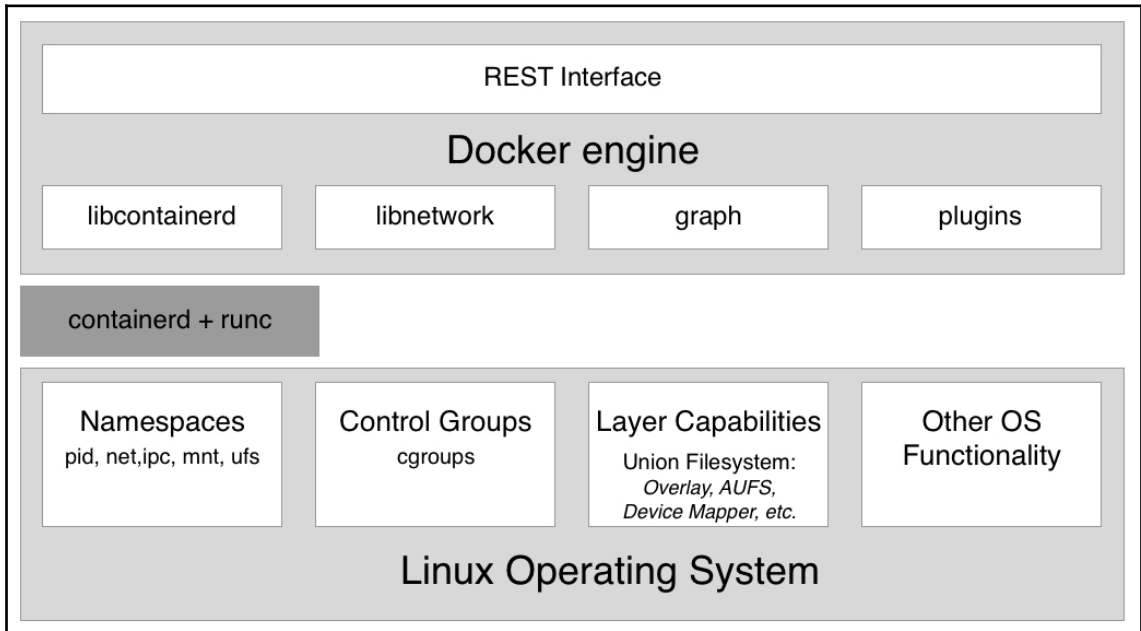


Chapter 1: What Are Containers and Why Should I Use Them?



Chapter 2: Setting up a Working Environment

```
$ docker-machine ls
NAME      ACTIVE   DRIVER        STATE     URL                  SWARM   DOCKER     ERRORS
default  -        virtualbox    Running   tcp://192.168.99.100:2376   v18.04.0-ce
```

```
$ docker-machine create --driver virtualbox default
Running pre-create checks...
Creating machine...
(default) Copying /Users/gabriel/.docker/machine/cache/boot2docker.iso to /Users/gabriel/.docker/machine/machines/default/boot2docker.iso...
(default) Creating VirtualBox VM...
(default) Creating SSH key...
(default) Starting the VM...
(default) Check network to re-create if needed...
(default) Waiting for an IP...
Waiting for machine to be running, this may take a few minutes...
Detecting operating system of created instance...
Waiting for SSH to be available...
Detecting the provisioner...
Provisioning with boot2docker...
Copying certs to the local machine directory...
Copying certs to the remote machine...
Setting Docker configuration on the remote daemon...
Checking connection to Docker...
Docker is up and running!
To see how to connect your Docker Client to the Docker Engine running on this virtual machine, run: docker-machine env default
$
```

```
docker@default:~$ docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
ca4f61b1923c: Pull complete
Digest: sha256:97ce6fa4b6cdc0790cda65fe7290b74cfebd9fa0c9b8c38e979330d547d22ce1
Status: Downloaded newer image for hello-world:latest
```

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
```

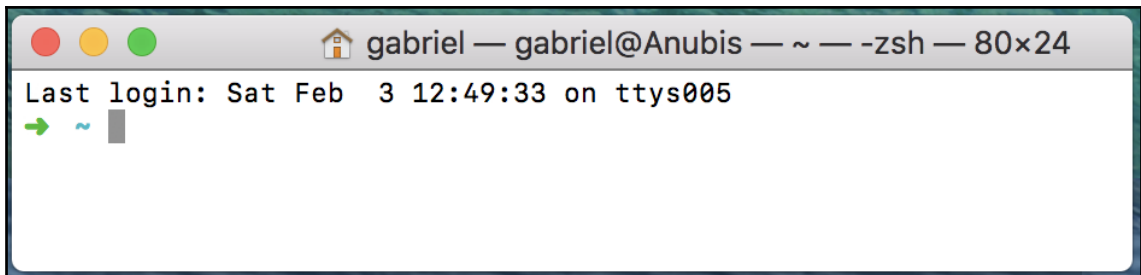
Share images, automate workflows, and more with a free Docker ID:

<https://cloud.docker.com/>

For more examples and ideas, visit:

<https://docs.docker.com/engine/userguide/>

```
docker@default:~$ █
```



```
$ docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
ca4f61b1923c: Pull complete
Digest: sha256:97ce6fa4b6cdc0790cda65fe7290b74cfefd9fa0c9b8c38e979330d547d22ce1
Status: Downloaded newer image for hello-world:latest
```

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.
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For more examples and ideas, visit:

<https://docs.docker.com/engine/userguide/>

```
$ █
```

```
docker@default:~$ docker version
```

```
Client:
```

```
Version:           18.06.1-ce  
API version:       1.38  
Go version:        go1.10.3  
Git commit:        e68fc7a  
Built:             Tue Aug 21 17:20:43 2018  
OS/Arch:           linux/amd64  
Experimental:     false
```

```
Server:
```

```
Engine:
```

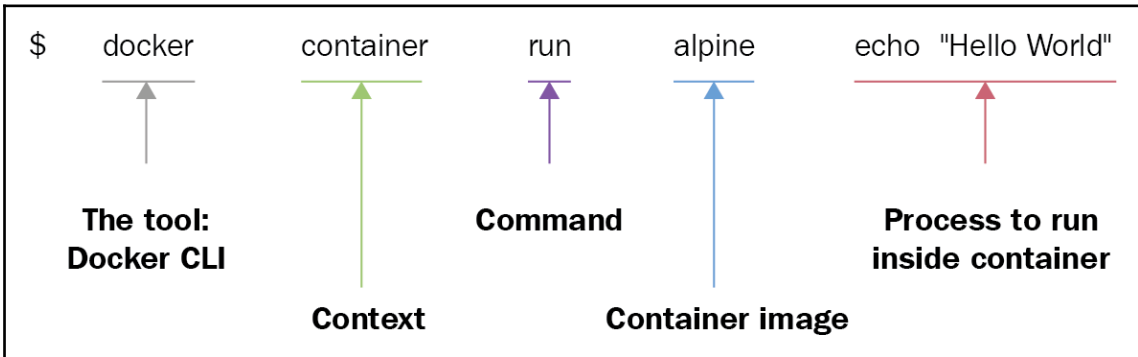
```
Version:           18.06.1-ce  
API version:       1.38 (minimum version 1.12)  
Go version:        go1.10.3  
Git commit:        e68fc7a  
Built:             Tue Aug 21 17:28:38 2018  
OS/Arch:           linux/amd64  
Experimental:     false
```

```
docker@default:~$ |
```

```
Starting local Kubernetes v1.9.0 cluster...
Starting VM..
Downloading Minikube ISO
 142.22 MB / 142.22 MB [=====] 100.00% 0s
Getting VM IP address...
Moving files into cluster...
Downloading localkube binary
 162.41 MB / 162.41 MB [=====] 100.00% 0s
  0 B / 65 B [-----] 0.00%
 65 B / 65 B [=====] 100.00% 0sSetting up certs...
Connecting to cluster...
Setting up kubeconfig...
Starting cluster components...
Kubectl is now configured to use the cluster.
Loading cached images from config file.
$ █
```

```
$ kubectl version
Client Version: version.Info{Major:"1", Minor:"9", GitVersion:"v1.9.0", GitCommit:"925c127ec6b946659ad0fd596fa959be43f0cc05",
GitTreeState:"clean", BuildDate:"2017-12-15T21:07:38Z", GoVersion:"go1.9.2", Compiler:"gc", Platform:"darwin/amd64"}
Server Version: version.Info{Major:"", Minor:"", GitVersion:"v1.9.0", GitCommit:"925c127ec6b946659ad0fd596fa959be43f0cc05",
GitTreeState:"clean", BuildDate:"2018-01-26T19:04:38Z", GoVersion:"go1.9.1", Compiler:"gc", Platform:"linux/amd64"}
$ █
```

Chapter 3: Working with Containers

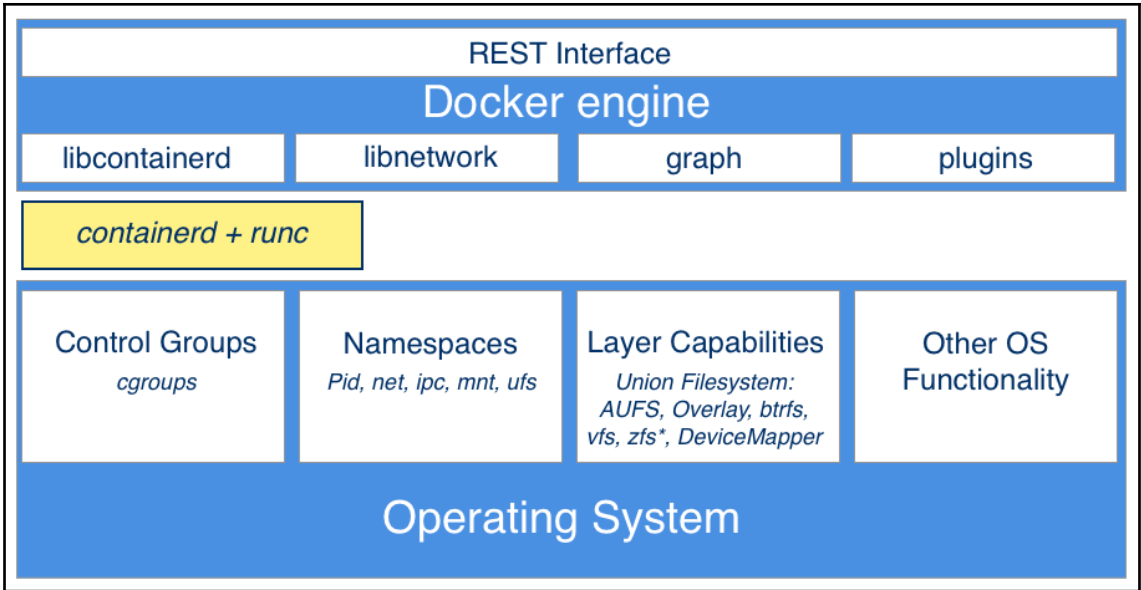


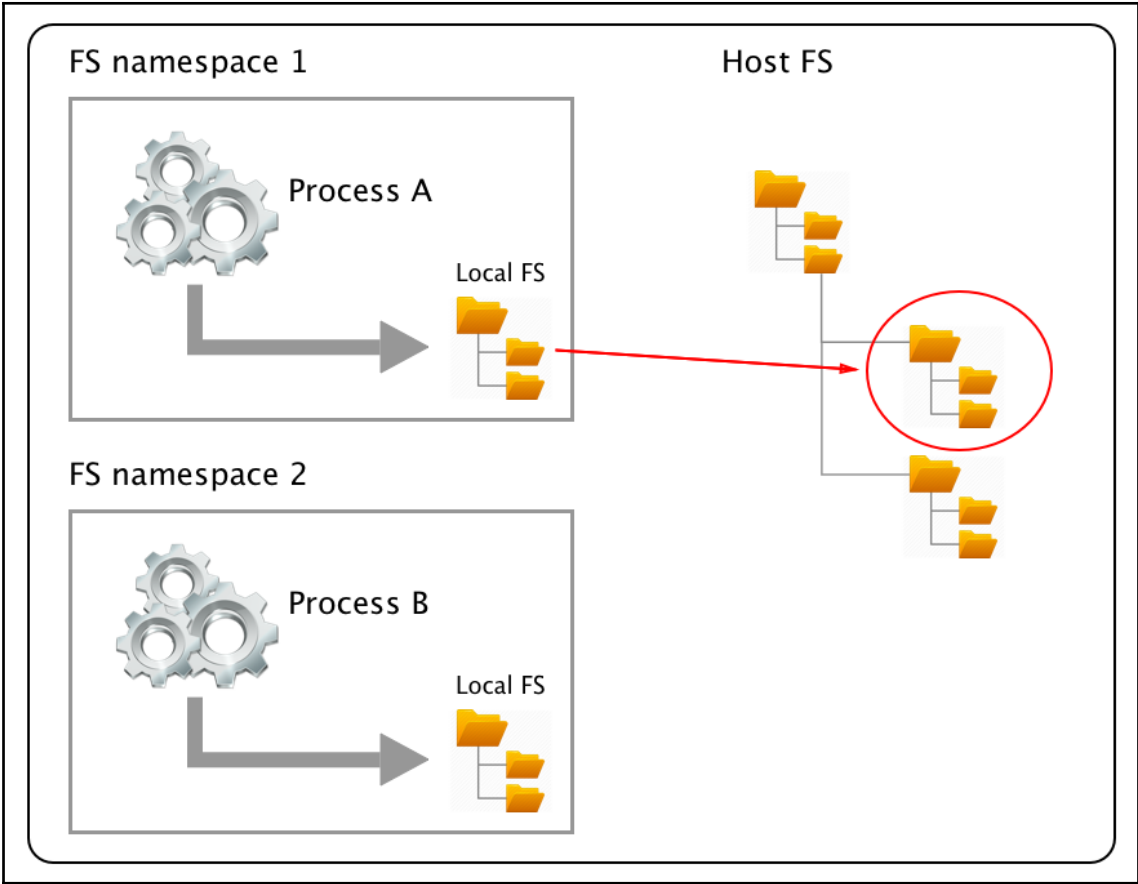
```
$ docker container ls -l
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS              NAMES
6ce5e46da7ce      alpine             "/bin/sh -c 'while :...'" 41 seconds ago     Up 16 seconds        
quotes
```

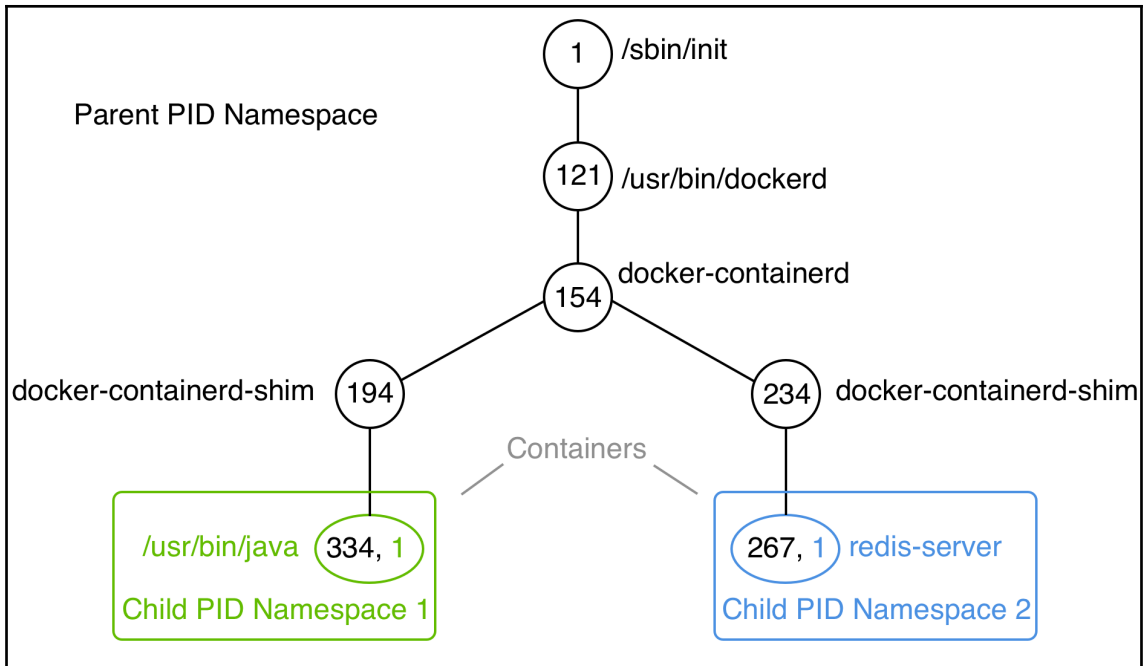
```
$ docker container ls
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS              NAMES
314719b2f439      nginx:alpine       "nginx -g 'daemon of...'" 35 seconds ago     Up 30 seconds      80/tcp            cranky_curie
27b96de70b58      alpine:latest     "ping 127.0.0.1"      23 hours ago       Up 23 hours                c2
35b8dd512acb      alpine:latest     "/bin/sh"            23 hours ago       Up 23 hours                c1
```

```
/ # ps
PID   USER     TIME   COMMAND
  1   root      0:00  /bin/sh -c while :; do wget -q0- https://talaikis.com/api
 85   root      0:00  /bin/sh
110   root      0:00  sleep 5
111   root      0:00  ps
```

