

API billioner

How to develop successful cloud native software

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Agenda

- **failure - your new friend**
- **design for failure patterns and practices**
- **Q&A**

**FAILURE
IS NATURAL
STATE
OF APPLICATION**



Shatters when exposed to even a small stressor

HANDLE WITH CARE

FRAGILE

THANK YOU

PLEASE MISHANDLE

ANTIFRAGILE

THANK YOU

Failure is inevitable so:

- **Assume everything will fail**
- **Cause failure to validate resiliency**
- **Test design assumption by stressing them**
- **Don't wait for random failure. Remove its uncertainty by forcing it periodically.**

CHAOS MONKEY

LATENCY MONKEY

CONFORMITY MONKEY

CHAOS GORILLA

....

NETFLIX



HANDS ON CODE

RUN APPLICATION

```
git clone https://github.com/pbochynski/spotify
npm install
node index.js
```

TEST IT

```
bench-rest -n 100 -c 30 http://localhost:3000/statistics/
loadtest
```

Results



```
errors: 0
stats: { totalElapsed: 29966.033288002014,
  main:
    { meter:
      { mean: 3.337431559894907,
        count: 100,
        currentRate: 3.485550977233192,
        '1MinuteRate': 1.1500644370651443,
        '5MinuteRate': 0.27914520273452764,
        '15MinuteRate': 0.09617021080360737 },
      histogram:
        { min: 164.28184401988983,
          max: 29920.29207599163,
          sum: 1185664.6324920058,
          variance: 70015985.43336506,
          mean: 11856.646324920059,
          stddev: 8367.55552317193,
          count: 100,
          median: 11032.140416502953,
          p75: 17089.299232020974,
          p95: 28467.981525839856,
          p99: 29914.296768491862,
          p999: 29920.29207599163 } } }
```





TIMEOUTS (FAIL FAST)

CIRCUIT BREAKER

THROTTLING

BULKHEADS

SUPERVISORS (CONTROL CRASHES)

