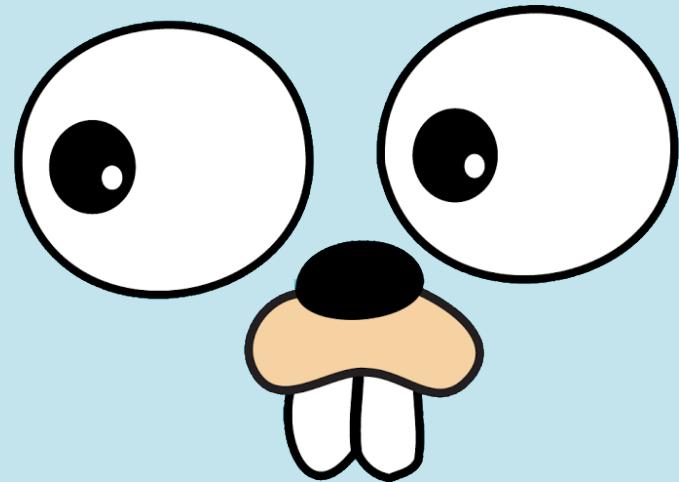




# docker



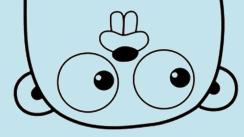
GopherCon 2014, Denver

## Making Docker GO

Victor Vieux, Docker Inc.

@vieux

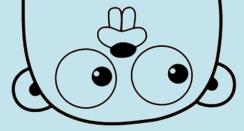




# The Docker Community

- 11000+ Github Stars
- 400+ Contributors
- ~50% of the commits done by the community.
- Some of you are in the audience, thanks!





# What is docker ?

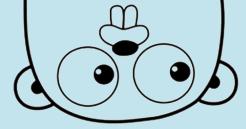




# The Matrix From Hell

		?	?	?	?	?	?
			?	?	?	?	?
		?	?	?	?	?	?
		?	?	?	?	?	?
		?	?	?	?	?	?
		?	?	?	?	?	?

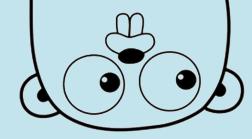




# Another Matrix From Hell

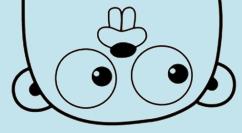
	?	?	?	?	?	?
	?	?	?	?	?	?
	?	?	?	?	?	?
	?	?	?	?	?	?
	?	?	?	?	?	?
	?	?	?	?	?	?





