Using fallback to build reliable services

Anthony Regeda

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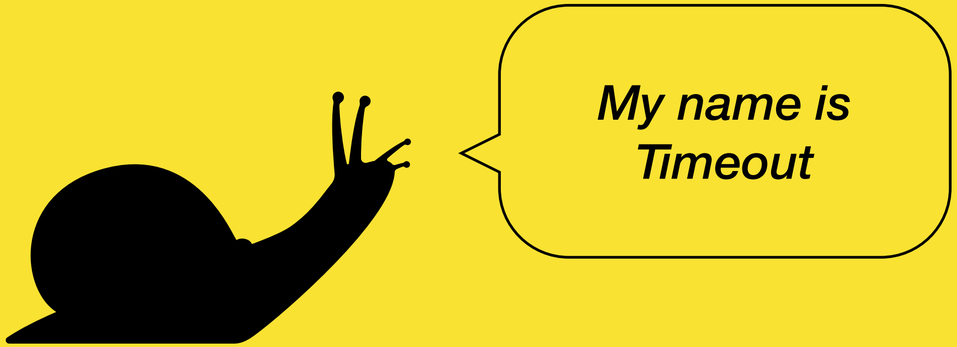



https://www.facebook.com/GoJuno/

Routing service

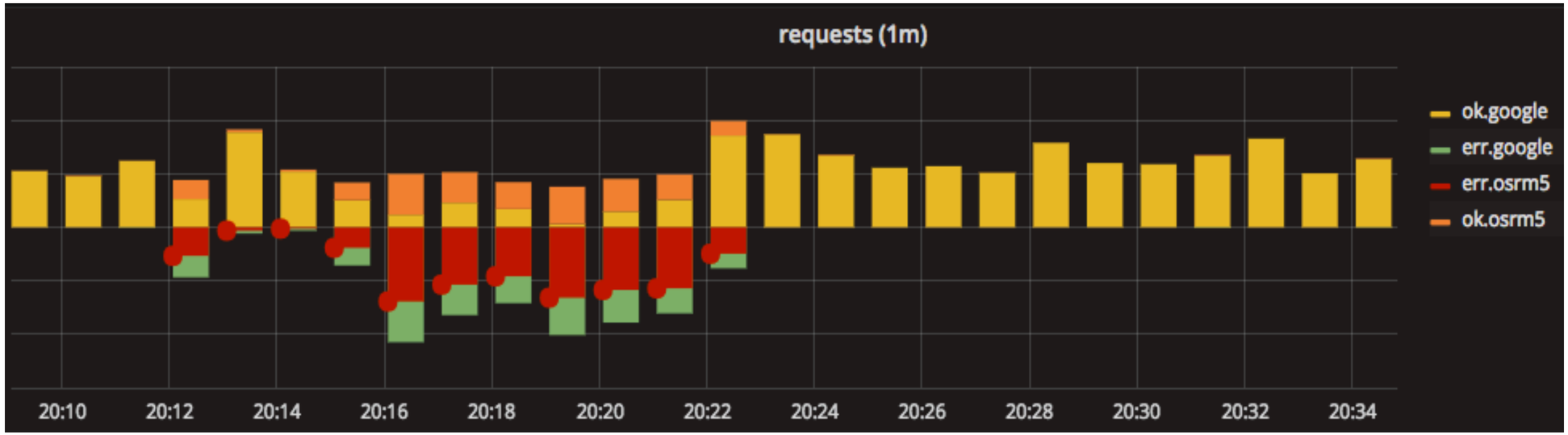
- Fare estimation (price per minute/km)
- Provider estimation (time of arrival)
- Navigation (figure out where is a car)

Service numbers

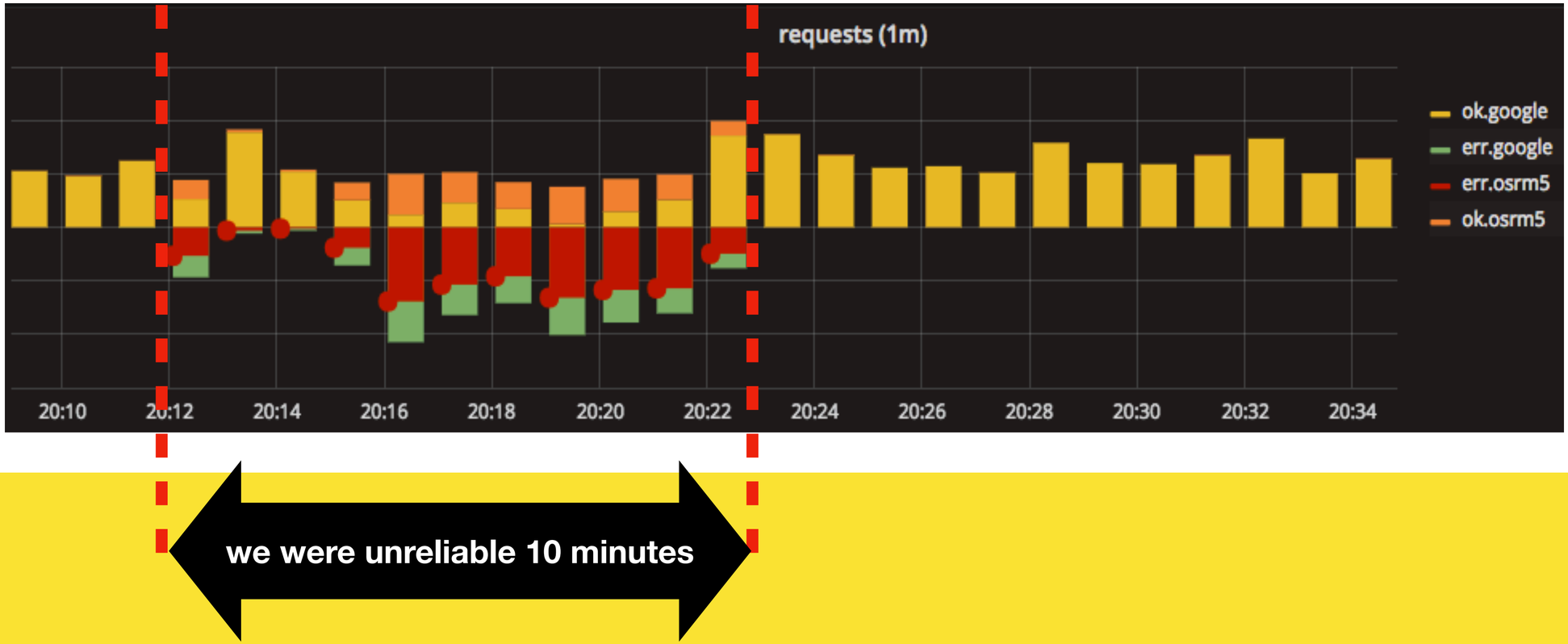
- 1kk requests per day
- response time up to 2 seconds in 0.99 quantile


OSRM
OPEN SOURCE ROUTING MACHINE
Dirty
Accurate
Quick
Slow

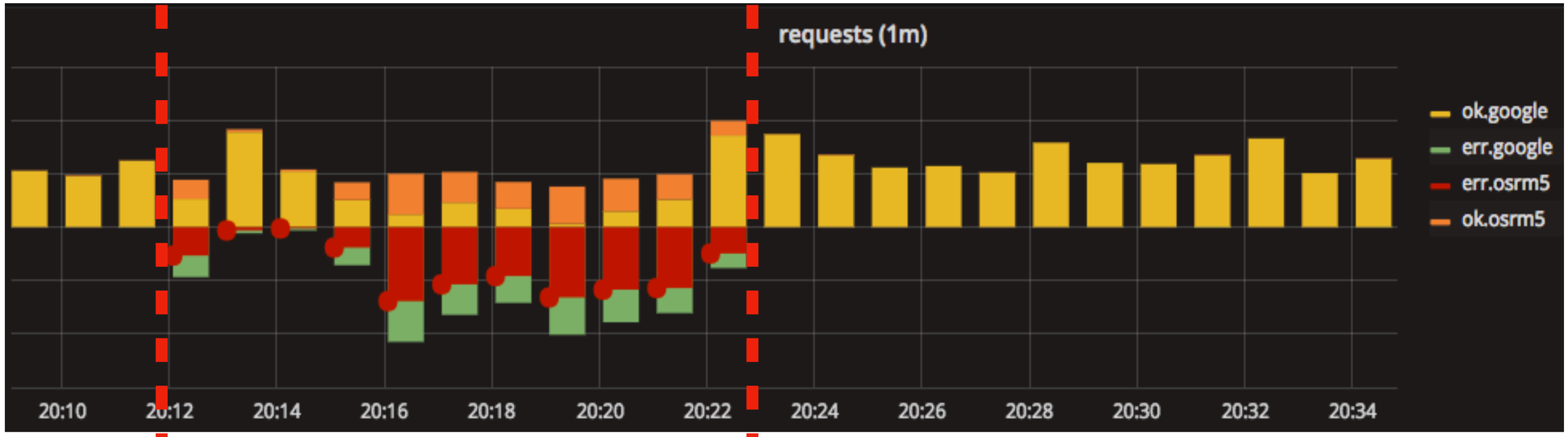
Once day…


requests (1m)
ok.google
err.google
err.osrm5
ok.osrm5
20:10
20:12
20:14
20:16
20:18
20:20
20:22
20:24
20:26
20:28
20:30
20:32
20:34

