58d310a2ce320c2a38d527cc47fc61d202b925/resolv.conf",
  "HostnamePath":
"/var/lib/docker/containers/d5a4ad3a417f6f589c08a17f0a58d310a2ce320c2a38d527cc47fc61d202b925/hostname",
  "HostsPath":
"/var/lib/docker/containers/d5a4ad3a417f6f589c08a17f0a58d310a2ce320c2a38d527cc47fc61d202b925/hosts",
  "LogPath": "",
  "Name": "/mycentos",
  "RestartCount": 0,
  "Driver": "overlay2",
  "MountLabel": "system_u:object_r:svirt_sandbox_file_t:s0:c194,c638",
  "ProcessLabel": "system_u:system_r:svirt_lxc_net_t:s0:c194,c638",
  "AppArmorProfile": "",
  "ExecIDs": null,
  "HostConfig": {
    "Binds": null,
    "ContainerIDFile": "",
    "LogConfig": {
      "Type": "journald",
      "Config": {}
    },
    "NetworkMode": "host",
    "PortBindings": {},
    "RestartPolicy": {
      "Name": "no",
      "MaximumRetryCount": 0
    },
    "AutoRemove": false,
    "VolumeDriver": "",
    "VolumesFrom": null,
    "CapAdd": null,
    "CapDrop": null,
    "Dns": [],
    "DnsOptions": [],
    "DnsSearch": [],
    "ExtraHosts": null,
    "GroupAdd": null,
    "IpcMode": "",
    "Cgroup": "",
    "Links": null,
    "OomScoreAdj": 0,
    "PidMode": "",
    "Privileged": false,
    "PublishAllPorts": false,
    "ReadonlyRootfs": false,
    "SecurityOpt": null,
    "UTSMode": "",
    "UsernsMode": "",
    "ShmSize": 67108864,
    "Runtime": "docker-runc",
    "ConsoleSize": [
      0,
      0
    ],
    "Isolation": "",
    "CpuShares": 0,
    "Memory": 0,
    "NanoCpus": 0,
    "CgroupParent": "",
    "BlkioWeight": 0,
    "BlkioWeightDevice": null,
    "BlkioDeviceReadBps": null,
    "BlkioDeviceWriteBps": null,
    "BlkioDeviceReadIOps": null,
    "BlkioDeviceWriteIOps": null,
    "CpuPeriod": 0,
    "CpuQuota": 0,
    "CpuRealtimePeriod": 0,
    "CpuRealtimeRuntime": 0,
    "CpusetCpus": "",
    "CpusetMems": "",
    "Devices": [],
    "DiskQuota": 0,
    "KernelMemory": 0,
    "MemoryReservation": 0,
    "MemorySwap": 0,
    "MemorySwappiness": -1,
    "OomKillDisable": false,
    "PidsLimit": 0,
    "Ulimits": null,
    "CpuCount": 0,
    "CpuPercent": 0,
```

```
        "IOMaximumIOps": 0,
        "IOMaximumBandwidth": 0
    },
    "GraphDriver": {
        "Name": "overlay2",
        "Data": {
            "LowerDir": "/var/lib/docker/overlay2/c0d324233606d5400578937314561978391bf5b73af2def7b29dc58051cf1ba1-init/diff:/var/lib/docker/overlay2/43964e441a8da0a71b86e177d8895fa24a38715b2e352ba7f275717545be1bb8/diff",
            "MergedDir":
"/var/lib/docker/overlay2/c0d324233606d5400578937314561978391bf5b73af2def7b29dc58051cf1ba1/merged",
            "UpperDir":
"/var/lib/docker/overlay2/c0d324233606d5400578937314561978391bf5b73af2def7b29dc58051cf1ba1/diff",
            "WorkDir":
"/var/lib/docker/overlay2/c0d324233606d5400578937314561978391bf5b73af2def7b29dc58051cf1ba1/work"
        }
    },
    "Mounts": [],
    "Config": {
        "Hostname": "myserver3.mydomain.com",
        "Domainname": "",
        "User": "",
        "AttachStdin": true,
        "AttachStdout": true,
        "AttachStderr": true,
        "Tty": true,
        "OpenStdin": true,
        "StdinOnce": true,
        "Env": [
            "PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"
        ],
        "Cmd": [
            "/bin/bash"
        ],
        "Image": "centos",
        "Volumes": null,
        "WorkingDir": "",
        "Entrypoint": null,
        "OnBuild": null,
        "Labels": {
            "org.label-schema.build-date": "20200114",
            "org.label-schema.license": "GPLv2",
            "org.label-schema.name": "CentOS Base Image",
            "org.label-schema.schema-version": "1.0",
            "org.label-schema.vendor": "CentOS",
            "org.opencontainers.image.created": "2020-01-14 00:00:00-08:00",
            "org.opencontainers.image.licenses": "GPL-2.0-only",
            "org.opencontainers.image.title": "CentOS Base Image",
            "org.opencontainers.image.vendor": "CentOS"
        }
    },
    "NetworkSettings": {
        "Bridge": "",
        "SandboxID": "dd1619398917c07fadea83c614a8aec93bca561d5b5239a7936ee235a5bb3b91",
        "HairpinMode": false,
        "LinkLocalIPv6Address": "",
        "LinkLocalIPv6PrefixLen": 0,
        "Ports": {},
        "SandboxKey": "/var/run/docker/netns/default",
        "SecondaryIPAddresses": null,
        "SecondaryIPv6Addresses": null,
        "EndpointID": "",
        "Gateway": "",
        "GlobalIPv6Address": "",
        "GlobalIPv6PrefixLen": 0,
        "IPAddress": "",
        "IPPrefixLen": 0,
        "IPv6Gateway": "",
        "MacAddress": "",
        "Networks": {
            "host": {
                "IPAMConfig": null,
                "Links": null,
                "Aliases": null,
                "NetworkID": "889191759d76771c1af0aeaeb4632b06e78ecfafd6831ed16173a72746611e80",
                "EndpointID": "bd9cb7ba57d41446fa9cf74748953f4df80c822d5dbd816af4efed9c3a39233f",
                "Gateway": "",
                "IPAddress": "",
                "IPPrefixLen": 0,
                "IPv6Gateway": "",
                "GlobalIPv6Address": "",
                "GlobalIPv6PrefixLen": 0,
                "MacAddress": ""
            }
        }
    }
}
```



```
# brctl show
bridge name      bridge id        STP enabled      interfaces
docker0          8000.0242c901550a  no              virbr0
virbr0           8000.525400ec7f50  yes            virbr0-nic

# ip l
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
   link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP mode DEFAULT group default qlen 1000
   link/ether 00:0c:29:03:84:3d brd ff:ff:ff:ff:ff:ff
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default qlen 1000
   link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
4: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc pfifo_fast master virbr0 state DOWN mode DEFAULT group default qlen 1000
   link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
5: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default
   link/ether 02:42:c9:01:55:0a brd ff:ff:ff:ff:ff:ff

# ip a
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
   inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
   link/ether 00:0c:29:03:84:3d brd ff:ff:ff:ff:ff:ff
   inet 192.168.1.8/24 brd 192.168.1.255 scope global noprefixroute dynamic ens33
       valid_lft 77765sec preferred_lft 77765sec
   inet6 fe80::fbcd:9191:c63:e1c2/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
   link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
   inet 192.168.122.1/24 brd 192.168.122.255 scope global virbr0
       valid_lft forever preferred_lft forever
4: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc pfifo_fast master virbr0 state DOWN group default qlen 1000
   link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
5: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default
   link/ether 02:42:c9:01:55:0a brd ff:ff:ff:ff:ff:ff
   inet 172.17.0.1/16 scope global docker0
       valid_lft forever preferred_lft forever
   inet6 fe80::42:c9ff:fe01:550a/64 scope link
       valid_lft forever preferred_lft forever

# ip r
default via 192.168.1.1 dev ens33 proto dhcp metric 100
172.17.0.0/16 dev docker0 proto kernel scope link src 172.17.0.1
192.168.1.0/24 dev ens33 proto kernel scope link src 192.168.1.8 metric 100
192.168.122.0/24 dev virbr0 proto kernel scope link src 192.168.122.1

# cat /etc/resolv.conf
# Generated by NetworkManager
search mydomain.com
nameserver 192.168.1.1
nameserver fe80::1%ens33

# ln -s /var/run/docker/netns /var/run/netns

# ip netns show
default          <=== Host network mode does not create network namespace.
```

2.3. Viewing the contents of /var/lib/containers

