

# highly available persistent applications in containers

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[emccode.com](http://emccode.com) | [github.com/kacole2](https://github.com/kacole2)



highly available persistent  
applications in containers

# Kendrick Coleman

Developer Advocate | EMC {code}  
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dockercon 16

# Agenda

- Persistence for containers, but why?
- Volume Plugins with VirtualBox in action
- Performing fail-over of a container to another container host

credit: LightBend (source: [www.slideshare.net/Lightbend/the-6-traits-of-reactive-microservices](http://www.slideshare.net/Lightbend/the-6-traits-of-reactive-microservices))

THERE IS **NO SUCH THING** AS A  
"**STATELESS**" ARCHITECTURE  
IT'S JUST **SOMEONE ELSE'S PROBLEM**

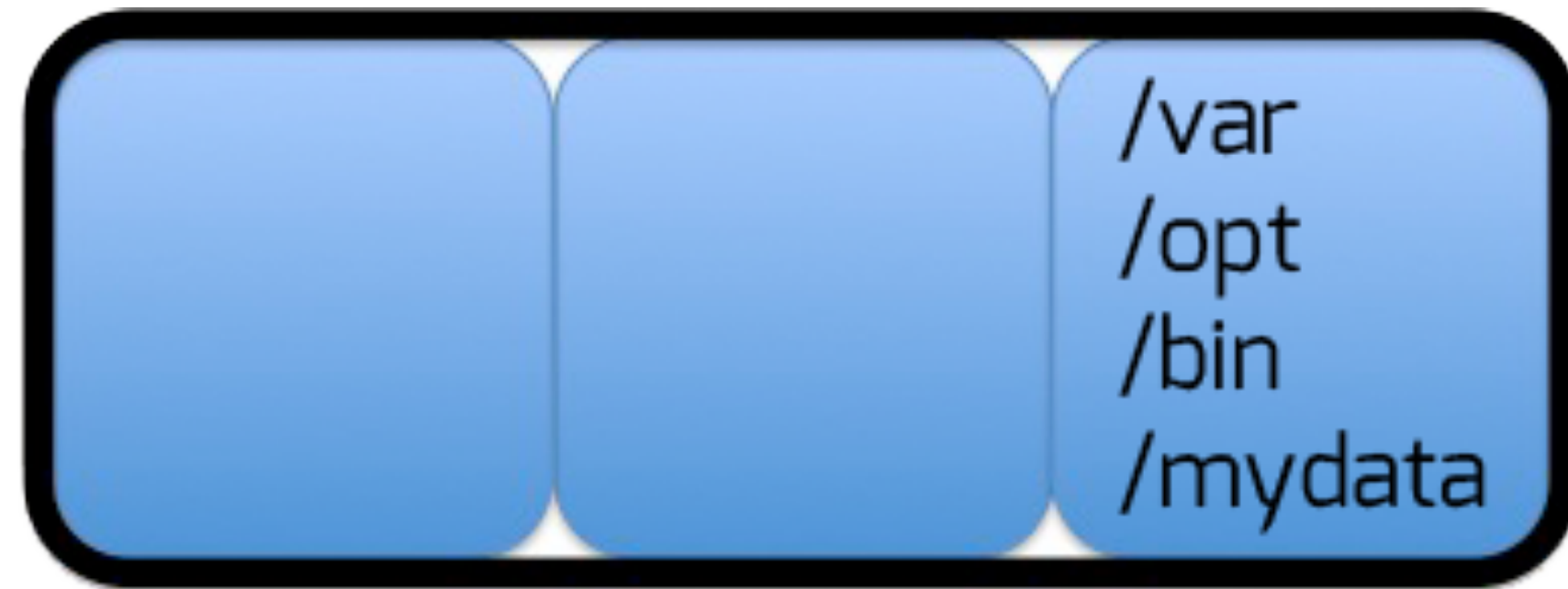
7/12 are persistent

hub.docker.com

 nginx official	3.1K STARS	10M+ PULLS	> DETAILS
 busybox official	672 STARS	10M+ PULLS	> DETAILS
 ubuntu official	4.0K STARS	10M+ PULLS	> DETAILS
 registry official	845 STARS	10M+ PULLS	> DETAILS
 swarm official	346 STARS	10M+ PULLS	> DETAILS
 redis official	2.2K STARS	10M+ PULLS	> DETAILS
 django official	1.1K STARS	10M+ PULLS	> DETAILS
 MySQL official	2.4K STARS	10M+ PULLS	> DETAILS
 node official	2.2K STARS	10M+ PULLS	> DETAILS
 postgres official	2.1K STARS	10M+ PULLS	> DETAILS
 elasticsearch official	1.2K STARS	10M+ PULLS	> DETAILS
 wordpress official	1.0K STARS	5M+ PULLS	> DETAILS