Once day…


requests (1m)
ok.google
err.google
err.osrm5
ok.osrm5
20:10
20:12
20:14
20:16
20:18
20:20
20:22
20:24
20:26
20:28
20:30
20:32
20:34
we were unreliable 10 minutes

Once day…



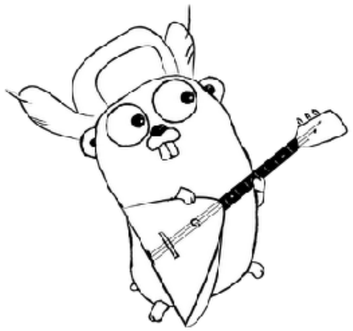
we were unreliable 10 minutes

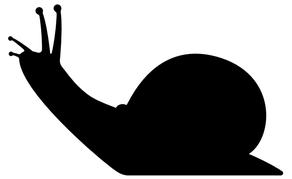
Can’t estimate a ride!
Can’t find a car!
:lol:

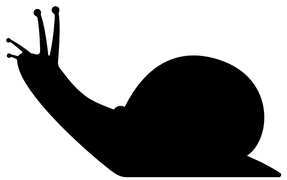
A lot of errors like…

```
handler returned an error: ERR_INTERNAL http(500) [failover: failed to
route: google - context deadline exceeded, osrm - request canceled]
```

failover, failback, fallback

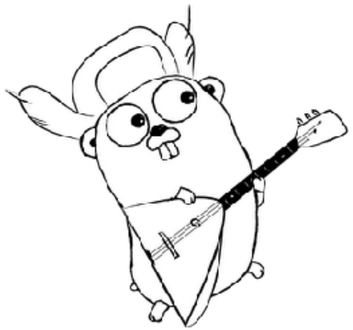


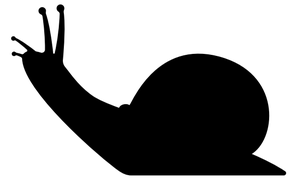


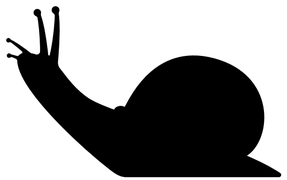


fallback

failover, failback, fallback







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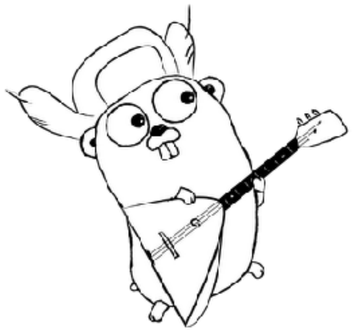

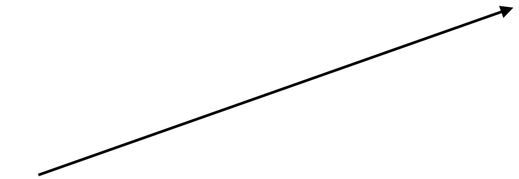

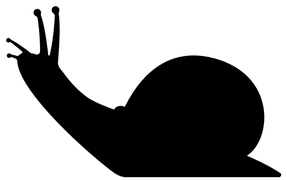

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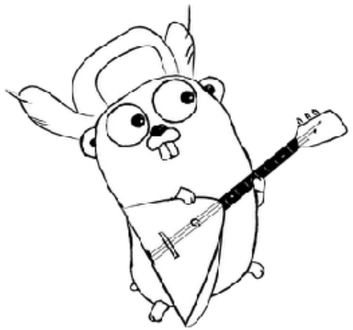
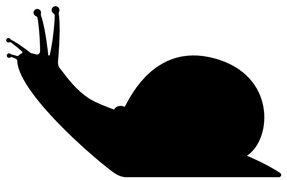
failover, failback, fallback



failover



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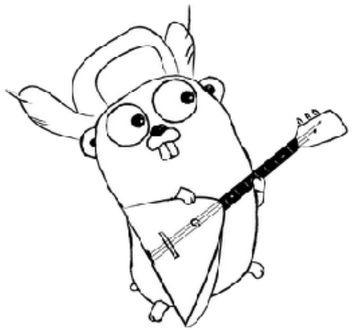
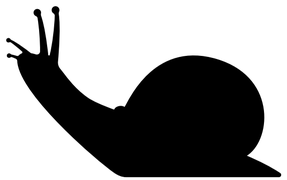


failover



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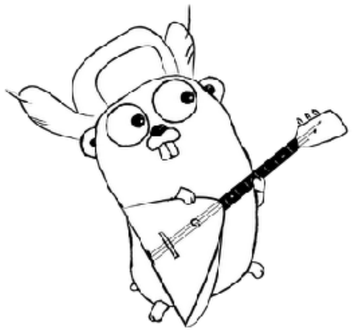

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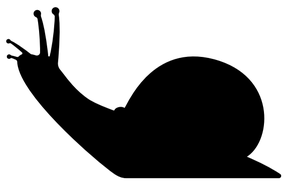

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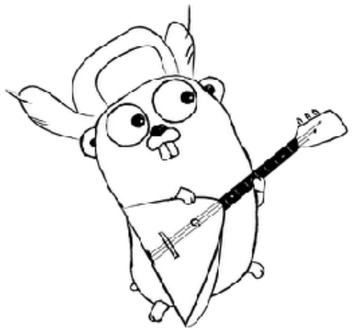
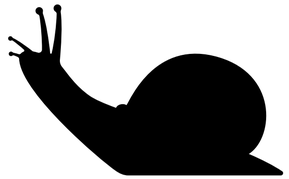
failover, failback, fallback





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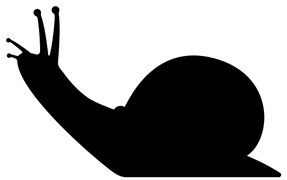

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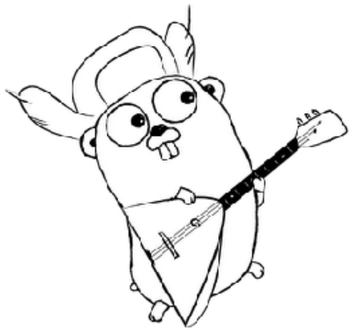

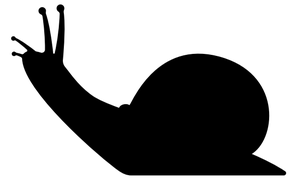

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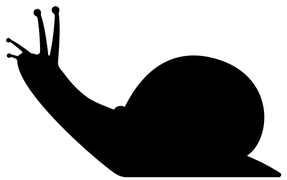

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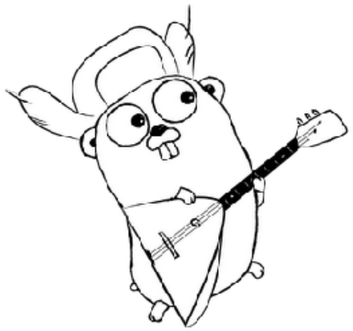

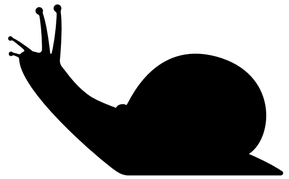

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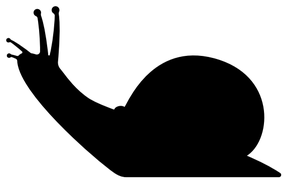