```
# pwd
/var/lib/docker

# ls
containers image network overlay2 plugins swarm tmp trust volumes

# ls -FR containers/
containers/:
a0c018852a4b71541125343ee9a69329883c21139e37eb02fca8211794384333/

containers/a0c018852a4b71541125343ee9a69329883c21139e37eb02fca8211794384333:
checkpoints/ config.v2.json hostconfig.json hostname hosts resolv.conf secrets/ shm/

containers/a0c018852a4b71541125343ee9a69329883c21139e37eb02fca8211794384333/checkpoints:

containers/a0c018852a4b71541125343ee9a69329883c21139e37eb02fca8211794384333/secrets:

containers/a0c018852a4b71541125343ee9a69329883c21139e37eb02fca8211794384333/shm:
```

cd containers/a0c018852a4b71541125343ee9a69329883c21139e37eb02fca8211794384333/

ls
checkpoints config.v2.json hostconfig.json hostname hosts resolv.conf secrets shm

more *
...

.....
hostname
.....
myserver3.mydomain.com

.....
hosts
.....
127.0.0.1 localhost localhost.localdomain localhost4 localhost4.localdomain4
::1 localhost localhost.localdomain localhost6 localhost6.localdomain6

.....
resolv.conf
.....
Generated by NetworkManager
search mydomain.com
nameserver 192.168.1.1
nameserver fe80::1%ens33

3. Running Docker with Default Network Mode

3.1. Viewing Network Configuration inside the Container

```
# docker container run -it --name mycentos --network=default centos /bin/bash

[root@715e2c18ca6e /]# uname -n
715e2c18ca6e

[root@715e2c18ca6e /]# ip l
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
16: eth0@if17: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP mode DEFAULT group default
    link/ether 02:42:ac:11:00:02 brd ff:ff:ff:ff:ff:ff link-netnsid 0

[root@715e2c18ca6e /]# ip a
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
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
16: eth0@if17: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:ac:11:00:02 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 172.17.0.2/16 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::42:acff:fe11:2/64 scope link
        valid_lft forever preferred_lft forever

[root@715e2c18ca6e /]# ip r
default via 172.17.0.1 dev eth0
172.17.0.0/16 dev eth0 proto kernel scope link src 172.17.0.2

[root@715e2c18ca6e /]# cat /etc/resolv.conf
# Generated by NetworkManager
search mydomain.com
nameserver 192.168.1.1

[root@715e2c18ca6e /]# cd /etc/sysconfig/network-scripts/

[root@715e2c18ca6e network-scripts]# ls
ifcfg-ens3

[root@715e2c18ca6e network-scripts]# more ifcfg-ens3
# Generated by dracut initrd
NAME="ens3"
DEVICE="ens3"
ONBOOT="yes"
NETBOOT="yes"
UUID="22c5fd20-2314-4577-99d0-e71ee7684a14"
IPV6INIT="yes"
BOOTPROTO="dhcp"
TYPE="Ethernet"
PROXY_METHOD="none"
BROWSER_ONLY="no"
DEFROUTE="yes"
IPV4_FAILURE_FATAL="no"
IPV6_AUTOCONF="yes"
IPV6_DEFROUTE="yes"
IPV6_FAILURE_FATAL="no"

[root@715e2c18ca6e network-scripts]# systemctl|grep -i net
System has not been booted with systemd as init system (PID 1). Can't operate.
Failed to connect to bus: Host is down

[root@715e2c18ca6e network-scripts]# nmcli
bash: nmcli: command not found
```

3.1. Viewing Network Configuration from Physical Host

```
# docker container ls
CONTAINER ID          IMAGE          COMMAND          CREATED          STATUS          PORTS
715e2c18ca6e         centos        "/bin/bash"     15 minutes ago  Up 15 minutes
mycentos

# docker container inspect mycentos
[
  {
    "Id": "715e2c18ca6e265d83efaee81a68365f7179b77a98d72c170b9bb98d8897b476",
    "Created": "2020-04-23T03:13:46.775438854Z",
    "Path": "/bin/bash",
    "Args": [],
    "State": {
```

```
    "Status": "running",
    "Running": true,
    "Paused": false,
    "Restarting": false,
    "OOMKilled": false,
    "Dead": false,
    "Pid": 7192,
    "ExitCode": 0,
    "Error": "",
    "StartedAt": "2020-04-23T03:13:47.036288045Z",
    "FinishedAt": "0001-01-01T00:00:00Z"
  },
  "Image": "sha256:470671670cac686c7cf0081e0b37da2e9f4f768ddc5f6a26102ccd1c6954c1ee",
  "ResolvConfPath":
"/var/lib/docker/containers/715e2c18ca6e265d83efae81a68365f7179b77a98d72c170b9bb98d8897b476/resolv.conf",
  "HostnamePath":
"/var/lib/docker/containers/715e2c18ca6e265d83efae81a68365f7179b77a98d72c170b9bb98d8897b476/hostname",
  "HostsPath":
"/var/lib/docker/containers/715e2c18ca6e265d83efae81a68365f7179b77a98d72c170b9bb98d8897b476/hosts",
  "LogPath": "",
  "Name": "/mycentos",
  "RestartCount": 0,
  "Driver": "overlay2",
  "MountLabel": "system_u:object_r:svirt_sandbox_file_t:s0:c479,c484",
  "ProcessLabel": "system_u:system_r:svirt_lxc_net_t:s0:c479,c484",
  "AppArmorProfile": "",
  "ExecIDs": null,
  "HostConfig": {
    "Binds": null,
    "ContainerIDFile": "",
    "LogConfig": {
      "Type": "journald",
      "Config": {}
    },
    "NetworkMode": "default",
    "PortBindings": {},
    "RestartPolicy": {
      "Name": "no",
      "MaximumRetryCount": 0
    },
    "AutoRemove": false,
    "VolumeDriver": "",
    "VolumesFrom": null,
    "CapAdd": null,
    "CapDrop": null,
    "Dns": [],
    "DnsOptions": [],
    "DnsSearch": [],
    "ExtraHosts": null,
    "GroupAdd": null,
    "IpcMode": "",
    "Cgroup": "",
    "Links": null,
    "OomScoreAdj": 0,
    "PidMode": "",
    "Privileged": false,
    "PublishAllPorts": false,
    "ReadonlyRootfs": false,
    "SecurityOpt": null,
    "UTSMode": "",
    "UsernsMode": "",
    "ShmSize": 67108864,
    "Runtime": "docker-runc",
    "ConsoleSize": [
      0,
      0
    ],
    "Isolation": "",
    "CpuShares": 0,
    "Memory": 0,
    "NanoCpus": 0,
    "CgroupParent": "",
    "BlkioWeight": 0,
    "BlkioWeightDevice": null,
    "BlkioDeviceReadBps": null,
    "BlkioDeviceWriteBps": null,
    "BlkioDeviceReadIOps": null,
    "BlkioDeviceWriteIOps": null,
    "CpuPeriod": 0,
    "CpuQuota": 0,
    "CpuRealtimePeriod": 0,
    "CpuRealtimeRuntime": 0,
    "CpusetCpus": "",
    "CpusetMems": "",
    "Devices": [],
    "DiskQuota": 0,
    "KernelMemory": 0,
```

```
    "MemoryReservation": 0,
    "MemorySwap": 0,
    "MemorySwappiness": -1,
    "OomKillDisable": false,
    "PidsLimit": 0,
    "Ulimits": null,
    "CpuCount": 0,
    "CpuPercent": 0,
    "IOMaximumIOps": 0,
    "IOMaximumBandwidth": 0
  },
  "GraphDriver": {
    "Name": "overlay2",
    "Data": {
      "LowerDir": "/var/lib/docker/overlay2/37ebe3bc59c83c0e300a88b74edf15d658d5eea3372701657b8bbc603c33ecdf-
init/diff:/var/lib/docker/overlay2/43964e441a8da0a71b86e177d8895fa24a38715b2e352ba7f275717545be1bb8/diff",
      "MergedDir":
"/var/lib/docker/overlay2/37ebe3bc59c83c0e300a88b74edf15d658d5eea3372701657b8bbc603c33ecdf/merged",
      "UpperDir":
"/var/lib/docker/overlay2/37ebe3bc59c83c0e300a88b74edf15d658d5eea3372701657b8bbc603c33ecdf/diff",
      "WorkDir":
"/var/lib/docker/overlay2/37ebe3bc59c83c0e300a88b74edf15d658d5eea3372701657b8bbc603c33ecdf/work"
    }
  },
  "Mounts": [],
  "Config": {
    "Hostname": "715e2c18ca6e",
    "Domainname": "",
    "User": "",
    "AttachStdin": true,
    "AttachStdout": true,
    "AttachStderr": true,
    "Tty": true,
    "OpenStdin": true,
    "StdinOnce": true,
    "Env": [
      "PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"
    ],
    "Cmd": [
      "/bin/bash"
    ],
    "Image": "centos",
    "Volumes": null,
    "WorkingDir": "",
    "Entrypoint": null,
    "OnBuild": null,
    "Labels": {
      "org.label-schema.build-date": "20200114",
      "org.label-schema.license": "GPLv2",
      "org.label-schema.name": "CentOS Base Image",
      "org.label-schema.schema-version": "1.0",
      "org.label-schema.vendor": "CentOS",
      "org.opencontainers.image.created": "2020-01-14 00:00:00-08:00",
      "org.opencontainers.image.licenses": "GPL-2.0-only",
      "org.opencontainers.image.title": "CentOS Base Image",
      "org.opencontainers.image.vendor": "CentOS"
    }
  },
  "NetworkSettings": {
    "Bridge": "",
    "SandboxID": "374a497083a0d8eec307f7515a79a769160c8638b53e73e9a1e270b313a8b8a6",
    "HairpinMode": false,
    "LinkLocalIPv6Address": "",
    "LinkLocalIPv6PrefixLen": 0,
    "Ports": {},
    "SandboxKey": "/var/run/docker/netns/374a497083a0",
    "SecondaryIPAddresses": null,
    "SecondaryIPv6Addresses": null,
    "EndpointID": "b62e76fe791cab8a529369b1d8b8af6c83f48218962cad81c09066687c15d303",
    "Gateway": "172.17.0.1",
    "GlobalIPv6Address": "",
    "GlobalIPv6PrefixLen": 0,
    "IPAddress": "172.17.0.2",
    "IPPrefixLen": 16,
    "IPv6Gateway": "",
    "MacAddress": "02:42:ac:11:00:02",
    "Networks": {
      "bridge": {
        "IPAMConfig": null,
        "Links": null,
        "Aliases": null,
        "NetworkID": "b578ad519da3e6806f06c23abc6b2d63d04baeaf8b5a8767c3eb733f02e05e55",
        "EndpointID": "b62e76fe791cab8a529369b1d8b8af6c83f48218962cad81c09066687c15d303",
        "Gateway": "172.17.0.1",
        "IPAddress": "172.17.0.2",
        "IPPrefixLen": 16,
        "IPv6Gateway": "",
```

