Docker run

(Running with Default)

```
(base) λ ~/.aws/ docker run busybox
Unable to find image 'busybox:latest' locally
latest: Pulling from library/busybox
9c075fe2c773: Pull complete
Digest:
sha256:c3dbcbbf6261c620d133312aee9e858b45e1b686efbcead7b34d9aae58a37378
Status: Downloaded newer image for busybox:latest
(base) λ ~/.aws/
```
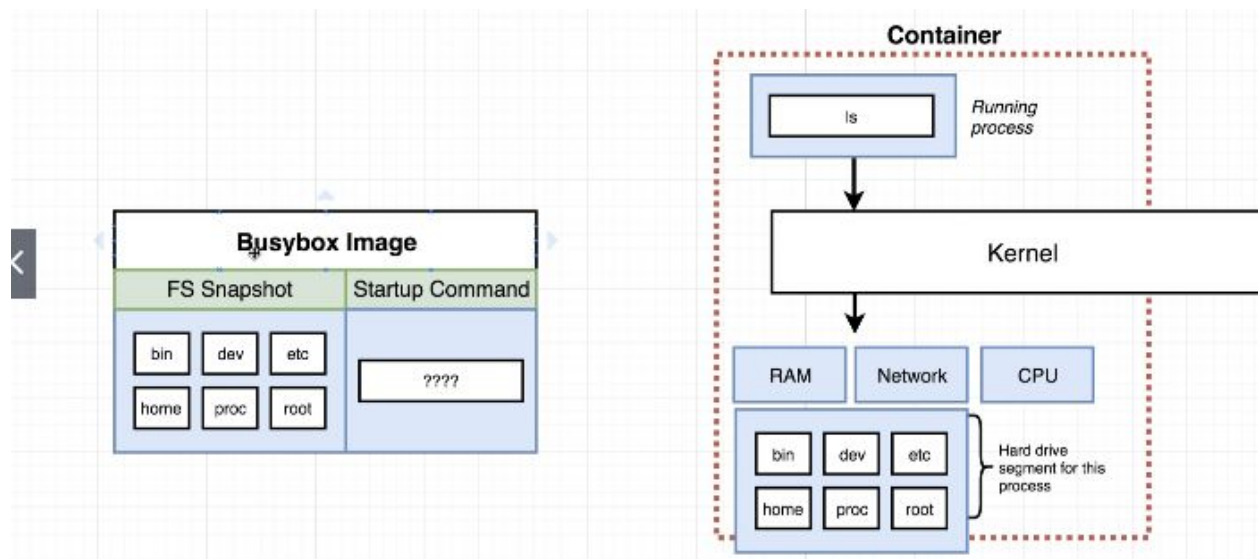
(Overriding Default Command)

```
(base) λ ~/.aws/ docker run busybox echo hi there
hi there
(base) λ ~/.aws/ docker run busybox echo by there
by there
(base) λ ~/.aws/
```

(overriding with ls)

```
(base) λ ~/.aws/ docker run busybox ls
bin
dev
etc
home
proc
root
sys
tmp
usr
var
(base) λ ~/.aws/
```

Example Architecture

Example commands that will not execute correctly.
(must exist within the filesystem snapshot)

```
(base) λ ~/.aws/ docker run hello-world ls
docker: Error response from daemon: OCI runtime create failed:
container_linux.go:349: starting container process caused "exec: \"ls\": executable
file not found in $PATH": unknown.
(base) λ ~/.aws/ docker run hello-world hi there
docker: Error response from daemon: OCI runtime create failed:
container_linux.go:349: starting container process caused "exec: \"hi\": executable
file not found in $PATH": unknown.
ERRO[0000] error waiting for container: context canceled
(base) λ ~/.aws/
```

List running containers

(no containers running)

```
(base) λ ~/.aws/ docker ps
CONTAINER ID          IMAGE               COMMAND              CREATED
STATUS                PORTS               NAMES
```

```
(base) λ ~/.aws/
```

