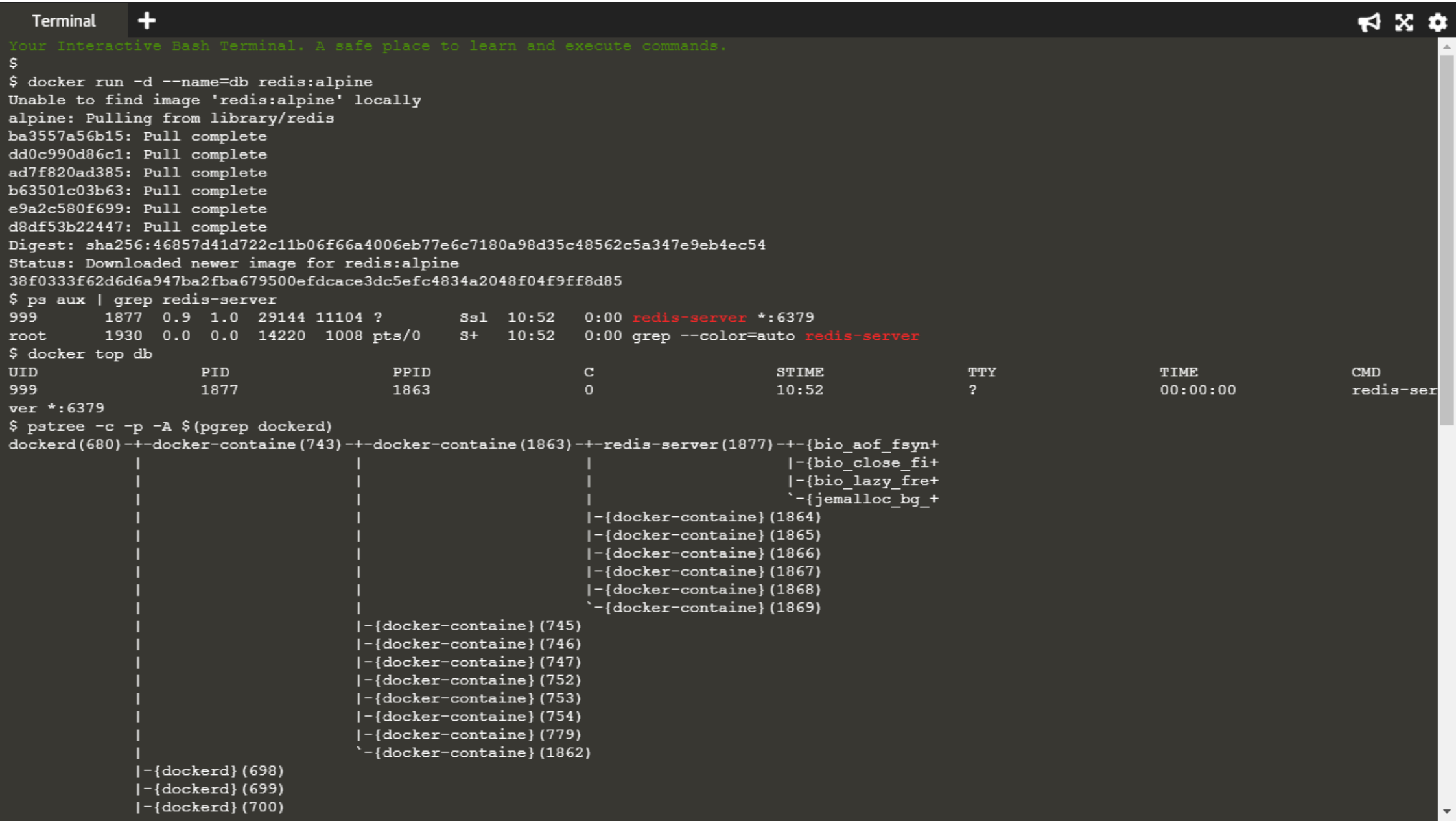
Terminal
Your Interactive Bash Terminal. A safe place to learn and execute commands.