```
        "GlobalIPv6Address": "",
        "GlobalIPv6PrefixLen": 0,
        "MacAddress": "02:42:ac:11:00:02"
    }
}
}
}
]

# ip l
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP mode DEFAULT group default qlen 1000
    link/ether 00:0c:29:03:84:3d brd ff:ff:ff:ff:ff:ff
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
4: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc pfifo_fast master virbr0 state DOWN mode DEFAULT group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
5: docker0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP mode DEFAULT group default
    link/ether 02:42:c9:01:55:0a brd ff:ff:ff:ff:ff:ff
17: veth504d275@if16: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue master docker0 state UP mode DEFAULT
group default
    link/ether b6:1c:01:af:cf:d6 brd ff:ff:ff:ff:ff:ff link-netnsid 0

# brctl show
bridge name      bridge id      STP enabled    interfaces
docker0          8000.0242c901550a    no            veth504d275
virbr0           8000.525400ec7f50    yes           virbr0-nic

# ip netns show

# ip netns

Showing Network Namespace

# ln -s /var/run/docker/netns /var/run/netns

# ip netns show
ed91cec47b91 (id: 0)
default

# ip netns ed91cec47b91 ip l
Command "ed91cec47b91" is unknown, try "ip netns help".

# ip netns exec ed91cec47b91 ip l
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
18: eth0@if19: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP mode DEFAULT group default
    link/ether 02:42:ac:11:00:02 brd ff:ff:ff:ff:ff:ff link-netnsid 0
# ip netns exec ed91cec47b91 ip a
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
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
18: eth0@if19: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:ac:11:00:02 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 172.17.0.2/16 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::42:acff:fe11:2/64 scope link
        valid_lft forever preferred_lft forever

# ip netns exec ed91cec47b91 ip r
default via 172.17.0.1 dev eth0
172.17.0.0/16 dev eth0 proto kernel scope link src 172.17.0.2

# ip netns exec ed91cec47b91 uname -n
myserver3.mydomain.com

# iptables -t nat -L
Chain PREROUTING (policy ACCEPT)
target     prot opt source                destination
PREROUTING_direct  all  --  anywhere              anywhere
PREROUTING_ZONES_SOURCE  all  --  anywhere              anywhere
PREROUTING_ZONES  all  --  anywhere              anywhere
DOCKER     all  --  anywhere              anywhere             ADDRTYPE match dst-type LOCAL

Chain INPUT (policy ACCEPT)
target     prot opt source                destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source                destination
OUTPUT_direct  all  --  anywhere              anywhere
DOCKER       all  --  anywhere              !loopback/8          ADDRTYPE match dst-type LOCAL
```

```
Chain POSTROUTING (policy ACCEPT)
target      prot opt source      destination
MASQUERADE  all  --  172.17.0.0/16  anywhere
RETURN      all  --  192.168.122.0/24  base-address.mcast.net/24
RETURN      all  --  192.168.122.0/24  255.255.255.255
MASQUERADE  tcp  --  192.168.122.0/24  !192.168.122.0/24  masq ports: 1024-65535
MASQUERADE  udp  --  192.168.122.0/24  !192.168.122.0/24  masq ports: 1024-65535
MASQUERADE  all  --  192.168.122.0/24  !192.168.122.0/24
POSTROUTING_direct all -- anywhere      anywhere
POSTROUTING_ZONES_SOURCE all -- anywhere      anywhere
POSTROUTING_ZONES all -- anywhere      anywhere

Chain DOCKER (2 references)
target      prot opt source      destination
RETURN      all  --  anywhere      anywhere

Chain OUTPUT_direct (1 references)
target      prot opt source      destination

Chain POSTROUTING_ZONES (1 references)
target      prot opt source      destination
POST_public all  --  anywhere      anywhere      [goto]
POST_public all  --  anywhere      anywhere      [goto]

Chain POSTROUTING_ZONES_SOURCE (1 references)
target      prot opt source      destination

Chain POSTROUTING_direct (1 references)
target      prot opt source      destination

Chain POST_public (2 references)
target      prot opt source      destination
POST_public_log all  --  anywhere      anywhere
POST_public_deny all  --  anywhere      anywhere
POST_public_allow all  --  anywhere      anywhere

Chain POST_public_allow (1 references)
target      prot opt source      destination

Chain POST_public_deny (1 references)
target      prot opt source      destination

Chain POST_public_log (1 references)
target      prot opt source      destination

Chain PREROUTING_ZONES (1 references)
target      prot opt source      destination
PRE_public  all  --  anywhere      anywhere      [goto]
PRE_public  all  --  anywhere      anywhere      [goto]

Chain PREROUTING_ZONES_SOURCE (1 references)
target      prot opt source      destination

Chain PREROUTING_direct (1 references)
target      prot opt source      destination

Chain PRE_public (2 references)
target      prot opt source      destination
PRE_public_log all  --  anywhere      anywhere
PRE_public_deny all  --  anywhere      anywhere
PRE_public_allow all  --  anywhere      anywhere

Chain PRE_public_allow (1 references)
target      prot opt source      destination

Chain PRE_public_deny (1 references)
target      prot opt source      destination

Chain PRE_public_log (1 references)
target      prot opt source      destination
#
```

3.3. The content of /var/lib/docker/containers

```
# pwd
/var/lib/docker/containers/

# ls
containers image network overlay2 plugins swarm tmp trust volumes

# ls -FR containers/
containers/:
ecd0b54dcf6e950e29153d9b3d7926499d2542f9f9906e67706ff318a3bb133b/

containers/ecd0b54dcf6e950e29153d9b3d7926499d2542f9f9906e67706ff318a3bb133b:
checkpoints/ config.v2.json hostconfig.json hostname hosts resolv.conf resolv.conf.hash secrets/ shm/
```

```

:::
resolv.conf.hash
:::
sha256:4d89a4d575757aaa96a714e930ace8556a856a0c87a116a63a1b8c4e4b1e7f27

```


4. Running Docker using User-defined Network Mode

```
# docker network ls
NETWORK ID          NAME                DRIVER              SCOPE
b578ad519da3        bridge              bridge              local
889191759d76        host                host                local
acd8568a7a3e        none                null                local

# docker network create mynetwork1
416dc9f6889fa671ac38e873140d096df6eaa88f56b86337d984ee6ccb95ef39

# docker network ls
NETWORK ID          NAME                DRIVER              SCOPE
b578ad519da3        bridge              bridge              local
889191759d76        host                host                local
416dc9f6889f        mynetwork1          bridge              local
acd8568a7a3e        none                null                local

# docker network inspect mynetwork1
[
  {
    "Name": "mynetwork1",
    "Id": "45810ff9b581427cf1ab79b28c48f9783e9903b6bca1e469ea146a1277ea9539",
    "Created": "2020-06-22T02:40:24.239821487-04:00",
    "Scope": "local",
    "Driver": "bridge",
    "EnableIPv6": false,
    "IPAM": {
      "Driver": "default",
      "Options": {},
      "Config": [
        {
          "Subnet": "172.18.0.0/16",
          "Gateway": "172.18.0.1"
        }
      ]
    },
    "Internal": false,
    "Attachable": false,
    "Containers": {},
    "Options": {},
    "Labels": {}
  }
]