```
$ docker container exec quotes ps
PID   USER     TIME   COMMAND
  1   root      0:00  /bin/sh -c while :; do wget -q0- https://talaikis.com/api
520   root      0:00  sleep 5
521   root      0:00  ps
```







Chapter 4: Creating and Managing Container Images

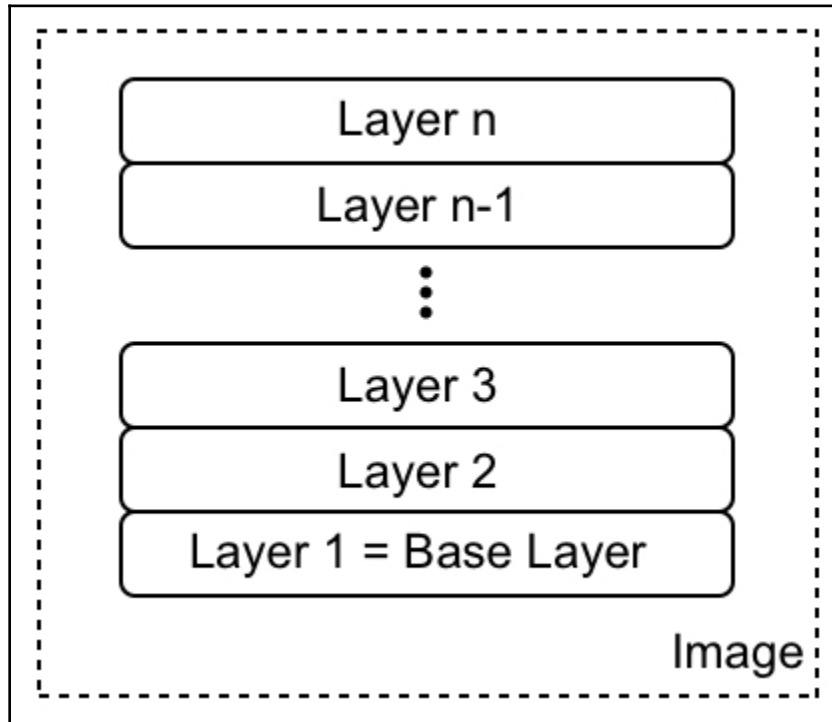



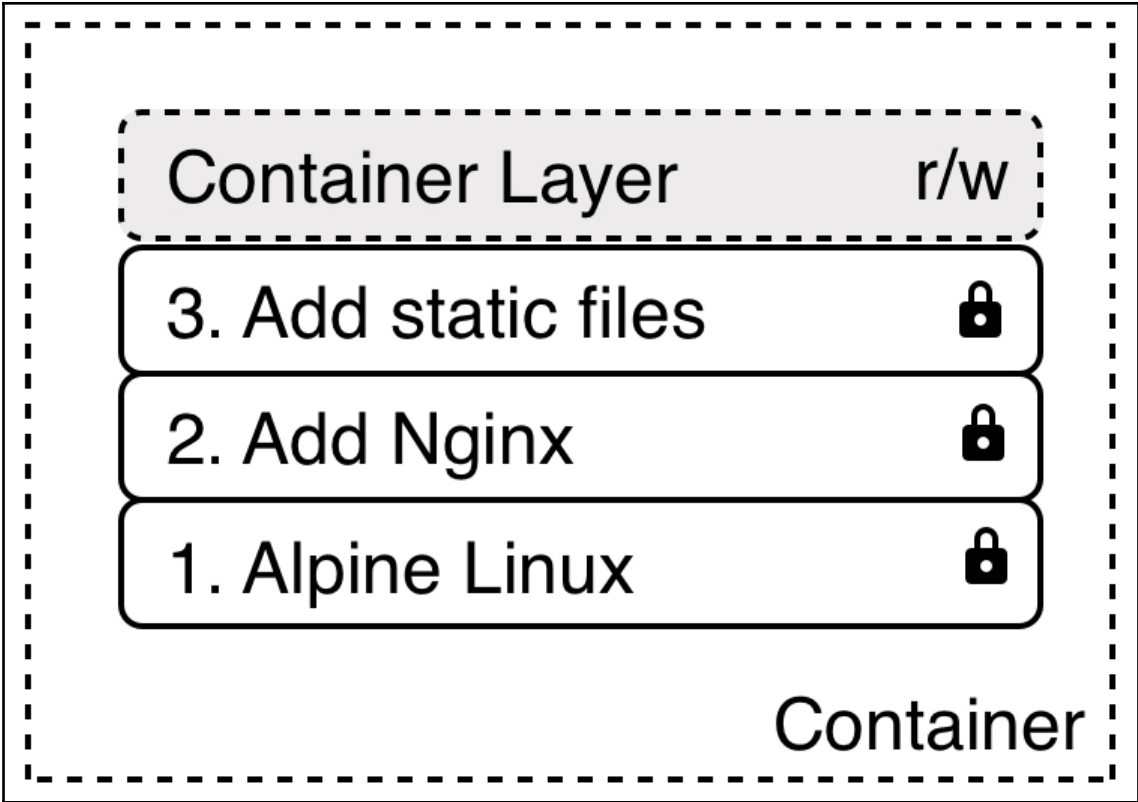
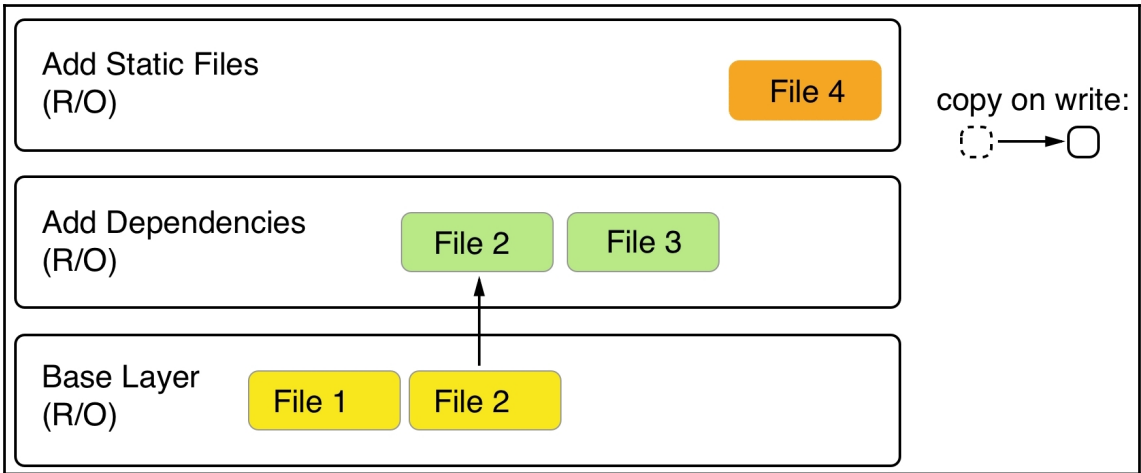
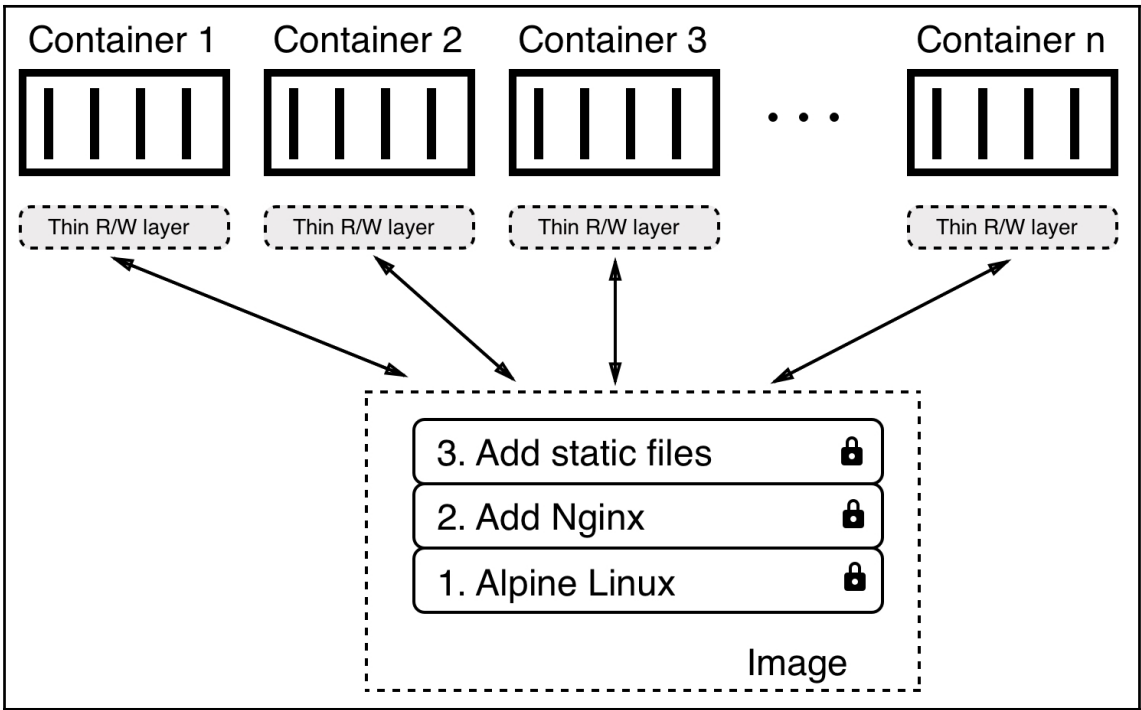
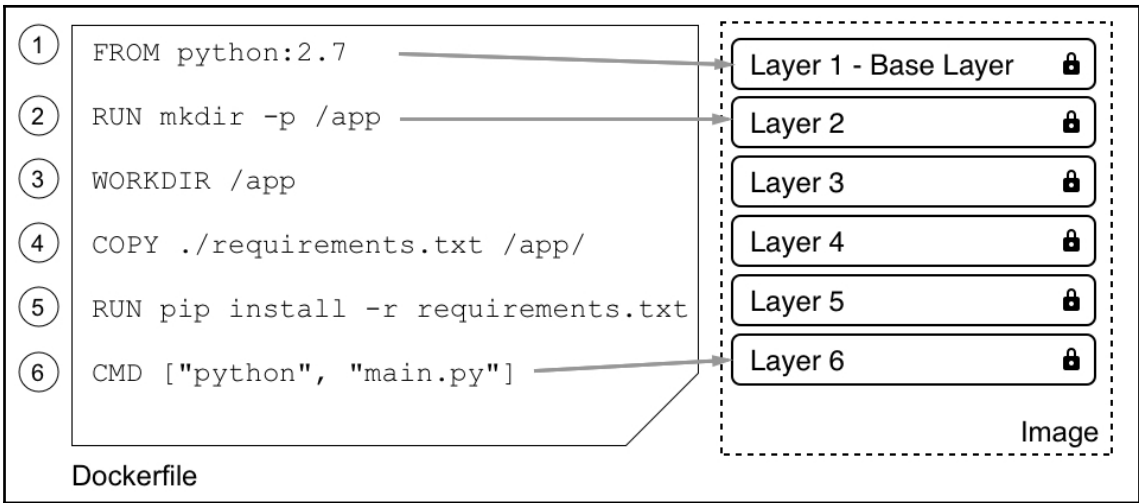


Image = layered FS

1. Alpine Linux 
2. Add Nginx 
3. Add static files 





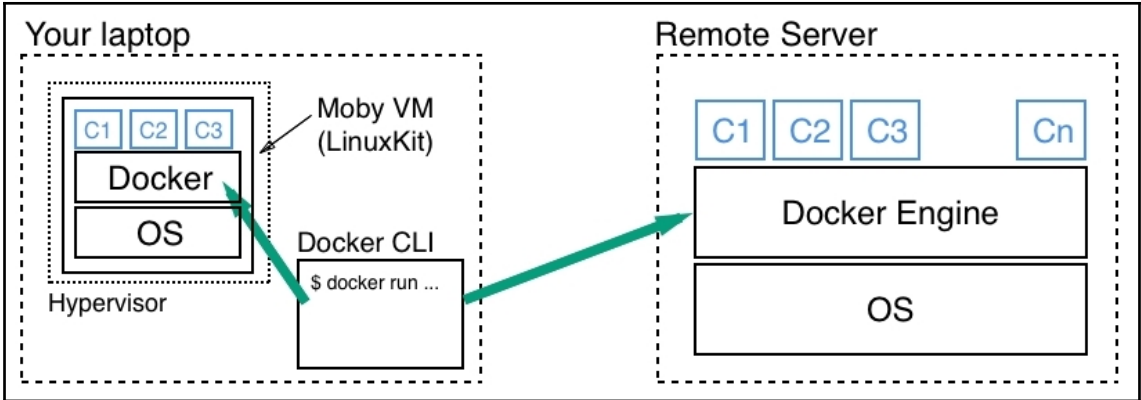


Step	Builder Container	Command	Resulting Image
①	Pull base Image		Layer 1 - Base Layer 🔒
②	<div style="border: 1px dashed black; padding: 2px;">Container Layer r/w</div> Layer 1 - Base Layer 🔒	RUN mkdir -p /app	Layer 2 🔒 Layer 1 - Base Layer 🔒
③	<div style="border: 1px dashed black; padding: 2px;">Container Layer r/w</div> Layer 2 🔒 Layer 1 - Base Layer 🔒 ⋮	WORKDIR /app ⋮	Layer 3 🔒 Layer 2 🔒 Layer 1 - Base Layer 🔒 ⋮
⑦	<div style="border: 1px dashed black; padding: 2px;">Container Layer r/w</div> Layer 6 🔒 Layer 5 🔒 Layer 4 🔒 Layer 3 🔒 Layer 2 🔒 Layer 1 - Base Layer 🔒	CMD ["python", "main.py"]	<div style="border: 1px dashed black; padding: 2px;"> Layer 7 🔒 Layer 6 🔒 Layer 5 🔒 Layer 4 🔒 Layer 3 🔒 Layer 2 🔒 Layer 1 - Base Layer 🔒 </div> Final Image

Chapter 5: Data Volumes and System Management

```
$ docker version
Client:
 Version:      18.04.0-ce
 API version:  1.37
 Go version:   go1.9.4
 Git commit:   3d479c0
 Built: Tue Apr 10 18:13:16 2018
 OS/Arch:     darwin/amd64
 Experimental: true
 Orchestrator: swarm

Server:
 Engine:
  Version:      18.04.0-ce
  API version:  1.37 (minimum version 1.12)
  Go version:   go1.9.4
  Git commit:   3d479c0
  Built:       Tue Apr 10 18:23:05 2018
  OS/Arch:     linux/amd64
  Experimental: true
$ █
```

```
$ docker system info
Containers: 1
  Running: 0
  Paused: 0
  Stopped: 1
Images: 70
Server Version: 18.04.0-ce
Storage Driver: overlay2
  Backing Filesystem: extfs
  Supports d_type: true
  Native Overlay Diff: true
Logging Driver: json-file
Cgroup Driver: cgroupfs
Plugins:
  Volume: local
  Network: bridge host ipvlan macvlan null overlay
  Log: awslogs fluentd gcplogs gelf journald json-file logentries splunk syslog
Swarm: inactive
Runtimes: runc
Default Runtime: runc
Init Binary: docker-init
containerd version: 773c489c9c1b21a6d78b5c538cd395416ec50f88
runc version: 4fc53a81fb7c994640722ac585fa9ca548971871
init version: 949e6fa
Security Options:
  seccomp
    Profile: default
Kernel Version: 4.9.87-linuxkit-aufs
Operating System: Docker for Mac
OSType: linux
Architecture: x86_64
CPUs: 4
Total Memory: 1.952GiB
Name: linuxkit-025000000001
ID: WV5X:CY7N:LHIP:SWJ2:T55W:P5QM:MEYU:MM3V:550H:RALF:5ZDN:QH7Y
Docker Root Dir: /var/lib/docker
Debug Mode (client): false
Debug Mode (server): true
  File Descriptors: 22
  Goroutines: 42
  System Time: 2018-04-21T12:08:17.962868Z
  EventsListeners: 2
HTTP Proxy: gateway.docker.internal:3128
HTTPS Proxy: gateway.docker.internal:3129
Registry: https://index.docker.io/v1/
Labels:
Experimental: true
Insecure Registries:
  127.0.0.0/8
Live Restore Enabled: false
```

```
$ docker system df -v
Images space usage:
```

REPOSITORY	TAG	IMAGE ID	CREATED ago	SIZE	SHARED SIZE	UNIQUE SIZE	CONTAINERS
fundamentalsofdocker/ch14-web	1.0	f6612f845be	12 days ago ago	72.05MB	72.05MB	1.834KB	0
fundamentalsofdocker/web	2.0	944523644dd7	12 days ago ago	72.05MB	72.05MB	1.827KB	0
fundamentalsofdocker/ch13-web	2.0	b47675c8e53c	2 weeks ago ago	72.05MB	72.05MB	1.836KB	0
builder2	latest	074a85b21f3a	3 weeks ago ago	1.514GB	1.456GB	58.7MB	0
builder	latest	9864221c5187	3 weeks ago ago	1.464GB	1.456GB	8.051MB	0
ruby	alpine	b620ae34414c	3 weeks ago ago	55.52MB	4.148MB	51.38MB	1
microsoft/azure-cli	latest	a52f6e53da4c	4 weeks ago ago	400.4MB	0B	400.4MB	0
nginx	alpine	91ce6206f9d8	4 weeks ago ago	18MB	4.148MB	13.86MB	1
perl	5.26	3c2c4c3b2e15	5 weeks ago ago	879.2MB	879.2MB	0B	0
fundamentalsofdocker/ch08-web	1.0	922e085ed002	7 weeks ago ago	72.01MB	68.02MB	3.992MB	0
fundamentalsofdocker/ch08-db	1.0	4953d5353c17	7 weeks ago ago	39.46MB	4.148MB	35.31MB	0
node	9.6-alpine	a88ff852e3d4	8 weeks ago ago	68.02MB	68.02MB	0B	0
alpine	latest	3f99005ea702	3 months ago ago	4.148MB	4.148MB	0B	0
confluentinc/cp-enterprise-kafka	4.0.0	07041f8648f5	3 months ago ago	565.1MB	0B	565.1MB	0
hello-world	latest	f2a91732366c	5 months ago ago	1.848KB	0B	1.848KB	0
hseeberger/scala-sbt	latest	da0e1be3bb79	9 months ago ago	925.4MB	0B	925.4MB	0