$
$ docker run -d --name=db redis:alpine
Unable to find image 'redis:alpine' locally
alpine: Pulling from library/redis
ba3557a56b15: Pull complete
dd0c990d86c1: Pull complete
ad7f820ad385: Pull complete
b63501c03b63: Pull complete
e9a2c580f699: Pull complete
d8df53b22447: Pull complete
Digest: sha256:46857d41d722c11b06f66a4006eb77e6c7180a98d35c48562c5a347e9eb4ec54
Status: Downloaded newer image for redis:alpine
38f0333f62d6d6a947ba2fba679500efdcace3dc5efc4834a2048f04f9ff8d85
$ ps aux | grep redis-server
999 1877 0.9 1.0 29144 11104 ? Ssl 10:52 0:00 redis-server *:6379
root 1930 0.0 0.0 14220 1008 pts/0 S+ 10:52 0:00 grep --color=auto redis-server
$ docker top db
UID PID PPID C STIME TTY TIME CMD
999 1877 1863 0 10:52 ? 00:00:00 redis-server *:6379
$ pstree -c -p -A $(pgrep dockerd)
dockerd(680)-+-docker-containe(743)-+-docker-containe(1863)-+-redis-server(1877)-+-{bio_aof_fsyn+
|-{bio_close_fi+
|-{bio_lazy_fre+
`-{jemalloc_bg_+
|-{docker-containe}(1864)
|-{docker-containe}(1865)
|-{docker-containe}(1866)
|-{docker-containe}(1867)
|-{docker-containe}(1868)
`-{docker-containe}(1869)
|-{docker-containe}(745)
|-{docker-containe}(746)
|-{docker-containe}(747)
|-{docker-containe}(752)
|-{docker-containe}(753)
|-{docker-containe}(754)
|-{docker-containe}(779)
`-{docker-containe}(1862)
|-{dockerd}(698)
|-{dockerd}(699)
|-{dockerd}(700)

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```
            |-{dockerd}(744)
            |-{dockerd}(756)
            |-{dockerd}(757)
            |-{dockerd}(758)
            `-{dockerd}(1835)
$ DBPID=$(pgrep redis-server)
$ echo Redis is $DBPID
Redis is 1877
$ ls /proc
1    140  220  35   57   708  acpi         interrupts   misc          sysrq-trigger
10   15   23   36   58   715  buddyinfo    iomem        modules       sysvipc
11   16   232  4    59   718  bus          ioports      mounts        thread-self
12   166  24   436  593  72   cgroups      irq          mtrr          timer_list
124  167  2427 441  6    724  cmdline      kallsyms     net           timer_stats
125  17   25   448  60   726  consoles     kcore        pagetypeinfo  tty
126  18   26   463  61   743  cpuinfo      keys         partitions    uptime
127  1863 263  490  611  759  crypto       key-users    sched_debug   version
128  1877 27   494  62   766  devices      kmsg         schedstat     version_signature
129  19   28   5    63   8    diskstats    kpagecgroup  scsi          vmallocinfo
13   191  289  509  64   842  dma          kpagecount   self          vmstat
130  194  29   52   65   85   driver       kpageflags   slabinfo      zoneinfo
131  2    3    53   66   86   execdomains  loadavg      softirqs
132  20   32   54   678  87   fb           locks        stat
134  21   33   55   680  9    filesystems  mdstat       swaps
135  22   34   56   7    974  fs           meminfo      sys
$ ls /proc/$DBPID
attr        coredump_filter  gid_map    mountinfo   oom_score      schedstat  status
autogroup   cpuset           io         mounts      oom_score_adj  sessionid  syscall
auxv        cwd              limits     mountstats  pagemap        setgroups  task
cgroup      environ          loginuid   net         personality    smaps      timers
clear_refs  exe              map_files  ns          projid_map     stack      uid_map
cmdline     fd               maps       numa_maps   root           stat       wchan
comm        fdinfo           mem        oom_adj     sched          statm
$ cat /proc/$DBPID/environ
*:6379$ docker exec -it db env
PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
HOSTNAME=38f0333f62d6
TERM=xterm
REDIS_VERSION=6.2.1
REDIS_DOWNLOAD_URL=http://download.redis.io/releases/redis-6.2.1.tar.gz
REDIS_DOWNLOAD_SHA=cd222505012cce20b25682fca931ec93bd21ae92cb4abfe742cf7b76aa907520
HOME=/root
$
```

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```
HOME=/root
$ unshare --help

Usage:
 unshare [options] <program> [<argument>...]

Run a program with some namespaces unshared from the parent.