Create Container the remains running instead of quickly executing and shutting down

```
(base) λ ~/.aws/ docker run busybox ping google.com
PING google.com (64.233.177.138): 56 data bytes
64 bytes from 64.233.177.138: seq=0 ttl=37 time=18.978 ms
64 bytes from 64.233.177.138: seq=1 ttl=37 time=24.430 ms
64 bytes from 64.233.177.138: seq=2 ttl=37 time=19.849 ms
64 bytes from 64.233.177.138: seq=3 ttl=37 time=21.725 ms
64 bytes from 64.233.177.138: seq=4 ttl=37 time=17.620 ms
64 bytes from 64.233.177.138: seq=5 ttl=37 time=14.487 ms
64 bytes from 64.233.177.138: seq=6 ttl=37 time=13.875 ms
64 bytes from 64.233.177.138: seq=7 ttl=37 time=13.858 ms
64 bytes from 64.233.177.138: seq=8 ttl=37 time=19.098 ms
64 bytes from 64.233.177.138: seq=9 ttl=37 time=17.490 ms
64 bytes from 64.233.177.138: seq=10 ttl=37 time=32.735 ms
```

```
(base) λ ~/.aws/ docker ps
CONTAINER ID        IMAGE            COMMAND              CREATED
STATUS              PORTS            NAMES
74cfdf3d91bf        busybox            "ping google.com"   About a minute ago    Up
About a minute                        dazzling_jennings
(base) λ ~/.aws/
```

(see all containers that have ever executed on machine)

```
(base) λ ~/.aws/ docker ps --all
CONTAINER ID        IMAGE            COMMAND              CREATED
STATUS                     PORTS              NAMES
74cfdf3d91bf        busybox          "ping google.com"   4 minutes ago
Exited (0) About a minute ago              dazzling_jennings
58e1213b3a6b        hello-world      "hi there"          14 minutes ago
Created                                    trusting_dijkstra
556d4f9ef26f        hello-world      "ls"                14 minutes ago
Created                                    mystifying_ride
e768082a36ce        busybox          "ls"                17 minutes ago
Exited (0) 17 minutes ago                  elegant_franklin
9f60663211ee        busybox          "echo by there"     19 minutes ago
Exited (0) 19 minutes ago                  confident_nobel
39954a72f5a2        busybox          "echo hi there"     19 minutes ago
Exited (0) 19 minutes ago                  intelligent_kilby
```

```
95ab1e827a6d          busybox              "sh"                  21 minutes ago
Exited (0) 21 minutes ago                          agitated_archimedes
64d3411aa0e4          hello-world          "/hello"              About an hour ago
Exited (0) About an hour ago                       boring_poitras
(base) λ ~/.aws/
```

Container Lifecycle
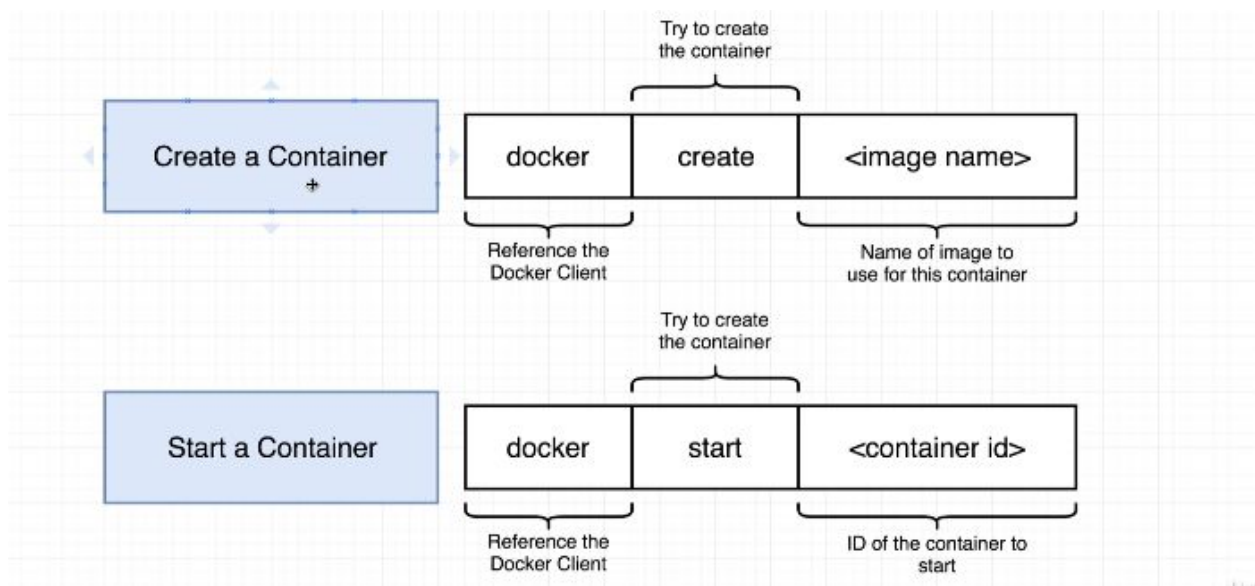

```
(base) λ ~/.aws/ docker create hello-world
a3c89ca46906d59a0e9c7b46e92548704948e26f61e2920bd2bd026a20bda992
(base) λ ~/.aws/ docker start -a
a3c89ca46906d59a0e9c7b46e92548704948e26f61e2920bd2bd026a20bda992

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
 4. The Docker daemon streamed that output to the Docker client, which sent it
    to your terminal.
```

```
To try something more ambitious, you can run an Ubuntu container with:
 $ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
 https://hub.docker.com/

For more examples and ideas, visit:
 https://docs.docker.com/get-started/

(base) λ ~/.aws/
```