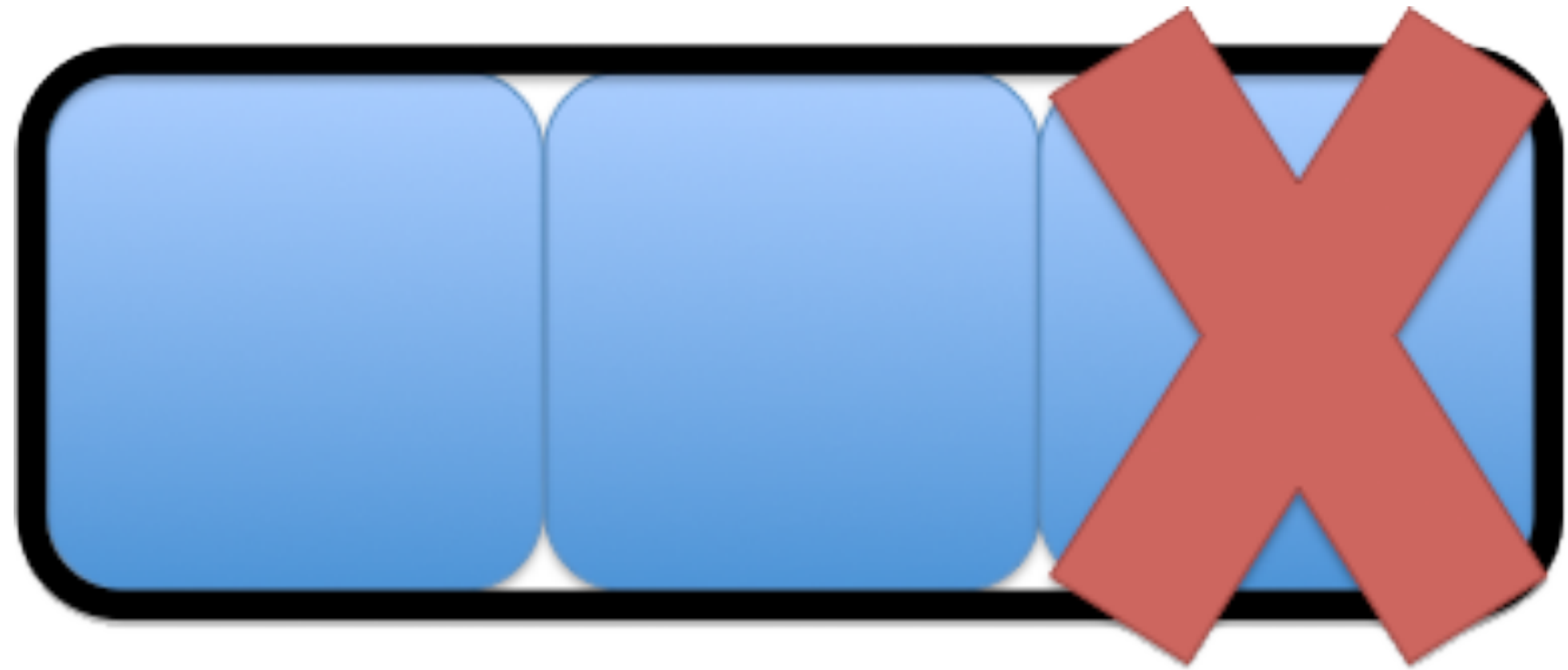
# What's the problem?

