why you should not program in node.js

abi raja

A way to write (web) applications/servers in js

Hello World\r\n

acabee.org

"if we stacked up all the textbooks from elementary to high school, and then got the best teacher in the world to make one video on each of these topics, how much would it cost?"

who uses node?

- yahoo!

- palm (WebOS)

- lots of companies have some node services

- nodeKO
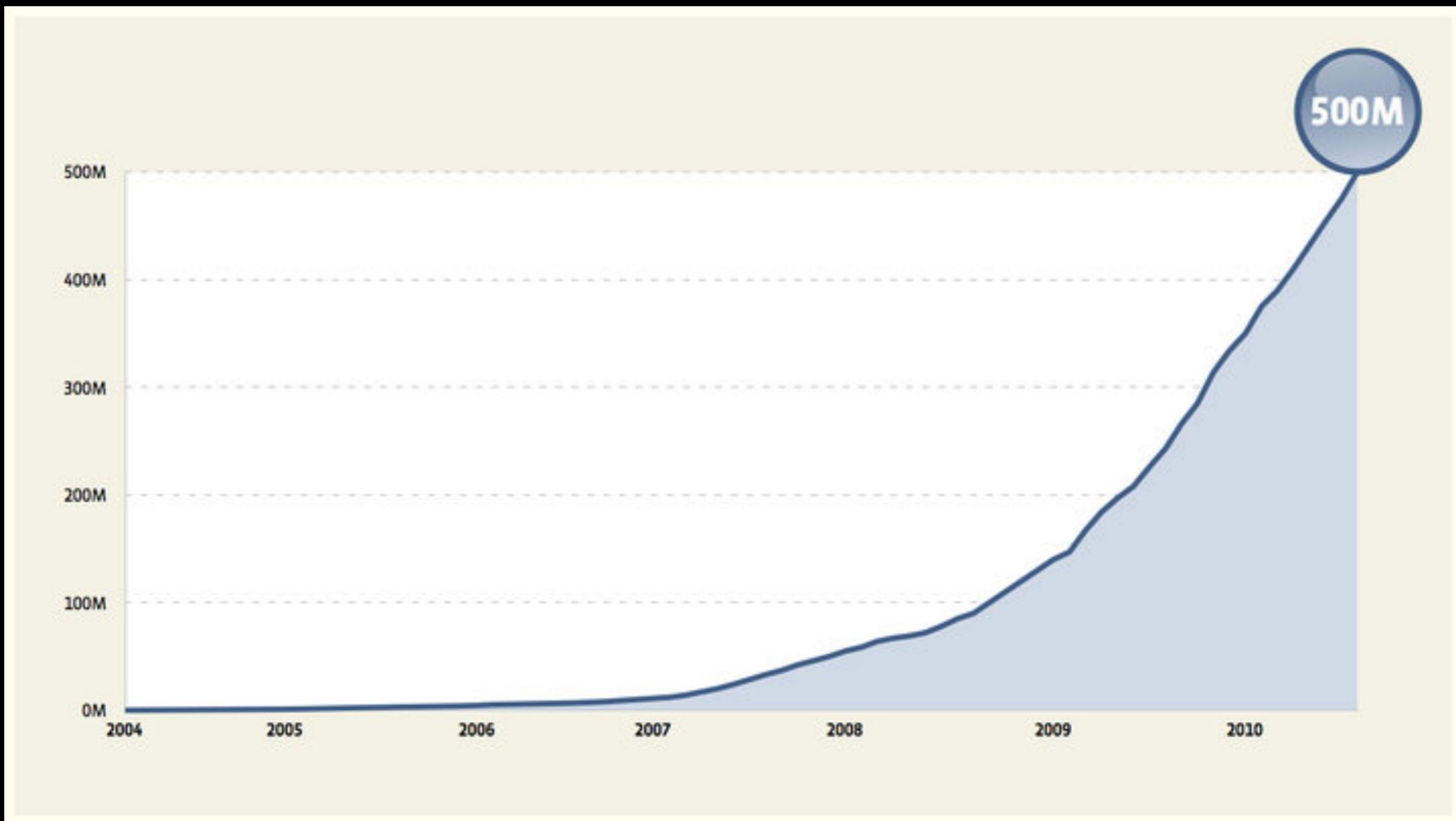
Don't ever use node.js ....

... unless you want to learn a ton about complex, beautiful man-made systems.

No, but really, node can be quite a pain sometimes

The bane of high-level languages

Let's build the perfect server!