-docker start -a watch for output and print to terminal

```
(base) λ ~/.aws/ docker start
a3c89ca46906d59a0e9c7b46e92548704948e26f61e2920bd2bd026a20bda992
a3c89ca46906d59a0e9c7b46e92548704948e26f61e2920bd2bd026a20bda992
(base) λ ~/.aws/
```

```
(base) λ ~/.aws/ docker start -a
a3c89ca46906d59a0e9c7b46e92548704948e26f61e2920bd2bd026a20bda992

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
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    to your terminal.

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```

Restarting Stopped Containers

```
(base) λ ~/.aws/ docker ps --all
CONTAINER ID        IMAGE              COMMAND               CREATED
STATUS                        PORTS              NAMES
a3c89ca46906        hello-world        "/hello"              10 minutes ago
Exited (0) 8 minutes ago                         clever_greider
74cfdf3d91bf        busybox            "ping google.com"   20 minutes ago
Exited (0) 17 minutes ago                        dazzling_jennings
58e1213b3a6b        hello-world        "hi there"            30 minutes ago
Created                                          trusting_dijkstra
556d4f9ef26f        hello-world        "ls"                  30 minutes ago
Created                                          mystifying_ride
e768082a36ce        busybox            "ls"                  33 minutes ago
Exited (0) 33 minutes ago                        elegant_franklin
9f60663211ee        busybox            "echo by there"      35 minutes ago
Exited (0) 35 minutes ago                        confident_nobel
39954a72f5a2        busybox            "echo hi there"      35 minutes ago
Exited (0) 35 minutes ago                        intelligent_kilby
95ab1e827a6d        busybox            "sh"                  37 minutes ago
Exited (0) 37 minutes ago                        agitated_archimedes
64d3411aa0e4        hello-world        "/hello"              2 hours ago
Exited (0) 2 hours ago                           boring_poitras
(base) λ ~/.aws/
```

(can start a container that was stopped at any time in the past)

```
(base) λ ~/.aws/ docker start -a 64d3411aa0e4

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
 4. The Docker daemon streamed that output to the Docker client, which sent it
    to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
 $ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
 https://hub.docker.com/
```

```
For more examples and ideas, visit:
 https://docs.docker.com/get-started/

(base) λ ~/.aws/
```

(When executing a container again you cannot override the default command saved from the last run)

```
(base) λ ~/.aws/ docker start -a 39954a72f5a2
hi there
(base) λ ~/.aws/ docker start -a 39954a72f5a2  echo hello
you cannot start and attach multiple containers at once
(base) λ ~/.aws/
```

Removing stopped containers