Options:
 -m, --mount[=<file>]      unshare mounts namespace
 -u, --uts[=<file>]        unshare UTS namespace (hostname etc)
 -i, --ipc[=<file>]        unshare System V IPC namespace
 -n, --net[=<file>]        unshare network namespace
 -p, --pid[=<file>]        unshare pid namespace
 -U, --user[=<file>]       unshare user namespace
 -f, --fork                fork before launching <program>
     --mount-proc[=<dir>]  mount proc filesystem first (implies --mount)
 -r, --map-root-user       map current user to root (implies --user)
     --propagation slave|shared|private|unchanged
                           modify mount propagation in mount namespace
 -s, --setgroups allow|deny  control the setgroups syscall in user namespaces

 -h, --help     display this help and exit
 -V, --version  output version information and exit

For more details see unshare(1).
$ sudo unshare --fork --pid --mount-proc bash
$ ps
  PID TTY          TIME CMD
    1 pts/0    00:00:00 bash
    9 pts/0    00:00:00 ps
$ exit
exit
$ ls -lha /proc/$DBPID/ns/
total 0
dr-x--x--x 2 999 packer 0 Mar 19 10:52 .
dr-xr-xr-x 9 999 packer 0 Mar 19 10:52 ..
lrwxrwxrwx 1 999 packer 0 Mar 19 11:08 cgroup -> cgroup:[4026531835]
lrwxrwxrwx 1 999 packer 0 Mar 19 10:52 ipc -> ipc:[4026532157]
lrwxrwxrwx 1 999 packer 0 Mar 19 10:52 mnt -> mnt:[4026532155]
lrwxrwxrwx 1 999 packer 0 Mar 19 10:52 net -> net:[4026532160]
lrwxrwxrwx 1 999 packer 0 Mar 19 10:52 pid -> pid:[4026532158]
lrwxrwxrwx 1 999 packer 0 Mar 19 10:52 user -> user:[4026531837]
```

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```
exit
$ ls -lha /proc/$DBPID/ns/
total 0
dr-x--x--x 2 999 packer 0 Mar 19 10:52 .
dr-xr-xr-x 9 999 packer 0 Mar 19 10:52 ..
lrwxrwxrwx 1 999 packer 0 Mar 19 11:08 cgroup -> cgroup:[4026531835]
lrwxrwxrwx 1 999 packer 0 Mar 19 10:52 ipc -> ipc:[4026532157]
lrwxrwxrwx 1 999 packer 0 Mar 19 10:52 mnt -> mnt:[4026532155]
lrwxrwxrwx 1 999 packer 0 Mar 19 10:52 net -> net:[4026532160]
lrwxrwxrwx 1 999 packer 0 Mar 19 10:52 pid -> pid:[4026532158]
lrwxrwxrwx 1 999 packer 0 Mar 19 10:52 user -> user:[4026531837]
lrwxrwxrwx 1 999 packer 0 Mar 19 10:52 uts -> uts:[4026532156]
$ nsenter --help

Usage:
 nsenter [options] <program> [<argument>...]

Run a program with namespaces of other processes.

Options:
 -t, --target <pid>     target process to get namespaces from
 -m, --mount[=<file>]   enter mount namespace
 -u, --uts[=<file>]     enter UTS namespace (hostname etc)
 -i, --ipc[=<file>]     enter System V IPC namespace
 -n, --net[=<file>]     enter network namespace
 -p, --pid[=<file>]     enter pid namespace
 -U, --user[=<file>]    enter user namespace
 -S, --setuid <uid>     set uid in entered namespace
 -G, --setgid <gid>     set gid in entered namespace
     --preserve-credentials do not touch uids or gids
 -r, --root[=<dir>]     set the root directory
 -w, --wd[=<dir>]       set the working directory
 -F, --no-fork          do not fork before exec'ing <program>
 -Z, --follow-context   set SELinux context according to --target PID

 -h, --help     display this help and exit
 -V, --version  output version information and exit

For more details see nsenter(1).