JavaScript is (going to be) the fastest dynamic language

js
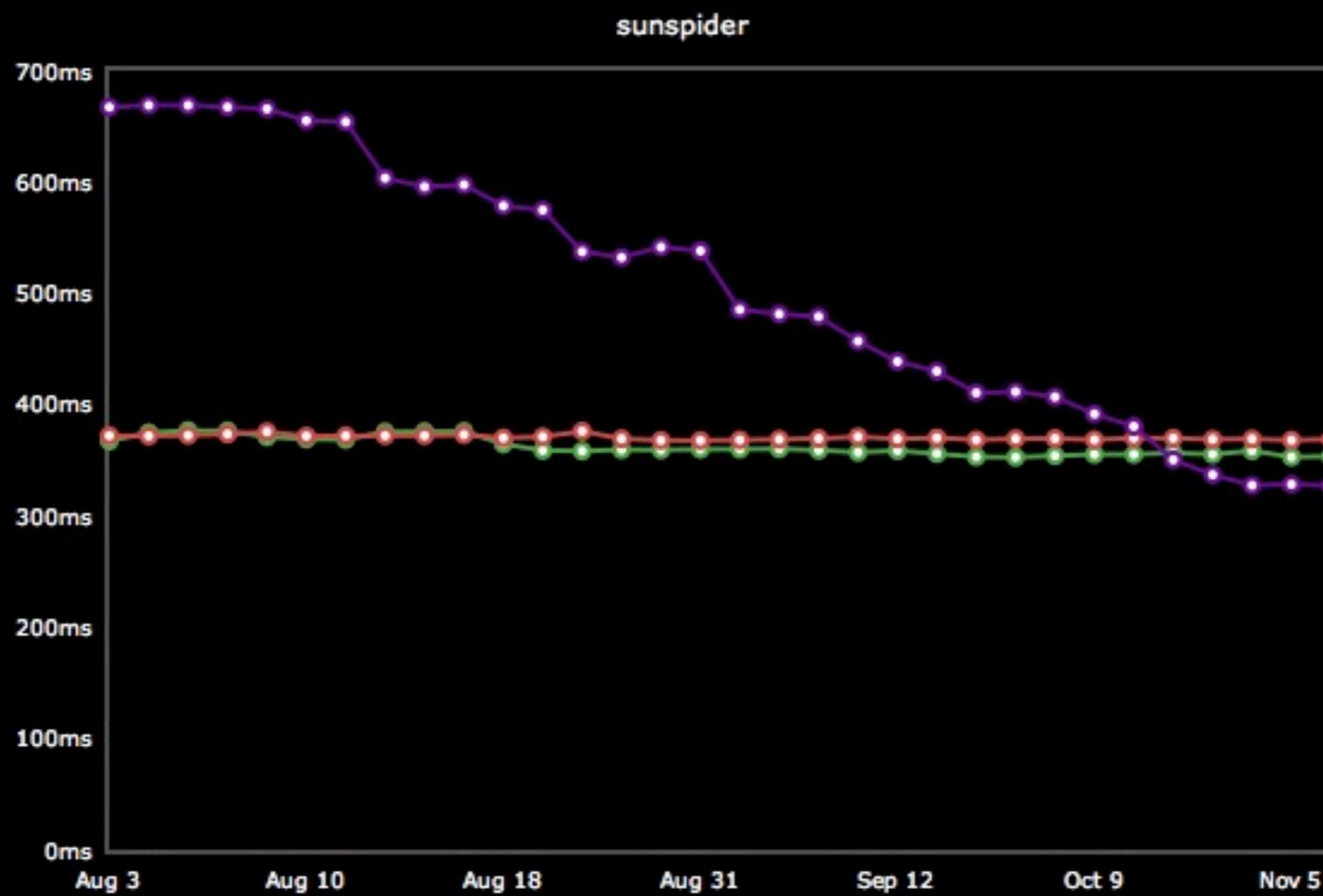
		sort	sort	
×	Program Source Code	CPU secs	Elapsed secs	M
1.0	**C** GNU gcc #7	12.10	**12.11**	
1.1	**Java** 6 -server #2	12.90	**12.92**	
1.1	**Scala** #4	13.25	**13.28**	
1.1	**C++** GNU g++ #6	13.50	**13.51**	
1.3	**Java** 6 -server	15.80	15.84	
1.5	**ATS** #3	17.70	**17.71**	
1.5	**ATS**	18.13	18.14	