```
(base) λ ~/.aws/ docker ps -all
CONTAINER ID        IMAGE              COMMAND            CREATED
STATUS                        PORTS            NAMES
a3c89ca46906        hello-world        "/hello"           27 minutes ago
Exited (0) 25 minutes ago                  clever_greider
(base) λ ~/.aws/ docker ps --all
CONTAINER ID        IMAGE              COMMAND            CREATED
STATUS                        PORTS            NAMES
a3c89ca46906        hello-world        "/hello"           27 minutes ago
Exited (0) 25 minutes ago                  clever_greider
74cfdf3d91bf        busybox            "ping google.com"   38 minutes ago
Exited (0) 34 minutes ago                  dazzling_jennings
58e1213b3a6b        hello-world        "hi there"         47 minutes ago
Created                                    trusting_dijkstra
556d4f9ef26f        hello-world        "ls"               48 minutes ago
Created                                    mystifying_ride
e768082a36ce        busybox            "ls"               51 minutes ago
Exited (0) 51 minutes ago                  elegant_franklin
9f60663211ee        busybox            "echo by there"     52 minutes ago
Exited (0) 52 minutes ago                  confident_nobel
39954a72f5a2        busybox            "echo hi there"     53 minutes ago
Exited (0) 13 minutes ago                  intelligent_kilby
95ab1e827a6d        busybox            "sh"               55 minutes ago
Exited (0) 55 minutes ago                  agitated_archimedes
64d3411aa0e4        hello-world        "/hello"           2 hours ago
Exited (0) 16 minutes ago                  boring_poitras
(base) λ ~/.aws/ docker system prune
WARNING! This will remove:
  - all stopped containers
```

```
  - all networks not used by at least one container
  - all dangling images
  - all dangling build cache

Are you sure you want to continue? [y/N] y
Deleted Containers:
a3c89ca46906d59a0e9c7b46e92548704948e26f61e2920bd2bd026a20bda992
74cfdf3d91bff9339719513c0cf2c05eb94394c830230c7540c3f6367b4efac4
58e1213b3a6b420e14e42c506c9b4e41dc3b7b0612b94dec2402c3643c3eefdb
556d4f9ef26f4fe5fe6bcd5eeee03115070ca743e10bf14d6fd7d3a67ff8e216
e768082a36ce957a12dd098a4f4f34fea09fd07b26d25f5efde0b9a4b0c410ec
9f60663211ee1bb69e7b513bbcc29a142c458b9985f43eefb0010221038fcc5d
39954a72f5a2ed3c2b9f33c464d325551c639b929a1e43e1d18153a1480b5849
95ab1e827a6db4a8b3a59af610dd85b205ee687e3d5f6580b974e032a468bc0c
64d3411aa0e46585c4737f380e2452dc4096e7fcf4c2654ece25330c2f444744


Total reclaimed space: 0B
(base) λ ~/.aws/ docker ps --all
CONTAINER ID       IMAGE              COMMAND              CREATED
STATUS             PORTS              NAMES
(base) λ ~/.aws/
```
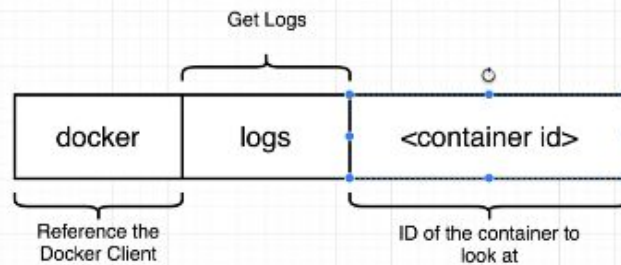
Retrieving Log Outputs

```
(base) λ ~/.aws/ docker create busybox echo hi there
730769a981e2703ce8831b0618b4395b8176e94ed907fc68662fe5865398ef34
(base) λ ~/.aws/ docker start
730769a981e2703ce8831b0618b4395b8176e94ed907fc68662fe5865398ef34
730769a981e2703ce8831b0618b4395b8176e94ed907fc68662fe5865398ef34
(base) λ ~/.aws/ docker start -a
730769a981e2703ce8831b0618b4395b8176e94ed907fc68662fe5865398ef34
hi there
(base) λ ~/.aws/
```

(Viewing Docker Logs)

Get logs from a container

Get Logs

| docker | logs | <container id> |

Reference the Docker Client

ID of the container to look at