$ nsenter --target $DBPID --mount --uts --ipc --net --pid ps aux
PID   USER     TIME  COMMAND
    1 redis     0:05 redis-server *:6379
   18 root      0:00 ps aux
```

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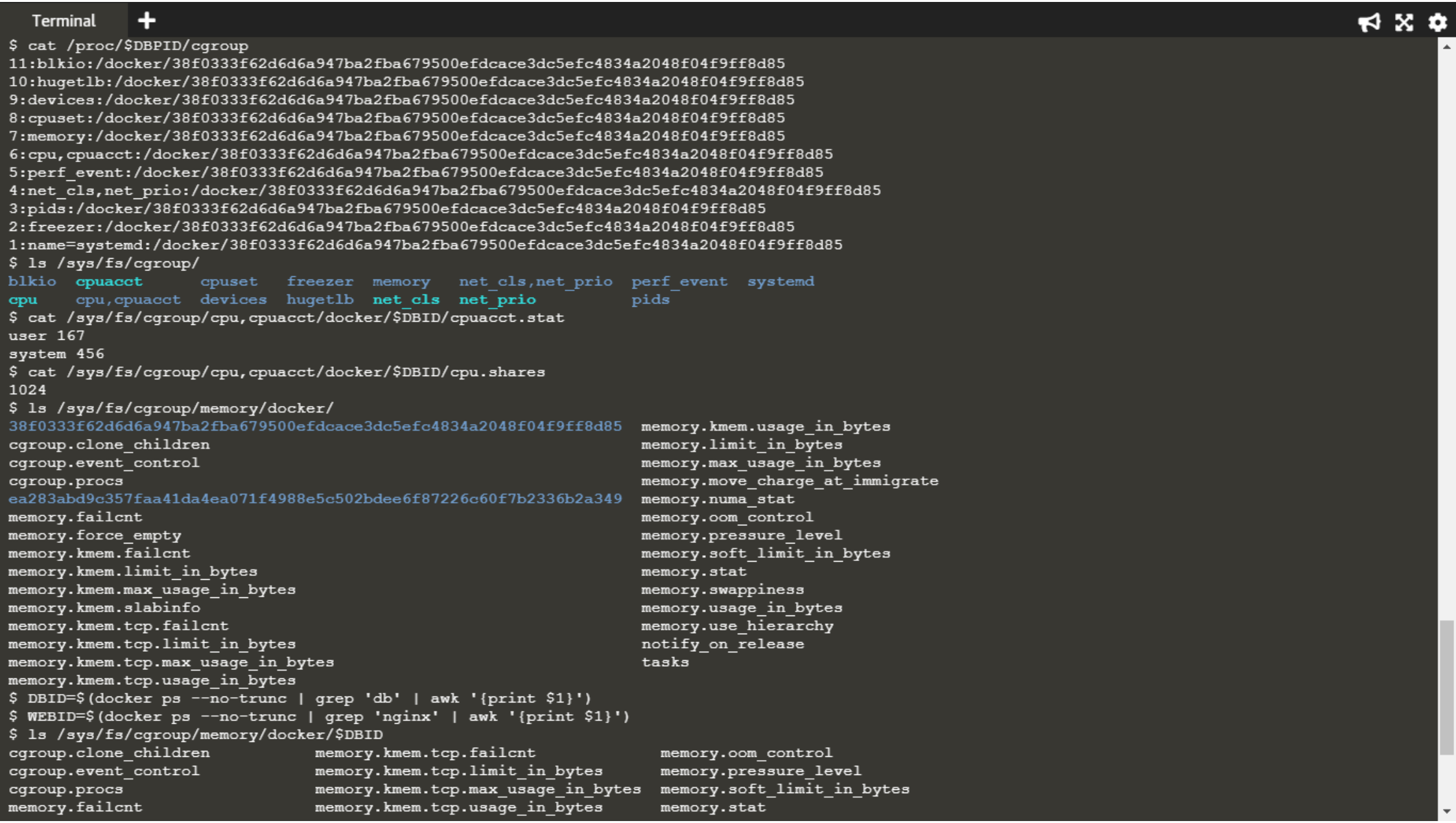
```
 -n, --net[=<file>]     enter network namespace
 -p, --pid[=<file>]     enter pid namespace
 -U, --user[=<file>]    enter user namespace
 -S, --setuid <uid>     set uid in entered namespace
 -G, --setgid <gid>     set gid in entered namespace
     --preserve-credentials do not touch uids or gids
 -r, --root[=<dir>]     set the root directory
 -w, --wd[=<dir>]       set the working directory
 -F, --no-fork          do not fork before exec'ing <program>
 -Z, --follow-context   set SELinux context according to --target PID

 -h, --help     display this help and exit
 -V, --version  output version information and exit

For more details see nsenter(1).