1.6	**Scala** #2	18.92	18.97	
2.6	**Clean** #3	31.01	**31.03**	
2.6	**Haskell** GHC	31.13	**31.15**	
2.8	**Lisp** SBCL	33.53	**33.55**	
2.9	**C** GNU gcc	34.52	34.53	
3.0	**Pascal** Free Pascal	36.30	**36.30**	
3.1	**Erlang** HiPE	38.06	**38.06**	
3.3	**JavaScript** V8	39.81	**39.84**	
3.3	**C++** GNU g++ #2	40.49	40.50	
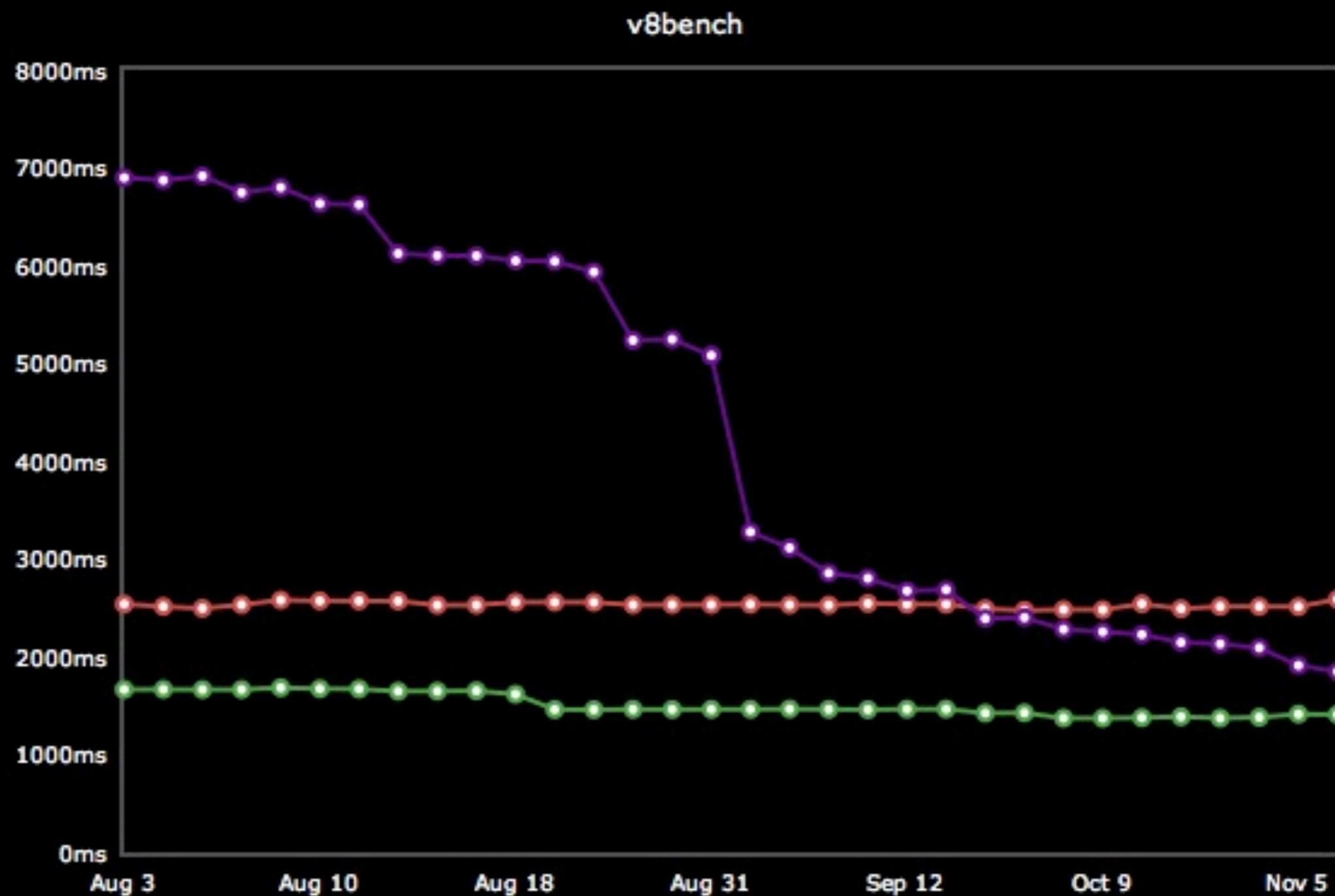
snakes, gems and crap