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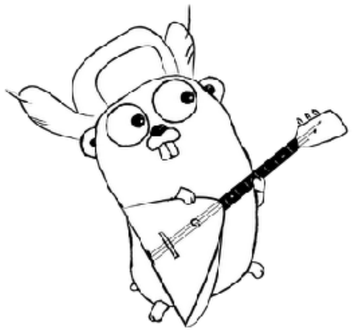
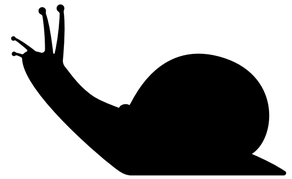
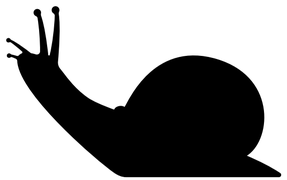
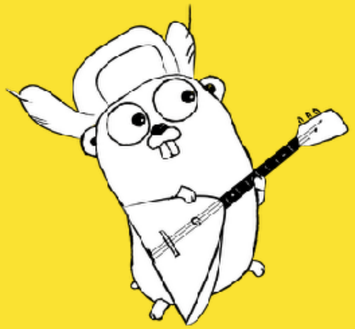






fallback

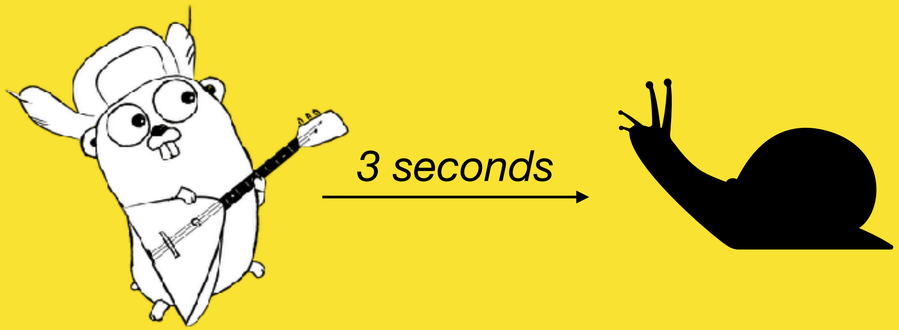
Naive approach – fallback on error



Google

OSRM

Naive approach – fallback on error



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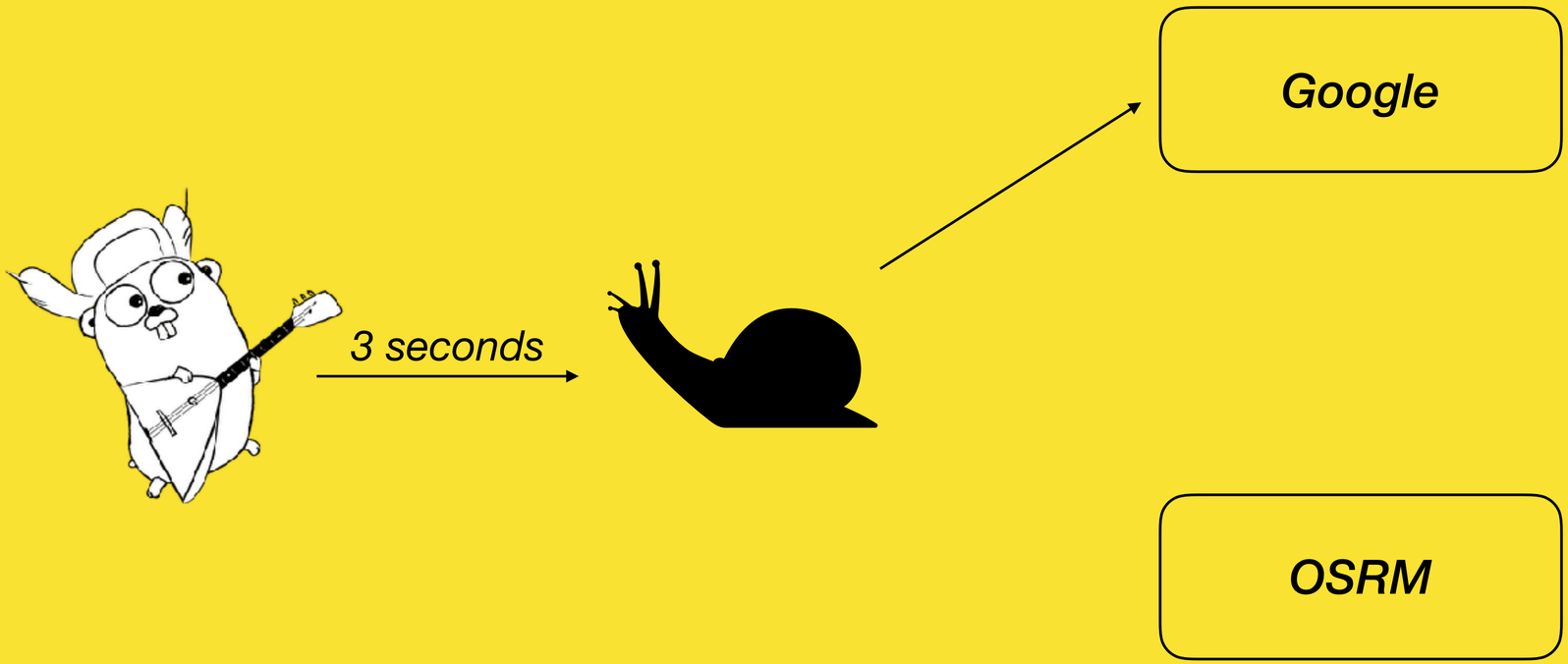

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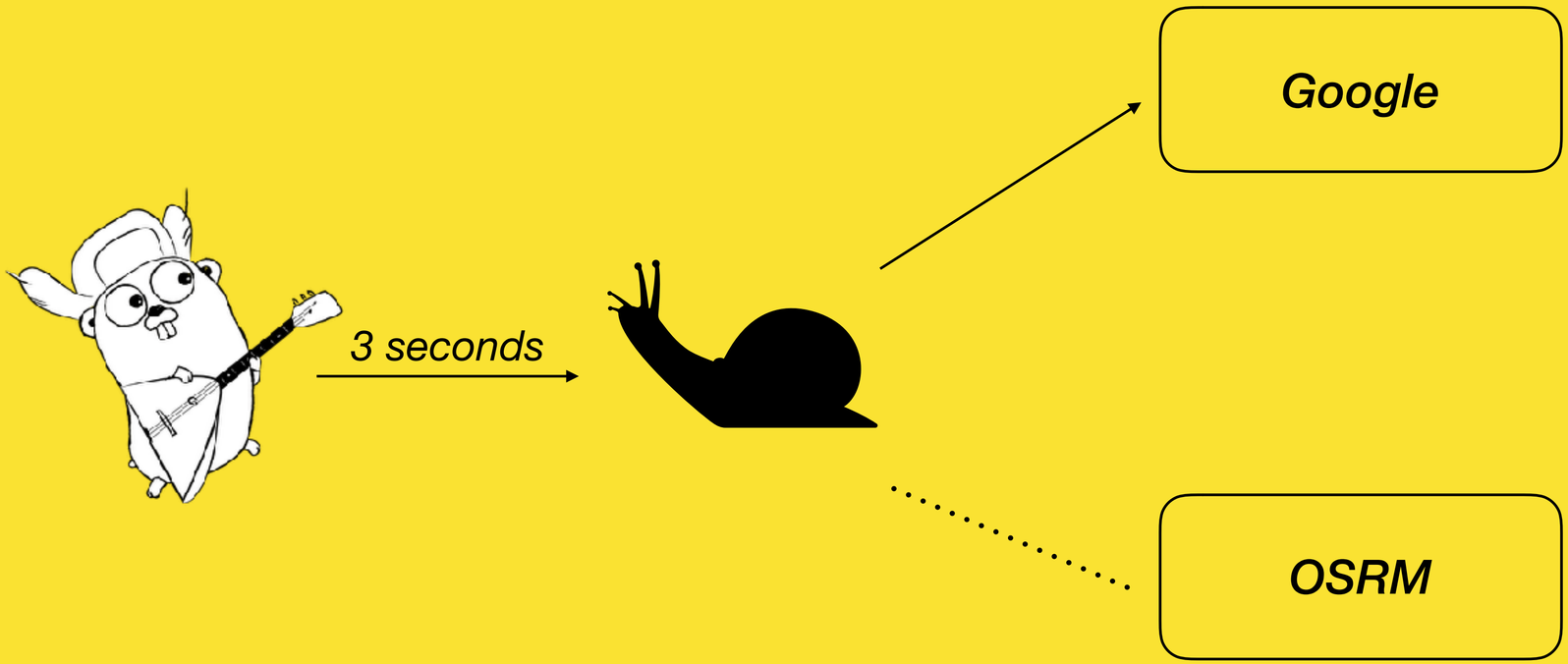