Timeouts

(x)

```
request.get(url, {timeout:500}, function(...))
```



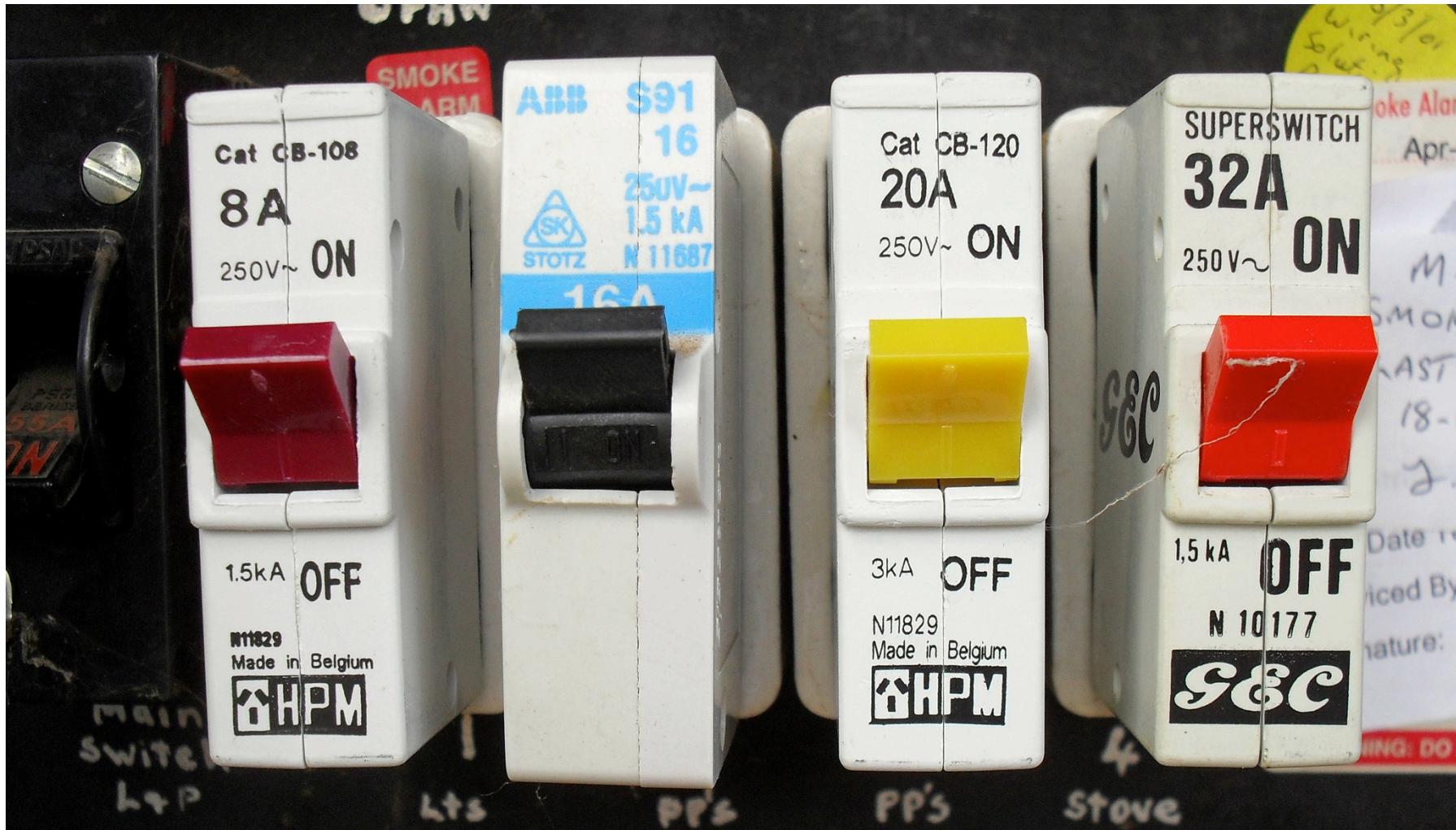
Results



```
errors: 96
stats: { totalElapsed: 652.2629109919071,
  main:
    { meter:
        { mean: 153.72264030524093,
          count: 100,
          currentRate: 153.71138041880536,
          '1MinuteRate': 0,
          '5MinuteRate': 0,
          '15MinuteRate': 0 },
      histogram:
        { min: 174.53227698802948,
          max: 599.2677159905434,
          sum: 57835.404274106026,
          variance: 6759.856466864552,
          mean: 578.3540427410603,
          stddev: 82.21834629122962,
          count: 100,
          median: 595.4386444985867,
          p75: 596.715599745512,
          p95: 598.3088306173682,
          p99: 599.2659187707305,
          p999: 599.2677159905434 } } }
```

Circuit Breaker

(x)