22	**Ruby** 1.9	267.52	**267.58**
27	Python PyPy #2	5 min	**5 min**
32	Python IronPython #2	6 min	**6 min**
37	**Python** CPython #7	7 min	**7 min**
37	Ruby **JRuby**	7 min	**7 min**
43	**Python** CPython #2	8 min	8 min
43	**Python** CPython #6	8 min	8 min
44	**Python 3** #7	8 min	**8 min**
48	**Lua** #2	9 min	**9 min**
51	**Python 3** #6	10 min	10 min
67	**Perl**	13 min	**13 min**
104	**Perl** #2	20 min	20 min
126	**PHP** #3	25 min	**25 min**
155	Ruby MRI	31 min	**31 min**
220	**PHP** #2	44 min	44 min

# v8 / JagerMonkey

sunspider

v8 / JagerMonkey

v8bench
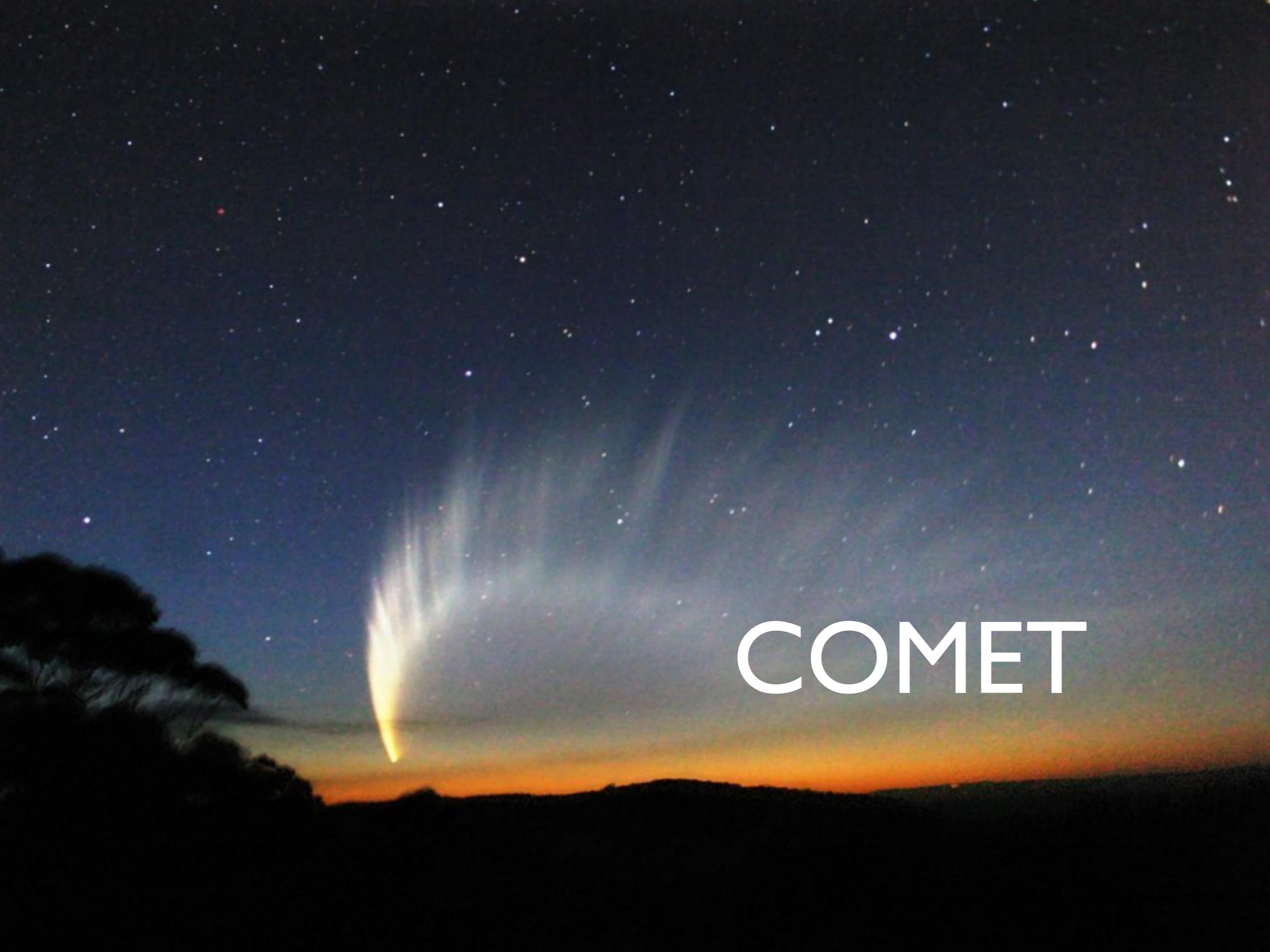
Depending on who you are, you either think it's the ugliest language or the most beautiful language
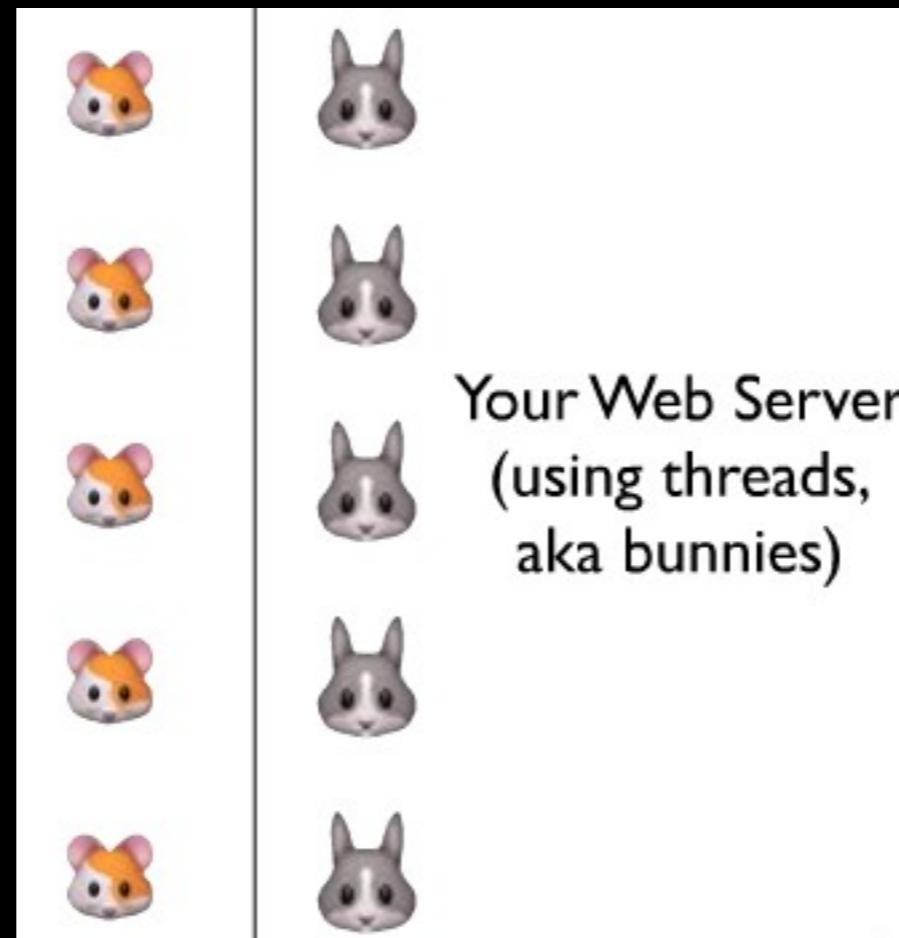
COMET
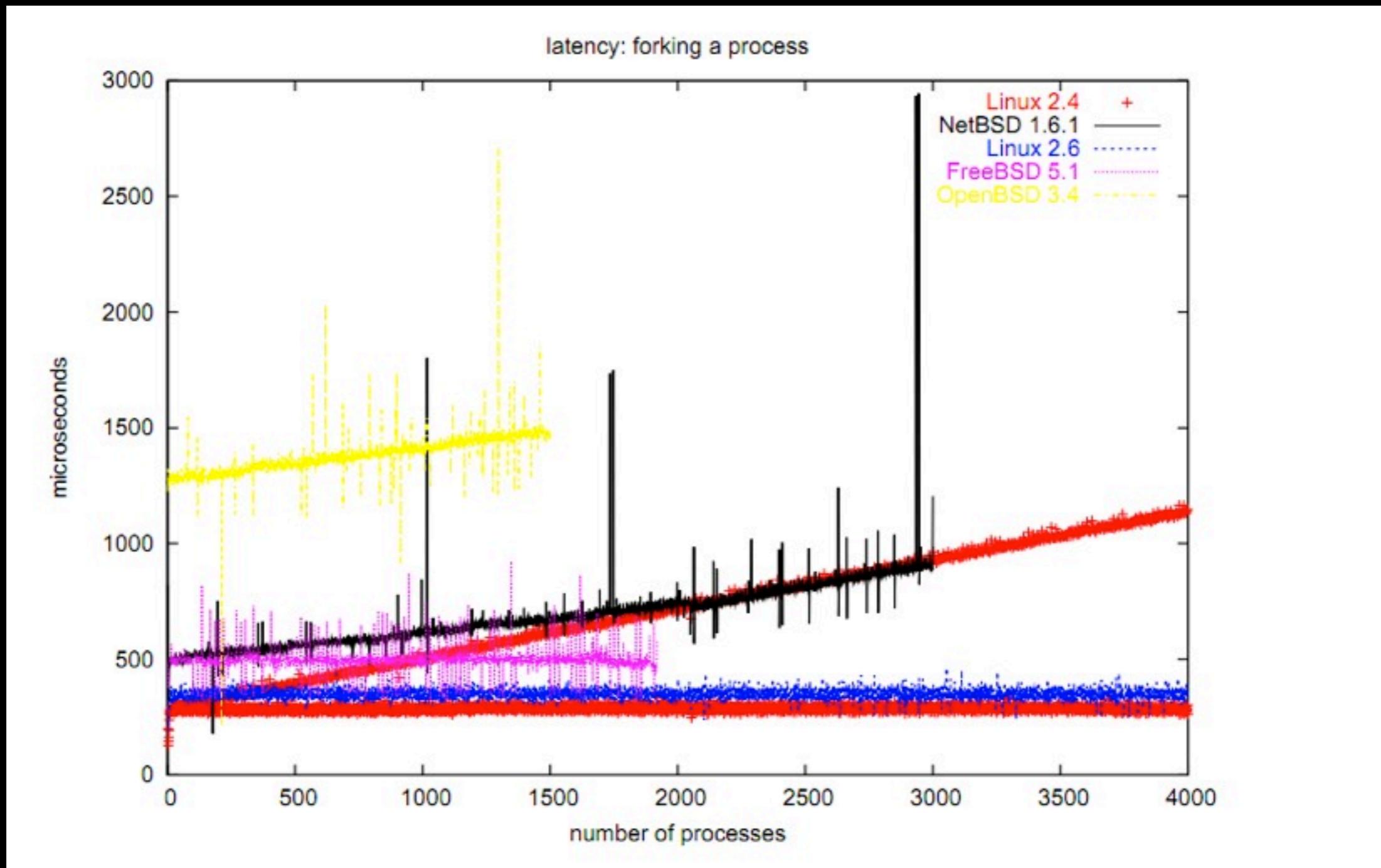
elements of perfection