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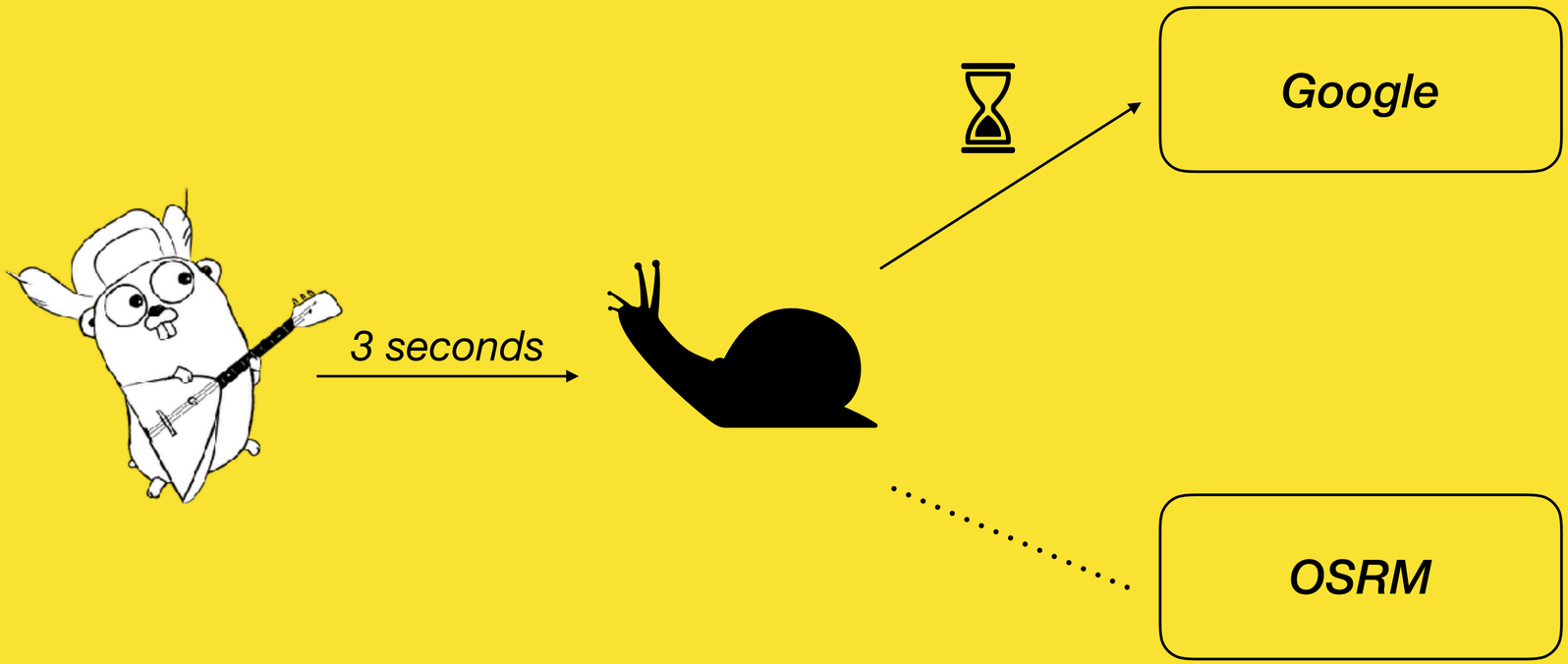

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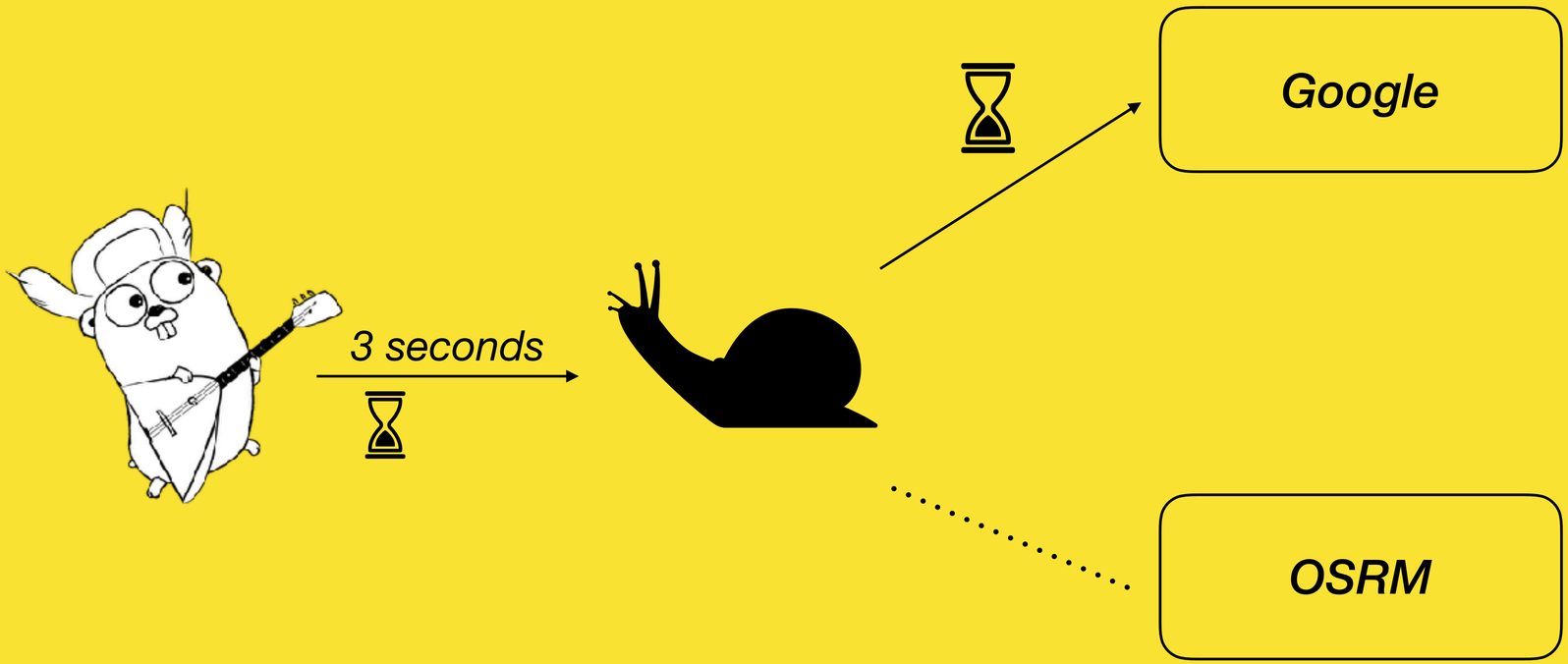