```
(base) λ ~/.aws/ docker create busybox echo hi there
730769a981e2703ce8831b0618b4395b8176e94ed907fc68662fe5865398ef34
(base) λ ~/.aws/ docker start
730769a981e2703ce8831b0618b4395b8176e94ed907fc68662fe5865398ef34
730769a981e2703ce8831b0618b4395b8176e94ed907fc68662fe5865398ef34
(base) λ ~/.aws/ docker start -a
730769a981e2703ce8831b0618b4395b8176e94ed907fc68662fe5865398ef34
hi there
(base) λ ~/.aws/ docker create busybox echo hi there
2acfaa67c20be22358197ac2eb4aa6cf7baaaedead2b4e10016f1ca60e50d961
(base) λ ~/.aws/ docker start
2acfaa67c20be22358197ac2eb4aa6cf7baaaedead2b4e10016f1ca60e50d961
2acfaa67c20be22358197ac2eb4aa6cf7baaaedead2b4e10016f1ca60e50d961
(base) λ ~/.aws/ docker logs
2acfaa67c20be22358197ac2eb4aa6cf7baaaedead2b4e10016f1ca60e50d961
hi there
(base) λ ~/.aws/
```

Stopping Containers

Stop a Container	docker	stop	<container id>

Kill a Container	docker	kill	<container id>
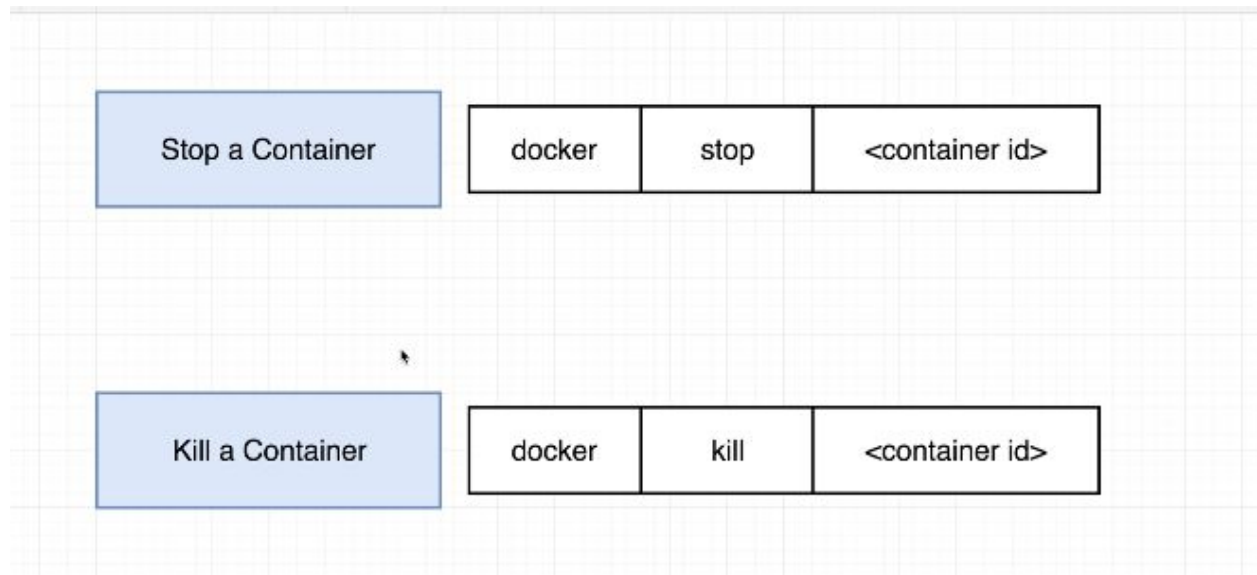
Stop container with docker stop unless it is not responding then use kill. If docker stop does not work docker will automatically use docker kill. ping is an example of this.