```
Containers space usage:
```

CONTAINER ID	IMAGE	COMMAND	LOCAL VOLUMES	SIZE	CREATED ago	STATUS	NAMES
afe0dcab9bc4	nginx:alpine	"ping 8.8.8.8"	0	0B	6 seconds ago ago	Up 4 seconds	xenodochial_easley
2a2d742604af	ruby:alpine	"/bin/sh"	0	16.7MB	5 hours ago ago	Exited (0) 13 minutes ago	keen_lumiere

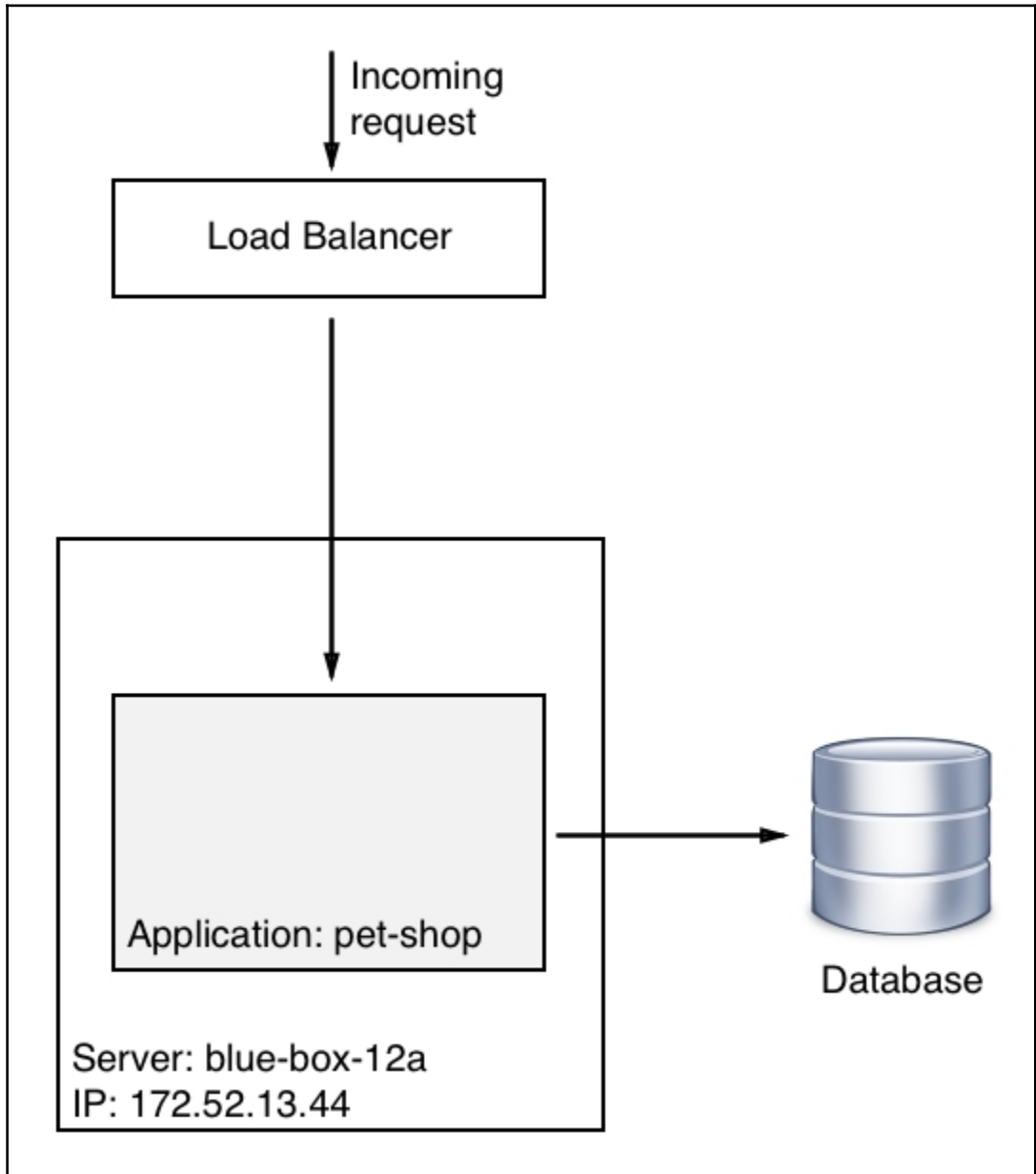
```
Local Volumes space usage:
```

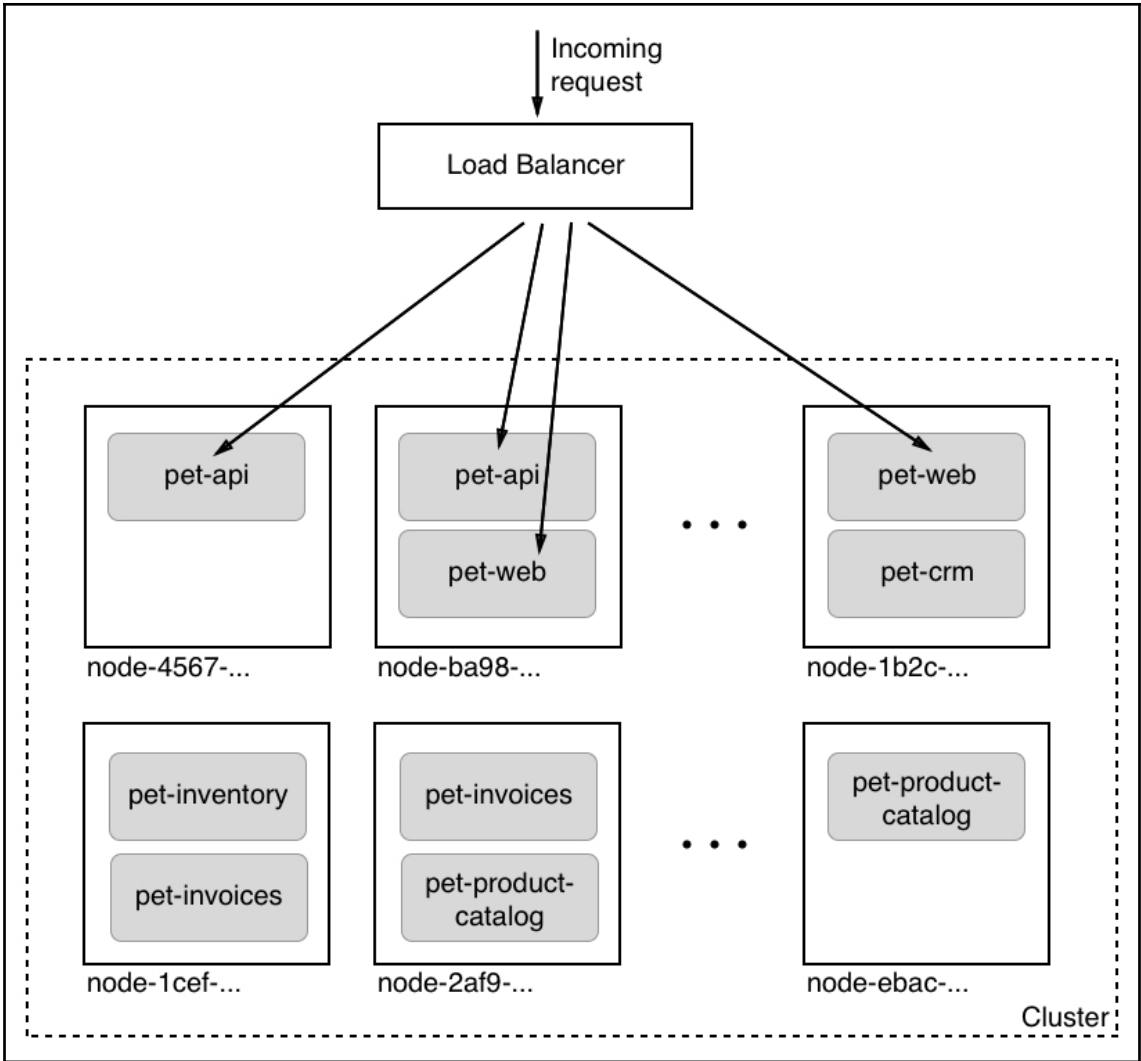
VOLUME NAME	LINKS	SIZE
ch08_pets-data	0	47.24MB

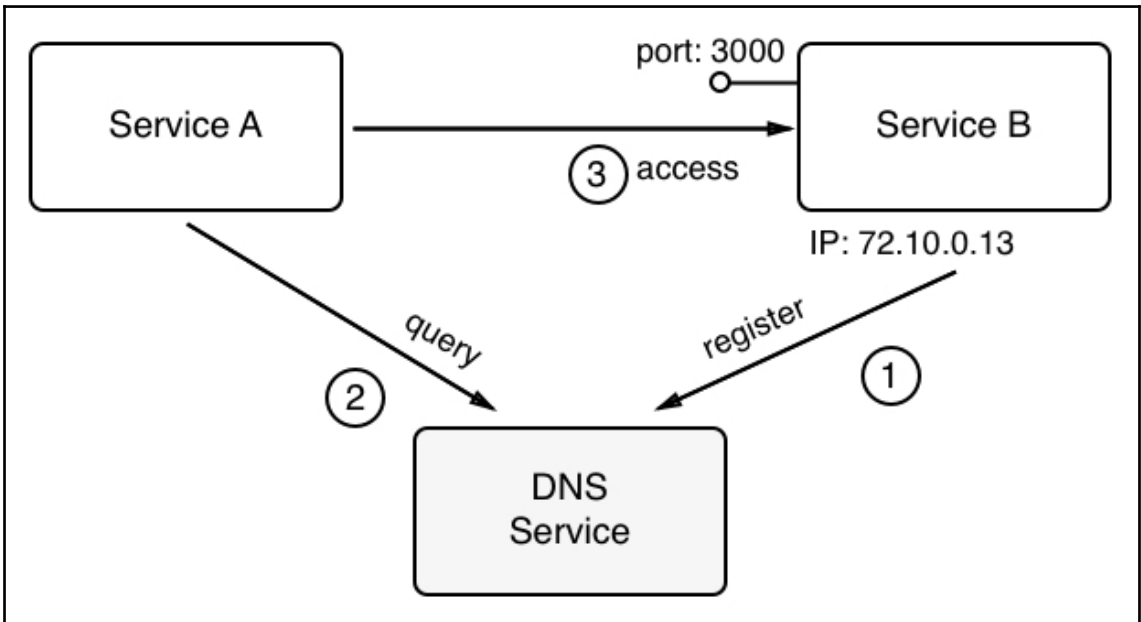
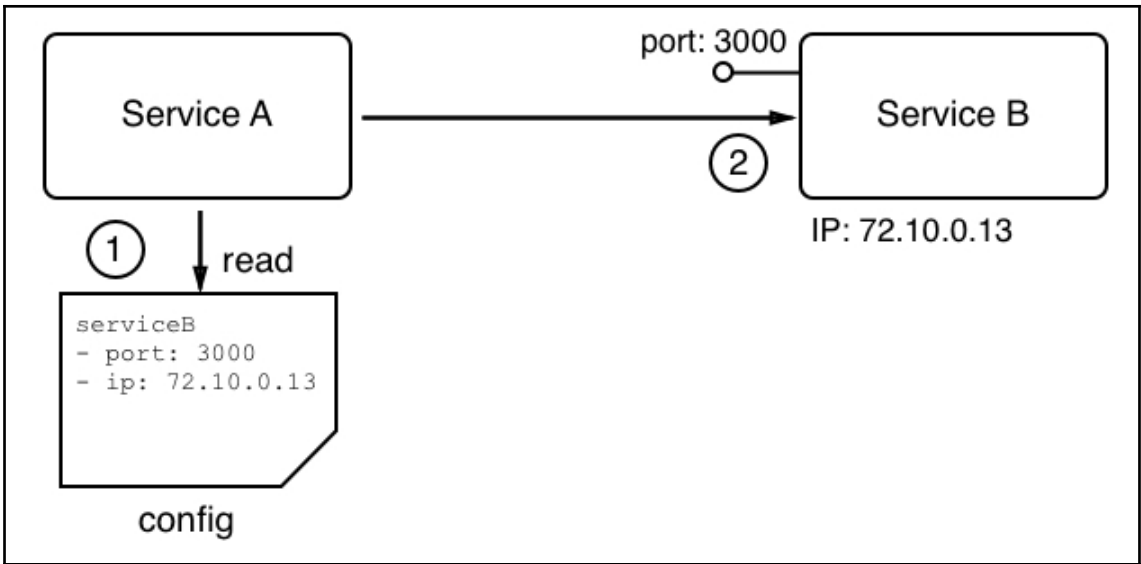
```
Build cache usage: 0B
```

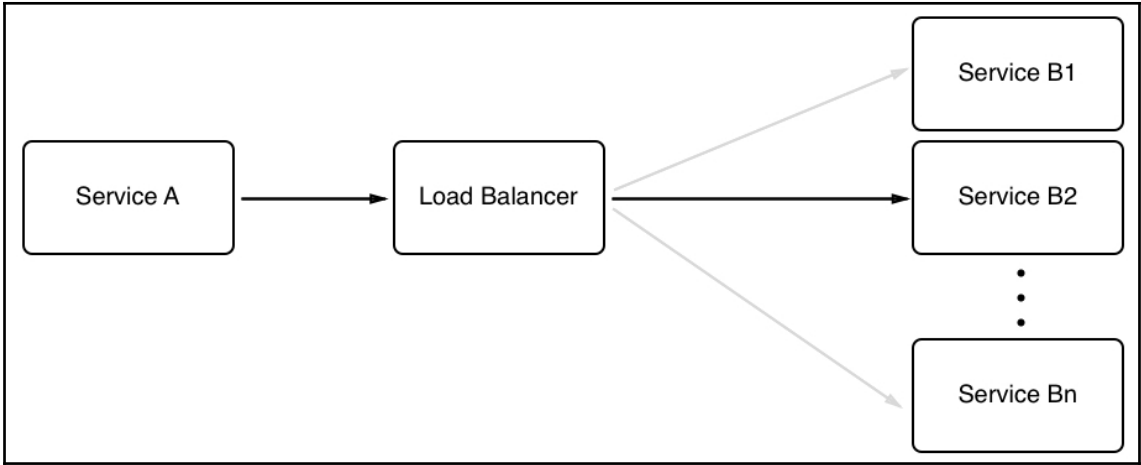
```
$
```

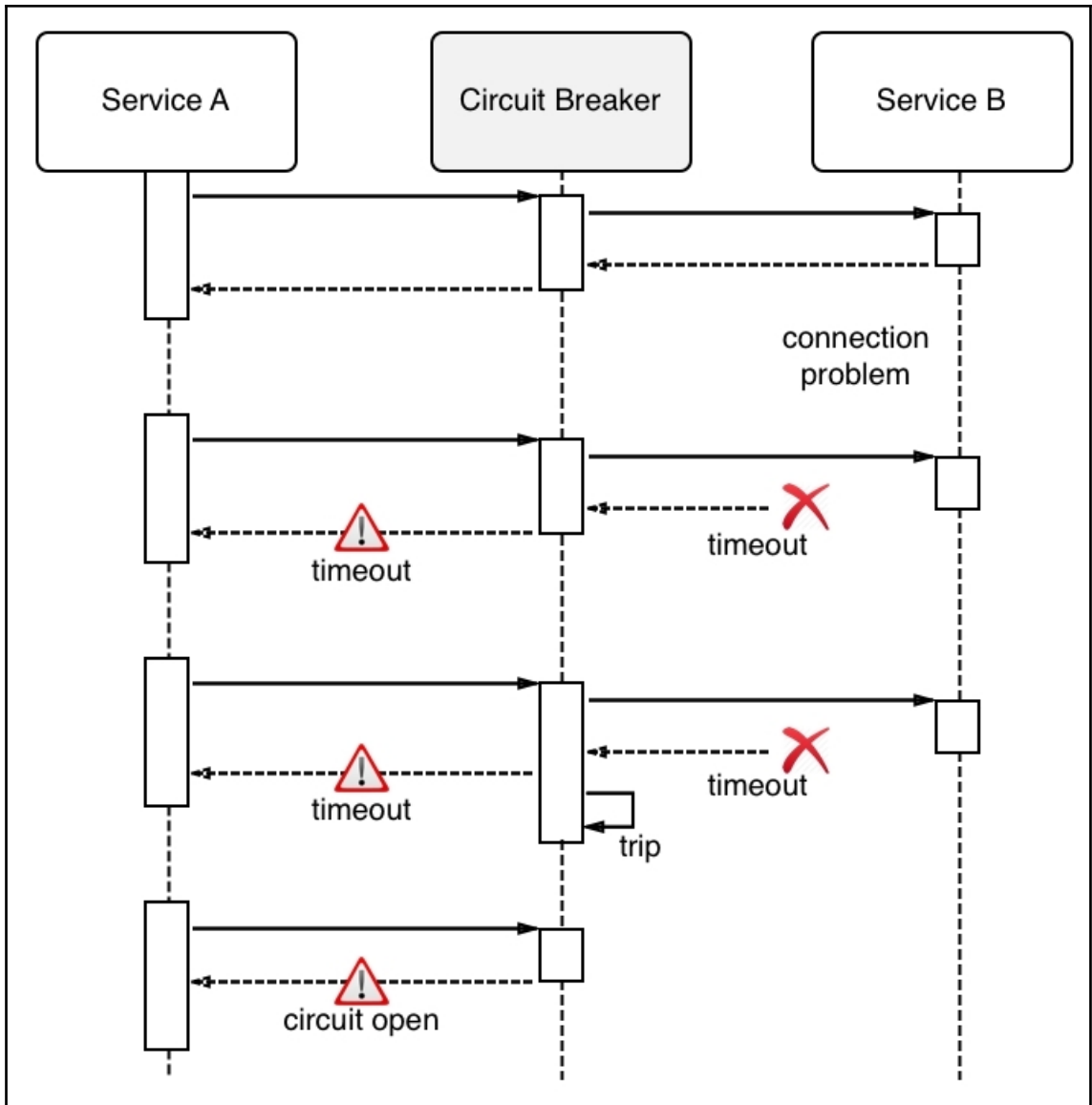
Chapter 6: Distributed Application Architecture

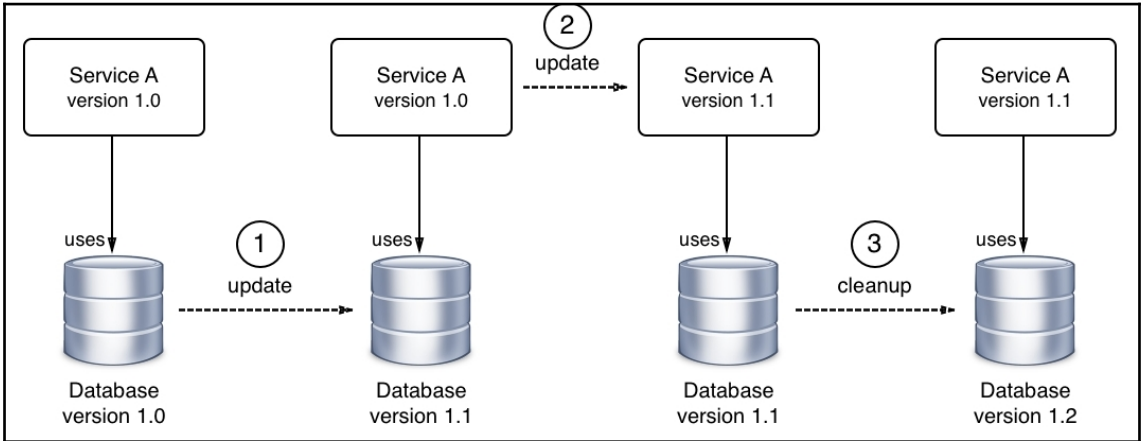
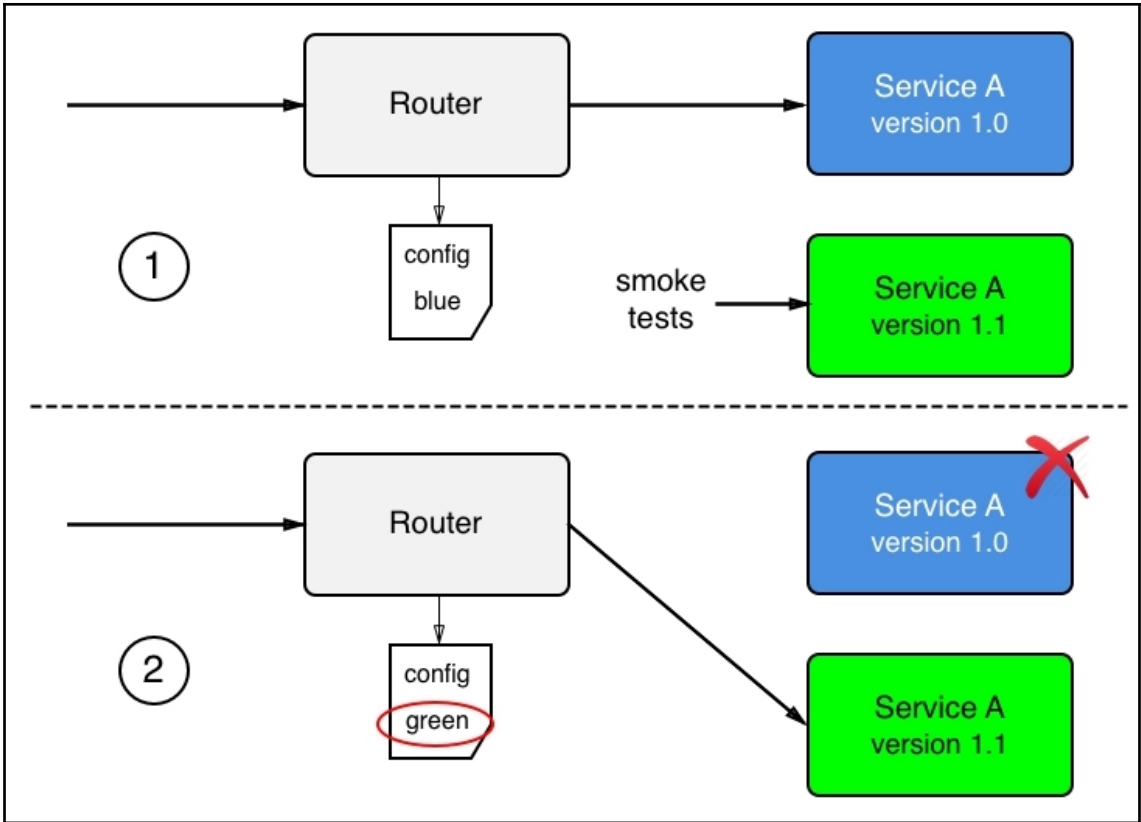




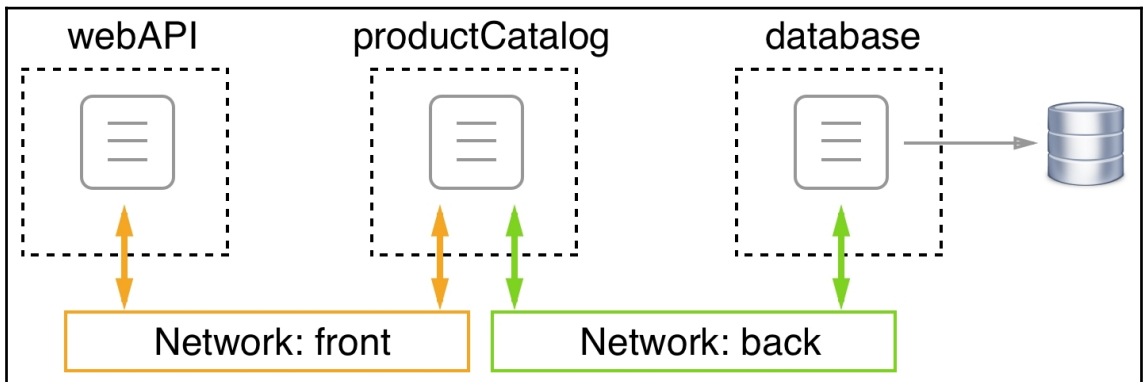
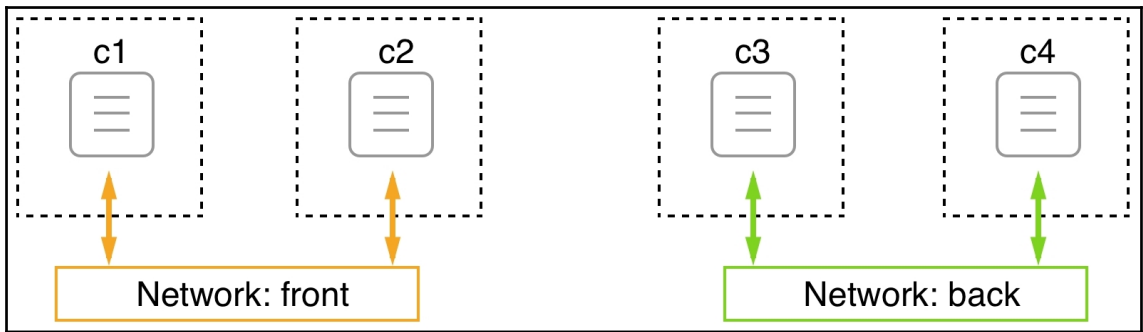
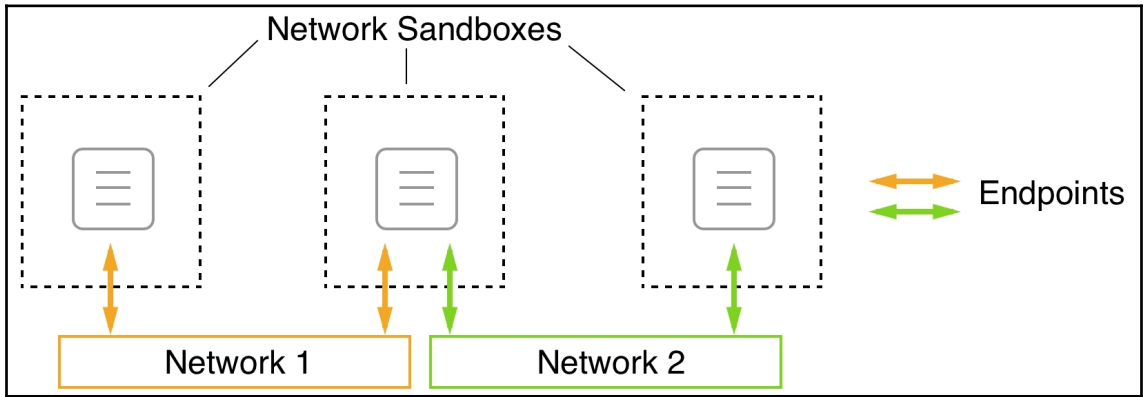








Chapter 7: Single-Host Networking



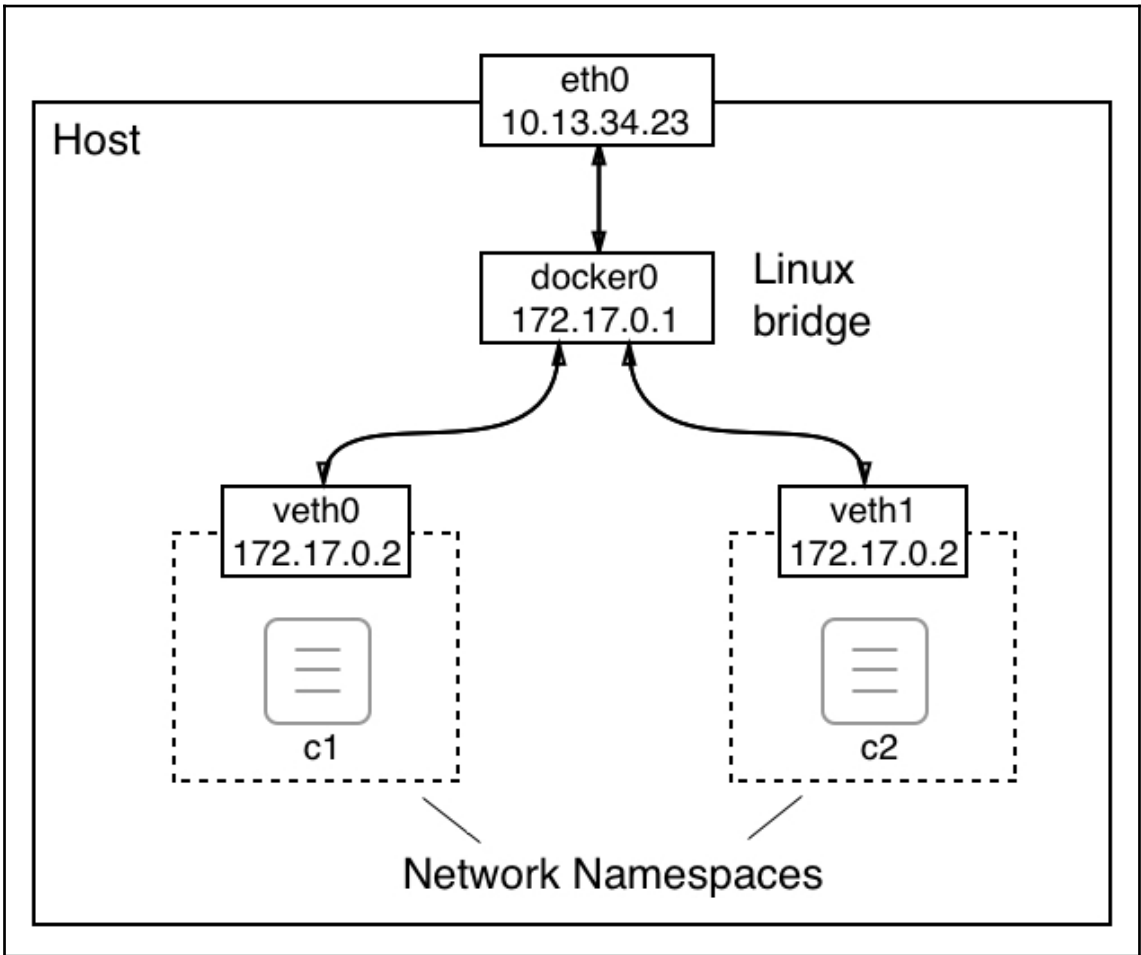
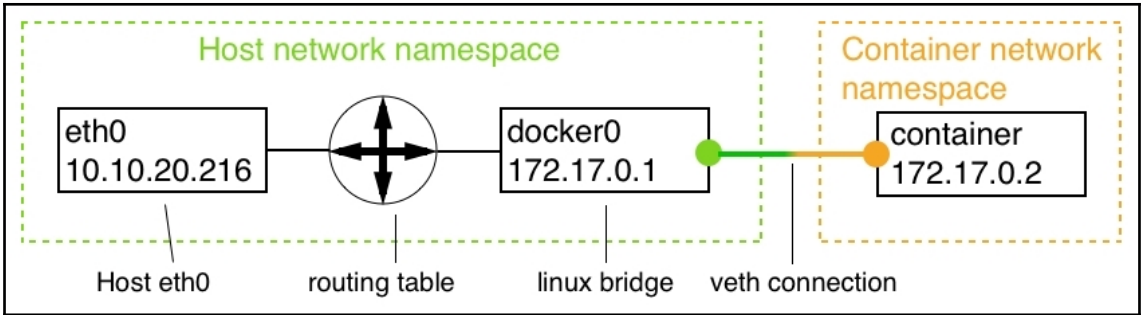
```
$ docker network ls
```

NETWORK ID	NAME	DRIVER	SCOPE
928c8ce47bf2	bridge	bridge	local
bdb36adcf70c	host	host	local
af82006f2f2d	none	null	local