# ip l
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP mode DEFAULT group default qlen 1000
    link/ether 00:0c:29:03:84:3d brd ff:ff:ff:ff:ff:ff
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
4: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc pfifo_fast master virbr0 state DOWN mode DEFAULT group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
5: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default
    link/ether 02:42:c9:01:55:0a brd ff:ff:ff:ff:ff:ff
24: br-416dc9f6889f: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default
    link/ether 02:42:f7:01:f3:d7 brd ff:ff:ff:ff:ff:ff

# brctl show
bridge name      bridge id        STP enabled      interfaces
br-416dc9f6889f  8000.0242f701f3d7  no
docker0          8000.0242c901550a  no
virbr0           8000.525400ec7f50  yes              virbr0-nic

# pwd
/var/lib/docker/network/files

# ls
local-kv.db
# strings local-kv.db |grep mynetwork1
{"addrSpace":"LocalDefault","attachable":false,"created":"2020-04-23T12:15:39.65539824+07:00","enableIPv6":false,"generic":{"com.docker.network.enable_ipv6":false,"com.docker.network.generic":{}}, "id":"416dc9f6889fa671ac38e873140d096df6eaa88f56b86337d984ee6ccb95ef39","inDelete":false,"ingress":false,"internal":false,"ipamOptions":{},"ipamType":"default","ipamV4Config":[{"PreferredPool":"","SubPool":"","Gateway":"","AuxAddresses":null}], "ipamV4Info":[{"IPAMData":"","AddressSpace":"","LocalDefault":"","Gateway":"","172.18.0.1/16":"","Pool":"","172.18.0.0/16"}],"PoolID":"","LocalDefault/172.18.0.0/16"}],"labels":{},"name":"mynetwork1","networkType":"bridge","persist":true,"postIPv6":false,"scope":"local"}docker/network/v1.0/network/889191759d76771c1af0aeaeb4632b06e78ecfafd6831ed16173a72746611e80/
```

4.1. Viewing Network Configuration inside the Container

```
# docker container run -it --name mycentos --network=mynetwork1 centos /bin/bash
```

```
[root@b246ffe527f9 /]# ip l
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
25: eth0@if26: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP mode DEFAULT group default
    link/ether 02:42:ac:12:00:02 brd ff:ff:ff:ff:ff:ff link-netnsid 0

[root@b246ffe527f9 /]# ip a
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
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
25: eth0@if26: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:ac:12:00:02 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 172.18.0.2/16 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::42:acff:fe12:2/64 scope link
        valid_lft forever preferred_lft forever

[root@b246ffe527f9 /]# ip r
default via 172.18.0.1 dev eth0
172.18.0.0/16 dev eth0 proto kernel scope link src 172.18.0.2

[root@b246ffe527f9 /]# uname -n
b246ffe527f9

[root@b246ffe527f9 /]# more /etc/resolv.conf
search mydomain.com
nameserver 127.0.0.11
options ndots:0

[root@b246ffe527f9 /]# more /etc/hosts
127.0.0.1 localhost
::1 localhost ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
172.18.0.2 b246ffe527f9
```

4.2. Viewing Configuration from Physical Host

```
# docker container ls
CONTAINER ID      IMAGE      COMMAND      CREATED      STATUS      PORTS
57f19a46e5d3     centos     "/bin/bash"  24 seconds ago  Up 23 seconds
mycentos

# docker container inspect mycentos
[
  {
    "Id": "57f19a46e5d358424970b9ca6952be1dfadc5617773574579920aad3a3ef8828",
    "Created": "2020-06-22T06:41:40.656569384Z",
    "Path": "/bin/bash",
    "Args": [],
    "State": {
      "Status": "running",
      "Running": true,
      "Paused": false,
      "Restarting": false,
      "OOMKilled": false,
      "Dead": false,
      "Pid": 16178,
      "ExitCode": 0,
      "Error": "",
      "StartedAt": "2020-06-22T06:41:41.044786915Z",
      "FinishedAt": "0001-01-01T00:00:00Z"
    },
    "Image": "sha256:831691599b88ad6cc2a4abbd0e89661a121aff14cfa289ad840fd3946f274f1f",
    "ResolvConfPath": "/var/lib/docker/containers/57f19a46e5d358424970b9ca6952be1dfadc5617773574579920aad3a3ef8828/resolv.conf",
    "HostnamePath": "/var/lib/docker/containers/57f19a46e5d358424970b9ca6952be1dfadc5617773574579920aad3a3ef8828/hostname",
    "HostsPath": "/var/lib/docker/containers/57f19a46e5d358424970b9ca6952be1dfadc5617773574579920aad3a3ef8828/hosts",
    "LogPath": "",
    "Name": "/mycentos",
    "RestartCount": 0,
    "Driver": "overlay2",
    "MountLabel": "system_u:object_r:svirt_sandbox_file_t:s0:c592,c841",
    "ProcessLabel": "system_u:system_r:svirt_lxc_net_t:s0:c592,c841",
    "AppArmorProfile": "",
    "ExecIDs": null,
    "HostConfig": {
      "Binds": null,
      "ContainerIDFile": "",
```

```
    "LogConfig": {
      "Type": "journald",
      "Config": {}
    },
    "NetworkMode": "mynetwork1",
    "PortBindings": {},
    "RestartPolicy": {
      "Name": "no",
      "MaximumRetryCount": 0
    },
    "AutoRemove": false,
    "VolumeDriver": "",
    "VolumesFrom": null,
    "CapAdd": null,
    "CapDrop": null,
    "Dns": [],
    "DnsOptions": [],
    "DnsSearch": [],
    "ExtraHosts": null,
    "GroupAdd": null,
    "IpcMode": "",
    "Cgroup": "",
    "Links": null,
    "OomScoreAdj": 0,
    "PidMode": "",
    "Privileged": false,
    "PublishAllPorts": false,
    "ReadonlyRootfs": false,
    "SecurityOpt": null,
    "UTSMode": "",
    "UsernsMode": "",
    "ShmSize": 67108864,
    "Runtime": "docker-runc",
    "ConsoleSize": [
      0,
      0
    ],
    "Isolation": "",
    "CpuShares": 0,
    "Memory": 0,
    "NanoCpus": 0,
    "CgroupParent": "",
    "BlkioWeight": 0,
    "BlkioWeightDevice": null,
    "BlkioDeviceReadBps": null,
    "BlkioDeviceWriteBps": null,
    "BlkioDeviceReadIOps": null,
    "BlkioDeviceWriteIOps": null,
    "CpuPeriod": 0,
    "CpuQuota": 0,
    "CpuRealtimePeriod": 0,
    "CpuRealtimeRuntime": 0,
    "CpusetCpus": "",
    "CpusetMems": "",
    "Devices": [],
    "DiskQuota": 0,
    "KernelMemory": 0,
    "MemoryReservation": 0,
    "MemorySwap": 0,
    "MemorySwappiness": -1,
    "OomKillDisable": false,
    "PidsLimit": 0,
    "Ulimits": null,
    "CpuCount": 0,
    "CpuPercent": 0,
    "IOMaximumIOps": 0,
    "IOMaximumBandwidth": 0
  },
  "GraphDriver": {
    "Name": "overlay2",
    "Data": {
      "LowerDir": "/var/lib/docker/overlay2/90da2be4b6640b6df7d7422b7689d88230a94f8b31eec8b44bc6ff3683cbdbd6-init/diff:/var/lib/docker/overlay2/627a721401d91083bdefc3f3eed5f117719ad9c2e88aa61d6ffae87bc0157e7/diff",
      "MergedDir": "/var/lib/docker/overlay2/90da2be4b6640b6df7d7422b7689d88230a94f8b31eec8b44bc6ff3683cbdbd6/merged",
      "UpperDir": "/var/lib/docker/overlay2/90da2be4b6640b6df7d7422b7689d88230a94f8b31eec8b44bc6ff3683cbdbd6/diff",
      "WorkDir": "/var/lib/docker/overlay2/90da2be4b6640b6df7d7422b7689d88230a94f8b31eec8b44bc6ff3683cbdbd6/work"
    }
  },
  "Mounts": [],
  "Config": {
    "Hostname": "57f19a46e5d3",
    "Domainname": "",
    "User": "",
    "AttachStdin": true,
```