```
(base) λ ~/.aws/ docker create busybox ping google.com
a106e4ef442a0a8e9ca043438a6bb41b2bcd7d9bfc77796ea35affb5cc2b3ac3
(base) λ ~/.aws/ docker start
a106e4ef442a0a8e9ca043438a6bb41b2bcd7d9bfc77796ea35affb5cc2b3ac3
a106e4ef442a0a8e9ca043438a6bb41b2bcd7d9bfc77796ea35affb5cc2b3ac3
(base) λ ~/.aws/ docker logs
a106e4ef442a0a8e9ca043438a6bb41b2bcd7d9bfc77796ea35affb5cc2b3ac3
PING google.com (64.233.177.113): 56 data bytes
64 bytes from 64.233.177.113: seq=0 ttl=37 time=18.280 ms
64 bytes from 64.233.177.113: seq=1 ttl=37 time=23.617 ms
64 bytes from 64.233.177.113: seq=2 ttl=37 time=14.385 ms
64 bytes from 64.233.177.113: seq=3 ttl=37 time=19.549 ms
64 bytes from 64.233.177.113: seq=4 ttl=37 time=19.436 ms
64 bytes from 64.233.177.113: seq=5 ttl=37 time=20.483 ms
64 bytes from 64.233.177.113: seq=6 ttl=37 time=13.453 ms
64 bytes from 64.233.177.113: seq=7 ttl=37 time=12.611 ms
64 bytes from 64.233.177.113: seq=8 ttl=37 time=25.080 ms
64 bytes from 64.233.177.113: seq=9 ttl=37 time=20.445 ms
64 bytes from 64.233.177.113: seq=10 ttl=37 time=18.947 ms
64 bytes from 64.233.177.113: seq=11 ttl=37 time=17.494 ms
(base) λ ~/.aws/ docker ps
CONTAINER ID        IMAGE                  COMMAND                 CREATED
STATUS              PORTS                  NAMES
a106e4ef442a        busybox                 "ping google.com"   26 seconds ago      Up
16 seconds                                  hungry_moser
(base) λ ~/.aws/ docker stop
```

```
a106e4ef442a0a8e9ca043438a6bb41b2bcd7d9bfc77796ea35affb5cc2b3ac3
a106e4ef442a0a8e9ca043438a6bb41b2bcd7d9bfc77796ea35affb5cc2b3ac3
```

```
(base) λ ~/.aws/ docker ps
CONTAINER ID        IMAGE             COMMAND             CREATED
STATUS              PORTS             NAMES
(base) λ ~/.aws/ docker start
a106e4ef442a0a8e9ca043438a6bb41b2bcd7d9bfc77796ea35affb5cc2b3ac3
a106e4ef442a0a8e9ca043438a6bb41b2bcd7d9bfc77796ea35affb5cc2b3ac3
(base) λ ~/.aws/ docker ps
CONTAINER ID        IMAGE             COMMAND             CREATED
STATUS              PORTS             NAMES
a106e4ef442a        busybox           "ping google.com"   7 minutes ago       Up
4 seconds                             hungry_moser
(base) λ ~/.aws/ docker kill
a106e4ef442a0a8e9ca043438a6bb41b2bcd7d9bfc77796ea35affb5cc2b3ac3
a106e4ef442a0a8e9ca043438a6bb41b2bcd7d9bfc77796ea35affb5cc2b3ac3
(base) λ ~/.aws/ docker ps
CONTAINER ID        IMAGE             COMMAND             CREATED
STATUS              PORTS             NAMES
(base) λ ~/.aws/
```
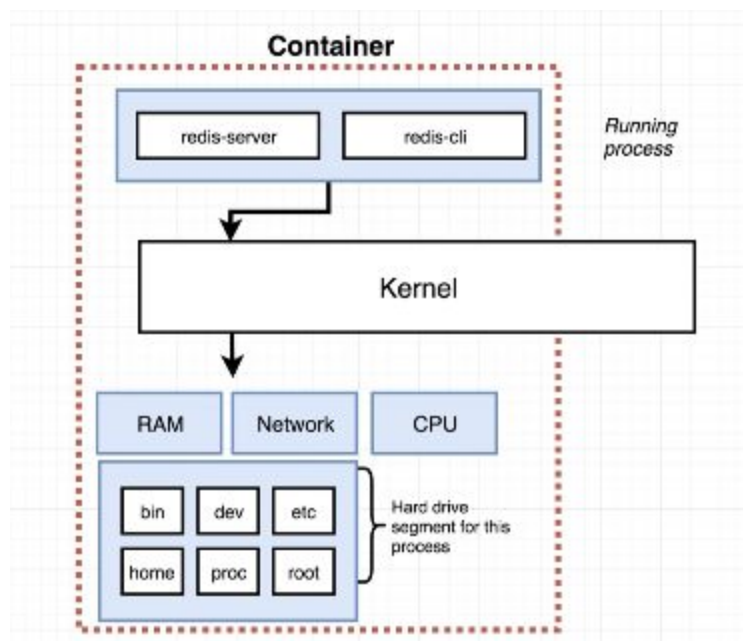
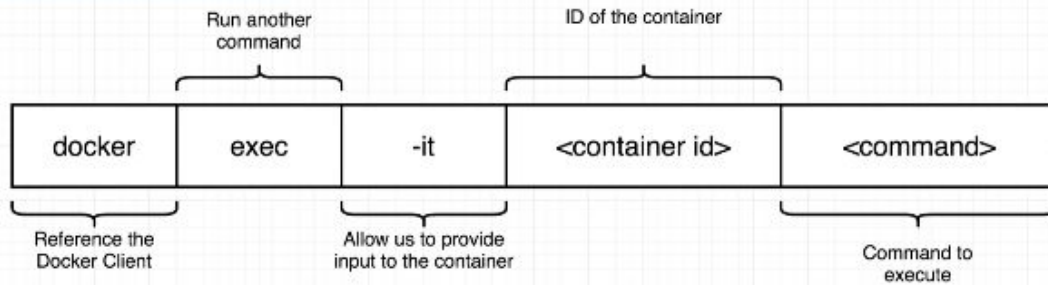## **Multi-Command Containers**

(Setup Redis server)