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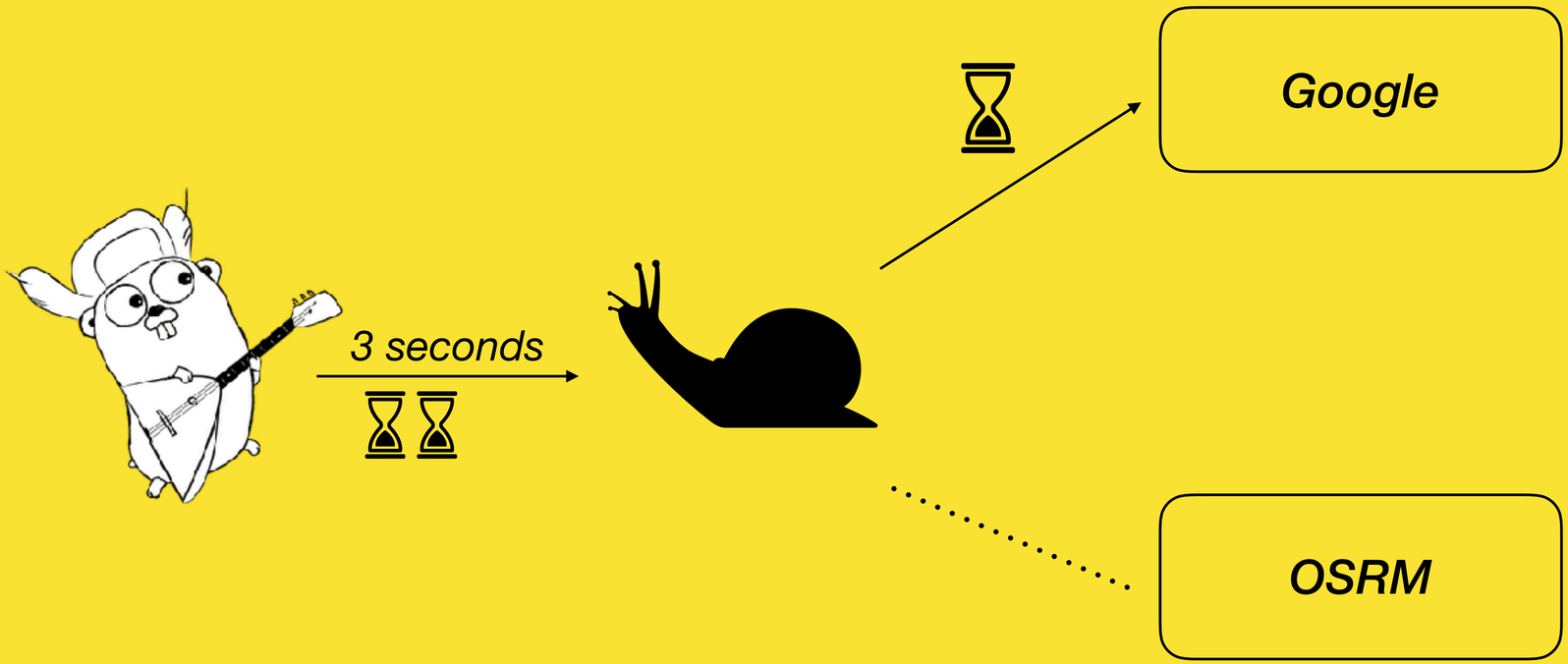

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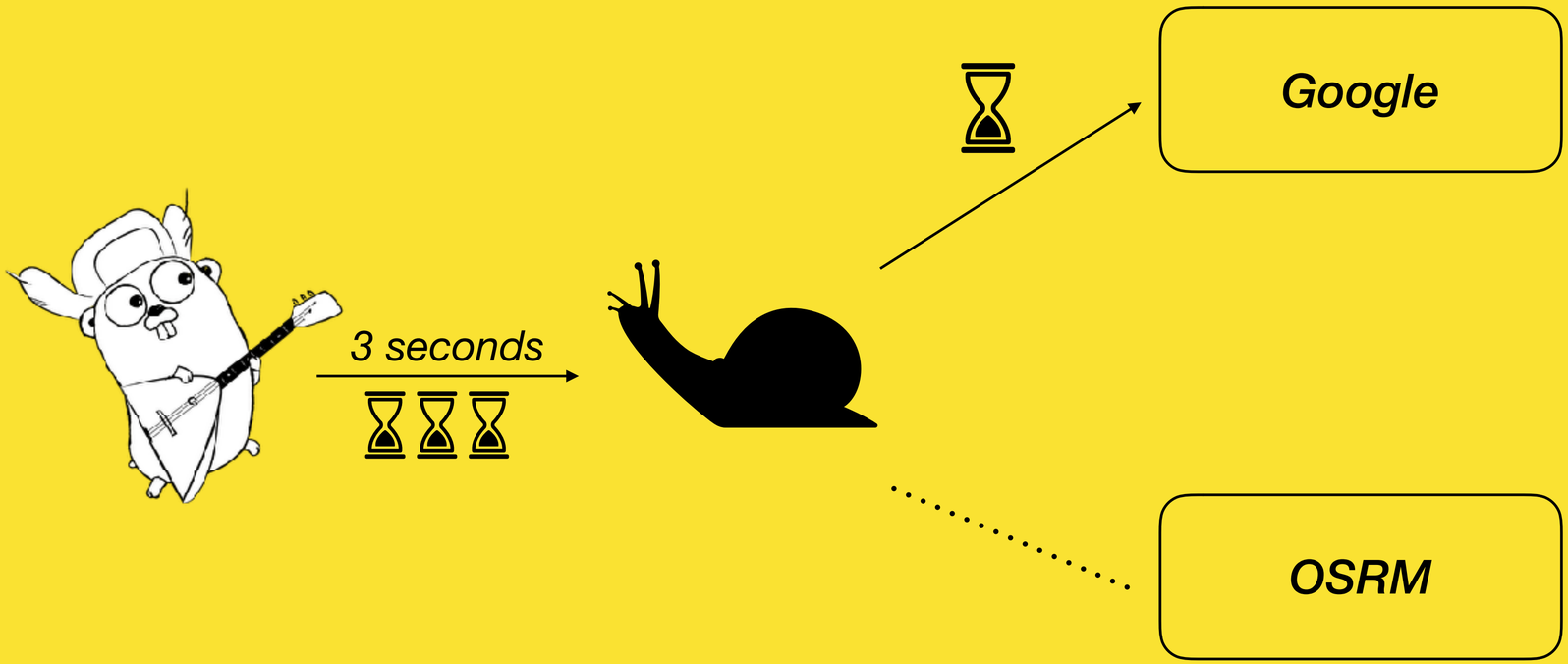

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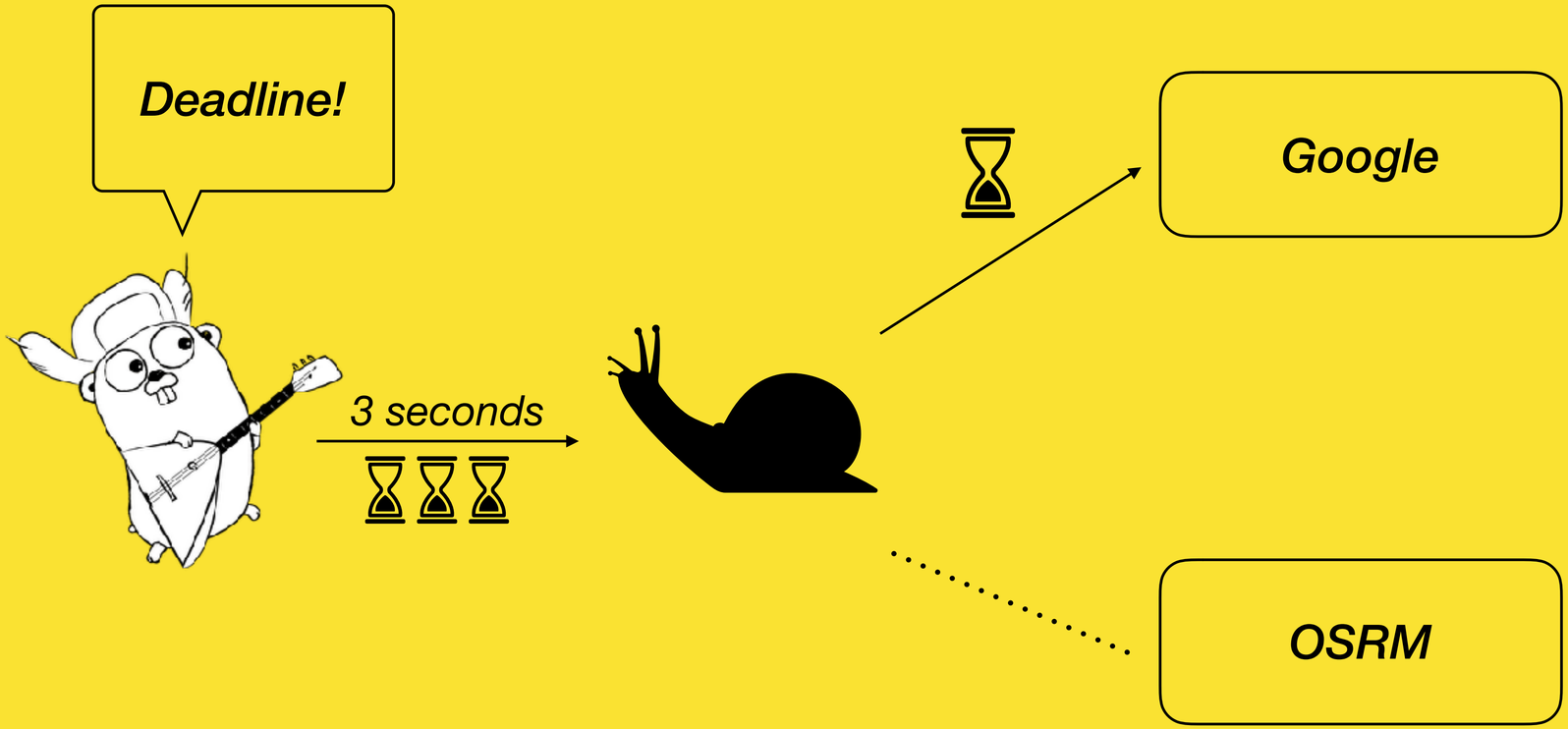