```
$
```

```
C:\Users\admin>docker network inspect bridge
```

```
[
  {
    "Name": "bridge",
    "Id": "3b08c1c711ada84ae859c4bed48b5af1f45b68db89356ca5045dc7ee8672e946",
    "Created": "2018-04-09T09:47:29.9424652Z",
    "Scope": "local",
    "Driver": "bridge",
    "EnableIPv6": false,
    "IPAM": {
      "Driver": "default",
      "Options": null,
      "Config": [
        {
          "Subnet": "172.17.0.0/16",
          "Gateway": "172.17.0.1"
        }
      ]
    },
    "Internal": false,
    "Attachable": false,
    "Ingress": false,
    "ConfigFrom": {
      "Network": ""
    },
    "ConfigOnly": false,
    "Containers": {},
    "Options": {
      "com.docker.network.bridge.default_bridge": "true",
      "com.docker.network.bridge.enable_icc": "true",
      "com.docker.network.bridge.enable_ip_masquerade": "true",
      "com.docker.network.bridge.host_binding_ipv4": "0.0.0.0",
      "com.docker.network.bridge.name": "docker0",
      "com.docker.network.driver.mtu": "1500"
    },
    "Labels": {}
  }
]
```



```
},
"NetworkSettings": {
  "Bridge": "",
  "SandboxID": "ae53496fba49de3d0a4727105cc0799b7fbd30746d76700238cb47c611f3eb68",
  "HairpinMode": false,
  "LinkLocalIPv6Address": "",
  "LinkLocalIPv6PrefixLen": 0,
  "Ports": {},
  "SandboxKey": "/var/run/docker/netns/ae53496fba49",
  "SecondaryIPAddresses": null,
  "SecondaryIPv6Addresses": null,
  "EndpointID": "c063a725d1f66e867b5769a80d1477cc88d07618860655fa3033a97478e55713",
  "Gateway": "172.17.0.1",
  "GlobalIPv6Address": "",
  "GlobalIPv6PrefixLen": 0,
  "IPAddress": "172.17.0.4",
  "IPPrefixLen": 16,
  "IPv6Gateway": "",
  "MacAddress": "02:42:ac:11:00:04",
  "Networks": {
    "bridge": {
      "IPAMConfig": null,
      "Links": null,
      "Aliases": null,
      "NetworkID": "026e653c2504e464748b4ce9b25cce69d29bc82a52105a25920f2b796663e635",
      "EndpointID": "c063a725d1f66e867b5769a80d1477cc88d07618860655fa3033a97478e55713",
      "Gateway": "172.17.0.1",
      "IPAddress": "172.17.0.4",
      "IPPrefixLen": 16,
      "IPv6Gateway": "",
      "GlobalIPv6Address": "",
      "GlobalIPv6PrefixLen": 0,
      "MacAddress": "02:42:ac:11:00:04",
      "DriverOpts": null
    }
  }
}
```

```

/ # ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
2: tunl0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN qlen 1
    link/ipip 0.0.0.0 brd 0.0.0.0
3: ip6tnl0@NONE: <NOARP> mtu 1452 qdisc noop state DOWN qlen 1
    link/tunnel6 00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00
19: eth0@if20: <BROADCAST,MULTICAST,UP,LOWER_UP,M-DOWN> mtu 1500 qdisc noqueue state UP
    link/ether 02:42:ac:11:00:04 brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.4/16 brd 172.17.255.255 scope global eth0
        valid_lft forever preferred_lft forever
/ # █

```

```

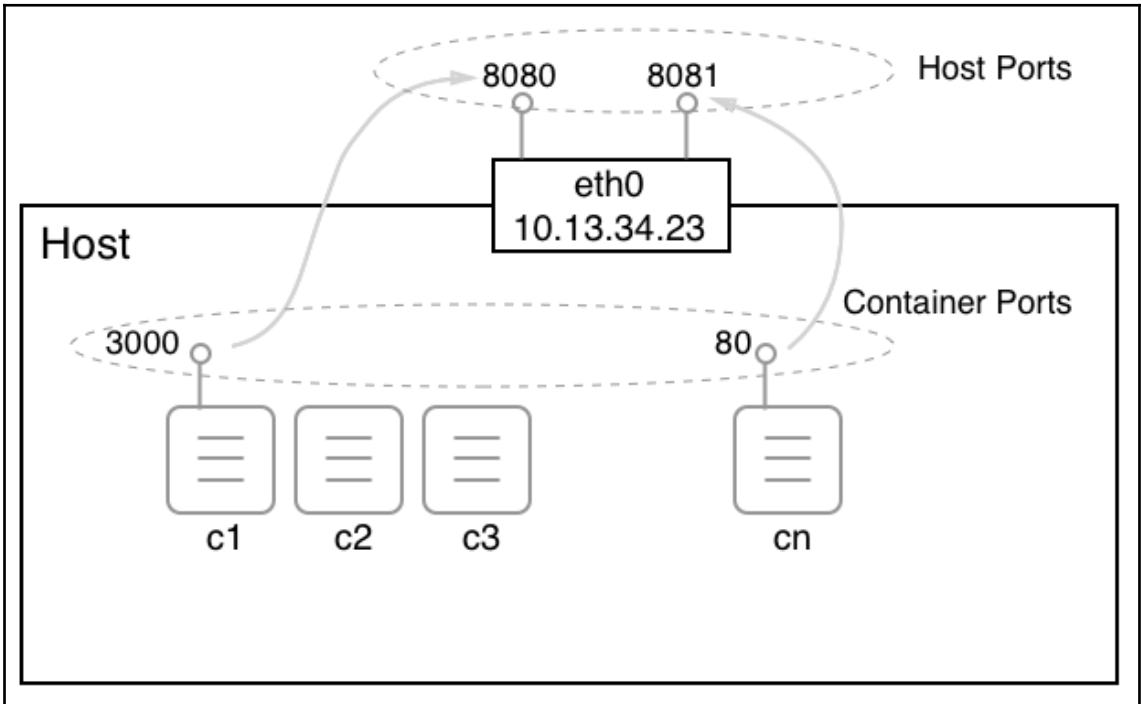
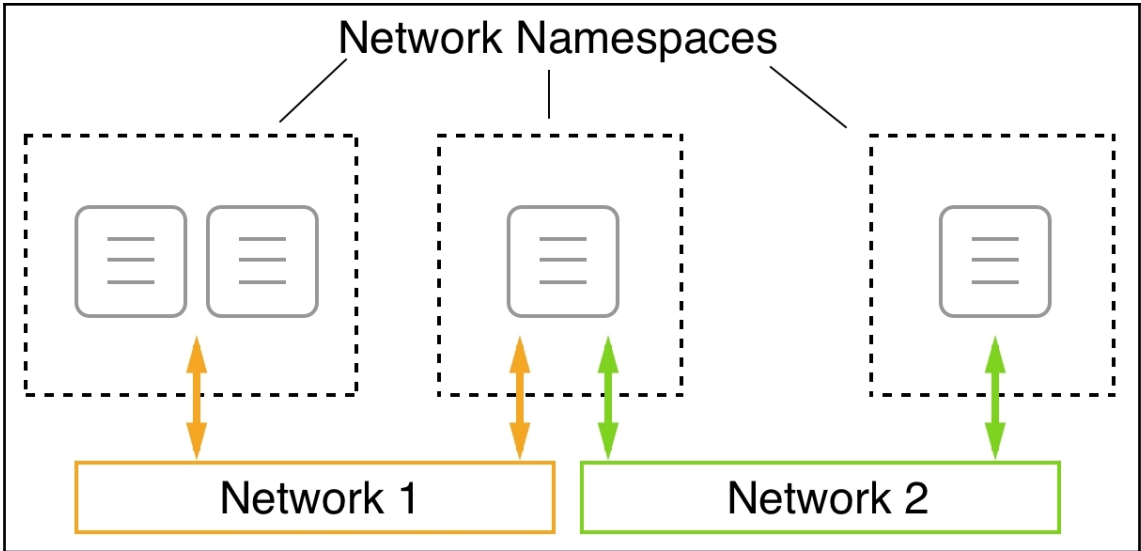
"ConfigOnly": false,
"Containers": {
  "27b96de70b58cd918d35c235a7c180f56f71df58cf4cec50b8f0103dd529b95f": {
    "Name": "c2",
    "EndpointID": "8883649774c5c4c53063da02598c8d09fe7ee427145b348b1d1703f31213e9ca",
    "MacAddress": "02:42:ac:11:00:03",
    "IPv4Address": "172.17.0.3/16",
    "IPv6Address": ""
  },
  "35b8dd512acb985647833e1cc52625e129c15e903fd8a0c0ab247932bc910166": {
    "Name": "c1",
    "EndpointID": "28269a9cc630135ab287052fa69c72f28c57a10bd5e7523c451bf2d0976fd1b5",
    "MacAddress": "02:42:ac:11:00:02",
    "IPv4Address": "172.17.0.2/16",
    "IPv6Address": ""
  }
},
"Options": {

```