- When I run a persistent application in a container, where does my data get stored?
- one container holds the directory and structure of the application



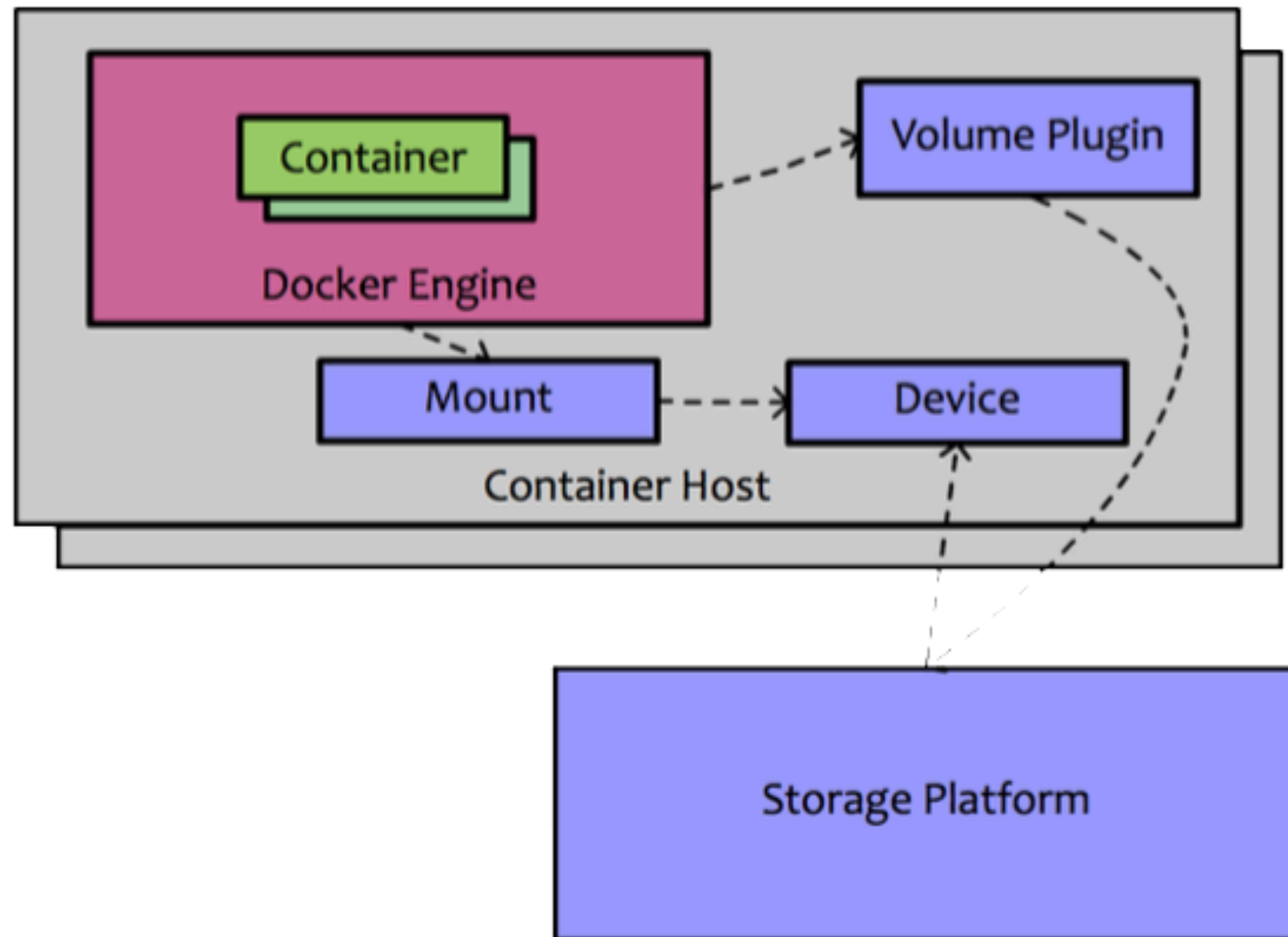
# What's the problem?

- lose a container. lose the data.
- or use `-v` for local persistence.  
Will not tolerate server failure