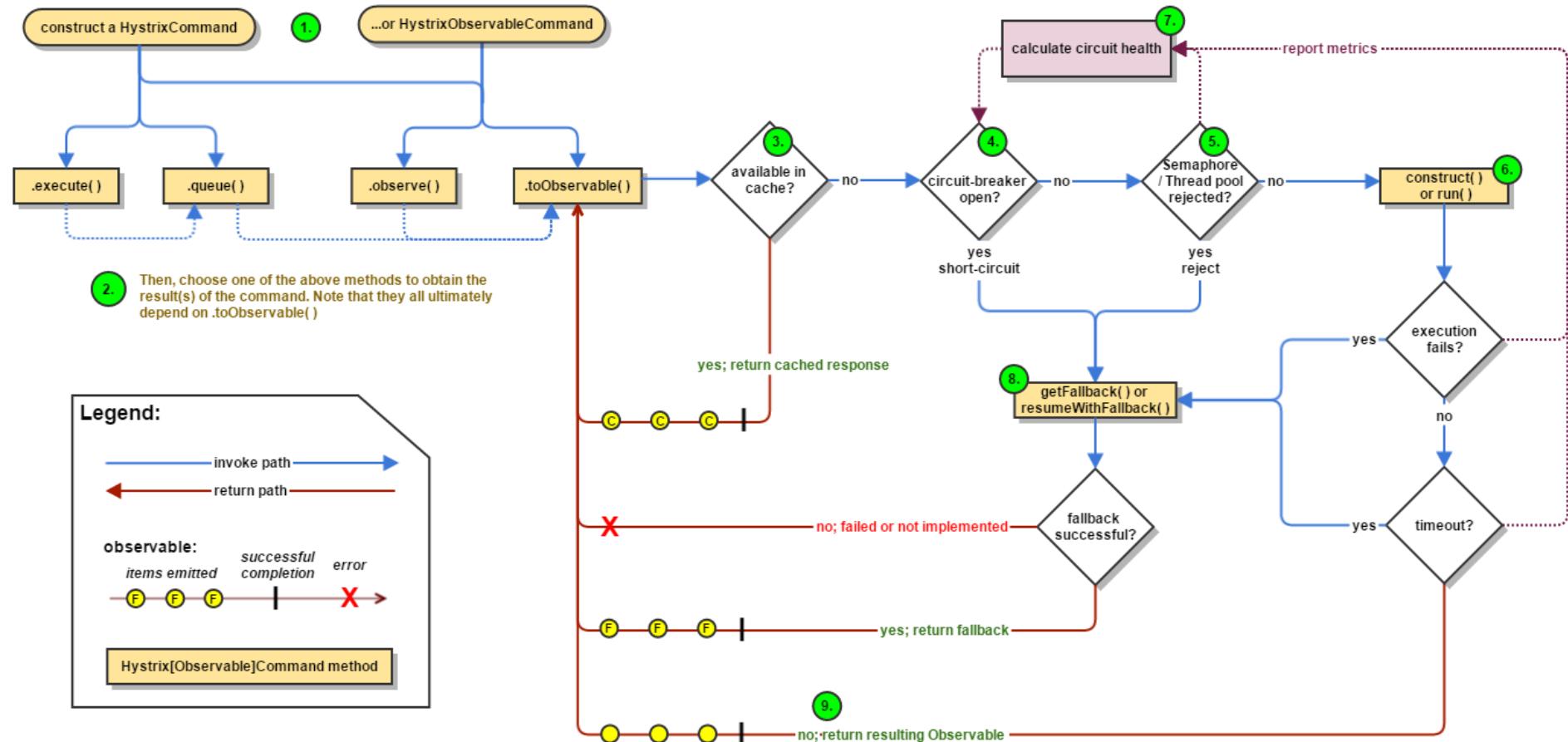


Circuit Breaker

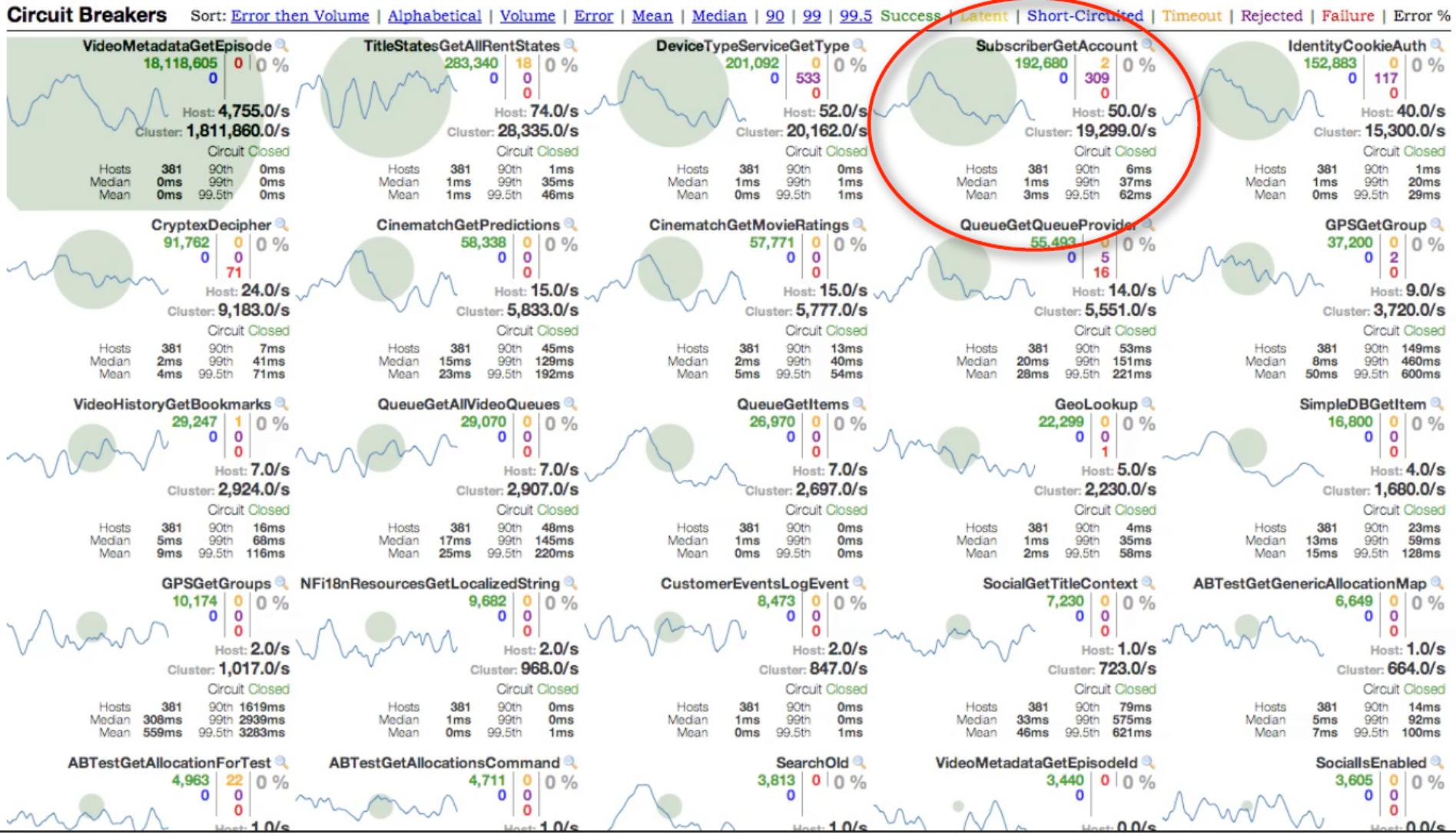
(v)



Hystrix Circuit Breaker



Hystrix Dashboard



Circuit Breaker for Node.js



```
var breaker = new CircuitBreaker();

var command = function(success, failed) {
    restCall()
        .done(success)
        .fail(failed);
};

var fallback = function() {
    alert("Service is down");
};

breaker.run(command, fallback);
```