```

"Containers": {
  "134295caa6012df5dc7d541436954af1a5264c6f69d5b8012e88f9c12faf40f1": {
    "Name": "c3",
    "EndpointID": "5693cd9329437a9ecec1d27f439887bb0258837b9342a1c32204fa4571298457",
    "MacAddress": "02:42:0a:01:00:02",
    "IPv4Address": "10.1.0.2/16",
    "IPv6Address": ""
  },
  "4a277d33ebfb74f00d31be272d2d74cbfec4b17666e44d88e26cfe83b0a790cc": {
    "Name": "c4",
    "EndpointID": "a1e9ecafebdcf816261883c171434273d9973832d43255b5aa224b081853ed0f",
    "MacAddress": "02:42:0a:01:00:03",
    "IPv4Address": "10.1.0.3/16",
    "IPv6Address": ""
  }
}

```





Chapter 8: Docker Compose


```
$ docker-compose up
Creating network "ch08_default" with the default driver
Creating volume "ch08_pets-data" with default driver
Pulling web (appswithdockerandkubernetes/ch08-web:1.0)...
1.0: Pulling from appswithdockerandkubernetes/ch08-web
605ce1bd3f31: Already exists
d9c1bb40879c: Already exists
d610e8516793: Already exists
66cc3fe80117: Pull complete
e253bc30f8b0: Pull complete
1aedab40d88: Pull complete
09092f231cdf: Pull complete
Digest: sha256:907f7c06a1ba2ba4b463b1b6c2a002a7fcbe5fc726473e177ed10227a246949
Status: Downloaded newer image for appswithdockerandkubernetes/ch08-web:1.0
Pulling db (appswithdockerandkubernetes/ch08-db:1.0)...
1.0: Pulling from appswithdockerandkubernetes/ch08-db
ff3a5c916c92: Already exists
a503b44e1ce0: Already exists
211706713093: Already exists
8df57d533e71: Already exists
7858f71c02fb: Already exists
55a8ef17ba59: Already exists
3fb44f23d323: Already exists
65cad41156b3: Already exists
5492a5bead70: Already exists
df43dbde4904: Pull complete
Digest: sha256:36a9f43628cfbf1483c7368cd730ef9fbfbefa468fc5c8511b895a27a9391bab
Status: Downloaded newer image for appswithdockerandkubernetes/ch08-db:1.0
Creating ch08_web_1 ... done
Creating ch08_db_1 ... done
Attaching to ch08_db_1, ch08_web_1
```

```
db_1 | done
db_1 | server started
web_1 | Listening at 0.0.0.0:3000
db_1 | CREATE DATABASE
db_1 |
db_1 | CREATE ROLE
db_1 |
db_1 |
db_1 | /usr/local/bin/docker-entrypoint.sh: running /docker-entrypoint-initdb.d/init-db.sql
db_1 | CREATE TABLE
db_1 | ALTER TABLE
db_1 | ALTER ROLE
db_1 | INSERT 0 1
db_1 | INSERT 0 1
db_1 | INSERT 0 1
db_1 | INSERT 0 1
db_1 | INSERT 0 1
db_1 | INSERT 0 1
db_1 | INSERT 0 1
db_1 | INSERT 0 1
db_1 | INSERT 0 1
db_1 | INSERT 0 1
db_1 | INSERT 0 1
db_1 | INSERT 0 1
db_1 | INSERT 0 1
db_1 |
db_1 |
db_1 | waiting for server to shut down...2018-03-21 12:52:40.709 UTC [34] LOG: received fast shutdown
request
db_1 | 2018-03-21 12:52:40.711 UTC [34] LOG: aborting any active transactions
db_1 | 2018-03-21 12:52:40.712 UTC [34] LOG: worker process: logical replication launcher (PID 41) exit
ted with exit code 1
db_1 | 2018-03-21 12:52:40.712 UTC [36] LOG: shutting down
db_1 | 2018-03-21 12:52:40.737 UTC [34] LOG: database system is shut down
db_1 | done
db_1 | server stopped
db_1 |
db_1 | PostgreSQL init process complete; ready for start up.
db_1 |
db_1 | 2018-03-21 12:52:40.817 UTC [1] LOG: listening on IPv4 address "0.0.0.0", port 5432
db_1 | 2018-03-21 12:52:40.817 UTC [1] LOG: listening on IPv6 address ":::", port 5432
db_1 | 2018-03-21 12:52:40.821 UTC [1] LOG: listening on Unix socket "/var/run/postgresql/.s.PGSQL.543
2"
db_1 | 2018-03-21 12:52:40.832 UTC [49] LOG: database system was shut down at 2018-03-21 12:52:40 UTC
db_1 | 2018-03-21 12:52:40.835 UTC [1] LOG: database system is ready to accept connections
```

localhost:3000/pet

localhost:3000/pet

CAT GIF OF THE DAY



Courtesy: [Wikimedia](#)

Delivered to you by container 43a52b535079

```

$ docker-compose up
Creating network "ch08_default" with the default driver
Creating ch08_web_1 ... done
Creating ch08_db_1 ... done
Attaching to ch08_web_1, ch08_db_1
db_1 | 2018-03-02 01:25:35.874 UTC [1] LOG: listening on IPv4 address "0.0.0.0", port 5432
db_1 | 2018-03-02 01:25:35.875 UTC [1] LOG: listening on IPv6 address ":::", port 5432
db_1 | 2018-03-02 01:25:35.877 UTC [1] LOG: listening on Unix socket "/var/run/postgresql/.s.PGSQL.5432"
db_1 | 2018-03-02 01:25:35.890 UTC [19] LOG: database system was shut down at 2018-03-02 01:25:23 UTC
db_1 | 2018-03-02 01:25:35.894 UTC [1] LOG: database system is ready to accept connections
web_1 | Listening at 0.0.0.0:3000

```

```

$ docker-compose ps

```

Name	Command	State	Ports
ch08_db_1	docker-entrypoint.sh postgres	Up	5432/tcp
ch08_web_1	/bin/sh -c node src/server.js	Up	0.0.0.0:3000->3000/tcp

```

$ docker-compose up --scale web=3
WARNING: The "web" service specifies a port on the host. If multiple containers for this
service are created on a single host, the port will clash.
Starting ch08_web_3 ...
Starting ch08_web_3 ... error

ERROR: for ch08_web_3 Cannot start service web: driver failed programming external connec-
tivity on endpoint ch08_web_3 (534216cc36e0284b775e48c6450e25ff21fe90ff6d7b8b9716f421cb9
8560351): Bind for 0.0.0.0:3000 failed: port is already allocated

ERROR: for web Cannot start service web: driver failed programming external connectivity
on endpoint ch08_web_3 (534216cc36e0284b775e48c6450e25ff21fe90ff6d7b8b9716f421cb98560351
): Bind for 0.0.0.0:3000 failed: port is already allocated
ERROR: Encountered errors while bringing up the project.

```

```

$ docker-compose ps

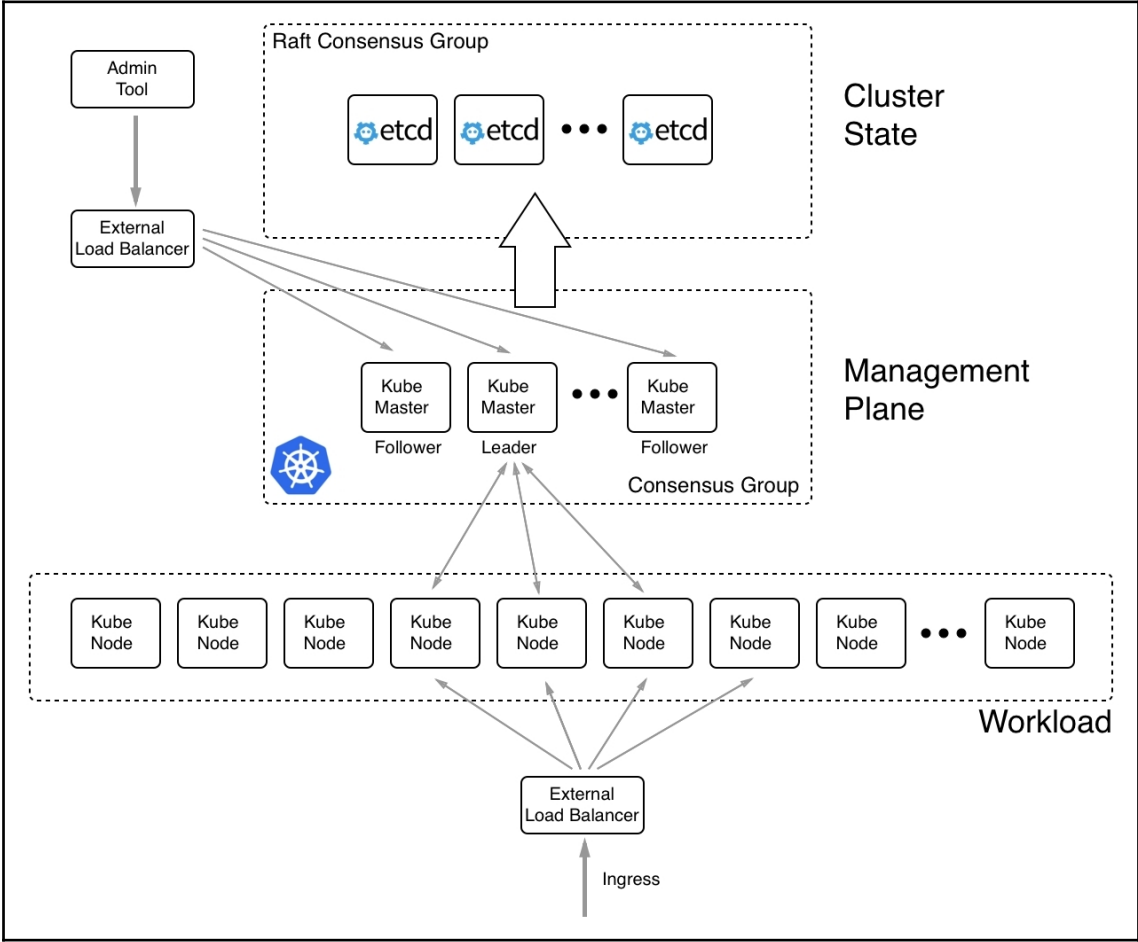
```

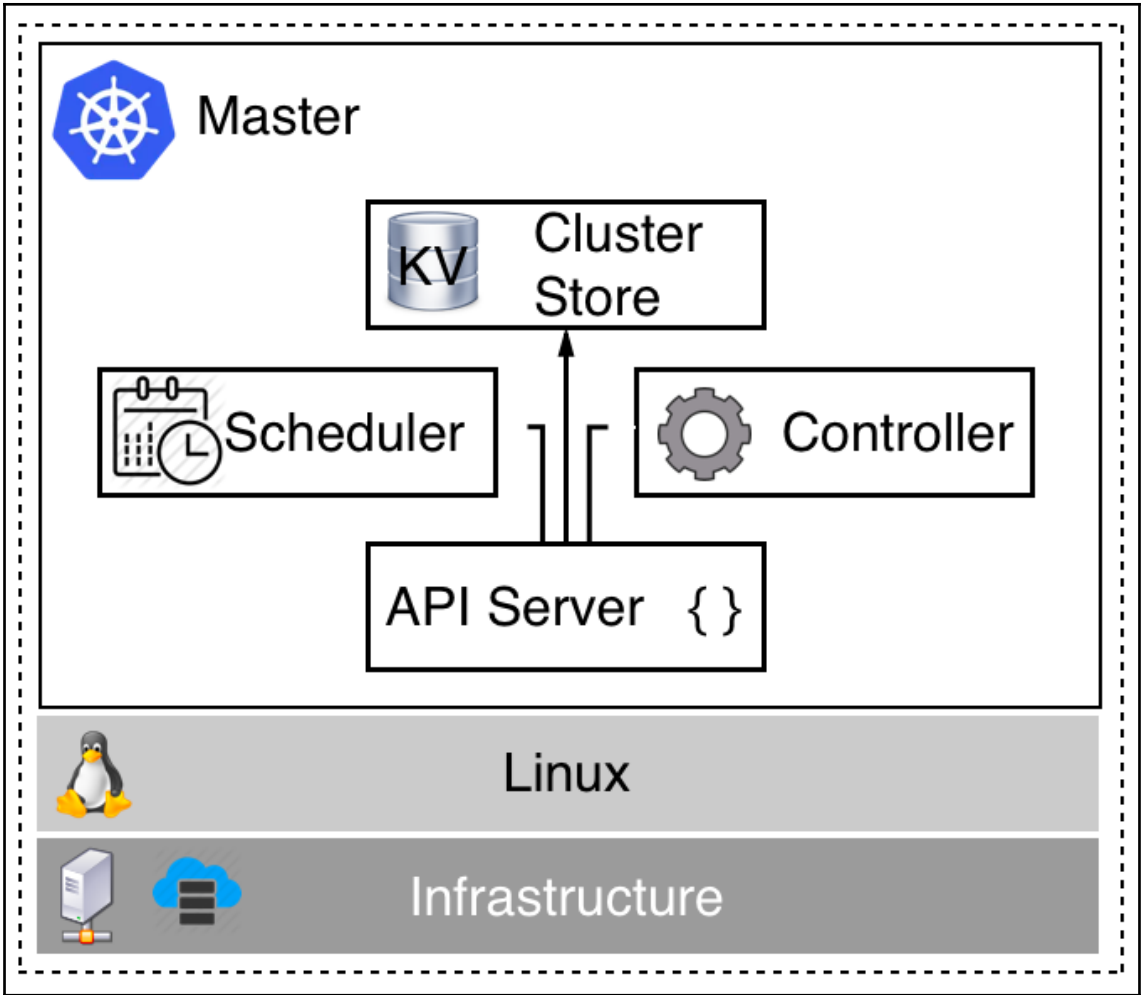
Name	Command	State	Ports
ch08_db_1	docker-entrypoint.sh postgres	Up	5432/tcp
ch08_web_1	/bin/sh -c node src/server.js	Up	0.0.0.0:32769->3000/tcp
ch08_web_2	/bin/sh -c node src/server.js	Up	0.0.0.0:32771->3000/tcp
ch08_web_3	/bin/sh -c node src/server.js	Up	0.0.0.0:32770->3000/tcp

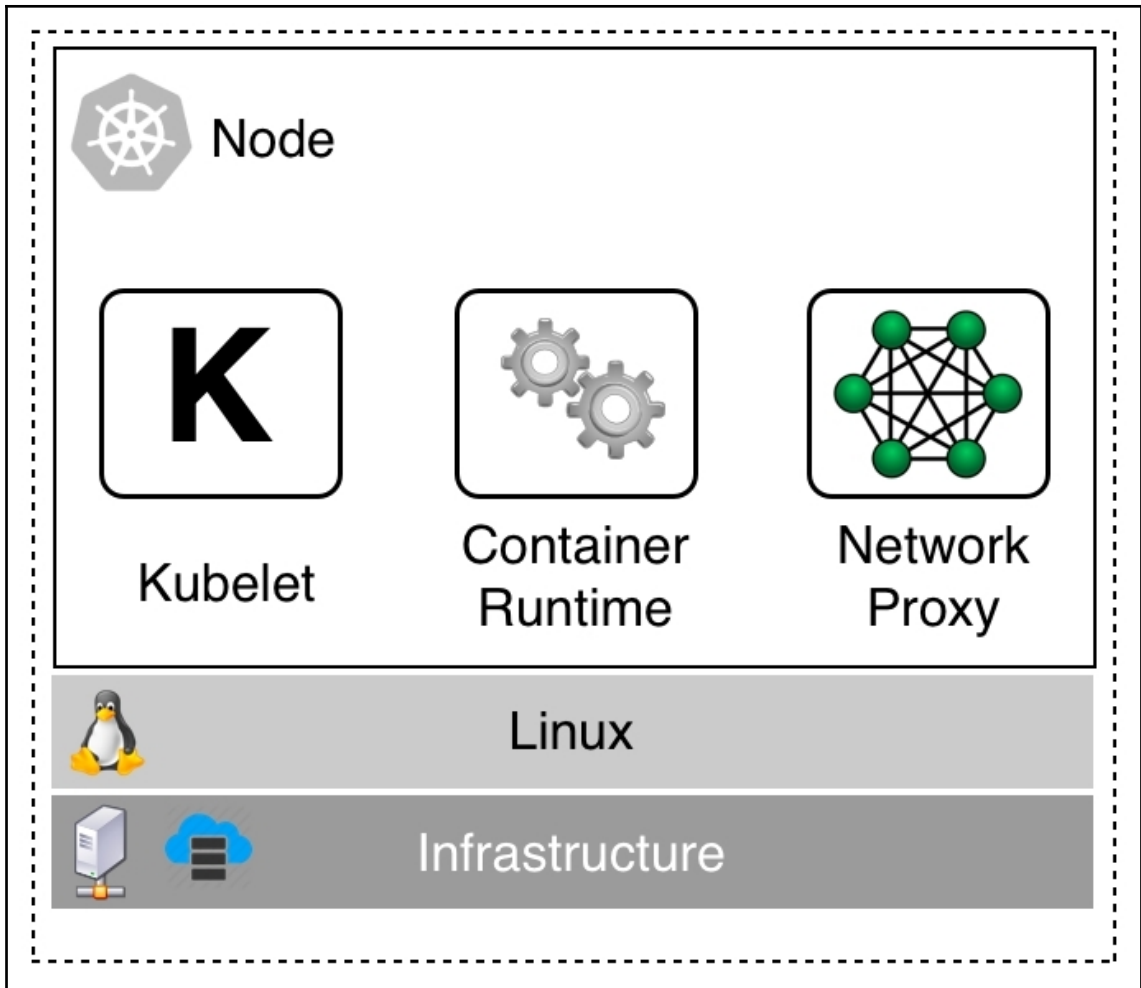
Chapter 9: Orchestrators



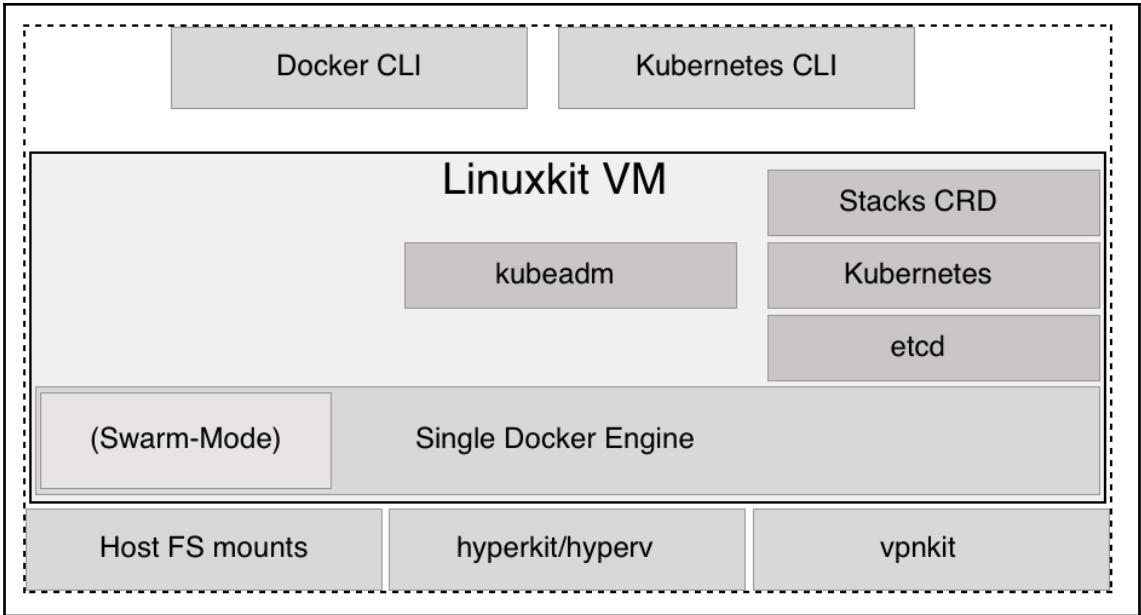
Chapter 10: Orchestrating Containerized Applications with Kubernetes