$ nsenter --target $DBPID --mount --uts --ipc --net --pid ps aux
PID   USER     TIME  COMMAND
    1 redis      0:05 redis-server *:6379
   18 root       0:00 ps aux
$ docker run -d --name=web --net=container:db nginx:alpine
Unable to find image 'nginx:alpine' locally
alpine: Pulling from library/nginx
ba3557a56b15: Already exists
468d8ccebf7a: Pull complete
b7f67c5d6ce9: Pull complete
ed91f01a4fcb: Pull complete
8051568c89ac: Pull complete
5b4dcb4d3646: Pull complete
Digest: sha256:e20c21e530f914fb6a95a755924b1cbf71f039372e94ac5ddcf8c3b386a44615
Status: Downloaded newer image for nginx:alpine
ea283abd9c357faa41da4ea071f4988e5c502bdee6f87226c60f7b2336b2a349
$ WEBPID=$(pgrep nginx | tail -n1)
$ echo nginx is $WEBPID
nginx is
$ cat /proc/$WEBPID/cgroup
cat: /proc//cgroup: No such file or directory
$ ls -lha /proc/$WEBPID/ns/
ls: cannot access '/proc//ns/': No such file or directory
$ ls -lha /proc/$WEBPID/ns/ | grep net
ls: cannot access '/proc//ns/': No such file or directory
$ ls -lha /proc/$DBPID/ns/ | grep net
lrwxrwxrwx 1 999 packer 0 Mar 19 10:52 net -> net:[4026532160]
$
```


Terminal
$ cat /proc/$DBPID/cgroup
11:blkio:/docker/38f0333f62d6d6a947ba2fba679500efdcace3dc5efc4834a2048f04f9ff8d85
10:hugetlb:/docker/38f0333f62d6d6a947ba2fba679500efdcace3dc5efc4834a2048f04f9ff8d85
9:devices:/docker/38f0333f62d6d6a947ba2fba679500efdcace3dc5efc4834a2048f04f9ff8d85
8:cpuset:/docker/38f0333f62d6d6a947ba2fba679500efdcace3dc5efc4834a2048f04f9ff8d85
7:memory:/docker/38f0333f62d6d6a947ba2fba679500efdcace3dc5efc4834a2048f04f9ff8d85
6:cpu,cpuacct:/docker/38f0333f62d6d6a947ba2fba679500efdcace3dc5efc4834a2048f04f9ff8d85
5:perf_event:/docker/38f0333f62d6d6a947ba2fba679500efdcace3dc5efc4834a2048f04f9ff8d85
4:net_cls,net_prio:/docker/38f0333f62d6d6a947ba2fba679500efdcace3dc5efc4834a2048f04f9ff8d85
3:pids:/docker/38f0333f62d6d6a947ba2fba679500efdcace3dc5efc4834a2048f04f9ff8d85
2:freezer:/docker/38f0333f62d6d6a947ba2fba679500efdcace3dc5efc4834a2048f04f9ff8d85
1:name=systemd:/docker/38f0333f62d6d6a947ba2fba679500efdcace3dc5efc4834a2048f04f9ff8d85
$ ls /sys/fs/cgroup/
blkio cpuacct cpuset freezer memory net_cls,net_prio perf_event systemd
cpu cpu,cpuacct devices hugetlb net_cls net_prio pids
$ cat /sys/fs/cgroup/cpu,cpuacct/docker/$DBID/cpuacct.stat
user 167
system 456
$ cat /sys/fs/cgroup/cpu,cpuacct/docker/$DBID/cpu.shares
1024
$ ls /sys/fs/cgroup/memory/docker/
38f0333f62d6d6a947ba2fba679500efdcace3dc5efc4834a2048f04f9ff8d85 memory.kmem.usage_in_bytes
cgroup.clone_children memory.limit_in_bytes
cgroup.event_control memory.max_usage_in_bytes
cgroup.procs memory.move_charge_at_immigrate
ea283abd9c357faa41da4ea071f4988e5c502bdee6f87226c60f7b2336b2a349 memory.numa_stat
memory.failcnt memory.oom_control
memory.force_empty memory.pressure_level
memory.kmem.failcnt memory.soft_limit_in_bytes
memory.kmem.limit_in_bytes memory.stat
memory.kmem.max_usage_in_bytes memory.swappiness
memory.kmem.slabinfo memory.usage_in_bytes
memory.kmem.tcp.failcnt memory.use_hierarchy
memory.kmem.tcp.limit_in_bytes notify_on_release
memory.kmem.tcp.max_usage_in_bytes tasks
memory.kmem.tcp.usage_in_bytes
$ DBID=$(docker ps --no-trunc | grep 'db' | awk '{print $1}')
$ WEBID=$(docker ps --no-trunc | grep 'nginx' | awk '{print $1}')
$ ls /sys/fs/cgroup/memory/docker/$DBID
cgroup.clone_children memory.kmem.tcp.failcnt memory.oom_control