```
(base) λ ~/.aws/ docker run redis
Unable to find image 'redis:latest' locally
latest: Pulling from library/redis
bf5952930446: Pull complete
911b8422b695: Pull complete
093b947e0ade: Pull complete
c7616728f575: Pull complete
61a55f107028: Pull complete
0ee3e0cb4e07: Pull complete
Digest: sha256:933c6c01829165885ea8468d87f71127b1cb76a711311e6c63708097e92ee3d1
Status: Downloaded newer image for redis:latest
1:C 07 Sep 2020 23:31:25.546 # oO0OoO0OoO0Oo Redis is starting oO0OoO0OoO0Oo
1:C 07 Sep 2020 23:31:25.546 # Redis version=6.0.7, bits=64, commit=00000000,
modified=0, pid=1, just started
1:C 07 Sep 2020 23:31:25.546 # Warning: no config file specified, using the default
config. In order to specify a config file use redis-server /path/to/redis.conf
```

```
1:M 07 Sep 2020 23:31:25.547 * Running mode=standalone, port=6379.
1:M 07 Sep 2020 23:31:25.547 # WARNING: The TCP backlog setting of 511 cannot be
enforced because /proc/sys/net/core/somaxconn is set to the lower value of 128.
1:M 07 Sep 2020 23:31:25.547 # Server initialized
1:M 07 Sep 2020 23:31:25.547 # WARNING you have Transparent Huge Pages (THP)
support enabled in your kernel. This will create latency and memory usage issues
with Redis. To fix this issue run the command 'echo never >
/sys/kernel/mm/transparent_hugepage/enabled' as root, and add it to your
/etc/rc.local in order to retain the setting after a reboot. Redis must be
restarted after THP is disabled.
1:M 07 Sep 2020 23:31:25.548 * Ready to accept connections
```

Need to execute a second service inside of the container to connect to Redis server like the below diagram.
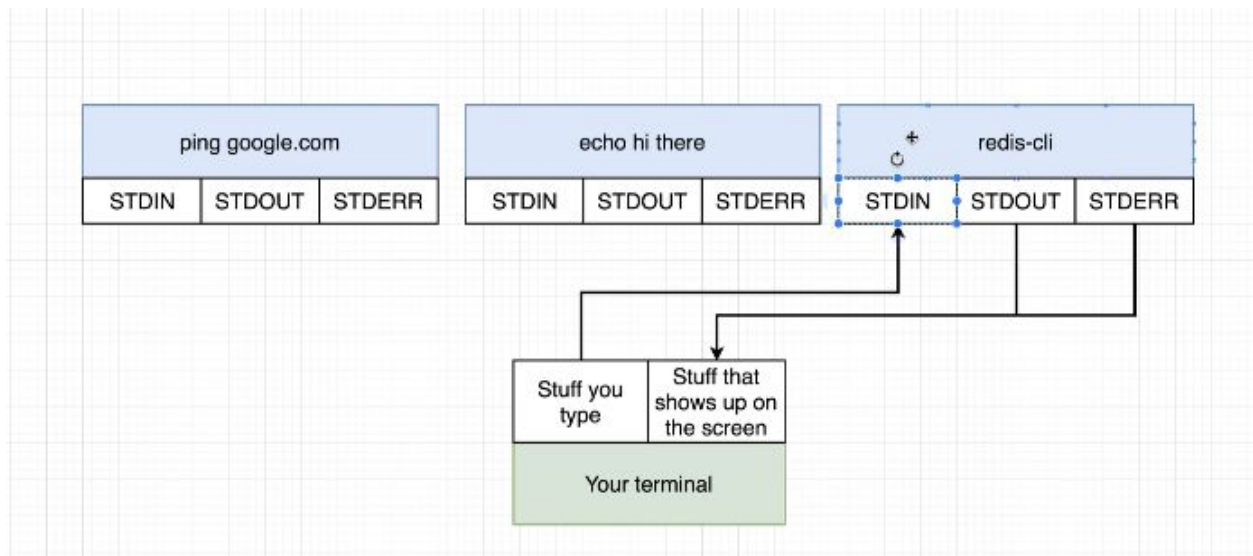
Executing commands in running containers