```
    "AttachStdout": true,
    "AttachStderr": true,
    "Tty": true,
    "OpenStdin": true,
    "StdinOnce": true,
    "Env": [
        "PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"
    ],
    "Cmd": [
        "/bin/bash"
    ],
    "Image": "centos",
    "Volumes": null,
    "WorkingDir": "",
    "Entrypoint": null,
    "OnBuild": null,
    "Labels": {
        "org.label-schema.build-date": "20200611",
        "org.label-schema.license": "GPLv2",
        "org.label-schema.name": "CentOS Base Image",
        "org.label-schema.schema-version": "1.0",
        "org.label-schema.vendor": "CentOS"
    }
},
"NetworkSettings": {
    "Bridge": "",
    "SandboxID": "e25f5febb4bd0b0556b68d976c8ed15645e5470bcc2e2608bae8f58b0356db2c",
    "HairpinMode": false,
    "LinkLocalIPv6Address": "",
    "LinkLocalIPv6PrefixLen": 0,
    "Ports": {},
    "SandboxKey": "/var/run/docker/netns/e25f5febb4bd",
    "SecondaryIPAddresses": null,
    "SecondaryIPv6Addresses": null,
    "EndpointID": "",
    "Gateway": "",
    "GlobalIPv6Address": "",
    "GlobalIPv6PrefixLen": 0,
    "IPAddress": "",
    "IPPrefixLen": 0,
    "IPv6Gateway": "",
    "MacAddress": "",
    "Networks": {
        "mynetwork1": {
            "IPAMConfig": null,
            "Links": null,
            "Aliases": [
                "57f19a46e5d3"
            ],
            "NetworkID": "45810ff9b581427cf1ab79b28c48f9783e9903b6bca1e469ea146a1277ea9539",
            "EndpointID": "2f2ec098f84cdf961ba1740c630cb45662a12d0fa444f8f0a2d1305a1b1e2684",
            "Gateway": "172.18.0.1",
            "IPAddress": "172.18.0.2",
            "IPPrefixLen": 16,
            "IPv6Gateway": "",
            "GlobalIPv6Address": "",
            "GlobalIPv6PrefixLen": 0,
            "MacAddress": "02:42:ac:12:00:02"
        }
    }
}
}
}
}
]

# ip l
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP mode DEFAULT group default qlen 1000
    link/ether 00:0c:29:03:84:3d brd ff:ff:ff:ff:ff:ff
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
4: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc pfifo_fast master virbr0 state DOWN mode DEFAULT group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
5: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default
    link/ether 02:42:c9:01:55:0a brd ff:ff:ff:ff:ff:ff
24: br-416dc9f6889f: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP mode DEFAULT group default
    link/ether 02:42:f7:01:f3:d7 brd ff:ff:ff:ff:ff:ff
26: veth3d25cc8@if25: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue master br-416dc9f6889f state UP mode
    link/ether 02:20:61:ee:d7:0d brd ff:ff:ff:ff:ff:ff link-netnsid 0

# brctl show
bridge name      bridge id        STP enabled      interfaces
br-416dc9f6889f  8000.0242f701f3d7  no               veth3d25cc8
docker0          8000.0242c901550a  no
virbr0           8000.525400ec7f50  yes             virbr0-nic
```

```
# ip a
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
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 00:0c:29:03:84:3d brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.8/24 brd 192.168.1.255 scope global noprefixroute dynamic ens33
        valid_lft 69014sec preferred_lft 69014sec
    inet6 fe80::fbcd:9191:cf63:e1c2/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.1/24 brd 192.168.122.255 scope global virbr0
        valid_lft forever preferred_lft forever
4: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc pfifo_fast master virbr0 state DOWN group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
5: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default
    link/ether 02:42:c9:01:55:0a brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 scope global docker0
        valid_lft forever preferred_lft forever
    inet6 fe80::42:c9ff:fe01:550a/64 scope link
        valid_lft forever preferred_lft forever
24: br-416dc9f6889f: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:f7:01:f3:d7 brd ff:ff:ff:ff:ff:ff
    inet 172.18.0.1/16 scope global br-416dc9f6889f
        valid_lft forever preferred_lft forever
    inet6 fe80::42:f7ff:fe01:f3d7/64 scope link
        valid_lft forever preferred_lft forever
26: veth3d25cc8@if25: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue master br-416dc9f6889f state UP group default
    link/ether 02:20:61:ee:d7:0d brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet6 fe80::20:61ff:feee:d70d/64 scope link
        valid_lft forever preferred_lft forever
```

```
# ip r
default via 192.168.1.1 dev ens33 proto dhcp metric 100
172.17.0.0/16 dev docker0 proto kernel scope link src 172.17.0.1
172.18.0.0/16 dev br-416dc9f6889f proto kernel scope link src 172.18.0.1
192.168.1.0/24 dev ens33 proto kernel scope link src 192.168.1.8 metric 100
192.168.122.0/24 dev virbr0 proto kernel scope link src 192.168.122.1
```

```
# iptables -t nat -L
Chain PREROUTING (policy ACCEPT)
target     prot opt source                destination
PREROUTING_direct all -- anywhere              anywhere
PREROUTING_ZONES_SOURCE all -- anywhere            anywhere
PREROUTING_ZONES all -- anywhere              anywhere
DOCKER     all -- anywhere            anywhere            ADDRTYPE match dst-type LOCAL

Chain INPUT (policy ACCEPT)
target     prot opt source                destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source                destination
OUTPUT_direct all -- anywhere            anywhere
DOCKER     all -- anywhere            !loopback/8         ADDRTYPE match dst-type LOCAL

Chain POSTROUTING (policy ACCEPT)
target     prot opt source                destination
MASQUERADE all -- 172.18.0.0/16      anywhere
MASQUERADE all -- 172.17.0.0/16      anywhere
RETURN     all -- 192.168.122.0/24    base-address.mcast.net/24
RETURN     all -- 192.168.122.0/24    255.255.255.255
MASQUERADE tcp -- 192.168.122.0/24    !192.168.122.0/24    masq ports: 1024-65535
MASQUERADE udp -- 192.168.122.0/24    !192.168.122.0/24    masq ports: 1024-65535
MASQUERADE all -- 192.168.122.0/24    !192.168.122.0/24
POSTROUTING_direct all -- anywhere            anywhere
POSTROUTING_ZONES_SOURCE all -- anywhere            anywhere
POSTROUTING_ZONES all -- anywhere            anywhere

Chain DOCKER (2 references)
target     prot opt source                destination
RETURN     all -- anywhere            anywhere
RETURN     all -- anywhere            anywhere

Chain OUTPUT_direct (1 references)
target     prot opt source                destination

Chain POSTROUTING_ZONES (1 references)
target     prot opt source                destination
POST_public all -- anywhere            anywhere            [goto]
POST_public all -- anywhere            anywhere            [goto]
```

```
Chain POSTROUTING_ZONES_SOURCE (1 references)
target      prot opt source      destination

Chain POSTROUTING_direct (1 references)
target      prot opt source      destination

Chain POST_public (2 references)
target      prot opt source      destination
POST_public_log  all  --  anywhere      anywhere
POST_public_deny all  --  anywhere      anywhere
POST_public_allow all  --  anywhere      anywhere

Chain POST_public_allow (1 references)
target      prot opt source      destination

Chain POST_public_deny (1 references)
target      prot opt source      destination

Chain POST_public_log (1 references)
target      prot opt source      destination

Chain PREROUTING_ZONES (1 references)
target      prot opt source      destination
PRE_public  all  --  anywhere      anywhere      [goto]
PRE_public  all  --  anywhere      anywhere      [goto]

Chain PREROUTING_ZONES_SOURCE (1 references)
target      prot opt source      destination

Chain PREROUTING_direct (1 references)
target      prot opt source      destination

Chain PRE_public (2 references)
target      prot opt source      destination
PRE_public_log  all  --  anywhere      anywhere
PRE_public_deny all  --  anywhere      anywhere
PRE_public_allow all  --  anywhere      anywhere

Chain PRE_public_allow (1 references)
target      prot opt source      destination

Chain PRE_public_deny (1 references)
target      prot opt source      destination

Chain PRE_public_log (1 references)
target      prot opt source      destination
#
```

5. Running httpd Container

5.1. Viewing Network Configuration inside the Container

```
# docker container run -d --name myhttpd --network=default -p 8080:80 httpd
ea95a10ed1580a7c36c153d4abbc26606a56384d636778a944a24d917abe0734

# docker exec -it myhttpd /bin/bash
root@ea95a10ed158:/usr/local/apache2# uname -n
ea95a10ed158

root@ea95a10ed158:/usr/local/apache2# ip l
bash: ip: command not found

root@ea95a10ed158:/usr/local/apache2# ip a
bash: ip: command not found

root@ea95a10ed158:/usr/local/apache2# ip r
bash: ip: command not found

root@ea95a10ed158:/usr/local/apache2# ifconfig
bash: ifconfig: command not found

root@ea95a10ed158:/usr/local/apache2# cat /etc/hosts
127.0.0.1 localhost
::1 localhost ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
172.17.0.2 ea95a10ed158

root@ea95a10ed158:/usr/local/apache2# cat /etc/resolv.conf
# Generated by NetworkManager
```