cgroup.event_control memory.kmem.tcp.limit_in_bytes memory.pressure_level
cgroup.procs memory.kmem.tcp.max_usage_in_bytes memory.soft_limit_in_bytes
memory.failcnt memory.kmem.tcp.usage_in_bytes memory.stat

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```
$ cat /sys/fs/cgroup/cpu,cpuacct/docker/$DBID/cpuacct.stat
user 167
system 456
$ cat /sys/fs/cgroup/cpu,cpuacct/docker/$DBID/cpu.shares
1024
$ ls /sys/fs/cgroup/memory/docker/
38f0333f62d6d6a947ba2fba679500efdcace3dc5efc4834a2048f04f9ff8d85  memory.kmem.usage_in_bytes
cgroup.clone_children                                            memory.limit_in_bytes
cgroup.event_control                                             memory.max_usage_in_bytes
cgroup.procs                                                     memory.move_charge_at_immigrate
ea283abd9c357faa41da4ea071f4988e5c502bdee6f87226c60f7b2336b2a349  memory.numa_stat
memory.failcnt                                                   memory.oom_control
memory.force_empty                                               memory.pressure_level
memory.kmem.failcnt                                              memory.soft_limit_in_bytes
memory.kmem.limit_in_bytes                                       memory.stat
memory.kmem.max_usage_in_bytes                                   memory.swappiness
memory.kmem.slabinfo                                             memory.usage_in_bytes
memory.kmem.tcp.failcnt                                          memory.use_hierarchy
memory.kmem.tcp.limit_in_bytes                                   notify_on_release
memory.kmem.tcp.max_usage_in_bytes                               tasks
memory.kmem.tcp.usage_in_bytes
$ DBID=$(docker ps --no-trunc | grep 'db' | awk '{print $1}')
$ WEBID=$(docker ps --no-trunc | grep 'nginx' | awk '{print $1}')
$ ls /sys/fs/cgroup/memory/docker/$DBID
cgroup.clone_children           memory.kmem.tcp.failcnt             memory.oom_control
cgroup.event_control            memory.kmem.tcp.limit_in_bytes      memory.pressure_level
cgroup.procs                    memory.kmem.tcp.max_usage_in_bytes  memory.soft_limit_in_bytes
memory.failcnt                  memory.kmem.tcp.usage_in_bytes      memory.stat
memory.force_empty              memory.kmem.usage_in_bytes          memory.swappiness
memory.kmem.failcnt             memory.limit_in_bytes               memory.usage_in_bytes
memory.kmem.limit_in_bytes      memory.max_usage_in_bytes           memory.use_hierarchy
memory.kmem.max_usage_in_bytes  memory.move_charge_at_immigrate     notify_on_release
memory.kmem.slabinfo            memory.numa_stat                    tasks
$ docker stats db --no-stream
CONTAINER ID        NAME                CPU %               MEM USAGE / LIMIT     MEM %               NET I/O             BLOCK I/O           PIDS
38f0333f62d6        db                  0.60%               6.758MiB / 992.1MiB   0.68%               1.3kB / 0B          0B / 0B             5
$ echo 8000000 > /sys/fs/cgroup/memory/docker/$DBID/memory.limit_in_bytes
$ cat /sys/fs/cgroup/memory/docker/$DBID/memory.limit_in_bytes
7999488
$ docker stats db --no-stream
CONTAINER ID        NAME                CPU %               MEM USAGE / LIMIT     MEM %               NET I/O             BLOCK I/O           PIDS