```
$ kubectl get nodes
NAME          STATUS    ROLES    AGE     VERSION
minikube     Ready    <none>   2d      v1.9.0
$
```



The initial Kubernetes cluster installation takes a few minutes and requires an Internet connection.

Install the Kubernetes cluster now?

Install

Cancel

```
$ kubectl config get-contexts
CURRENT  NAME                CLUSTER                AUTHINFO                NAMESPACE
*        docker-for-desktop  docker-for-desktop-cluster  docker-for-desktop
$
```

```
$ kubectl config use-context docker-for-desktop
Switched to context "docker-for-desktop".
$
```

```
$ kubectl get nodes
NAME                STATUS    ROLES    AGE     VERSION
docker-for-desktop  Ready    master   15m    v1.9.2
$
```

```

$ docker container ls --format "table {{.ID}}\t{{.Names}}"
CONTAINER ID      NAMES
0cddff5e5a86      k8s_compose_compose-5d4f4d67b6-gbrjh_docker_c3f07e06-2e3b-11e8-860f-025000000001_0
0edd323f6cbb      k8s_compose_compose-api-7bb7b5968f-f98jk_docker_c3e89385-2e3b-11e8-860f-025000000001_0
218514b4fc00      k8s_POD_compose-5d4f4d67b6-gbrjh_docker_c3f07e06-2e3b-11e8-860f-025000000001_0
af8a64fc9f7e      k8s_POD_compose-api-7bb7b5968f-f98jk_docker_c3e89385-2e3b-11e8-860f-025000000001_0
f64fbc5d070c      k8s_sidecar_kube-dns-6f4fd4bdf-9b8kn_kube-system_ab66aab5-2e3b-11e8-860f-025000000001_0
4b6138bd34e7      k8s_dnsmasq_kube-dns-6f4fd4bdf-9b8kn_kube-system_ab66aab5-2e3b-11e8-860f-025000000001_0
bf1394d8e48a      k8s_kubedns_kube-dns-6f4fd4bdf-9b8kn_kube-system_ab66aab5-2e3b-11e8-860f-025000000001_0
a16b63a8f614      k8s_kube-proxy_kube-proxy-p4cf8_kube-system_ab6e9881-2e3b-11e8-860f-025000000001_0
655f8dca4a1c      k8s_POD_kube-proxy-p4cf8_kube-system_ab6e9881-2e3b-11e8-860f-025000000001_0
108b5a2fe05c      k8s_POD_kube-dns-6f4fd4bdf-9b8kn_kube-system_ab66aab5-2e3b-11e8-860f-025000000001_0
23f1808a6f8a      k8s_kube-scheduler_kube-scheduler-docker-for-desktop_kube-system_3a369b3ba7d6d3b6fa014295eab94925_0
89a1032beee7      k8s_kube-controller-manager_kube-controller-manager-docker-for-desktop_kube-system_b098d9f7b8b45512f23bcb04fe3f64f5_0
bb25965301d8      k8s_etcd_etcd-docker-for-desktop_kube-system_7278f85057e8bf5cb81c9f96d3b25320_0
126d0edc29f0      k8s_kube-apiserver_kube-apiserver-docker-for-desktop_kube-system_8d19d05a3d7b137bafa35348cb849dd5_0
d87992c3ea6e      k8s_POD_kube-scheduler-docker-for-desktop_kube-system_3a369b3ba7d6d3b6fa014295eab94925_0
063fd120ea5       k8s_POD_kube-controller-manager-docker-for-desktop_kube-system_b098d9f7b8b45512f23bcb04fe3f64f5_0
22a1c70f6c4e      k8s_POD_kube-apiserver-docker-for-desktop_kube-system_8d19d05a3d7b137bafa35348cb849dd5_0
91ec502f1467      k8s_POD_etcd-docker-for-desktop_kube-system_7278f85057e8bf5cb81c9f96d3b25320_0
$ █

```

```

$ docker stack deploy -c docker-compose.yml app
Stack app was created
Waiting for the stack to be stable and running...
- Service db has one container running
- Service web has one container running
Stack app is stable and running

```

```

$ curl localhost:3000/pet
<html>
<head>
  <link rel="stylesheet" href="main.css">
</head>
<body>
  <div class="container">
    <h4>Cat Gif of the day</h4>
    Delivered to you by container web-5c5964c9b8-b5jq9<p>
  </div>
</body>
$ █

```

```
$ kubectl get all
```

NAME	DESIRED	CURRENT	UP-TO-DATE	AVAILABLE	AGE
deploy/web	1	1	1	1	9m

NAME	DESIRED	CURRENT	READY	AGE
rs/web-5c5964c9b8	1	1	1	9m

NAME	DESIRED	CURRENT	UP-TO-DATE	AVAILABLE	AGE
deploy/web	1	1	1	1	9m

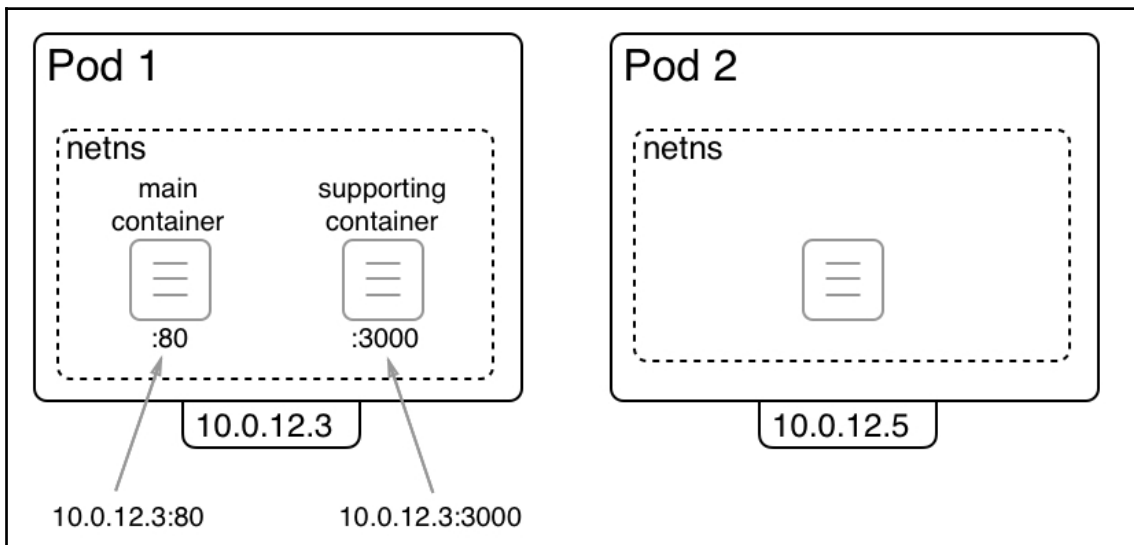
NAME	DESIRED	CURRENT	READY	AGE
rs/web-5c5964c9b8	1	1	1	9m

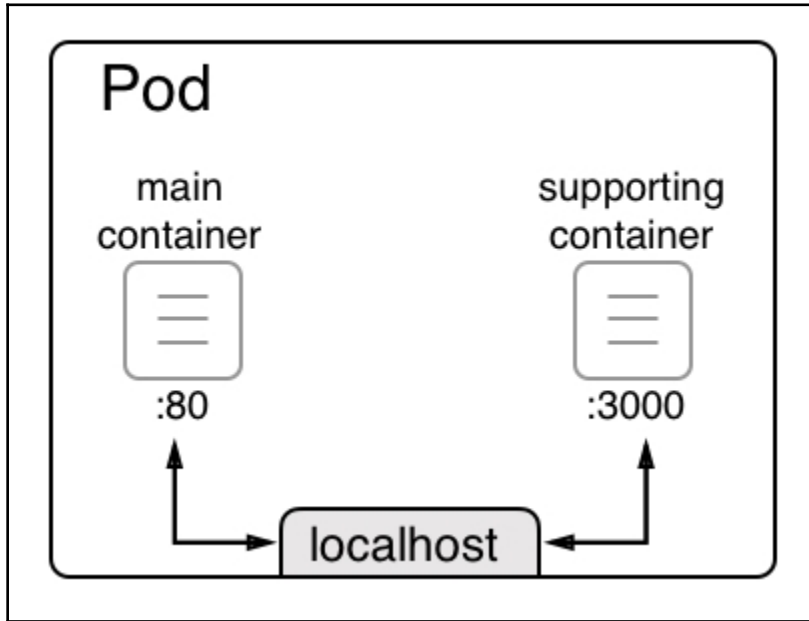
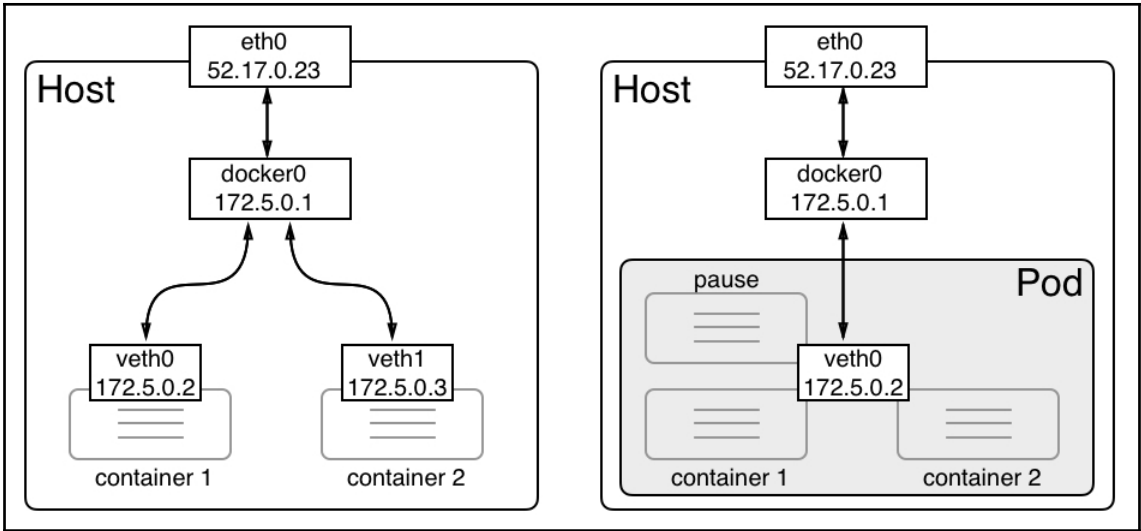
NAME	DESIRED	CURRENT	AGE
statefulsets/db	1	1	9m

NAME	READY	STATUS	RESTARTS	AGE
po/db-0	1/1	Running	0	9m
po/web-5c5964c9b8-b5jq9	1/1	Running	0	9m

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
svc/db	ClusterIP	None	<none>	5555/TCP	9m
svc/kubernetes	ClusterIP	10.96.0.1	<none>	443/TCP	45m
svc/web	ClusterIP	None	<none>	5555/TCP	9m
svc/web-published	LoadBalancer	10.111.43.147	localhost	3000:32590/TCP	9m

```
$ █
```





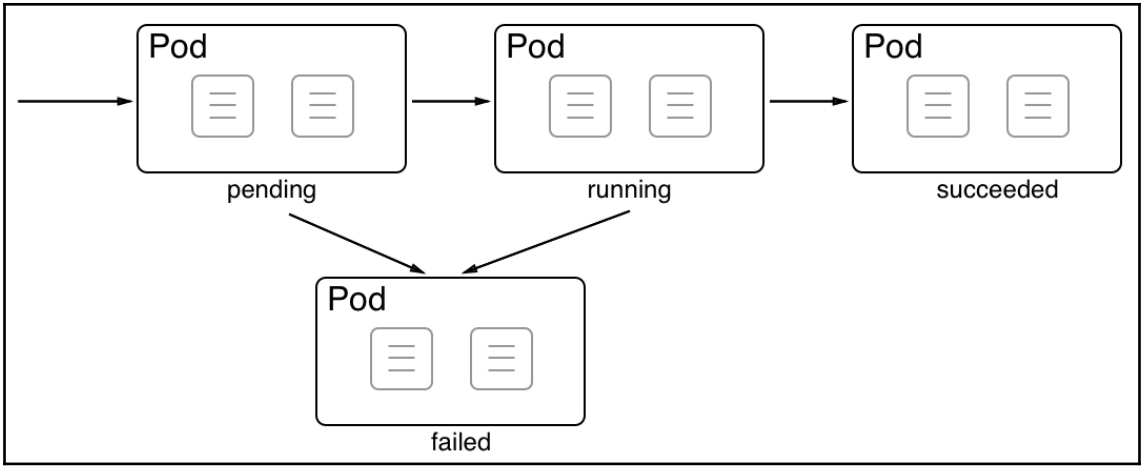
```
/ # wget -q0 - localhost
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
  body {
    width: 35em;
    margin: 0 auto;
    font-family: Tahoma, Verdana, Arial, sans-serif;
  }
</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
/ # █
```

```
/ # ip a show eth0
11: eth0@if12: <BROADCAST,MULTICAST,UP,LOWER_UP,M-DOWN> mtu 1500 qdisc noqueue state UP
link/ether 02:42:ac:11:00:02 brd ff:ff:ff:ff:ff:ff
inet 172.17.0.2/16 brd 172.17.255.255 scope global eth0
    valid_lft forever preferred_lft forever
/ # █
```

```
$ docker network inspect bridge
[
  {
    "Name": "bridge",
    "Id": "41909c08794041cab3a9d2e034426f2344f5310bd1cbfcbae65c5f25a05f541",
    "Created": "2018-03-26T22:16:44.790966007Z",
    "Scope": "local",
    "Driver": "bridge",
    "EnableIPv6": false,
    "IPAM": {
      "Driver": "default",
      "Options": null,
      "Config": [
        {
          "Subnet": "172.17.0.0/16",
          "Gateway": "172.17.0.1"
        }
      ]
    },
    "Internal": false,
    "Attachable": false,
    "Ingress": false,
    "ConfigFrom": {
      "Network": ""
    },
    "ConfigOnly": false,
    "Containers": {
      "8965ec65ca4a1de1f1d9c987b68e888c1115cf64f44ba3842953d29a2b9a0ea8": {
        "Name": "pause",
        "EndpointID": "890fc0527f7cb6484d24b7886772db23bb5a0502fe34269fc306277ea7a6f95e",
        "MacAddress": "02:42:ac:11:00:02",
        "IPv4Address": "172.17.0.2/16",
        "IPv6Address": ""
      }
    },
    "Options": {
      "com.docker.network.bridge.default_bridge": "true",
      "com.docker.network.bridge.enable_icc": "true",
      "com.docker.network.bridge.enable_ip_masquerade": "true",
      "com.docker.network.bridge.host_binding_ipv4": "0.0.0.0",
      "com.docker.network.bridge.name": "docker0",
      "com.docker.network.driver.mtu": "1500"
    },
    "Labels": {}
  }
]
$ █
```




```

$ kubectl describe pod/web-pod
Name:          web-pod
Namespace:     default
Node:          minikube/192.168.99.105
Start Time:   Sun, 25 Mar 2018 22:47:49 -0500
Labels:        <none>
Annotations:   <none>
Status:        Running
IP:           172.17.0.3
Containers:
  web:
    Container ID:  docker://e8784dfc2e3fcf1de4bfb9ab1508176799b6024b96d9447126e1db5dd5e2201f
    Image:         nginx:alpine
    Image ID:      docker-pullable://nginx@sha256:17c4704e19a11cd47545fa3c17e6903fc88672021f7f907f212d6663baf6ab57
    Port:         80/TCP
    State:         Running
      Started:     Sun, 25 Mar 2018 22:47:50 -0500
    Ready:         True
    Restart Count: 0
    Environment:   <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from default-token-fhds (ro)
Conditions:
  Type           Status
  Initialized     True
  Ready           True
  PodScheduled   True
Volumes:
  default-token-fhds:
    Type:          Secret (a volume populated by a Secret)
    SecretName:    default-token-fhds
    Optional:      false
QoS Class:        BestEffort
Node-Selectors:   <none>
Tolerations:      <none>
Events:
  Type    Reason             Age   From              Message
  ----    -
  Normal  Scheduled           5m    default-scheduler Successfully assigned web-pod to minikube
  Normal  SuccessfulMountVolume 5m    kubelet, minikube MountVolume.SetUp succeeded for volume "default-token-fhds"
  Normal  Pulled              5m    kubelet, minikube Container image "nginx:alpine" already present on machine
  Normal  Created              5m    kubelet, minikube Created container
  Normal  Started              5m    kubelet, minikube Started container
$