# Solution: the *intermodal shipping container*



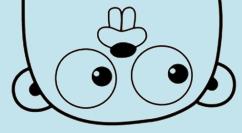


# Solved!

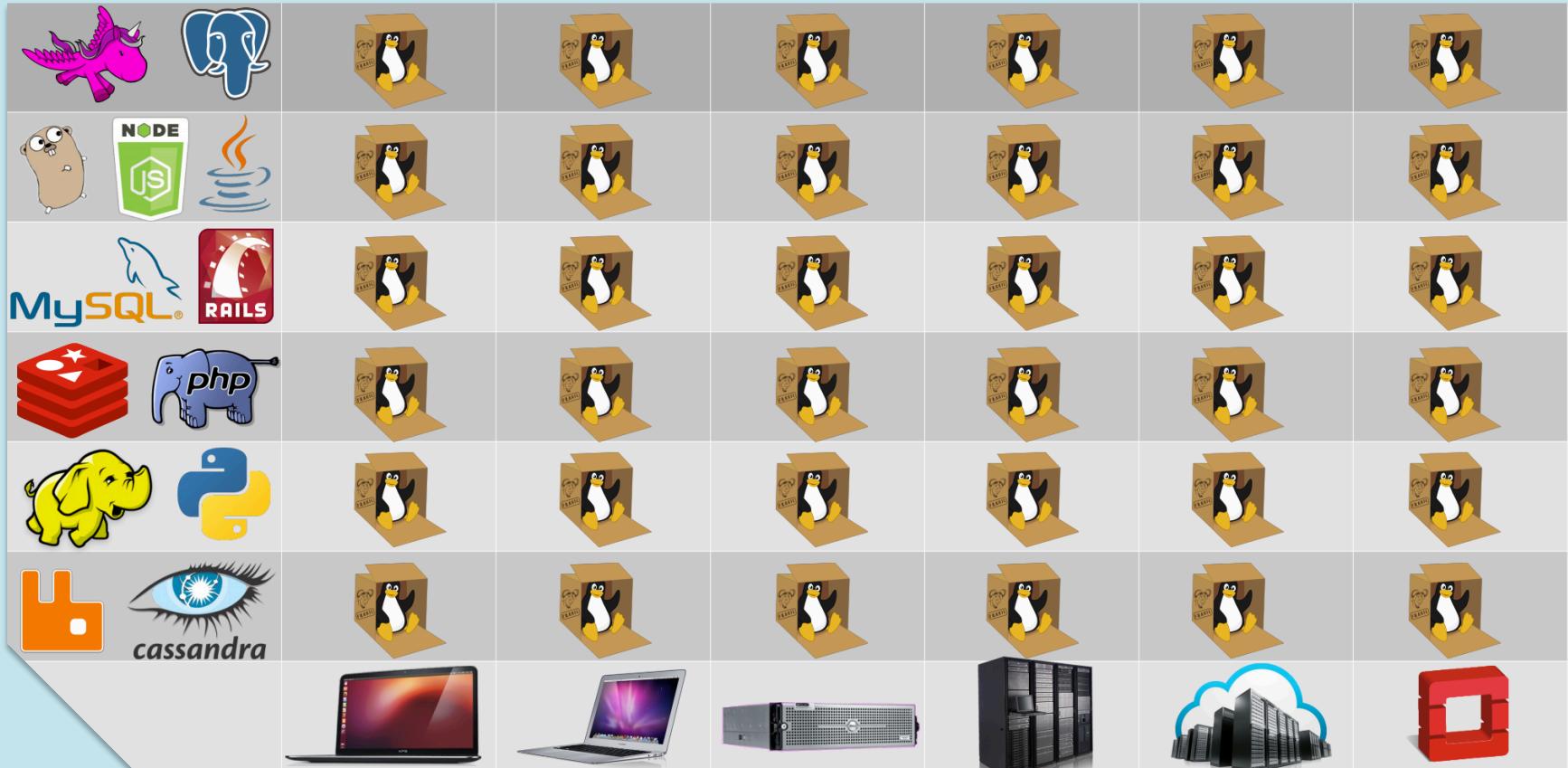


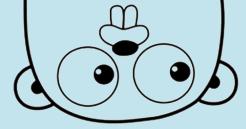
# Solution to the deployment problem: the *Linux container*





# Solved!



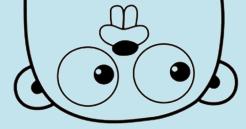


# High level approach: lightweight VM

- own process space
- own network interface
- can run stuff as root
- can have its own /sbin/init  
(different from the host)

“Machine Container”



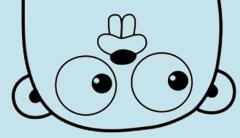


# Low level approach: chroot on steroids

- can also not have its own /sbin/init
- container = isolated process(es)
- share kernel with the host

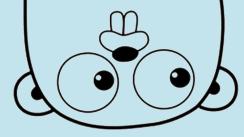
“Application Container”





# What's really docker ?





# Runtime for Linux containers

```
user@dockerhost:~$ docker run -it ubuntu bash
root@1b55513ade2e:/# ps aux
USER      PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root          1  0.0  0.0  18048  1960 ?        Ss   08:35   0:00 bash
root         13  0.0  0.0  15276  1140 ?        R+   08:35   0:00 ps aux
```

```
user@dockerhost:~$ docker run -d crosbymichael/redis
699eb403b54b
```

```
user@dockerhost:~$ docker inspect 699eb403b54b
```

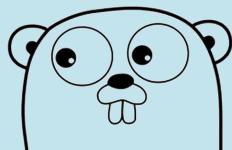
```
"IPAddress": "172.17.0.2",
"Ports": {
    "6379/tcp": [
        {
            "HostIp": "0.0.0.0",
            "HostPort": "49153"
        }
    ]
}
```