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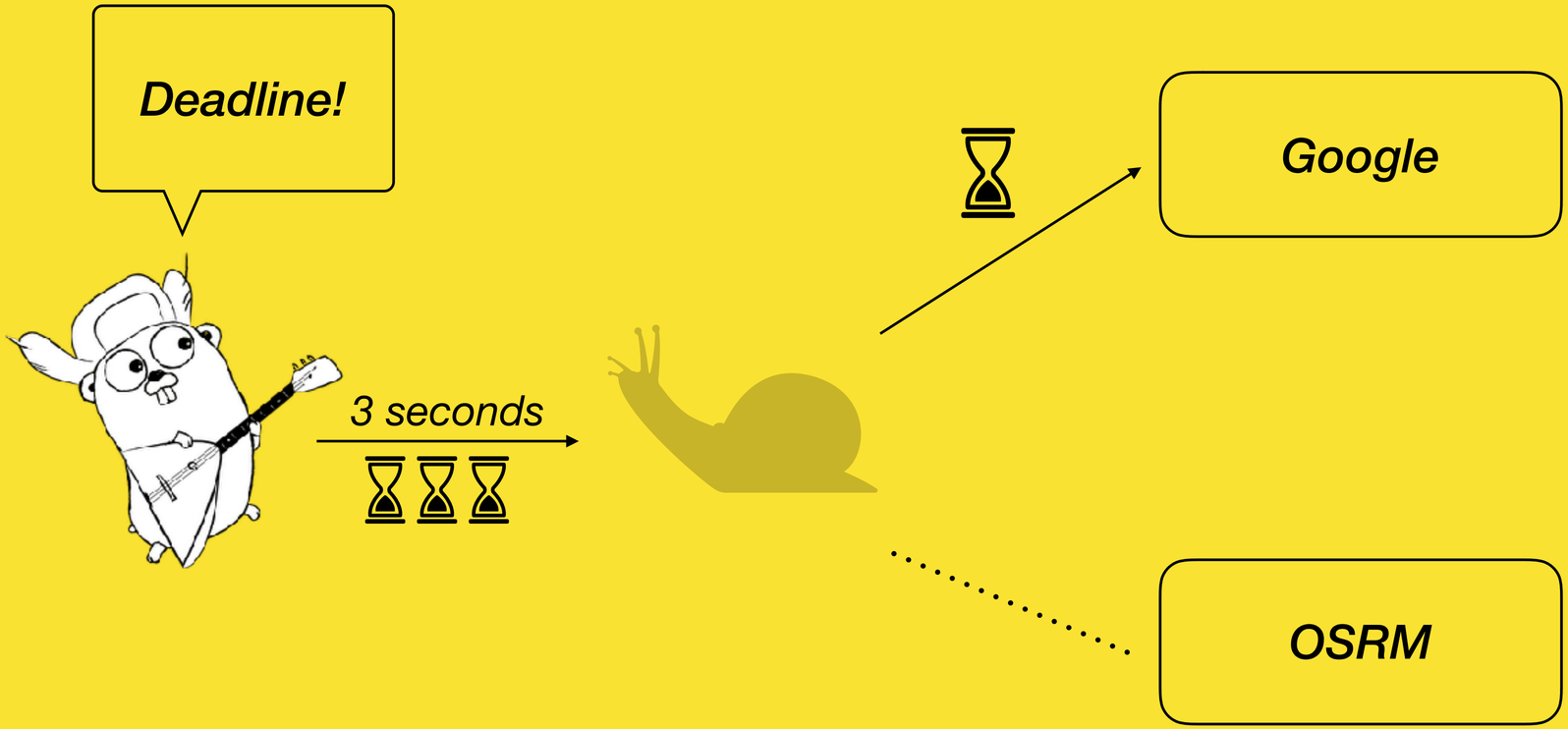

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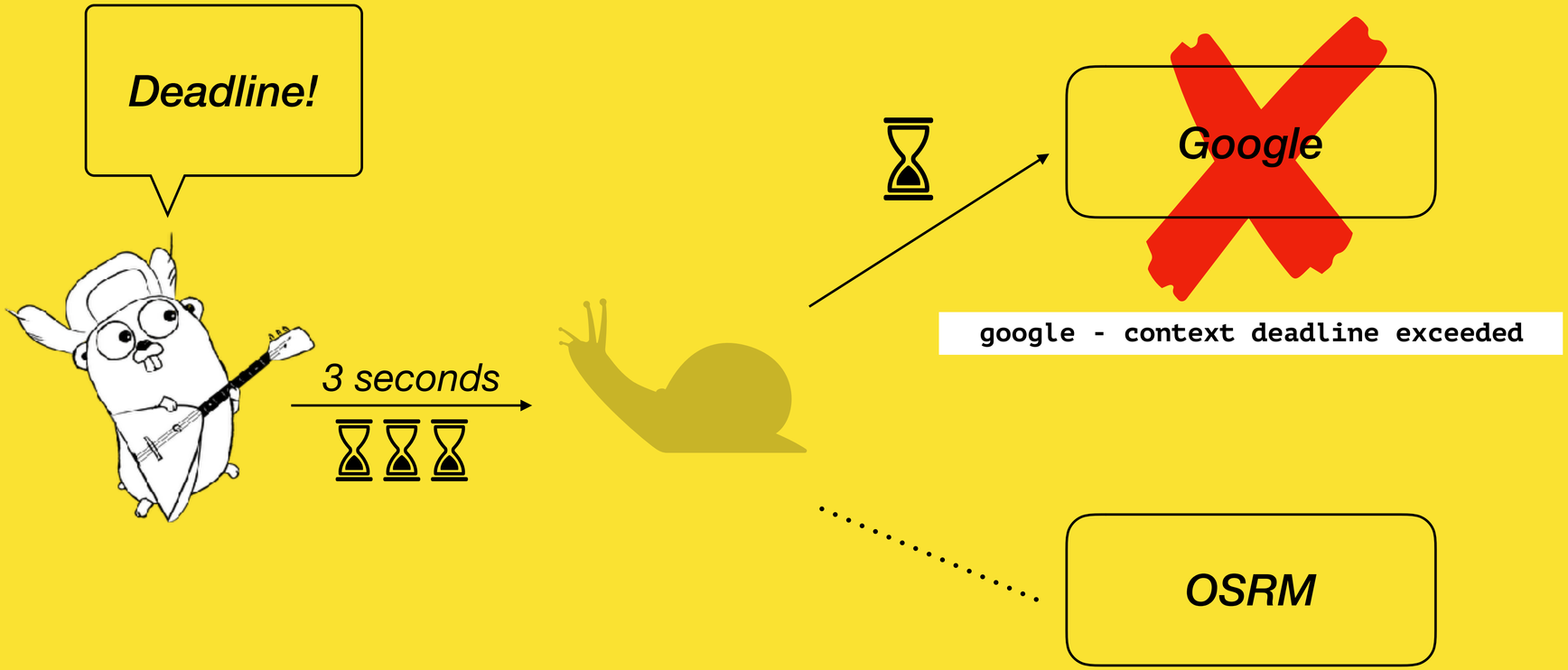