```
search mydomain.com
nameserver 192.168.1.1

root@ea95a10ed158:/usr/local/apache2# yum repolist
bash: yum: command not found

root@ea95a10ed158:/usr/local/apache2# ping google.com
bash: ping: command not found

root@ea95a10ed158:/usr/local/apache2# traceroute google.com
bash: traceroute: command not found

root@ea95a10ed158:/usr/local/apache2# exit
exit

# curl http://localhost:8080
<html><body><h1>It works!</h1></body></html>
```

5.2. Viewing Network Configuration for Physical Host

```
# docker container inspect myhttpd
[
  {
    "Id": "ea95a10ed1580a7c36c153d4abbc26606a56384d636778a944a24d917abe0734",
    "Created": "2020-04-23T05:42:04.651951507Z",
    "Path": "httpd-foreground",
    "Args": [],
    "State": {
      "Status": "running",
      "Running": true,
      "Paused": false,
      "Restarting": false,
      "OOMKilled": false,
      "Dead": false,
      "Pid": 10350,
      "ExitCode": 0,
      "Error": "",
      "StartedAt": "2020-04-23T05:42:04.959775318Z",
      "FinishedAt": "0001-01-01T00:00:00Z"
    },
    "Image": "sha256:bdc169d27d36e2438ec8452c7dd7a52a05561b5de7bef8391849b0513a6f774b",
    "ResolvConfPath": "/var/lib/docker/containers/ea95a10ed1580a7c36c153d4abbc26606a56384d636778a944a24d917abe0734/resolv.conf",
    "HostnamePath": "/var/lib/docker/containers/ea95a10ed1580a7c36c153d4abbc26606a56384d636778a944a24d917abe0734/hostname",
    "HostsPath": "/var/lib/docker/containers/ea95a10ed1580a7c36c153d4abbc26606a56384d636778a944a24d917abe0734/hosts",
    "LogPath": "",
    "Name": "/myhttpd",
    "RestartCount": 0,
    "Driver": "overlay2",
    "MountLabel": "system_u:object_r:svirt_sandbox_file_t:s0:c249,c463",
    "ProcessLabel": "system_u:system_r:svirt_lxc_net_t:s0:c249,c463",
    "AppArmorProfile": "",
    "ExecIDs": null,
    "HostConfig": {
      "Binds": null,
      "ContainerIDFile": "",
      "LogConfig": {
        "Type": "journald",
        "Config": {}
      },
      "NetworkMode": "default",
      "PortBindings": {
        "80/tcp": [
          {
            "HostIp": "",
            "HostPort": "8080"
          }
        ]
      },
      "RestartPolicy": {
        "Name": "no",
        "MaximumRetryCount": 0
      },
      "AutoRemove": false,
      "VolumeDriver": "",
      "VolumesFrom": null,
      "CapAdd": null,
      "CapDrop": null,
      "Dns": [],
      "DnsOptions": [],
      "DnsSearch": [],
      "ExtraHosts": null,
      "GroupAdd": null,
      "IpcMode": ""
    }
  }
]
```

```
"Cgroup": "",
"Links": null,
"OomScoreAdj": 0,
"PidMode": "",
"Privileged": false,
"PublishAllPorts": false,
"ReadonlyRootfs": false,
"SecurityOpt": null,
"UTSMode": "",
"UsernsMode": "",
"ShmSize": 67108864,
"Runtime": "docker-runc",
"ConsoleSize": [
    0,
    0
],
"Isolation": "",
"CpuShares": 0,
"Memory": 0,
"NanoCpus": 0,
"CgroupParent": "",
"BlkioWeight": 0,
"BlkioWeightDevice": null,
"BlkioDeviceReadBps": null,
"BlkioDeviceWriteBps": null,
"BlkioDeviceReadIOps": null,
"BlkioDeviceWriteIOps": null,
"CpuPeriod": 0,
"CpuQuota": 0,
"CpuRealtimePeriod": 0,
"CpuRealtimeRuntime": 0,
"CpusetCpus": "",
"CpusetMems": "",
"Devices": [],
"DiskQuota": 0,
"KernelMemory": 0,
"MemoryReservation": 0,
"MemorySwap": 0,
"MemorySwappiness": -1,
"OomKillDisable": false,
"PidsLimit": 0,
"Ulimits": null,
"CpuCount": 0,
"CpuPercent": 0,
"IOMaximumIOps": 0,
"IOMaximumBandwidth": 0
},
"GraphDriver": {
    "Name": "overlay2",
    "Data": {
        "LowerDir": "/var/lib/docker/overlay2/2474d477013569d4a9b73d1a96bc19328bda3418b9d486b08e9e6a8adea2b140-
init/diff:/var/lib/docker/overlay2/dc4cc2105efa0790fa6d4de03ea8b177caab79de940d250b670ae65107899d99/diff:/var/lib/docker
/overlay2/2de088e9fd32097b7d747d1b009ff596fc79b95b26c4fc1a91701e237ec1e9c8/diff:/var/lib/docker/overlay2/15300136bcd820
78d713aacff143fae777916ad79d5ca679aac1b77ddef8c0/diff:/var/lib/docker/overlay2/9da27fa48151c6558e4431dc60695bdcd76cd75d
a9f77430df003fc5a413f491/diff:/var/lib/docker/overlay2/dbdf674988fb9858e3b84acaf9f244f4c59d1a9a80261a6592e88544780b5398/
diff",
        "MergedDir":
"/var/lib/docker/overlay2/2474d477013569d4a9b73d1a96bc19328bda3418b9d486b08e9e6a8adea2b140/merged",
        "UpperDir":
"/var/lib/docker/overlay2/2474d477013569d4a9b73d1a96bc19328bda3418b9d486b08e9e6a8adea2b140/diff",
        "WorkDir":
"/var/lib/docker/overlay2/2474d477013569d4a9b73d1a96bc19328bda3418b9d486b08e9e6a8adea2b140/work"
    }
},
"Mounts": [],
"Config": {
    "Hostname": "ea95a10ed158",
    "Domainname": "",
    "User": "",
    "AttachStdin": false,
    "AttachStdout": false,
    "AttachStderr": false,
    "ExposedPorts": {
        "80/tcp": {}
    },
    "Tty": false,
    "OpenStdin": false,
    "StdinOnce": false,
    "Env": [
        "PATH=/usr/local/apache2/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin",
        "HTTPD_PREFIX=/usr/local/apache2",
        "HTTPD_VERSION=2.4.43",
        "HTTPD_SHA256=a497652ab3fc81318cdc2a203090a999150d86461acff97c1065dc910fe10f43",
        "HTTPD_PATCHES="
    ],
    "Cmd": [
        "httpd-foreground"
    ]
}
```



```
    ],
    "ArgsEscaped": true,
    "Image": "httpd",
    "Volumes": null,
    "WorkingDir": "/usr/local/apache2",
    "Entrypoint": null,
    "OnBuild": null,
    "Labels": {},
    "StopSignal": "SIGWINCH"
  },
  "NetworkSettings": {
    "Bridge": "",
    "SandboxID": "c5a68082ea08f3a73925d1ef1cc586539689bf34d16b818f1957c496a87c65f5",
    "HairpinMode": false,
    "LinkLocalIPv6Address": "",
    "LinkLocalIPv6PrefixLen": 0,
    "Ports": {
      "80/tcp": [
        {
          "HostIp": "0.0.0.0",
          "HostPort": "8080"
        }
      ]
    },
    "SandboxKey": "/var/run/docker/netns/c5a68082ea08",
    "SecondaryIPAddresses": null,
    "SecondaryIPv6Addresses": null,
    "EndpointID": "d771e7146bd988478f72c037797f939b955f7dcb7d7b2c1438e671b3706966e6",
    "Gateway": "172.17.0.1",
    "GlobalIPv6Address": "",
    "GlobalIPv6PrefixLen": 0,
    "IPAddress": "172.17.0.2",
    "IPPrefixLen": 16,
    "IPv6Gateway": "",
    "MacAddress": "02:42:ac:11:00:02",
    "Networks": {
      "bridge": {
        "IPAMConfig": null,
        "Links": null,
        "Aliases": null,
        "NetworkID": "b578ad519da3e6806f06c23abc6b2d63d04baeaf8b5a8767c3eb733f02e05e55",
        "EndpointID": "d771e7146bd988478f72c037797f939b955f7dcb7d7b2c1438e671b3706966e6",
        "Gateway": "172.17.0.1",
        "IPAddress": "172.17.0.2",
        "IPPrefixLen": 16,
        "IPv6Gateway": "",
        "GlobalIPv6Address": "",
        "GlobalIPv6PrefixLen": 0,
        "MacAddress": "02:42:ac:11:00:02"
      }
    }
  }
}
```