- js

- event loops are better than threads

bunnies

threads/processes

latency: forking a process

context switching

Here is a vmstat, running an MP3 player:

procs			memory			swap		io		system		cpu		
r	b	w	free	buff	cache	si	so	bi	bo	in	cs	us	sy	id
0	0	0	60316	9136	316280	0	0	135	113	47	8	8	9	82
0	0	0	60296	9152	316280	0	0	0	0	200	54	3	0	97
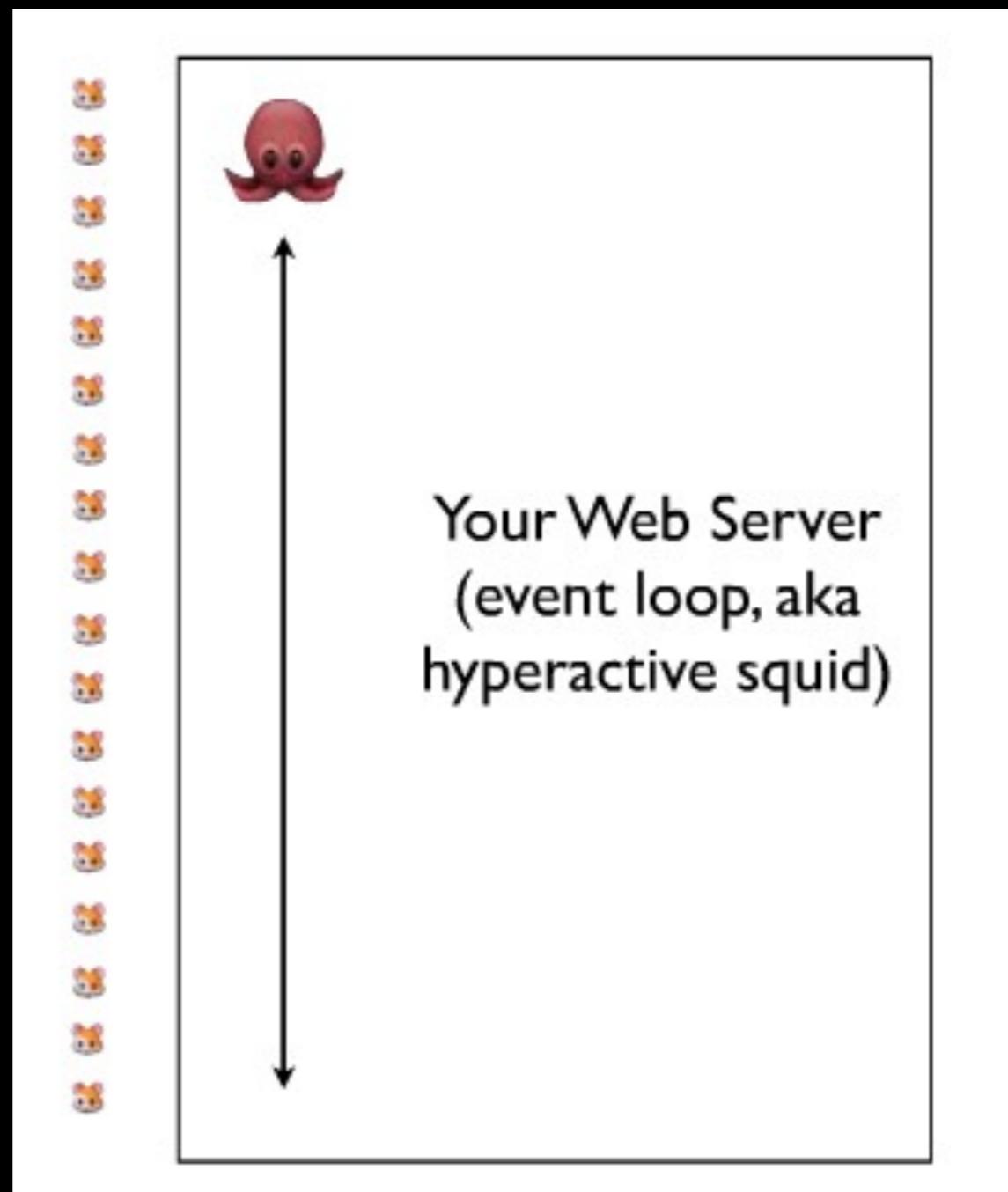
And now with httpbench running over lo and eth0:

4	0	0	56136	9236	317936	0	0	24	0	228	7953	6	59	35
0	0	0	56308	9236	317936	0	0	0	0	221	1590	4	10	86
4	0	0	53476	9304	320180	0	0	0	0	16416	12319	26	74	0
5	0	0	52552	9304	320180	0	0	0	0	16391	12307	20	80	0

impatient hamsters

squids

Your Web Server
(event loop, aka
hyperactive squid)