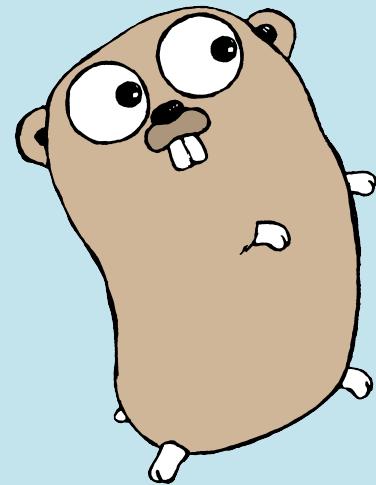


# Standard format for containers and a place to share them

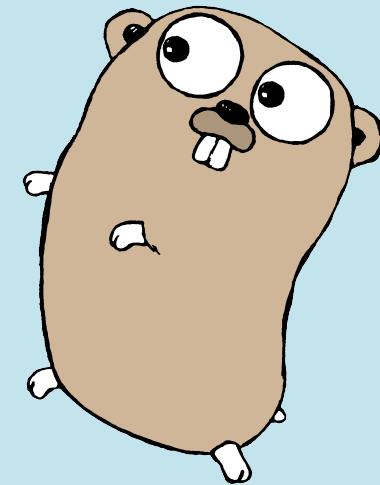


- Fetch an image from the public registry with “**docker pull**”
- Enter an image with “**docker run**“ and do some changes
- Record those changes with “**docker commit**”, repeat as many times as needed
- And then share the result with “**docker push**” on the public registry, or a private one





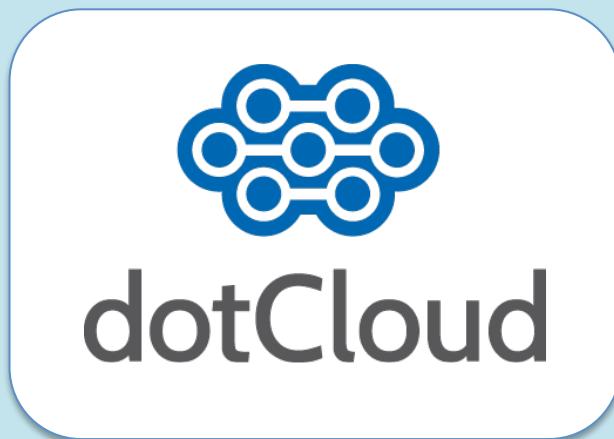
# Why Go ?

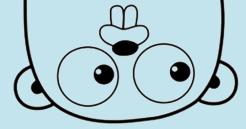




It's not  python™

No copy/paste from legacy code.

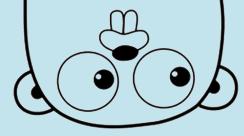




# Adoption by OPS

- Ruby shops don't use Java
- Python shops don't use node
- etc...
- Having a single binary that you can drop is **huge** win.

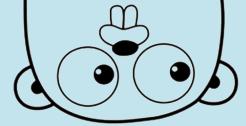




# No hype – No hate

- At that time, Go wasn't that hype
- Ruby has it's lovers and haters
- Same for python, ~~java~~ (who loves java anyway ???)
- Nobody had strong arguments against Go





# Easy to contribute

- Easy to read
- Looks like C
- go fmt

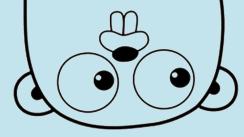


**lalyos** commented 3 hours ago

Fixes #5370

I just completed the [The Tour of Go](#) and felt competent enough to fix this issue, so be warned this my first day with go ;)

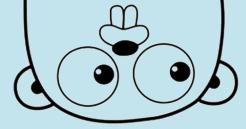




# cgo

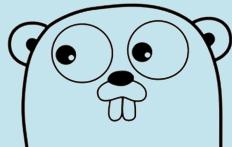
- The go standard library is great
- But sometimes it's not enough
  - sqlite
  - devicemapper
  - btrfs

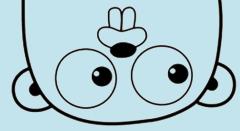




# Package system

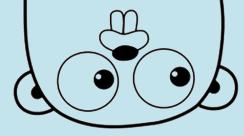
- /pkg/ in the docker repo
  - user (not relying on any library)
  - listenbuffer
  - cgroups
  - labels / apparmor SELinux
  - ...