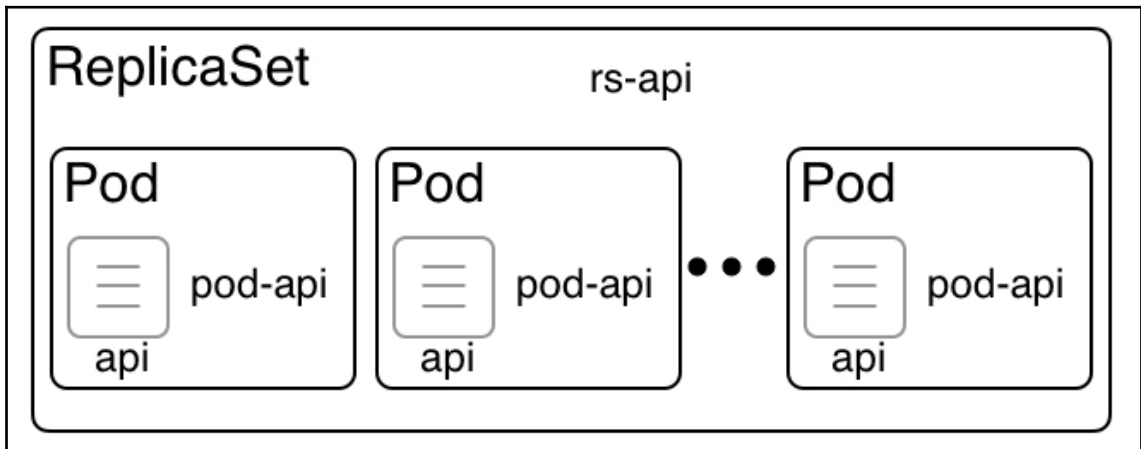
```

```

$ kubectl get pvc
NAME          STATUS    VOLUME                                     CAPACITY   ACCESS MODES   STORAGECLASS   AGE
my-data-claim Bound     pvc-aac3bb2c-3224-11e8-a07f-080027c10823  2Gi        RWO            standard       14m
$

```

```
$ kubectl delete po/web-pod
pod "web-pod" deleted
$ kubectl create -f pod-with-vol.yaml
pod "web-pod" created
$ kubectl exec -it web-pod -- /bin/sh
/ # cat /data/sample.txt
Hello world!
/ #
```

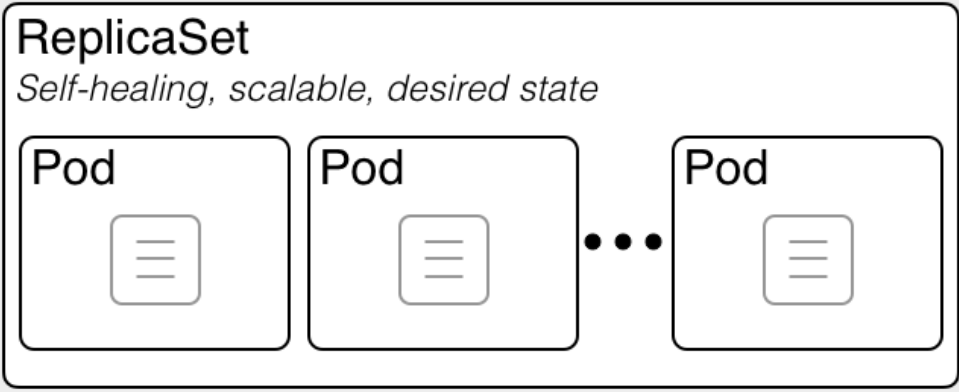


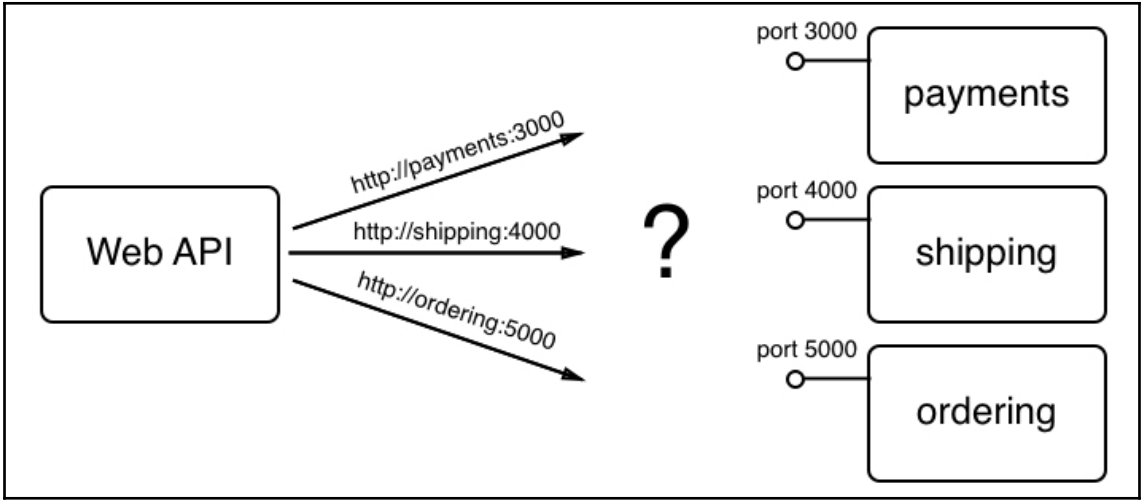
```
$ kubectl get pods
NAME                READY   STATUS    RESTARTS   AGE
rs-web-frj2m        1/1    Running   0           22h
rs-web-q6cr7        1/1    Running   0           41s
rs-web-zd2kt        1/1    Running   0           22h
$
```

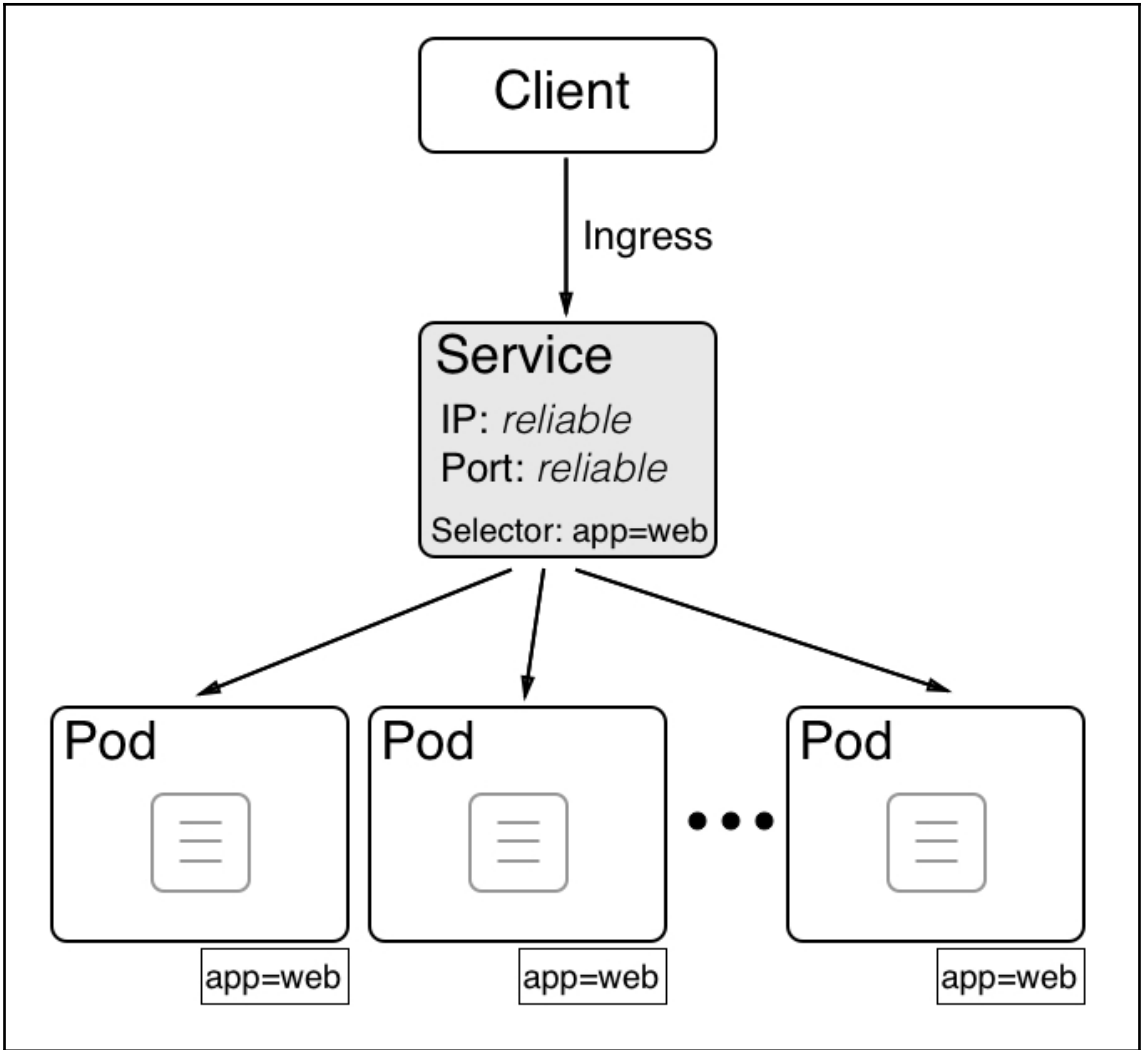
```
$ kubectl describe rs/rs-web
Name:          rs-web
Namespace:    default
Selector:     app=web
Labels:       app=web
Annotations:  <none>
Replicas:    3 current / 3 desired
Pods Status: 3 Running / 0 Waiting / 0 Succeeded / 0 Failed
Pod Template:
  Labels:  app=web
  Containers:
    nginx:
      Image:          nginx:alpine
      Port:           80/TCP
      Environment:    <none>
      Mounts:         <none>
      Volumes:        <none>
Events:
  Type    Reason          Age   From              Message
  ----    -
  Normal  SuccessfulCreate 4m    replicaset-controller  Created pod: rs-web-q6cr7
```

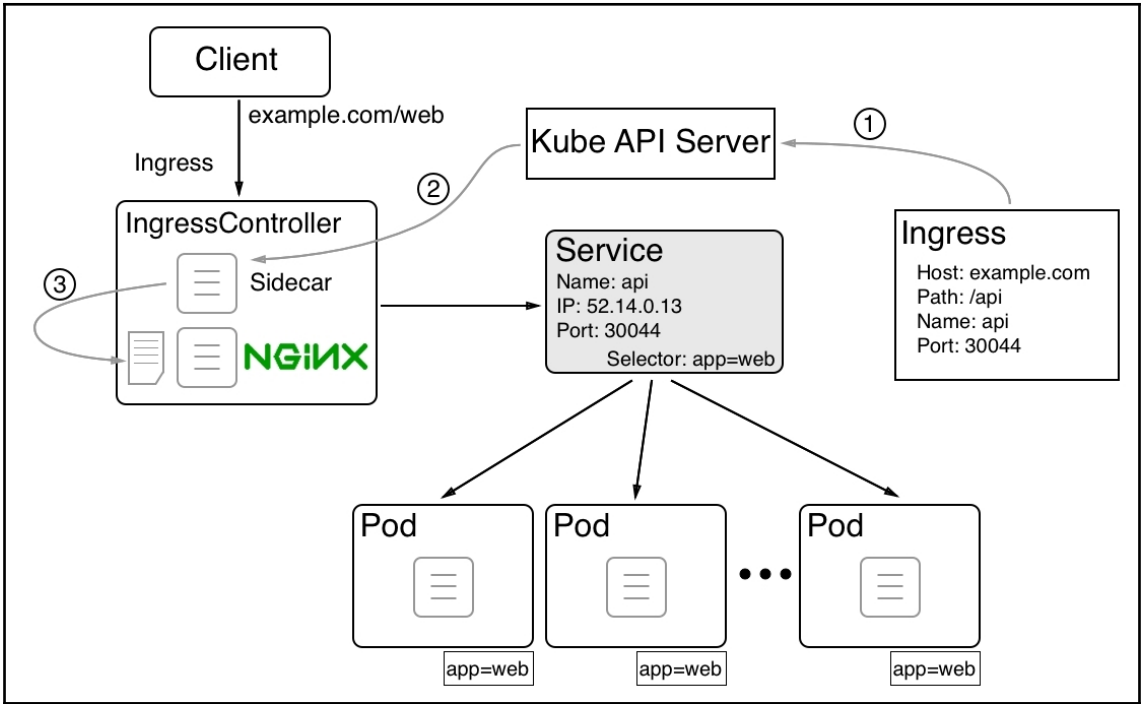
Deployment

Updates and Rollback









Chapter 11: Deploying, Updating, and Securing an Application with Kubernetes

! web-deployment.yaml x

```
You, 2 days ago | 1 author (You)
1  apiVersion: extensions/v1beta1      You, 19 days ago • A
2  kind: Deployment
3  metadata:
4    name: web
5  spec:
6    replicas: 1
7    selector:
8      matchLabels:
9        app: pets
10       service: web
11   template:
12     metadata:
13       labels:
14         app: pets
15         service: web
16     spec:
17       containers:
18       - image: appswithdockerandkubernetes/ch08-web:1.0
19         name: web
20         ports:
21         - containerPort: 3000
22           protocol: TCP
23
```

```
$ kubectl get all
```

NAME	DESIRED	CURRENT	UP-TO-DATE	AVAILABLE	AGE
deploy/web	1	1	1	1	5m

NAME	DESIRED	CURRENT	READY	AGE
rs/web-769b88f67	1	1	1	5m

NAME	DESIRED	CURRENT	UP-TO-DATE	AVAILABLE	AGE
deploy/web	1	1	1	1	5m

NAME	DESIRED	CURRENT	READY	AGE
rs/web-769b88f67	1	1	1	5m

NAME	READY	STATUS	RESTARTS	AGE
po/web-769b88f67-4fccx	1/1	Running	0	5m

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
svc/kubernetes	ClusterIP	10.96.0.1	<none>	443/TCP	8d

```
$ █
```


! web-service.yaml ✕

```
1  apiVersion: v1
2  kind: Service
3  metadata:
4    name: web
5  spec:
6    type: NodePort
7    ports:
8    - port: 3000
9      protocol: TCP
10   selector:
11     app: pets
12     service: web
```

```
$ kubectl get services
```

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
kubernetes	ClusterIP	10.96.0.1	<none>	443/TCP	9d
web	NodePort	10.103.113.40	<none>	3000:30125/TCP	3m

```
$ █
```

! db-stateful-set.yaml x

You, 2 days ago | 1 author (You)

```
1  apiVersion: apps/v1           You, 19 days ago • Adding exis
2  kind: StatefulSet
3  metadata:
4    name: db
5  spec:
6    selector:
7      matchLabels:
8        app: pets
9        service: db
10   serviceName: db
11   template:
12     metadata:
13       labels:
14         app: pets
15         service: db
16     spec:
17       containers:
18       - image: appswithdockerandkubernetes/ch08-db:1.0
19         name: db
20         ports:
21         - containerPort: 5432
22         volumeMounts:
23         - mountPath: /var/lib/postgresql/data
24           name: pets-data
25     volumeClaimTemplates:
26     - metadata:
27       name: pets-data
28     spec:
29       accessModes:
30       - ReadWriteOnce
31       resources:
32         requests:
33         storage: 100Mi
34
```

```
$ kubectl get all
```

NAME	DESIRED	CURRENT	UP-TO-DATE	AVAILABLE	AGE
deploy/web	1	1	1	1	27m

NAME	DESIRED	CURRENT	READY	AGE
rs/web-769b88f67	1	1	1	27m

NAME	DESIRED	CURRENT	UP-TO-DATE	AVAILABLE	AGE
deploy/web	1	1	1	1	27m

NAME	DESIRED	CURRENT	READY	AGE
rs/web-769b88f67	1	1	1	27m

NAME	DESIRED	CURRENT	AGE
statefulsets/db	1	1	49s

NAME	READY	STATUS	RESTARTS	AGE
po/db-0	1/1	Running	0	49s

po/web-769b88f67-qd2xf	1/1	Running	0	27m
------------------------	-----	---------	---	-----

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
svc/kubernetes	ClusterIP	10.96.0.1	<none>	443/TCP	10d
svc/web	NodePort	10.103.113.40	<none>	3000:30125/TCP	27m

```
$ █
```

! *db-service.yaml* ✕

Gabriel Schenker, 2 days ago

```
1  apiVersion: v1
2  kind: Service
3  metadata:
4    | name: db
5  spec:
6    | type: ClusterIP
7    | ports:
8    | - port: 5432
9    |   | protocol: TCP
10   | selector:
11   |   | app: pets
12   |   | service: db
```

192.168.99.100:30125/pet

Cat Gif of the day



Courtesy: [Buzzfeed](#)

Delivered to you by container web-769b88f67-qd2xf

```
$ kubectl create -f pets.yaml
deployment "web" created
service "web" created
statefulset "db" created
service "db" created
$
```

```
$ ./remove-pets.sh
deployment "web" deleted
service "web" deleted
statefulset "db" deleted
service "db" deleted
$ █
```

```
9   app.set('views', __dirname);
10
11  app.get('/',function(req,res){
12      res.status(200).send('Pets Demo Application v2\n');
13  });
14
```

```
Events:
Type      Reason          Age          From          Message
-----
Normal    ScalingReplicaSet 12m          deployment-controller Scaled up replica set web-769b88f67 to 5
Normal    ScalingReplicaSet 3m           deployment-controller Scaled up replica set web-55cdf67cd to 1
Normal    ScalingReplicaSet 3m           deployment-controller Scaled down replica set web-769b88f67 to 4
Normal    ScalingReplicaSet 3m           deployment-controller Scaled up replica set web-55cdf67cd to 2
Normal    ScalingReplicaSet 3m           deployment-controller Scaled down replica set web-769b88f67 to 3
Normal    ScalingReplicaSet 3m           deployment-controller Scaled up replica set web-55cdf67cd to 3
Normal    ScalingReplicaSet 3m           deployment-controller Scaled down replica set web-769b88f67 to 2
Normal    ScalingReplicaSet 3m           deployment-controller Scaled up replica set web-55cdf67cd to 4
Normal    ScalingReplicaSet 3m           deployment-controller Scaled down replica set web-769b88f67 to 1
Normal    ScalingReplicaSet 3m (x2 over 3m) deployment-controller (combined from similar events): Scaled down replica set web-769b88f67 to 0
$ █
```

```
$ kubectl get rs
```

NAME	DESIRED	CURRENT	READY	AGE
web-55cdf67cd	5	5	5	27m
web-769b88f67	0	0	0	36m

```
$ █
```

```
$ kubectl get rs
```

NAME	DESIRED	CURRENT	READY	AGE
web-55cdf67cd	0	0	0	36m
web-769b88f67	5	5	5	45m