event loops are cool
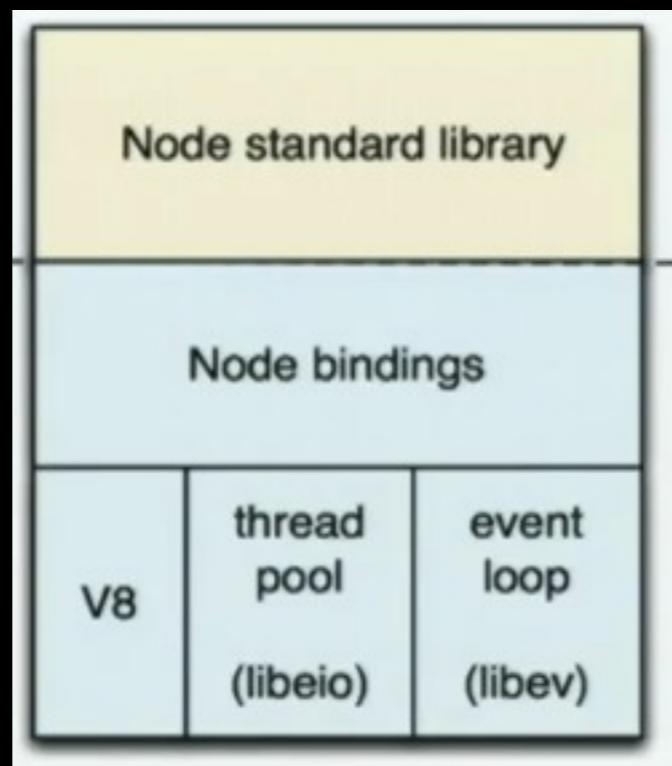
non-blocking I/O
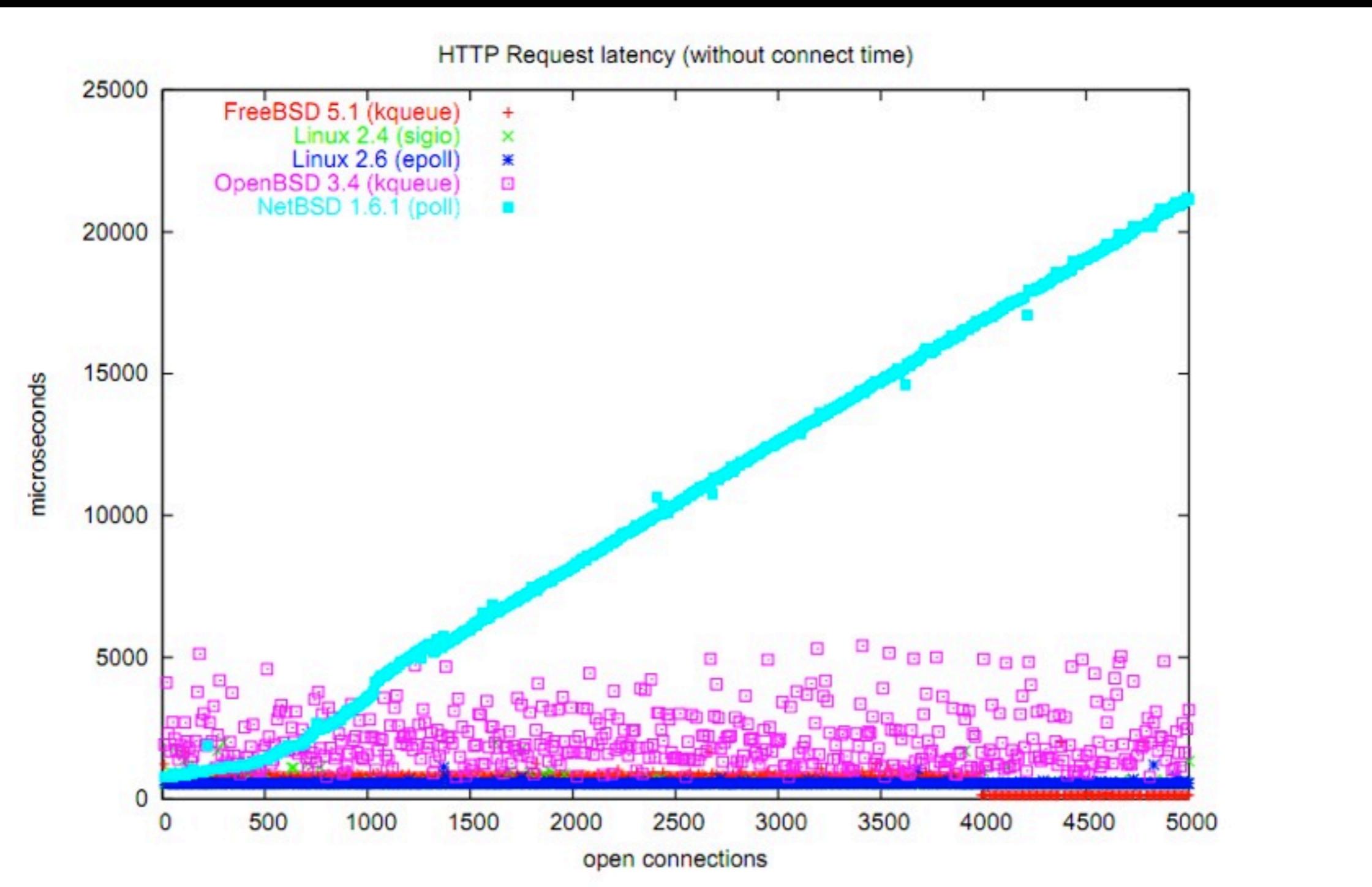
```
bytes_read = read(fd, buf, BUFSIZE);
```

someone understands callbacks

```
$("#header").onmouseover(function(){
  //do something
});
```

alert("node")

Node standard library		
Node bindings		
V8	thread pool (libeio)	event loop (libev)

HTTP Request latency (without connect time)

node.js

- js

- event loops are better than threads

- not awkward

ServerLand

POSIX

make the things you learn in CS107, CS110, CS140 similar to what you learn in CS142

```
fs.stat(path, [callback])
Asynchronous stat(2). The callback gets two arguments (err, stats) where stats is a
fs.Stats object. It looks like this:

{ dev: 2049
, ino: 305352
, mode: 16877
, nlink: 12
, uid: 1000
, gid: 1000
, rdev: 0
, size: 4096
, blksize: 4096
, blocks: 8
, atime: '2009-06-29T11:11:55Z'
, mtime: '2009-06-29T11:11:40Z'
, ctime: '2009-06-29T11:11:40Z'
}
```

web development is
less than 10 years old.

best practices are
discovered everyday

jade

```jade
html(lang="en")
  head
    title Hello World!
  body
    h1 Jade - node template engine
    #container
      - if (youAreUsingJade)
        p You are amazing
      - else
        p Get on it!
```

```html
<html lang="en">
  <head>
    <title>Jade</title>
  </head>
  <body>
    <h1>Jade - node template engine</h1>
    <div id="container">
      <p>You are amazing</p>
    </div>
  </body>
</html>
```

chatrooms are *so* 2011

we have seen the holy grail. but, why oh why must thou be so unholy?