## Enter Docker Volume Plugin Extensibility

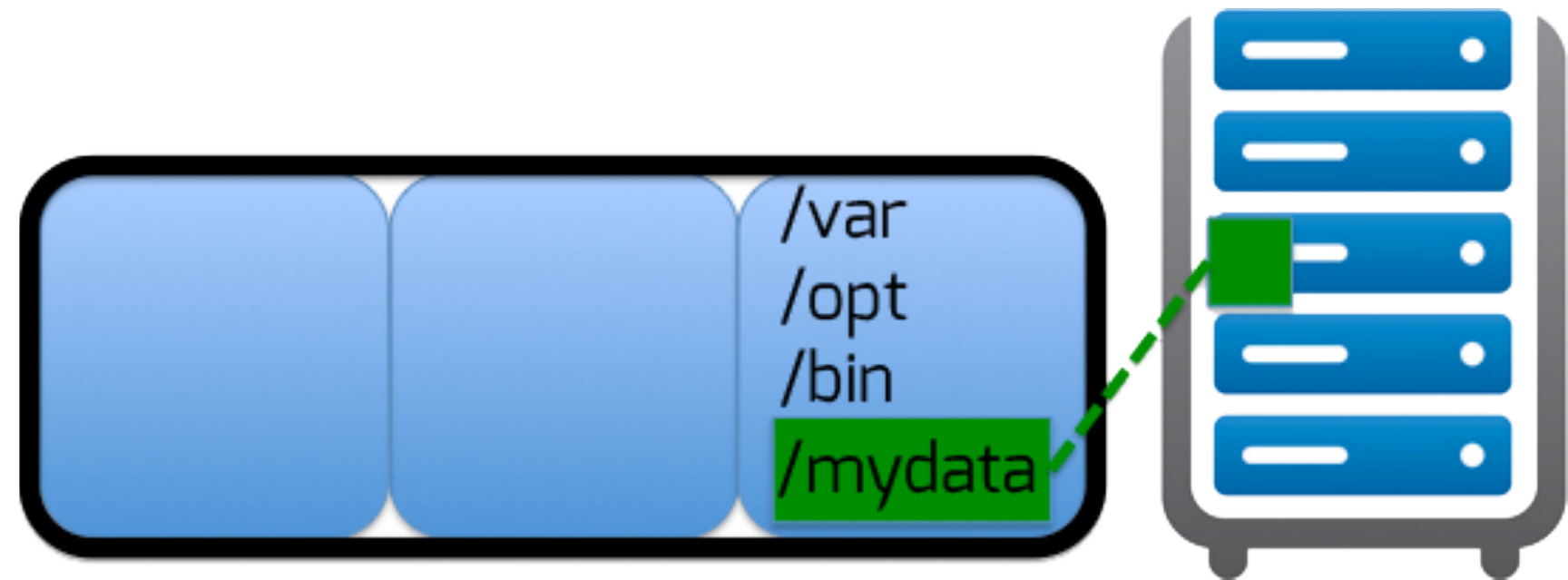
- simplified external storage usage for containers
- Receives plugin requests from Docker Daemon for Volume Create/Remove/Mount/Unmount/Path
- storage orchestration
  - `/var/lib/plugin/volumes/vol1/data`