```
$ █
```


! web-deploy-blue.yaml x

You, 2 days ago | 1 author (You)

```
1  apiVersion: extensions/v1beta1      You, 19 days ago • Add
2  kind: Deployment
3  metadata:
4    name: web-blue
5  spec:
6    replicas: 1
7    selector:
8      matchLabels:
9        app: pets
10       service: web
11       color: blue
12    template:
13      metadata:
14        labels:
15          app: pets
16          service: web
17          color: blue
18      spec:
19        containers:
20          - image: appswithdockerandkubernetes/ch08-web:1.0
21            name: web
22            ports:
23              - containerPort: 3000
24              protocol: TCP
25
```

! web-svc-blue-green.yaml x

```
1  apiVersion: v1
2  kind: Service
3  metadata:
4    name: web
5  spec:
6    type: NodePort
7    ports:
8    - port: 3000
9      protocol: TCP
10   selector:
11     app: pets
12     service: web
13     color: blue
14
```

! web-deploy-green.yaml x

You, a day ago | 1 author (You)

```
1  apiVersion: extensions/v1beta1      You, 19 days ago • A
2  kind: Deployment
3  metadata:
4    name: web-green
5  spec:
6    replicas: 1
7    selector:
8      matchLabels:
9        app: pets
10       service: web
11       color: green
12   template:
13     metadata:
14       labels:
15         app: pets
16         service: web
17         color: green
18     spec:
19       containers:
20       - image: appswithdockerandkubernetes/ch11-web:2.0
21         name: web
22         ports:
23         - containerPort: 3000
24           protocol: TCP
25
```

```
$ kubectl get deploy
```

NAME	DESIRED	CURRENT	UP-TO-DATE	AVAILABLE	AGE
web-blue	1	1	1	1	23h
web-green	1	1	1	1	3s

```
$ █
```

```
$ echo "john.doe" | base64  
am9obi5kb2UK
```

```
$ echo "sEcret-pasSw0rD" | base64  
c0VjcmV0LXBhc1N3MHJECg==
```

```
$ █
```

```
$ kubectl create -f pets-secret.yaml
secret "pets-secret" created
$ kubectl describe secrets/pets-secret
Name:          pets-secret
Namespace:     default
Labels:        <none>
Annotations:   <none>

Type:  Opaque

Data
====
password: 16 bytes
username: 9 bytes
$ █
```

```
$ kubectl get secrets/pets-secret -o yaml
apiVersion: v1
data:
  password: c0VjcmV0LXBhc1N3MHJECg==
  username: am9obi5kb2UK
kind: Secret
metadata:
  creationTimestamp: 2018-03-31T20:36:05Z
  name: pets-secret
  namespace: default
  resourceVersion: "154786"
  selfLink: /api/v1/namespaces/default/secrets/pets-secret
  uid: 22d818bd-3523-11e8-a3cb-080027c10823
type: Opaque
$ █
```

! web-deploy-secret.yaml x

You, 2 days ago | 1 author (You)

```
1  apiVersion: extensions/v1beta1      You, 19 days ago • Ad
2  kind: Deployment
3  metadata:
4    name: web
5  spec:
6    replicas: 1
7    selector:
8      matchLabels:
9        app: pets
10     service: web
11   template:
12     metadata:
13       labels:
14         app: pets
15         service: web
16     spec:
17       containers:
18         - image: appswithdockerandkubernetes/ch08-web:1.0
19           name: web
20           ports:
21             - containerPort: 3000
22               protocol: TCP
23           volumeMounts:
24             - name: secrets
25               mountPath: "/etc/secrets"
26               readOnly: true
27           volumes:
28             - name: secrets
29               secret:
30                 secretName: pets-secret
```

```
$ kubectl exec -it web-597b7f7749-87mq5 -- /bin/sh
/app # cd /etc/secrets/
/etc/secrets # ls -l
total 0
lrwxrwxrwx  1 root    root      15 Apr  2 01:26 password -> ../data/password
lrwxrwxrwx  1 root    root      15 Apr  2 01:26 username -> ../data/username
/etc/secrets # cat username && cat password
john.doe
sEcret-pasSw0rD
/etc/secrets # █
```


! web-deploy-secret-env.yaml x

```
1  apiVersion: extensions/v1beta1
2  kind: Deployment
3  metadata:
4    name: web
5  spec:
6    replicas: 1
7    selector:
8      matchLabels:
9        app: pets
10       service: web
11   template:
12     metadata:
13       labels:
14         app: pets
15         service: web
16     spec:
17       containers:
18         - image: fundamentalsofdocker/ch08-web:1.0
19           name: web
20           ports:
21             - containerPort: 3000
22               protocol: TCP
23         env:
24           - name: PETS_USERNAME
25             valueFrom:
26               secretKeyRef:
27                 name: pets-secret
28                 key: username
29           - name: PETS_PASSWORD
30             valueFrom:
31               secretKeyRef:
32                 name: pets-secret
33                 key: password
34
```

```
$ kubectl exec -it web-694f958cd4-6zq89 -- /bin/sh
/app # echo $PETS_USERNAME && echo $PETS_PASSWORD
john.doe
sEcret-pasSw0rD
/app # █
```

Chapter 12: Running a Containerized App in the Cloud

The screenshot shows the Microsoft Azure portal interface. The breadcrumb navigation at the top reads "Home > Resource groups > pets-group". The "pets-group" resource group name is highlighted with a red box. The left-hand navigation pane includes "Create a resource", "All services", "FAVORITES", "Dashboard", "Resource groups" (highlighted with a red box), "All resources", "Recent", "App Services", "Virtual machines (classic)", and "Virtual machines". The main content area shows the "Overview" tab for the "pets-group" resource group. It displays the subscription as "Visual Studio Premium with MSDN" and the subscription ID as "186760ad-9152-4499-b317-c9bff441fb9d". There are no deployments. A table lists resources, showing one item: "pets-cluster", which is a "Kubernetes service" located in "West Europe". A red arrow points to the "pets-cluster" entry in the table.

The screenshot shows the Microsoft Azure portal interface for the "pets-group" resource group. The breadcrumb navigation at the top reads "Home > Resource groups > pets-group". The "pets-group" resource group name is highlighted with a red box. The left-hand navigation pane includes "Overview", "Activity log", "Access control (IAM)", "Tags", "Events", "SETTINGS", "Quickstart", and "Resource costs". The main content area shows the "Overview" tab for the "pets-group" resource group. It displays the subscription as "Visual Studio Premium with MSDN" and the subscription ID as "186760ad-9152-4499-b317-c9bff441fb9d". There are no deployments. A table lists resources, showing two items: "gnsPetsRegistry" (Container registry) and "pets-cluster" (Kubernetes service), both located in "West Europe". A red dashed box highlights the "gnsPetsRegistry" entry in the table.

CAT GIF OF THE DAY



Courtesy: [Wikimedia](#)

Delivered to you by container web-59545bb958-sbctd

Log analytics workspace



Create new or link existing one created in OMS ...

Create New Link Existing

* OMS Workspace

pets-oms-workspace

* Subscription

Visual Studio Premium with MSDN

* Resource group

Create new Use existing

pets-group

* Location

West Europe

* Pricing tier

Per GB

pets-group
Resource group

Search (Ctrl+/) << + Add Edit columns Delete resource group Refresh Move Assign tags Delete

Subscription (change) Visual Studio Premium with MSDN Subscription ID 186760ad-9152-4499-b317-c9bff441fb9d Deployments 1 Succeeded

Tags (change) [Click here to add tags](#)

Filter by name... All types All locations

3 items Show hidden types

<input type="checkbox"/>	NAME	TYPE
<input type="checkbox"/>	gnspetsregistry	Container registry
<input type="checkbox"/>	pets-cluster	Kubernetes service
<input type="checkbox"/>	pets-oms-workspace	Log Analytics

Home > Resource groups > pets-group **pets-oms-workspace**

pets-oms-workspace
Log Analytics

Search (Ctrl+/) << OMS Portal Delete

Essentials ^

Resource group (change)	Workspace Name
pets-group	pets-oms-workspace
Status	Workspace Id
Active	517aa47a-0f69-49c2-921e-f4448b4de533
Location	Price tier
West Europe	Per GB
Subscription name (change)	Management services
Visual Studio Premium with MSDN	Operations logs
Subscription ID	
186760ad-9152-4499-b317-c9bff441fb9d	

Home > Resource groups > pets-group > pets-cluster > Health (preview)

pets-cluster - Health (preview)
Kubernetes service

Search (Ctrl+F)

TimeRange = Last hour Add Filter

Cluster Nodes Controllers Containers [Learn more](#) [Feedback](#)

Node CPU utilization %

1m granularity

Avg Min 50th 90th 95th Max

AVERAGE PETS-CLUSTER: 12.36%
95TH PETS-CLUSTER: 14.54%

Node memory utilization %

1m granularity

Avg Min 50th 90th 95th Max

AVERAGE PETS-CLUSTER: 15.01%
95TH PETS-CLUSTER: 15.19%

Node count

1m granularity

Total Ready Not Ready

READY PETS-CLUSTER: 1
NOT READY PETS-CLUSTER: 0

Active pod count

1m granularity

Total Pending Running Unknown

PENDING PETS-CLUSTER: 0
RUNNING PETS-CLUSTER: 13
UNKNOWN PETS-CLUSTER: 0

MONITORING

- Metrics (preview)
- Health (preview)**
- Logs

SUPPORT + TROUBLESHOOTING

- New support request

pets-group - Diagnostic settings

- Search (Ctrl+)
- Refresh
- Overview
- Activity log
- Access control (IAM)
- Tags
- Events
- SETTINGS
- Quickstart
- Resource costs
- Deployments
- Policies
- Properties
- Locks
- Automation script
- MONITORING
- Alerts
- Metrics
- Logs
- Diagnostic settings**

* Subscription: Visual Studio Premium with MSDN
Resource group: pets-group
Resource type: Kubernetes services

Select any of the resources to view logs.

NAME	RESOURCE TYPE	RESOURCE GROUP	DIAGNOSTICS STATUS
pets-cluster	Kubernetes service	pets-group	Disabled



Diagnostics settings



Save Discard Delete

* Name



Archive to a storage account

Stream to an event hub

Send to Log Analytics

Log Analytics
pets-oms-workspace



LOG

kube-apiserver

kube-controller-manager

kube-scheduler

guard

METRIC

AllMetrics

Home > Resource groups > pets-group > pets-cluster - Logs

pets-cluster - Logs
Kubernetes service

Search (Ctrl+J)

New Query 1*

pets-oms-workspace **RUN** Time range: Set in query

Schema Filter

Filter by name or type...

ACTIVE

- pets-oms-workspace
 - ContainerInsights
 - LogManagement
 - Custom Logs
 - Functions

FAVORITE WORKSPACES

```
let startTimestamp = ago(1d);
KubePodInventory
| where TimeGenerated > startTimestamp
| where ClusterName =~ "pets-cluster!"
| distinct ContainerID
| join
{
  ContainerLog
  | where TimeGenerated > startTimestamp
}
on ContainerID
Completed
```


LogEntrySource LogEntry TimeGenerated [UTC] Computer Image

LogEntrySource	LogEntry	TimeGenerated [UTC]	Computer	Image
> stdout	Connected!\n	2018-09-01T10:17:08.278	aks-nodepool1-54489083-0	debian
> stdout	Connecting to DB!\n	2018-09-01T10:17:08.278	aks-nodepool1-54489083-0	debian
> stdout	https://upload.wikimedia.org/wikipedia/commons/thumb/d/d4/Www.p...	2018-09-01T10:17:08.278	aks-nodepool1-54489083-0	debian
> stdout	Connecting to DB!\n	2018-09-01T10:17:08.278	aks-nodepool1-54489083-0	debian
> stdout	Connected!\n	2018-09-01T10:17:08.278	aks-nodepool1-54489083-0	debian
> stdout	http://upload.wikimedia.org/wikipedia/commons/9/97/Cat_and_kitten...	2018-09-01T10:17:08.278	aks-nodepool1-54489083-0	debian
> stdout	https://upload.wikimedia.org/wikipedia/commons/c/cd/Ragdoll_Blue_C...	2018-09-01T10:17:08.278	aks-nodepool1-54489083-0	debian
> stdout	Connecting to DB!\n	2018-09-01T10:17:08.277	aks-nodepool1-54489083-0	debian
> stdout	Connected!\n	2018-09-01T10:17:08.277	aks-nodepool1-54489083-0	debian

Health (preview)

```
bash-4.4# kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
db-6746668f6c-msv8m                1/1    Running   0           1d
ssh-helper-86966767d-v2xqg         1/1    Running   0           2m
web-74dbc994bc-5d2j6               1/1    Running   0           1d
web-74dbc994bc-ljml9               1/1    Running   0           1d
web-74dbc994bc-tj6p2               1/1    Running   0           1d
bash-4.4#
```

Create Kubernetes cluster

 Validation passed

[Basics](#) [Authentication](#) [Networking](#) [Monitoring](#) [Tags](#) [Review + create](#)

BASICS

Subscription	Visual Studio Premium with MSDN
Resource group	(new) pets-dev-group
Region	West Europe
Kubernetes cluster name	pets-dev-cluster
Kubernetes version	1.11.2
DNS name prefix	gns-pets-dev
Node count	1
Node size	Standard_DS2_v2

AUTHENTICATION

Enable RBAC	No
-------------	----

NETWORKING

HTTP application routing	Yes
Network configuration	Basic

MONITORING

Enable container monitoring	Yes
Log Analytics workspace	(new) pets-dev-workspace

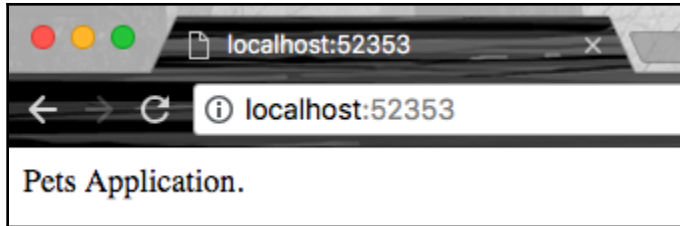
TAGS




(none)



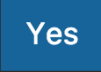
[Create](#)



[Previous](#)

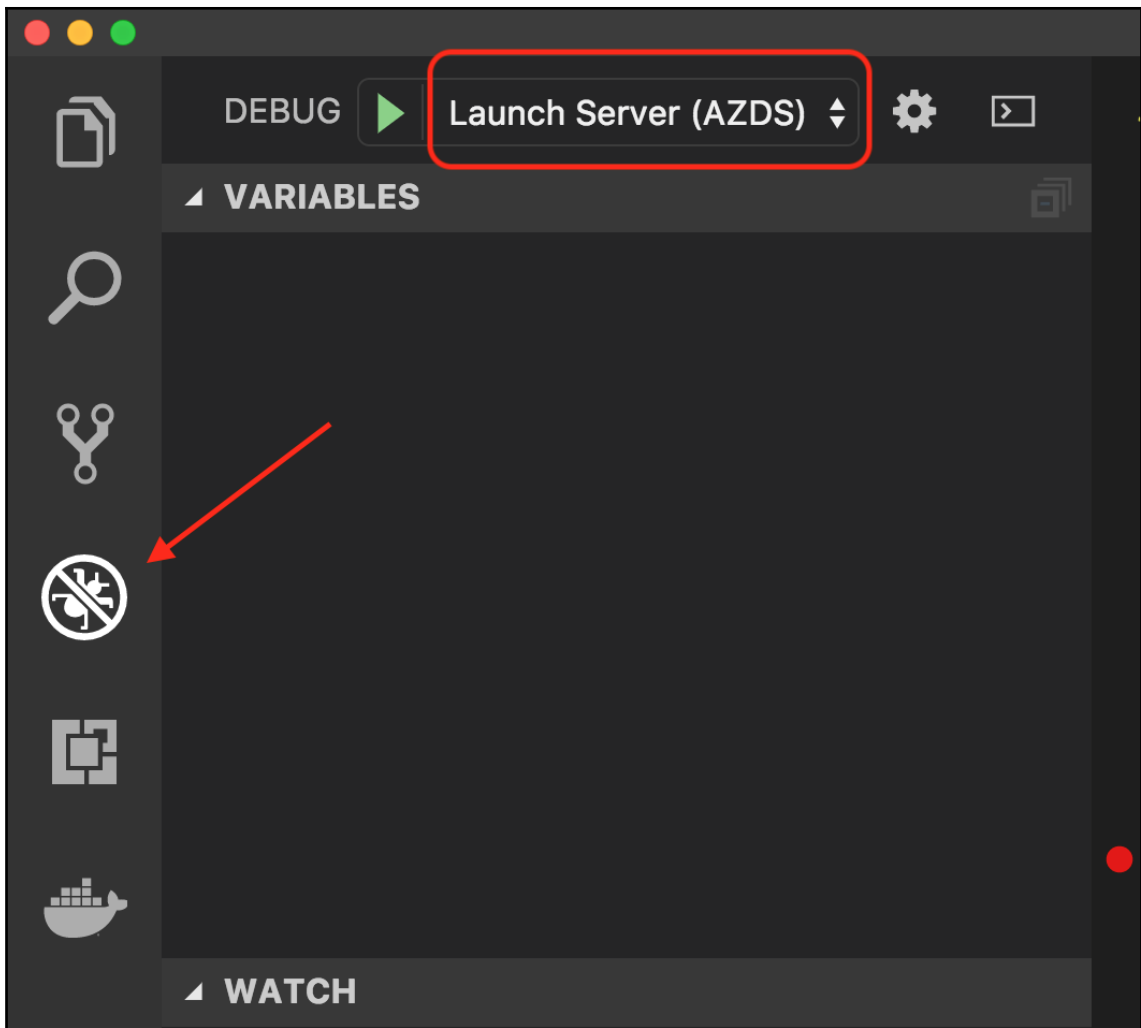
[Download a template for automation](#)



 [Azure Dev Spaces] Required assets to build and debug are missing from 'web'. Add them?  

Source: Azure Dev Spaces (E...   

Ln 45, Col 10 Spaces: 4 UTF-8 LF JavaScript   1



```
11  
12   app.get('/', function(req, res){  
13     res.status(200).send('Pets Application.');
```

```
JS server.js x
⋮ ▶ ↺ ↓ ↑ ↻ ■
1  const express = require('express');
2  const mustacheExpress = require('mustache-express');
3  const request = require('request');
4  const os = require('os');
5
6  const app = express();
7  app.set('view engine', 'html');
8  app.engine('html', mustacheExpress()); // register file extens
9  app.set('views', __dirname + '/public');
10 app.use(express.static('public'));
11
12 app.get('/', function(req, res){
13   res.status(200).send('Pets Application.');
```

```
16 app.get('/pet', function(req, res){
17   res.render('app', {
18     url: 'https://bit.ly/2nngIvD',
19     hostname: os.hostname()
20   });
21 });
```