# Drawbacks

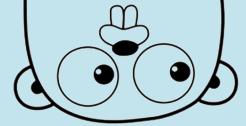




# go get

- Can't fetch a particular revision
- Building from others master can't be reliable!
- No automatic update (go get -u)





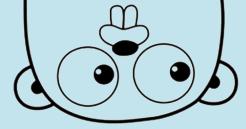
# go get : how we deal with it

- Bash script that handle git and mercurial

```
clone git github.com/kr/pty 98c7b80083
clone git github.com/gorilla/context 708054d61e5
clone git github.com/gorilla/mux 9b36453141c
clone hg code.google.com/p/go.net 84a4013f96e0
clone hg code.google.com/p/gosqlite 74691fb6f837
...
clone hg code.google.com/p/go a15f344a9efa
mv src/code.google.com/p/go/src/pkg/archive/tar tmp-tar
rm -rf src/code.google.com/p/go
mkdir -p src/code.google.com/p/go/src/pkg/archive
mv tmp-tar src/code.google.com/p/go/src/pkg/archive/tar
```

<https://github.com/dotcloud/docker/blob/master/hack/vendor.sh>





# flag package

- Doesn't handle short/long options  
`-o --option`
- Doesn't handle options grouping  
`-a -b -c -> -abc`
- Seriously just don't use it, there are lots of alternatives out there...

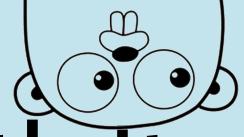
# flag package: how we deal with it

[github.com/dotcloud/docker/pkg/mflag](https://github.com/dotcloud/docker/pkg/mflag)

- “fork” of the go flag package
- Almost drop-in replacement:

name string -> names []string



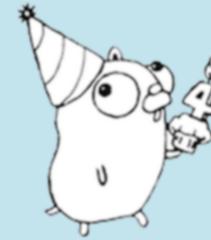


# flag package: how we deal with it

- Does handle short/long options
- Does handle options grouping
- Doesn't break compatibility:
  - old flags still work
  - but are hidden from the usage
  - and a warning is displayed



# Still a bit young

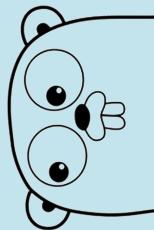


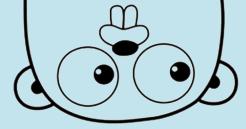
- The syscall package isn't perfect:
  - sendmsg() wrapper missing return value
  - RecvMsg doesn't pass MSG\_CMSG\_CLOEXEC
- We found a few issues in go itself (tar package mostly)



# Still a bit young: how we deal with it

- Made patch upstream to go
- Before: build off tip
- Now: build off 1.2.1, but vendor some pkg from tip

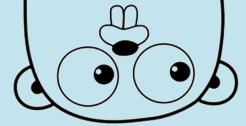




# go test

- Can't have destructors/cleanups
- Use a test names “**`z_final_test.go`**”
- ... which doesn't work too well when running individual tests!

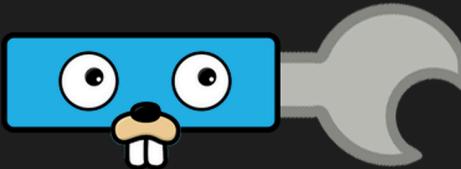




# GoCover.io

GoCover.io

About



See code coverage of **any\*** Go package.

Most popular repositories

- [code.google.com/p/getopt](http://code.google.com/p/getopt)
- [github.com/jimenez/fpasteCL](http://github.com/jimenez/fpasteCL)
- [github.com/go-martini/martini](http://github.com/go-martini/martini)
- [github.com/dotcloud/docker/engine](http://github.com/dotcloud/docker/engine)

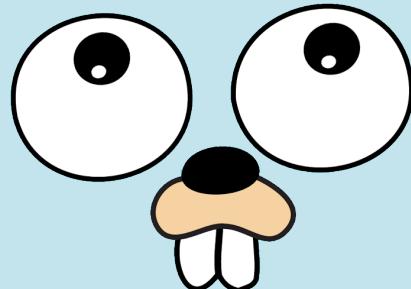
Last repositories covered

- [code.google.com/p/getopt](http://code.google.com/p/getopt)
- [github.com/jimenez/fpasteCL](http://github.com/jimenez/fpasteCL)
- [github.com/skynetservices/skydns/server](http://github.com/skynetservices/skydns/server)
- [github.com/dotcloud/docker/api/server](http://github.com/dotcloud/docker/api/server)



# Thank you! Questions?

See you Saturday at the HackDay!



<http://docker.io>  
<http://docker.com>  
@docker - @vieux