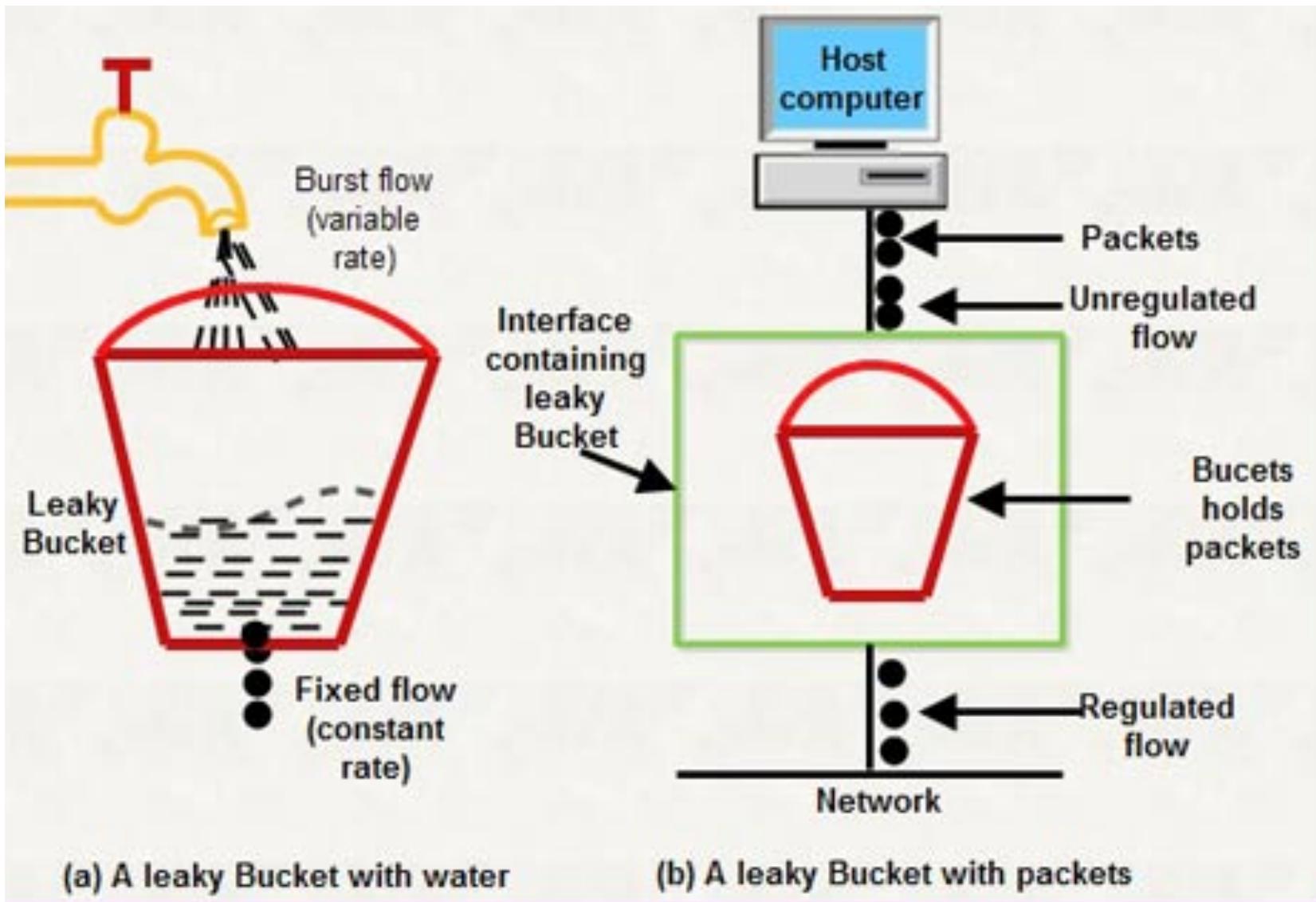
<https://github.com/yammer/circuit-breaker-js>

Results

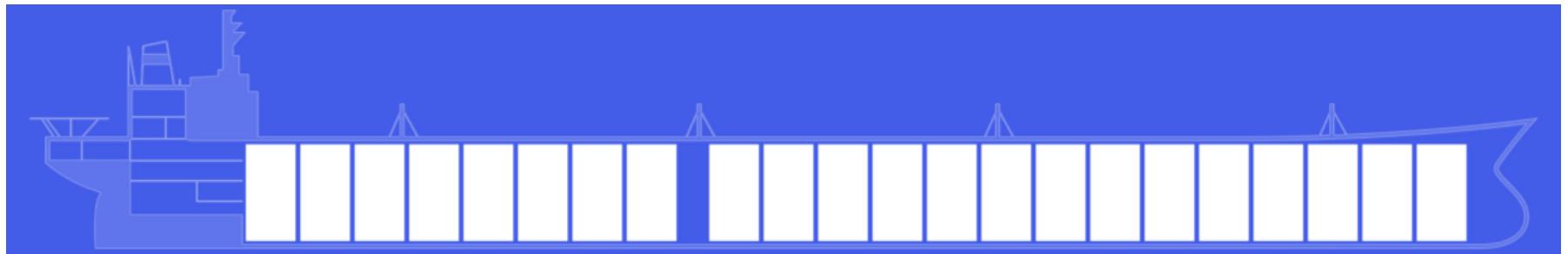


```
errors: 100
stats: { totalElapsed: 5200.367489993572,
  main:
    { meter:
        { mean: 1953.4825910882446,
          count: 10000,
          currentRate: 2779.3452581780525,
          '1MinuteRate': 155.19379120448372,
          '5MinuteRate': 32.08190813224066,
          '15MinuteRate': 10.753435022495234 },
      histogram:
        { min: 16.73906499147415,
          max: 611.6362690031528,
          sum: 507399.8872964978,
          variance: 3027.1552783916154,
          mean: 50.73998872964978,
          stddev: 55.01958995114027,
          count: 10000,
          median: 42.4541550129652,
          p75: 50.565358243882656,
          p95: 74.0842597991228,
          p99: 120.26998450934892,
          p999: 603.5870527159869 } } }
```