38f0333f62d6        db                  0.42%               6.758MiB / 7.629MiB   88.58%              1.3kB / 0B          0B / 0B             5
$
```

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```
$ cat /proc/$DBPID/attr/current
docker-default (enforce)
$ cat /proc/$DBPID/status
Name:   redis-server
State:  S (sleeping)
Tgid:   1877
Ngid:   0
Pid:    1877
PPid:   1863
TracerPid:      0
Uid:    999     999     999     999
Gid:    1000    1000    1000    1000
FDSize: 64
Groups: 1000 1000
NStgid: 1877    1
NSpid:  1877    1
NSpgid: 1877    1
NSsid:  1877    1
VmPeak:    29144 kB
VmSize:    29144 kB
VmLck:         0 kB
VmPin:         0 kB
VmHWM:     11104 kB
VmRSS:     11104 kB
VmData:    23204 kB
VmStk:       132 kB
VmExe:      1660 kB
VmLib:      1656 kB
VmPTE:        60 kB
VmPMD:        12 kB
VmSwap:        0 kB
HugetlbPages:          0 kB
Threads:        5
SigQ:   0/3824
SigPnd: 0000000000000000
ShdPnd: 0000000000000000
SigBlk: 0000000000000000
SigIgn: 0000000000001001
SigCgt: 00000000000044ea
CapInh: 00000000a80425fb
CapPrm: 0000000000000000
CapEff: 0000000000000000
CapBnd: 00000000a80425fb
```

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```
Gid:    1000    1000    1000    1000
FDSize: 64
Groups: 1000 1000
NStgid: 1877    1
NSpid:  1877    1
NSpgid: 1877    1
NSsid:  1877    1
VmPeak:    29144 kB
VmSize:    29144 kB
VmLck:         0 kB
VmPin:         0 kB
VmHWM:     11104 kB
VmRSS:     11104 kB
VmData:    23204 kB
VmStk:       132 kB
VmExe:      1660 kB
VmLib:      1656 kB
VmPTE:        60 kB
VmPMD:        12 kB
VmSwap:        0 kB
HugetlbPages:          0 kB
Threads:        5
SigQ:   0/3824
SigPnd: 0000000000000000
ShdPnd: 0000000000000000
SigBlk: 0000000000000000
SigIgn: 0000000000001001
SigCgt: 00000000000044ea
CapInh: 00000000a80425fb
CapPrm: 0000000000000000
CapEff: 0000000000000000
CapBnd: 00000000a80425fb
CapAmb: 0000000000000000
Seccomp:        2
Cpus_allowed:   3
Cpus_allowed_list:      0-1
Mems_allowed:   00000000,00000001
Mems_allowed_list:      0
voluntary_ctxt_switches:        11510
nonvoluntary_ctxt_switches:     280
$ cat /proc/$DBPID/status | grep Seccomp
Seccomp:        2
$
```

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```
VmLck:         0 kB
VmPin:         0 kB
VmHWM:     11104 kB
VmRSS:     11104 kB
VmData:    23204 kB
VmStk:       132 kB
VmExe:      1660 kB
VmLib:      1656 kB
VmPTE:        60 kB
VmPMD:        12 kB
VmSwap:        0 kB
HugetlbPages:          0 kB
Threads:        5
SigQ:   0/3824
SigPnd: 0000000000000000
ShdPnd: 0000000000000000
SigBlk: 0000000000000000
SigIgn: 0000000000001001
SigCgt: 00000000000044ea
CapInh: 00000000a80425fb
CapPrm: 0000000000000000
CapEff: 0000000000000000
CapBnd: 00000000a80425fb
CapAmb: 0000000000000000
Seccomp:        2
Cpus_allowed:   3
Cpus_allowed_list:      0-1
Mems_allowed:   00000000,00000001
Mems_allowed_list:      0
voluntary_ctxt_switches:        11510
nonvoluntary_ctxt_switches:     280
$ cat /proc/$DBPID/status | grep Seccomp
Seccomp:        2
$ cat /proc/$DBPID/status | grep ^Cap
CapInh: 00000000a80425fb
CapPrm: 0000000000000000
CapEff: 0000000000000000
CapBnd: 00000000a80425fb
CapAmb: 0000000000000000
$ capsh --decode=00000000a80425fb
0x00000000a80425fb=cap_chown,cap_dac_override,cap_fowner,cap_fsetid,cap_kill,cap_setgid,cap_setuid,cap_setpcap,cap_net_bind_service,cap_net_raw,cap_s
ys_chroot,cap_mknod,cap_audit_write,cap_setfcap
$
```