```
(base) λ ~/.aws/ docker ps
CONTAINER ID        IMAGE               COMMAND                     CREATED
STATUS              PORTS               NAMES
10e928df4f4e        redis               "docker-entrypoint.s..."    8 minutes ago
Up 8 minutes        6379/tcp            beautiful_torvalds
(base) λ ~/.aws/ docker exec -it 10e928df4f4e redis-cli
127.0.0.1:6379> set myvalue 5
OK
127.0.0.1:6379> get myvalue
"5"
127.0.0.1:6379>
(base) λ ~/.aws/ docker exec 10e928df4f4e redis-cli
(base) λ ~/.aws/
```

Purpose of IT Flag

(executing docker exec -i without the -t or -it will result in a less human readable output to the cli)

```
(base) λ ~/.aws/ docker ps
CONTAINER ID        IMAGE           COMMAND                     CREATED
STATUS              PORTS           NAMES
10e928df4f4e        redis           "docker-entrypoint.s..."    16 minutes ago
Up 16 minutes       6379/tcp        beautiful_torvalds
(base) λ ~/.aws/ docker exec -i 10e928df4f4e redis-cli

e
ERR unknown command `e`, with args beginning with:

set myvalue 5
OK
get myvalue
5
^C
(base) λ ~/.aws/
```

Shell in a the container

(executing an additional command in a container)

```
(base) λ ~/.aws/ docker exec -it 10e928df4f4e sh
# cd ~/
```

```
# ls
# cd /
# ls
bin  boot  data  dev  etc  home  lib  lib64  media  mnt  opt  proc  root  run  sbin
srv  sys  tmp  usr  var
# export b=5
# echo $b
5
# redis-cli
127.0.0.1:6379>
```

Start with a shell

```
(base) λ ~/.aws/ docker run -it busybox sh
/ # ls
bin    dev    etc    home   proc   root   sys    tmp    usr    var
/ # ping google.com
PING google.com (64.233.177.139): 56 data bytes
64 bytes from 64.233.177.139: seq=0 ttl=37 time=18.000 ms
64 bytes from 64.233.177.139: seq=1 ttl=37 time=22.684 ms
^C
--- google.com ping statistics ---
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max = 18.000/20.342/22.684 ms
/ # echo hello
hello
/ #
```

Container Isolation
(Between two containers they do not automatically share the same filesystem)

```
(base) λ ~/.aws/ docker run -it busybox sh
/ # ls
bin    dev    etc    home   proc   root   sys    tmp    usr    var
/ # touch hithere
/ # ls
bin     dev     etc     hithere  home     proc     root     sys     tmp
usr     var
/ #
```

```
(base) λ ~/.aws/ docker run -it busybox sh
/ # ls
bin   dev   etc   home  proc  root  sys   tmp   usr   var
/ #
```

```
(base) λ ~/ docker ps
CONTAINER ID        IMAGE              COMMAND              CREATED
STATUS              PORTS              NAMES
f7aefcb32dc5        busybox            "sh"                 6 seconds ago        Up
5 seconds                              youthful_shtern
319f26b14bdd        busybox            "sh"                 About a minute ago   Up
About a minute                         great_lederberg
(base) λ ~/
```

No data is shared between the two containers.