{callback soup}

```javascript
server.get('/sofo', function(req, res){
  auth.verify(req, res, function(user){
    db._select("videos", {"video_id" : [69, 70, 71]}, "", function(videos){
      db._select("users", {"user_id" : _.pluck(videos, 'user_id')}, "", function(users){
        db._select("cats", {"cat_id" : _.pluck(videos, 'cat_id')}, "", function(cats){
          res.render('sofo', {
            ...
          });
        });
      });
    });
  });
});
```

CoffeeScript

```coffeescript
# Objects:
math =
  root:   Math.sqrt
  square: square
  cube:   (x) -> x * square x

# Splats:
race = (winner, runners...) ->
  print winner, runners

# Existence:
alert "I knew it!" if elvis?

# Array comprehensions:
cubes = (math.cube num for num in list)
```

Libraries

Stale or move
too fast.

Always read
code, not
documentation

node-mysql / Commit History

2011-01-03

Bump version

felixge (author)
January 03, 2011

Add note about multiple queries in one sql query

felixge (author)
January 03, 2011

2010-11-25

Make Makfile more portable

felixge (author)
November 25, 2010

2010-11-20

Improve Readme example further

felixge (author)
November 20, 2010

Readme.md: fix syntax in tutorial, cleanup

Jason Woofenden (author)
November 15, 2010

felixge (committer)
November 20, 2010

Writing your own libraries

lsof is your best friend

```
bitnami@ip-10-112-70-232:~$ lsof -p 28197
COMMAND   PID    USER   FD   TYPE  DEVICE SIZE/OFF    NODE NAME
node    28197 bitnami  cwd    DIR     8,1    4096  409642 /home/bitnami/acabee/project
node    28197 bitnami  rtd    DIR     8,1    4096       2 /
node    28197 bitnami  txt    REG     8,1 6353903  338864 /usr/local/bin/node
node    28197 bitnami  mem    REG     8,1   79512  549765 /lib/libz.so.1.2.3.3
node    28197 bitnami  mem    REG     8,1 1421892  566509 /lib/tls/i686/nosegneg/libc-2.11.1.so
node    28197 bitnami  mem    REG     8,1  117086  566523 /lib/tls/i686/nosegneg/libpthread-2.11.1.so
node    28197 bitnami  mem    REG     8,1  120368  549712 /lib/libgcc_s.so.1
node    28197 bitnami  mem    REG     8,1  149392  566513 /lib/tls/i686/nosegneg/libm-2.11.1.so
node    28197 bitnami  mem    REG     8,1  975088  371197 /usr/lib/libstdc++.so.6.0.13
node    28197 bitnami  mem    REG     8,1    9736  566512 /lib/tls/i686/nosegneg/libdl-2.11.1.so
node    28197 bitnami  mem    REG     8,1 1364764  549507 /lib/i686/cmov/libcrypto.so.0.9.8
node    28197 bitnami  mem    REG     8,1  294664  549518 /lib/i686/cmov/libssl.so.0.9.8
node    28197 bitnami  mem    REG     8,1   30684  566525 /lib/tls/i686/nosegneg/librt-2.11.1.so
node    28197 bitnami  mem    REG     8,1  113964  549950 /lib/ld-2.11.1.so
node    28197 bitnami   0r    CHR     1,3     0t0     700 /dev/null
node    28197 bitnami   1w    REG     8,1 3987656  409606 /home/bitnami/acabee/project/nohup.out
node    28197 bitnami   2w   FIFO     0,8     0t0 5926578 pipe
node    28197 bitnami   3u   0000     0,9       0     690 anon_inode
node    28197 bitnami   4u   0000     0,9       0     690 anon_inode
node    28197 bitnami   5u   IPv4 5928217     0t0         TCP *:8111 (LISTEN)
node    28197 bitnami   6u   sock     0,6     0t0 5928218 can't identify protocol
node    28197 bitnami   7u   sock     0,6     0t0 5928219 can't identify protocol
node    28197 bitnami   9u   IPv4 5978614     0t0         TCP ip-10-112-70-232.ec2.internal:8111->adsl-69-234-97-182.dsl.irvnca.pacbell.n
STABLISHED)
node    28197 bitnami  10u   IPv4 5978616     0t0         TCP ip-10-112-70-232.ec2.internal:8111->adsl-69-234-97-182.dsl.irvnca.pacbell.n
STABLISHED)
node    28197 bitnami  11u   IPv4 5978618     0t0         TCP ip-10-112-70-232.ec2.internal:8111->adsl-69-234-97-182.dsl.irvnca.pacbell.n
```

Remember: you are the only person in the world using it!

resist the temptation to try too many new things at once (especially DBs)

GAMES GAMES GAMES GAMES

GAMES GAMES GAMES AMES

Adventureland

FROM THE DIRECTOR OF
Superbad

check out

- http://nodejs.org/

- http://jashkenas.github.com/coffee-script/

- http://socket.io/

- https://github.com/visionmedia/jade

- http://bulk.fefe.de/scalable-networking.pdf

- http://arewefastyet.com/

- http://shootout.alioth.debian.org/

- http://www.slideshare.net/simon/evented-io-based-web-servers-explained-using-bunnies