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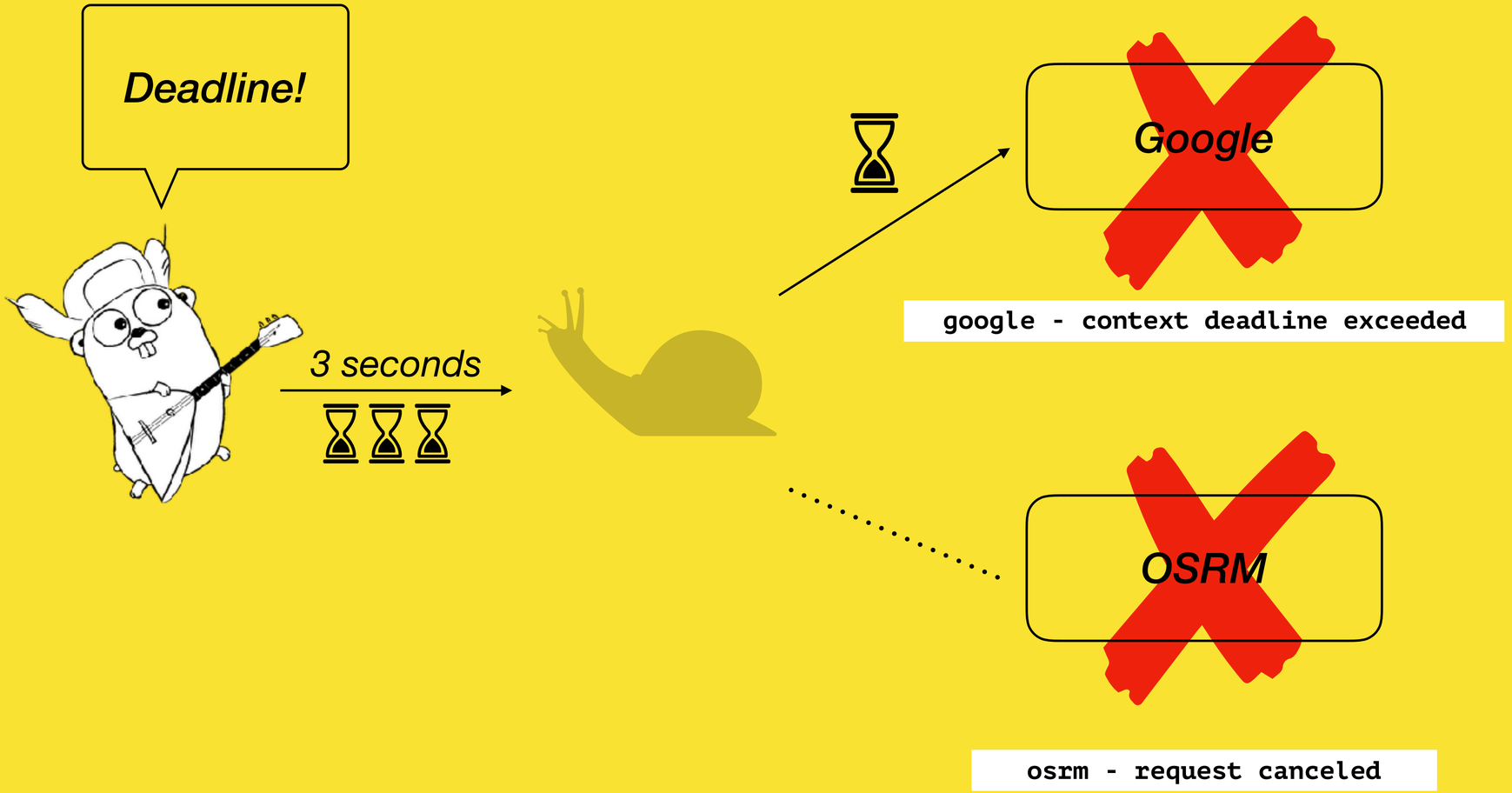

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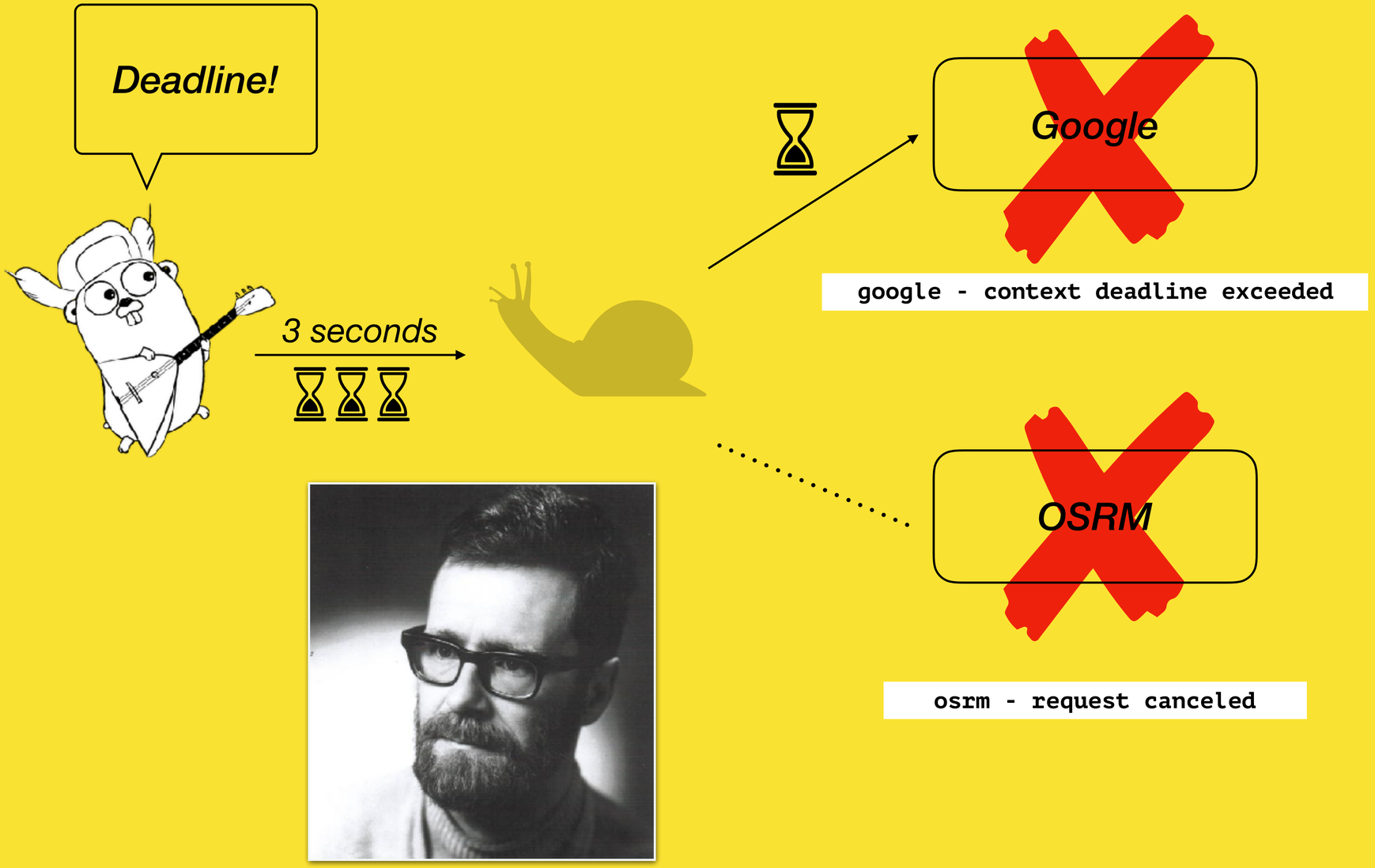
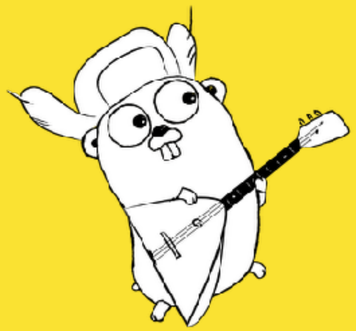
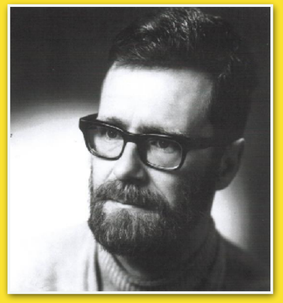