```
# ip l
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP mode DEFAULT group default qlen 1000
    link/ether 00:0c:29:03:84:3d brd ff:ff:ff:ff:ff:ff
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
4: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc pfifo_fast master virbr0 state DOWN mode DEFAULT group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
5: docker0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP mode DEFAULT group default
    link/ether 02:42:c9:01:55:0a brd ff:ff:ff:ff:ff:ff
24: br-416dc9f6889f: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default
    link/ether 02:42:f7:01:f3:d7 brd ff:ff:ff:ff:ff:ff
28: veth8eb80e9@if27: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue master docker0 state UP mode DEFAULT
group default
    link/ether ee:87:ff:05:9a:89 brd ff:ff:ff:ff:ff:ff link-netnsid 0
```

```
# brctl show
bridge name      bridge id        STP enabled      interfaces
br-416dc9f6889f  8000.0242f701f3d7  no               veth8eb80e9
docker0          8000.0242c901550a  no               veth8eb80e9
virbr0           8000.525400ec7f50  yes              virbr0-nic
```

```
# ip a
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
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
```

```
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 00:0c:29:03:84:3d brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.8/24 brd 192.168.1.255 scope global noprefixroute dynamic ens33
        valid_lft 67753sec preferred_lft 67753sec
    inet6 fe80::fbcd:9191:cf63:e1c2/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.1/24 brd 192.168.122.255 scope global virbr0
        valid_lft forever preferred_lft forever
4: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc pfifo_fast master virbr0 state DOWN group default qlen 1000
    link/ether 52:54:00:ec:7f:50 brd ff:ff:ff:ff:ff:ff
5: docker0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:c9:01:55:0a brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 scope global docker0
        valid_lft forever preferred_lft forever
    inet6 fe80::42:c9ff:fe01:550a/64 scope link
        valid_lft forever preferred_lft forever
24: br-416dc9f6889f: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default
    link/ether 02:42:f7:01:f3:d7 brd ff:ff:ff:ff:ff:ff
    inet 172.18.0.1/16 scope global br-416dc9f6889f
        valid_lft forever preferred_lft forever
    inet6 fe80::42:f7ff:fe01:f3d7/64 scope link
        valid_lft forever preferred_lft forever
28: veth8eb80e9@if27: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue master docker0 state UP group default
    link/ether ee:87:ff:05:9a:89 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet6 fe80::ec87:ffff:fe05:9a89/64 scope link
        valid_lft forever preferred_lft forever
```

```
# iptables -t nat -L
Chain PREROUTING (policy ACCEPT)
target     prot opt source                destination
PREROUTING_direct  all  --  anywhere                anywhere
PREROUTING_ZONES_SOURCE  all  --  anywhere                anywhere
PREROUTING_ZONES  all  --  anywhere                anywhere
DOCKER      all  --  anywhere                anywhere                ADDRTYPE match dst-type LOCAL
```

```
Chain INPUT (policy ACCEPT)
target     prot opt source                destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source                destination
OUTPUT_direct  all  --  anywhere                anywhere
DOCKER       all  --  anywhere                !loopback/8                ADDRTYPE match dst-type LOCAL
```

```
Chain POSTROUTING (policy ACCEPT)
target     prot opt source                destination
MASQUERADE  all  --  172.18.0.0/16          anywhere
MASQUERADE  all  --  172.17.0.0/16          anywhere
RETURN      all  --  192.168.122.0/24       base-address.mcast.net/24
RETURN      all  --  192.168.122.0/24       255.255.255.255
MASQUERADE  tcp  --  192.168.122.0/24       !192.168.122.0/24        masq ports: 1024-65535
MASQUERADE  udp  --  192.168.122.0/24       !192.168.122.0/24        masq ports: 1024-65535
MASQUERADE  all  --  192.168.122.0/24       !192.168.122.0/24
POSTROUTING_direct  all  --  anywhere                anywhere
POSTROUTING_ZONES_SOURCE  all  --  anywhere                anywhere
POSTROUTING_ZONES  all  --  anywhere                anywhere
MASQUERADE  tcp  --  172.17.0.2            172.17.0.2                tcp dpt:http
```

```
Chain DOCKER (2 references)
target     prot opt source                destination
RETURN     all  --  anywhere                anywhere
RETURN     all  --  anywhere                anywhere
DNAT       tcp  --  anywhere                anywhere                tcp dpt:webcache to:172.17.0.2:80
```

```
Chain OUTPUT_direct (1 references)
target     prot opt source                destination
```

```
Chain POSTROUTING_ZONES (1 references)
target     prot opt source                destination
POST_public  all  --  anywhere                anywhere                [goto]
POST_public  all  --  anywhere                anywhere                [goto]
```

```
Chain POSTROUTING_ZONES_SOURCE (1 references)
target     prot opt source                destination
```

```
Chain POSTROUTING_direct (1 references)
target     prot opt source                destination
```

```
Chain POST_public (2 references)
target     prot opt source                destination
POST_public_log  all  --  anywhere                anywhere
POST_public_deny  all  --  anywhere                anywhere
POST_public_allow  all  --  anywhere                anywhere
```

```
Chain POST_public_allow (1 references)
```

```
target      prot opt source      destination

Chain POST_public_deny (1 references)
target      prot opt source      destination

Chain POST_public_log (1 references)
target      prot opt source      destination

Chain PREROUTING_ZONES (1 references)
target      prot opt source      destination
PRE_public  all  --  anywhere    anywhere    [goto]
PRE_public  all  --  anywhere    anywhere    [goto]

Chain PREROUTING_ZONES_SOURCE (1 references)
target      prot opt source      destination

Chain PREROUTING_direct (1 references)
target      prot opt source      destination

Chain PRE_public (2 references)
target      prot opt source      destination
PRE_public_log  all  --  anywhere    anywhere
PRE_public_deny all  --  anywhere    anywhere
PRE_public_allow all  --  anywhere    anywhere

Chain PRE_public_allow (1 references)
target      prot opt source      destination

Chain PRE_public_deny (1 references)
target      prot opt source      destination

Chain PRE_public_log (1 references)
target      prot opt source      destination


# netstat -an|grep 8080
tcp6        0      0 :::8080          :::*             LISTEN
```

5.3. Viewing the contents of /var/lib/docker

```
# pwd
/var/lib/docker

# ls
containers image network overlay2 plugins swarm tmp trust volumes

# ls -FR containers/
containers/:
ea95a10ed1580a7c36c153d4abbc26606a56384d636778a944a24d917abe0734/

containers/ea95a10ed1580a7c36c153d4abbc26606a56384d636778a944a24d917abe0734:
checkpoints/ config.v2.json hostconfig.json hostname hosts resolv.conf resolv.conf.hash secrets/ shm/

containers/ea95a10ed1580a7c36c153d4abbc26606a56384d636778a944a24d917abe0734/checkpoints:

containers/ea95a10ed1580a7c36c153d4abbc26606a56384d636778a944a24d917abe0734/secrets:

containers/ea95a10ed1580a7c36c153d4abbc26606a56384d636778a944a24d917abe0734/shm:

# cd containers/ea95a10ed1580a7c36c153d4abbc26606a56384d636778a944a24d917abe0734/

# ls
checkpoints config.v2.json hostconfig.json hostname hosts resolv.conf resolv.conf.hash secrets shm

# more *

...
::::::::::::
hostname
::::::::::::
ea95a10ed158

::::::::::::
hosts
::::::::::::
127.0.0.1 localhost
::1 localhost ip6-localhost ip6-loopback
fe00::0 ip6-localnet
```

ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
172.17.0.2 ea95a10ed158

:::::::::::::
resolv.conf
:::::::::::::
Generated by NetworkManager
search mydomain.com
nameserver 192.168.1.1

:::::::::::::
resolv.conf.hash
:::::::::::::
sha256:4d89a4d575757aaa96a714e930ace8556a856a0c87a116a63a1b8c4e4b1e7f27

6. Running Docker with MACVLAN Network Mode

```
# ls
anaconda-ks.cfg  macvlan-bridge.sh

# cat macvlan-bridge.sh
docker network create -d macvlan \
--subnet=10.10.50.0/24 \
--gateway=10.10.50.1 \
-o parent=eth0 \
my-macvlan-net

# chmod +x macvlan-bridge.sh

# ./macvlan-bridge.sh
fdb965f0800bede8981af79e32e03f3a6caded6fc966171bce26f341a1b9eb7

# docker network ls
NETWORK ID          NAME                DRIVER              SCOPE
0029b1eaaa4f        bridge             bridge              local
27c066505a7e        host               host                local
fdb965f0800         my-macvlan-net     macvlan             local
45810ff9b581        mynetwork1         bridge              local
b4d9dec942c9        none               null                local