# Solving the problem

```
→ docker run --volume-  
driver=xyz -v remoteVol:/  
internalVol
```



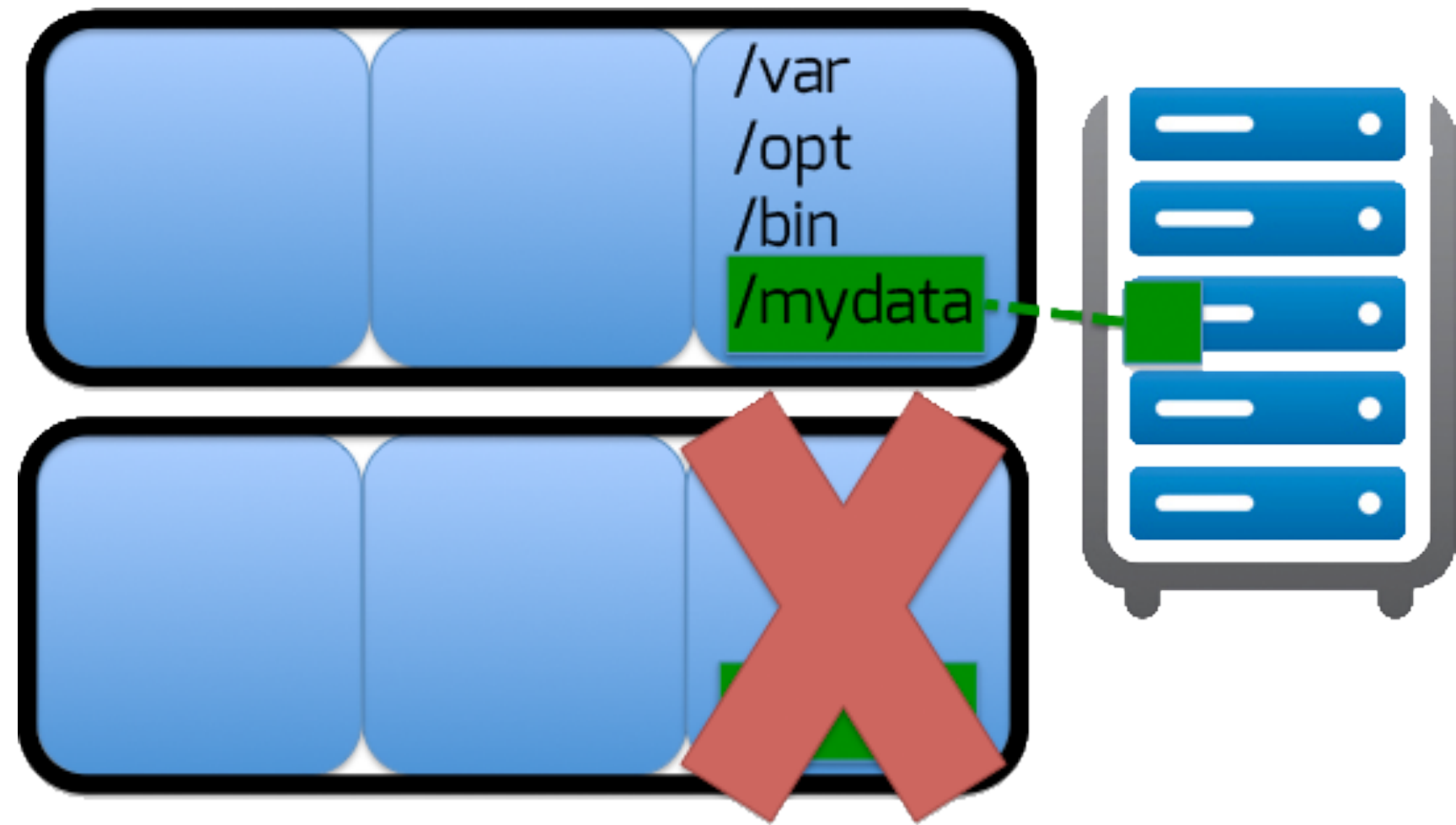
# Solving the problem

- lose the container, data remains intact on the remote volume



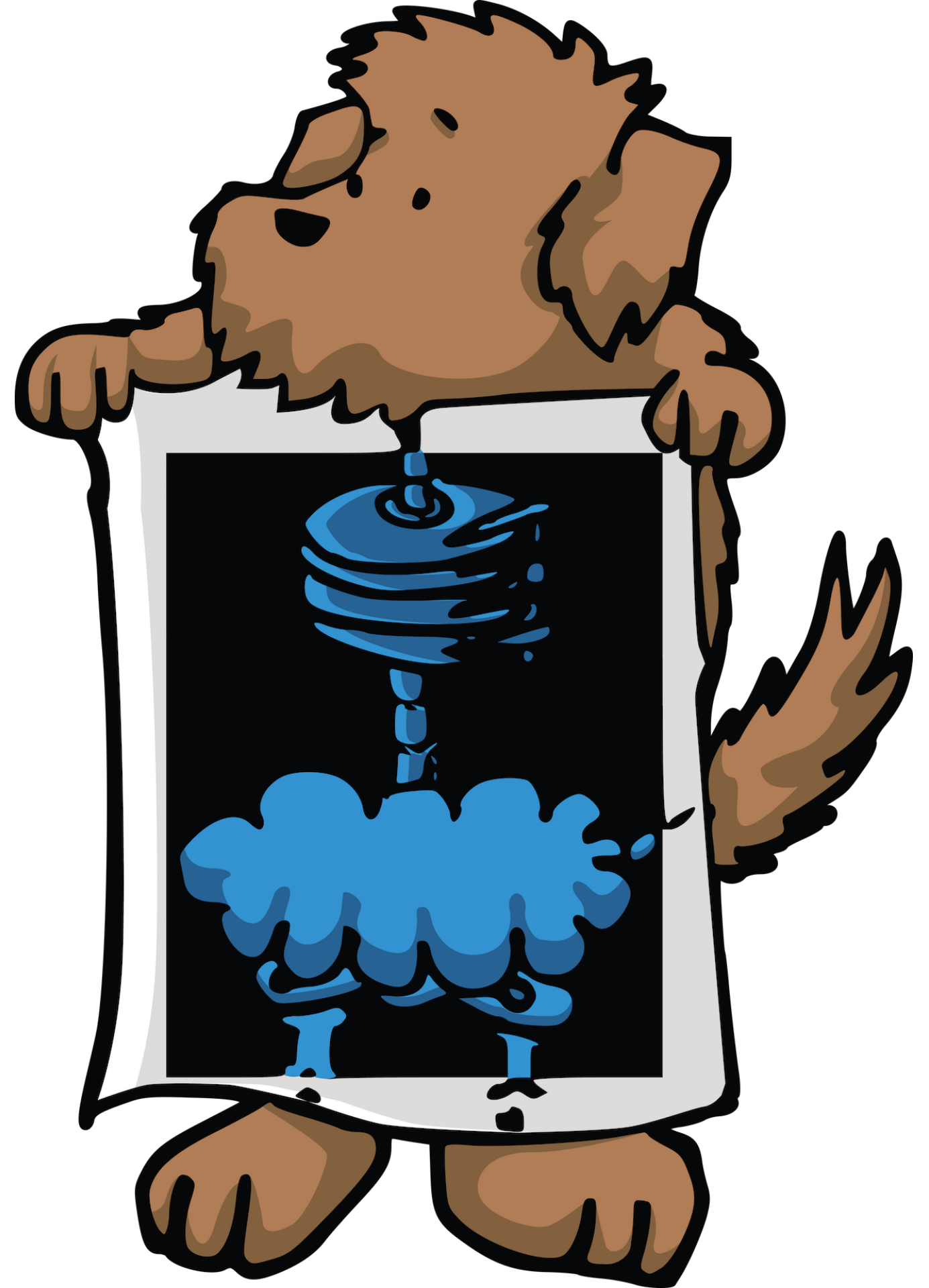
# Solving the problem

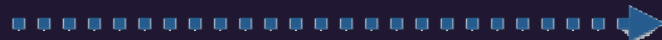
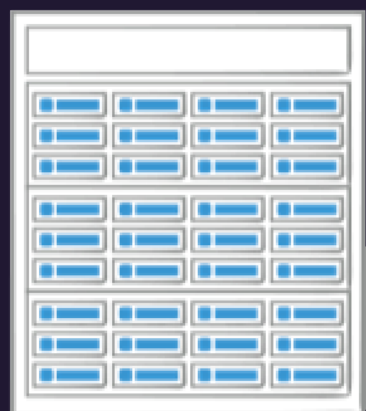
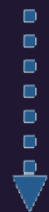
- attach the volume to a new container on a different host.  
persisted state



# REX-Ray

- [github.com/emccode/rexray](https://github.com/emccode/rexray)
- First libStorage Client/Server
- Storage Support:
  - Virtualbox, AWS EC2 EBS, GCE Disk, OpenStack Cinder
  - EMC ScaleIO, XtremIO, Isilon & VMAX
- HA Support via Preemption





**Container  
Runtimes**



**Container OS**

# Typical Install & Configuration

## → Install

```
curl -sSL https://dl.bintray.com/emccode/rexray/install | sh -
```

## → configuration file located at `/etc/rexray/config.yml`

```
rexray:  
  logLevel: warn  
  storageDrivers:  
    - virtualbox  
  mount:  
    volume:  
      preempt: true  
virtualbox:  
  endpoint: http://10.0.2.2:18083  
  tls: false  
  volumePath: "/Users/<username>/VirtualBox Volumes"  
  controllerName: SATA
```

# LET'S DO THIS



ALL NEW

EPISODE



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→ [github.com/emccode/rexray](https://github.com/emccode/rexray)

→ [github.com/emccode/polly](https://github.com/emccode/polly)

→ [github.com/emccode/libstorage](https://github.com/emccode/libstorage)

→ [github.com/emccode/mesos-module-dvdi](https://github.com/emccode/mesos-module-dvdi)

→ [github.com/RackHD/RackHD](https://github.com/RackHD/RackHD)

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@kendrickcoleman

github.com/kacole2

THANK YOU

community.emccode.com

we're hiring!





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