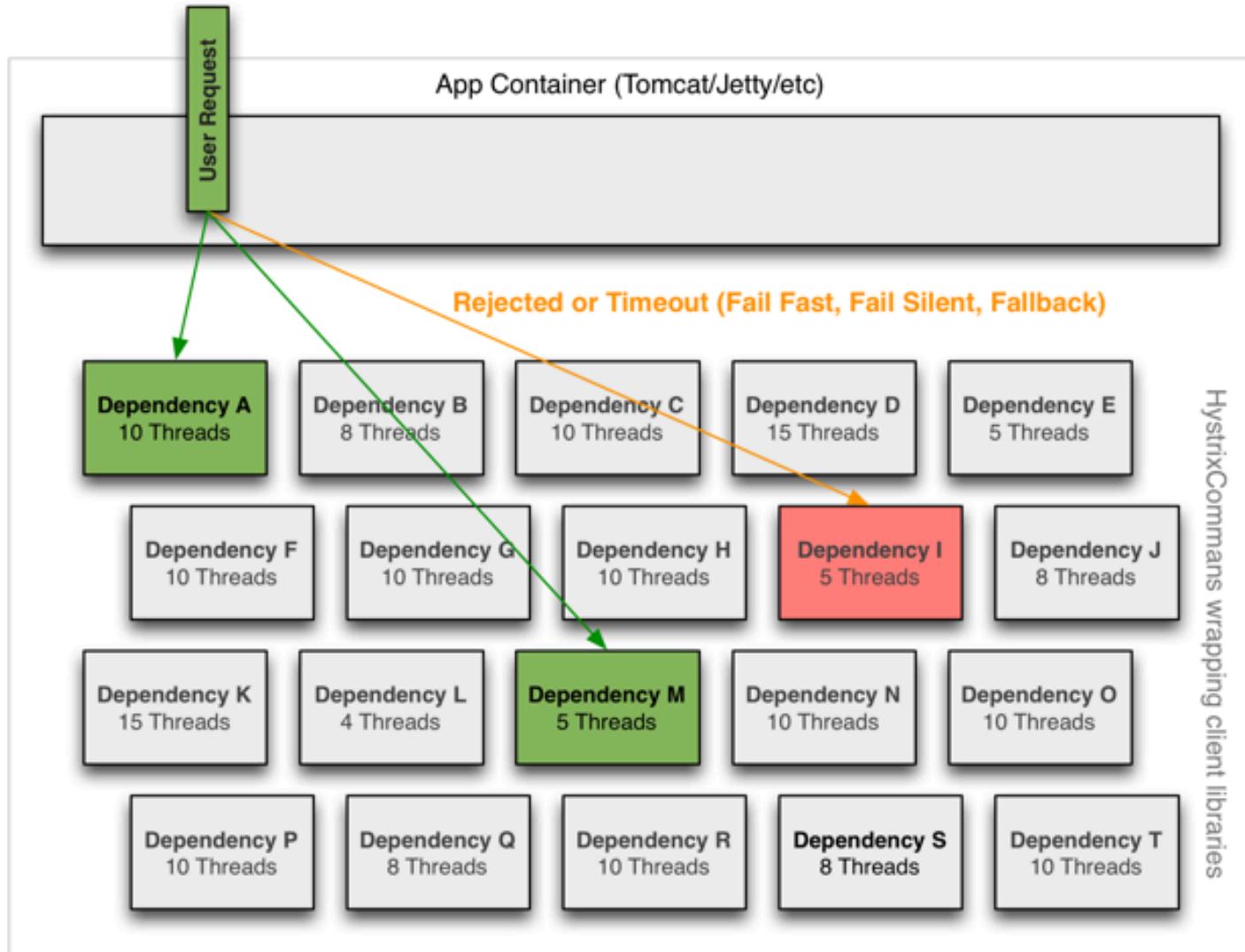
Leaky Bucket

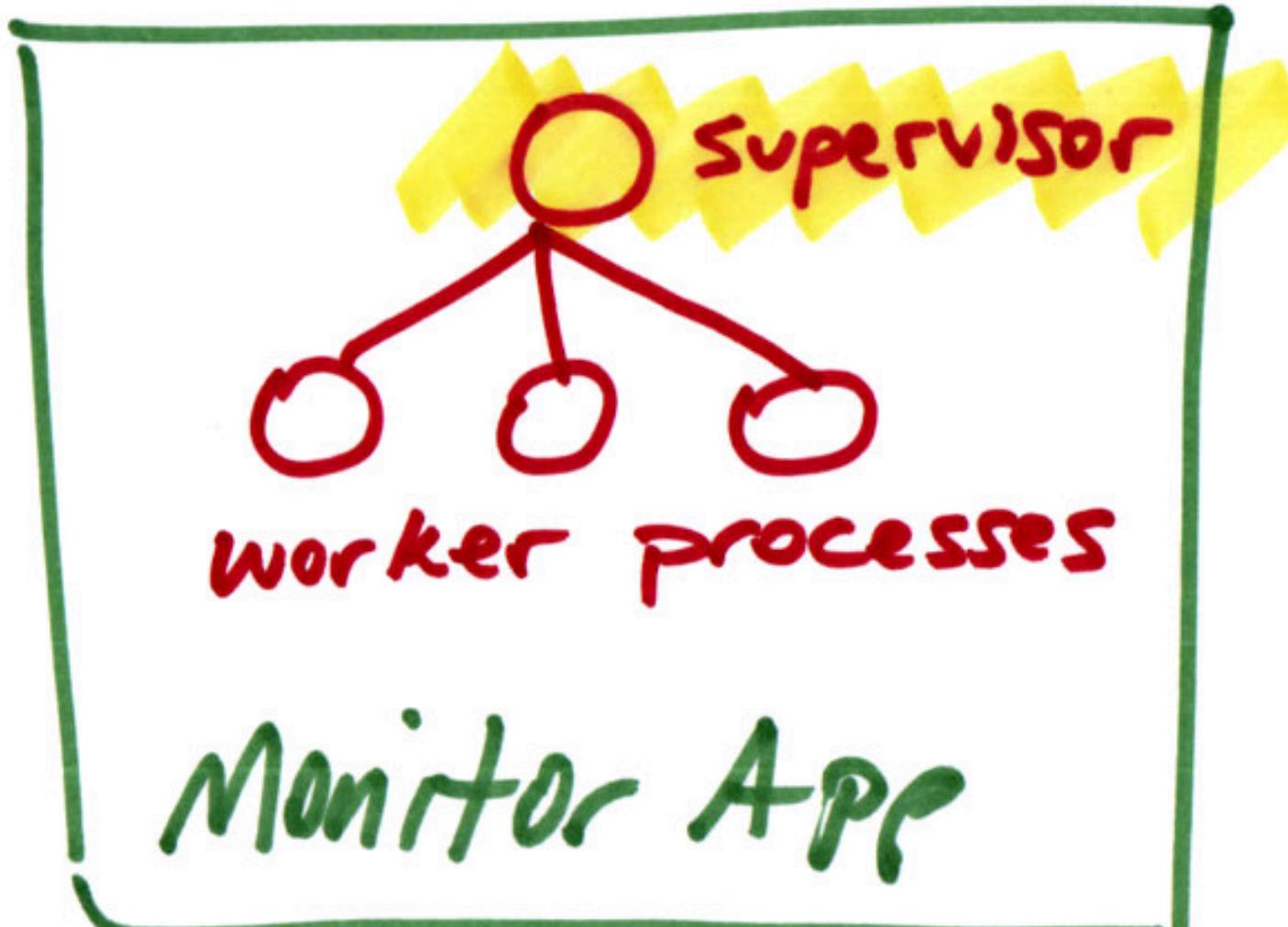


Bulkhead pattern



Bulkhead Pattern - Hystrix





Reactive Manifesto



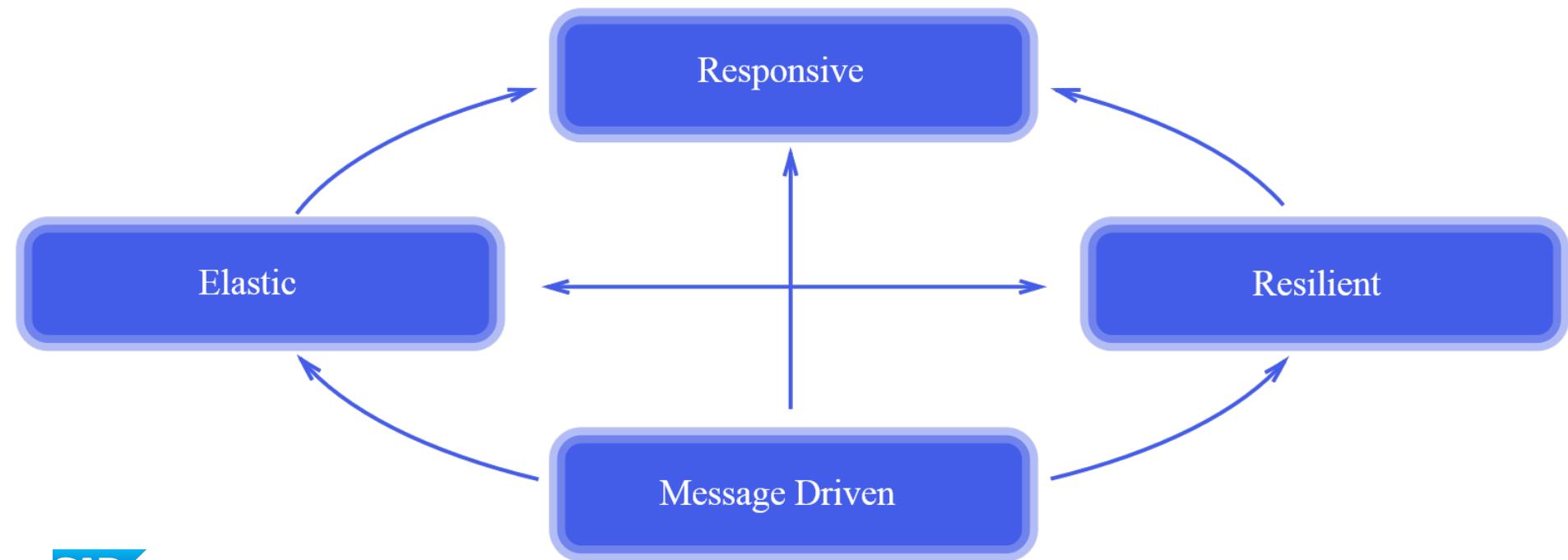
<http://www.reactivemanifesto.org/>

React to events

React to load

React to failure

React to users



The
Pragmatic
Programmers

Release It!

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Production-Ready Software



Michael T. Nygard

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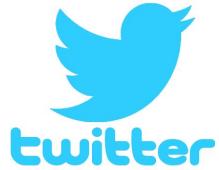
WE ARE NOT LOOKING FOR STUDENTS

WE HIRE PEOPLE WITH PASSION

LEARN, DO SOMETHING, LEARN, DO SOMETHING.....

.... THEN APPLY

QUESTIONS?



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