# docker network inspect my-macvlan-net
[
  {
    "Name": "my-macvlan-net",
    "Id": "fdb965f0800bede8981af79e32e03f3a6caded6fc966171bce26f341a1b9eb7",
    "Created": "2020-06-22T07:01:54.164945299-04:00",
    "Scope": "local",
    "Driver": "macvlan",
    "EnableIPv6": false,
    "IPAM": {
      "Driver": "default",
      "Options": {},
      "Config": [
        {
          "Subnet": "10.10.50.0/24",
          "Gateway": "10.10.50.1"
        }
      ]
    },
    "Internal": false,
    "Attachable": false,
    "Containers": {},
    "Options": {
      "parent": "eth0"
    },
    "Labels": {}
  }
]

# docker container run -it --name mycentos --network=my-macvlan-net centos /bin/bash
[root@e4c5b88eb8da /]# ip l
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
43: eth0@if2: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UNKNOWN mode DEFAULT group default
    link/ether 02:42:0a:0a:32:02 brd ff:ff:ff:ff:ff:ff link-netnsid 0

[root@e4c5b88eb8da /]# ip a
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
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
43: eth0@if2: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UNKNOWN group default
    link/ether 02:42:0a:0a:32:02 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 10.10.50.2/24 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::42:aff:fe0a:3202/64 scope link
        valid_lft forever preferred_lft forever

[root@e4c5b88eb8da /]# ip r
default via 10.10.50.1 dev eth0
10.10.50.0/24 dev eth0 proto kernel scope link src 10.10.50.2

[root@e4c5b88eb8da /]# more /etc/resolv.conf
nameserver 127.0.0.11
options ndots:0

[root@e4c5b88eb8da /]# yum repolist
Failed to set locale, defaulting to C.UTF-8
repo id                               repo name
AppStream                             CentOS-8 - AppStream
```

BaseOS
extras
[root@e4c5b88eb8da /]#

CentOS-8 - Base
CentOS-8 - Extras

[root@node1 ~]# docker container ls

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS
NAMES					
e4c5b88eb8da	centos	"/bin/bash"	2 minutes ago	Up 2 minutes	
mycentos					

[root@node1 ~]# docker container inspect mycentos

[

{

"Id": "e4c5b88eb8da4b28003cb64ac74f79592eda35dd32623908c97eb6dcf2345d6c",

"Created": "2020-06-22T11:10:19.589941573Z",

"Path": "/bin/bash",

"Args": [],

"State": {

"Status": "running",

"Running": true,

"Paused": false,

"Restarting": false,

"OOMKilled": false,

"Dead": false,

"Pid": 16788,

"ExitCode": 0,

"Error": "",

"StartedAt": "2020-06-22T11:10:20.084254501Z",

"FinishedAt": "0001-01-01T00:00:00Z"

},

"Image": "sha256:831691599b88ad6cc2a4abbd0e89661a121aff14cfa289ad840fd3946f274f1f",

"ResolvConfPath":

"/var/lib/docker/containers/e4c5b88eb8da4b28003cb64ac74f79592eda35dd32623908c97eb6dcf2345d6c/resolv.conf",

"HostnamePath":

"/var/lib/docker/containers/e4c5b88eb8da4b28003cb64ac74f79592eda35dd32623908c97eb6dcf2345d6c/hostname",

"HostsPath":

"/var/lib/docker/containers/e4c5b88eb8da4b28003cb64ac74f79592eda35dd32623908c97eb6dcf2345d6c/hosts",

"LogPath": "",

"Name": "/mycentos",

"RestartCount": 0,

"Driver": "overlay2",

"MountLabel": "system_u:object_r:svirt_sandbox_file_t:s0:c87,c670",

"ProcessLabel": "system_u:system_r:svirt_lxc_net_t:s0:c87,c670",

"AppArmorProfile": "",

"ExecIDs": null,

"HostConfig": {

"Binds": null,

"ContainerIDFile": "",

"LogConfig": {

"Type": "journald",

"Config": {}

},

"NetworkMode": "my-macvlan-net",

"PortBindings": {},

"RestartPolicy": {

"Name": "no",

"MaximumRetryCount": 0

},

"AutoRemove": false,

"VolumeDriver": "",

"VolumesFrom": null,

"CapAdd": null,

"CapDrop": null,

"Dns": [],

"DnsOptions": [],

"DnsSearch": [],

"ExtraHosts": null,

"GroupAdd": null,

"IpcMode": "",

"Cgroup": "",

"Links": null,

"OomScoreAdj": 0,

"PidMode": "",

"Privileged": false,

"PublishAllPorts": false,

"ReadonlyRootfs": false,

"SecurityOpt": null,

"UTSMode": "",

"UsernsMode": "",

"ShmSize": 67108864,

"Runtime": "docker-runc",

"ConsoleSize": [

0,

0

],

"Isolation": "",

"CpuShares": 0,

}

}

```
"Memory": 0,
"NanoCpus": 0,
"CgroupParent": "",
"BlkioWeight": 0,
"BlkioWeightDevice": null,
"BlkioDeviceReadBps": null,
"BlkioDeviceWriteBps": null,
"BlkioDeviceReadIOps": null,
"BlkioDeviceWriteIOps": null,
"CpuPeriod": 0,
"CpuQuota": 0,
"CpuRealtimePeriod": 0,
"CpuRealtimeRuntime": 0,
"CpusetCpus": "",
"CpusetMems": "",
"Devices": [],
"DiskQuota": 0,
"KernelMemory": 0,
"MemoryReservation": 0,
"MemorySwap": 0,
"MemorySwappiness": -1,
"OomKillDisable": false,
"PidsLimit": 0,
"Ulimits": null,
"CpuCount": 0,
"CpuPercent": 0,
"IOMaximumIOps": 0,
"IOMaximumBandwidth": 0
},
"GraphDriver": {
  "Name": "overlay2",
  "Data": {
    "LowerDir": "/var/lib/docker/overlay2/e76ced3011486d6ad85cd8e976334b2d134865e7bb1261c2c510144ae60c654f-init/diff:/var/lib/docker/overlay2/627a721401d91083bdefc3f3eed5f1117719ad9c2e88aa61d6ffae87bc0157e7/diff",
    "MergedDir":
"/var/lib/docker/overlay2/e76ced3011486d6ad85cd8e976334b2d134865e7bb1261c2c510144ae60c654f/merged",
    "UpperDir":
"/var/lib/docker/overlay2/e76ced3011486d6ad85cd8e976334b2d134865e7bb1261c2c510144ae60c654f/diff",
    "WorkDir":
"/var/lib/docker/overlay2/e76ced3011486d6ad85cd8e976334b2d134865e7bb1261c2c510144ae60c654f/work"
  }
},
"Mounts": [],
"Config": {
  "Hostname": "e4c5b88eb8da",
  "Domainname": "",
  "User": "",
  "AttachStdin": true,
  "AttachStdout": true,
  "AttachStderr": true,
  "Tty": true,
  "OpenStdin": true,
  "StdinOnce": true,
  "Env": [
    "PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"
  ],
  "Cmd": [
    "/bin/bash"
  ],
  "Image": "centos",
  "Volumes": null,
  "WorkingDir": "",
  "Entrypoint": null,
  "OnBuild": null,
  "Labels": {
    "org.label-schema.build-date": "20200611",
    "org.label-schema.license": "GPLv2",
    "org.label-schema.name": "CentOS Base Image",
    "org.label-schema.schema-version": "1.0",
    "org.label-schema.vendor": "CentOS"
  }
},
"NetworkSettings": {
  "Bridge": "",
  "SandboxID": "8dffccaf31c5f8c330b22b2c49ac47e1bb6cb4a4cfbe834348152cee0e2448c3",
  "HairpinMode": false,
  "LinkLocalIPv6Address": "",
  "LinkLocalIPv6PrefixLen": 0,
  "Ports": {},
  "SandboxKey": "/var/run/docker/netns/8dffccaf31c5",
  "SecondaryIPAddresses": null,
  "SecondaryIPv6Addresses": null,
  "EndpointID": "",
  "Gateway": "",
  "GlobalIPv6Address": "",
  "GlobalIPv6PrefixLen": 0,
  "IPAddress": "",
```

```
"IPPrefixLen": 0,
"IPv6Gateway": "",
"MacAddress": "",
"Networks": {
  "my-macvlan-net": {
    "IPAMConfig": null,
    "Links": null,
    "Aliases": [
      "e4c5b88eb8da"
    ],
    "NetworkID": "fdb965f0800bede8981af79e32e03f3a6caded6fc966171bce26f341a1b9eb7",
    "EndpointID": "f44aa90b7283334419c340b90dfeb1c466b312d11e20520b06548dee997d44ae",
    "Gateway": "10.10.50.1",
    "IPAddress": "10.10.50.2",
    "IPPrefixLen": 24,
    "IPv6Gateway": "",
    "GlobalIPv6Address": "",
    "GlobalIPv6PrefixLen": 0,
    "MacAddress": "02:42:0a:0a:32:02"
  }
}
}
```