Brainy approach – shifted fallback

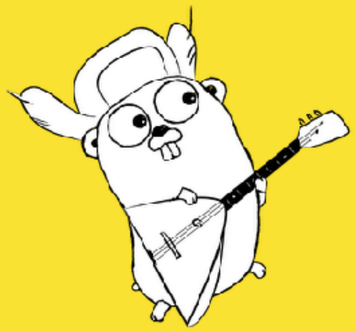




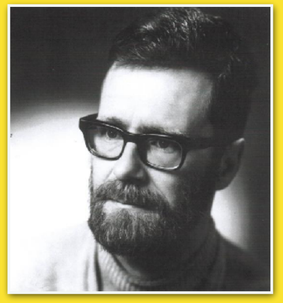
Google

OSRM

Brainy approach – shifted fallback



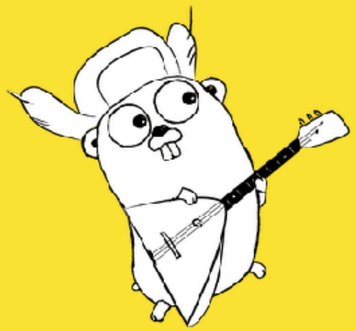
3 seconds



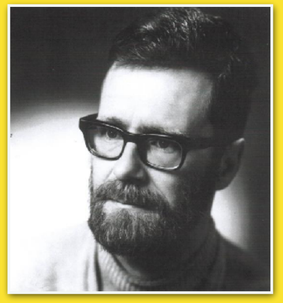
Google

OSRM

Brainy approach – shifted fallback



3 seconds



Google

OSRM

Brainy approach – shifted fallback

Brainy approach – shifted fallback

Brainy approach – shifted fallback

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Brainy approach – shifted fallback

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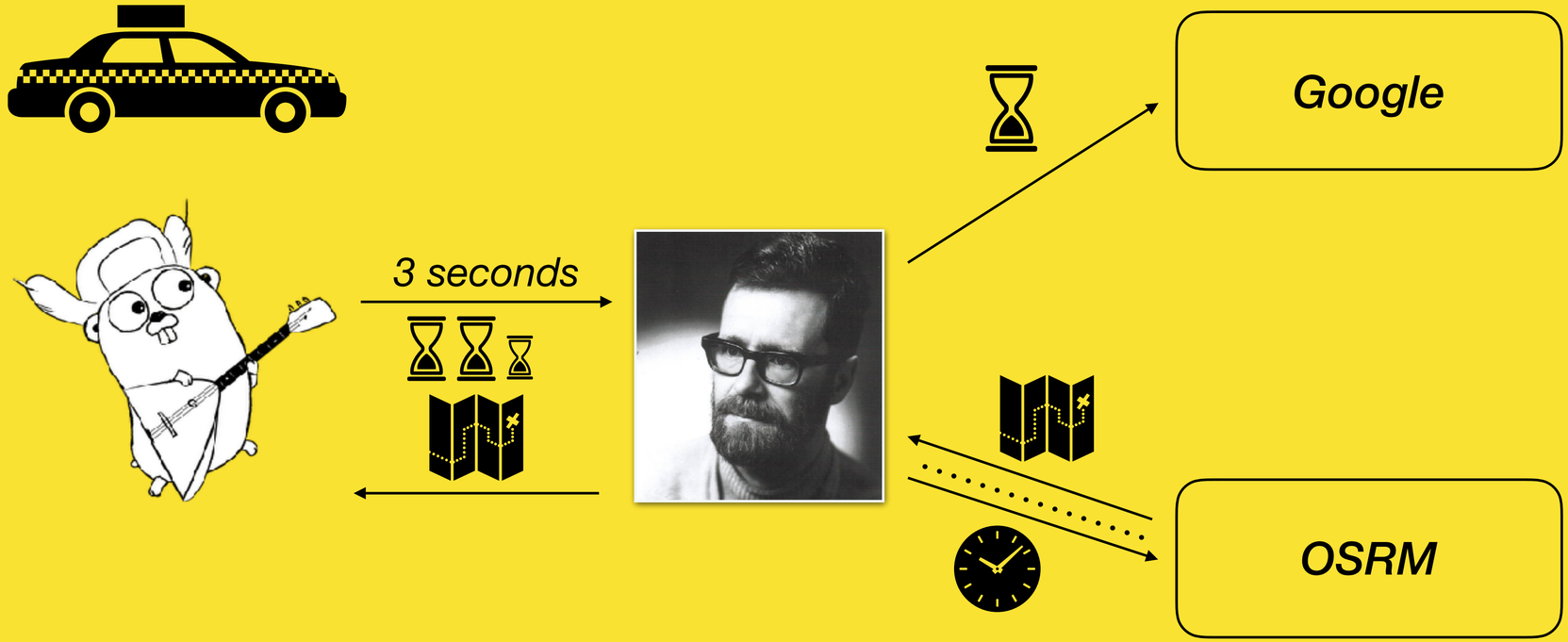
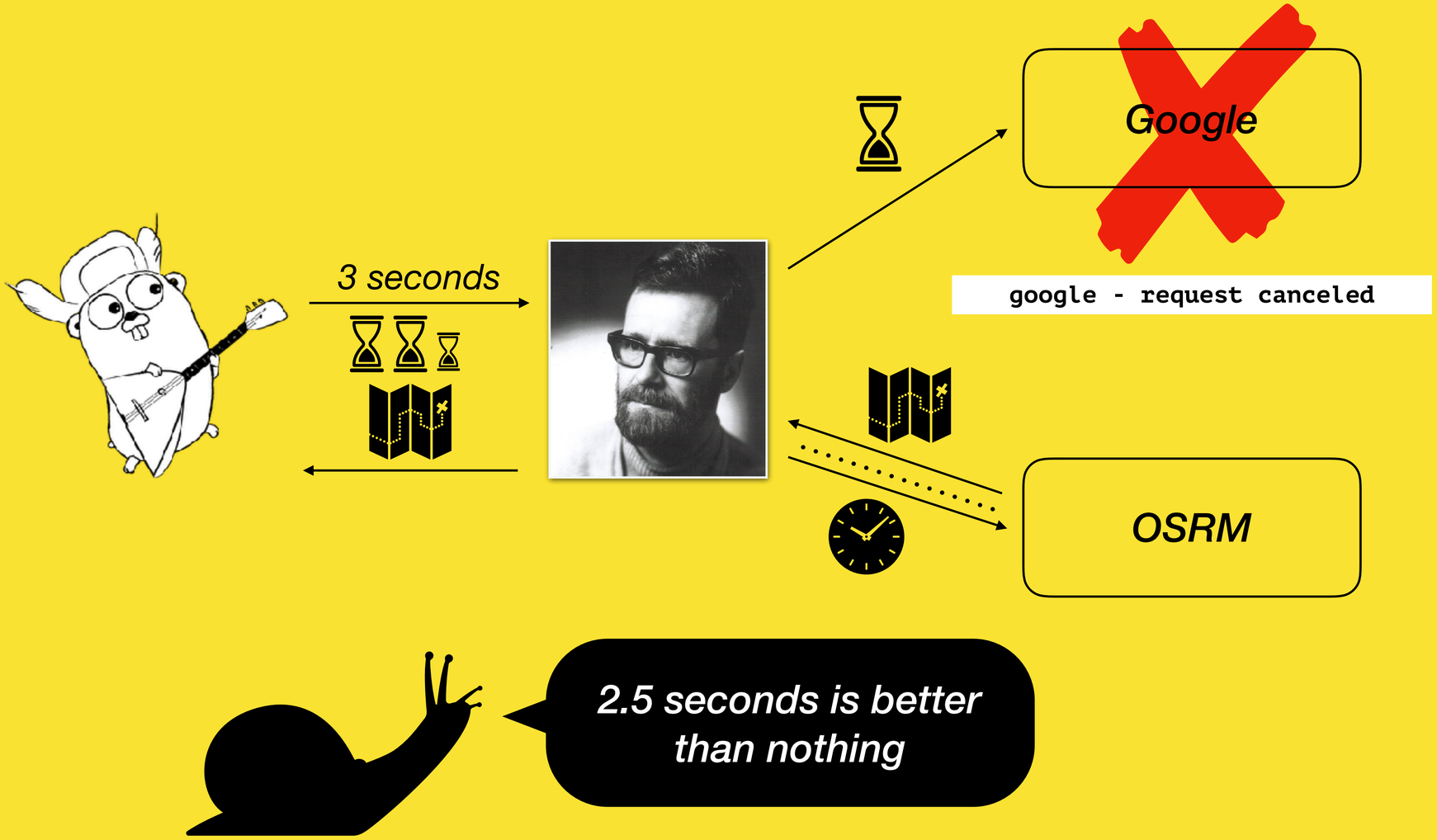
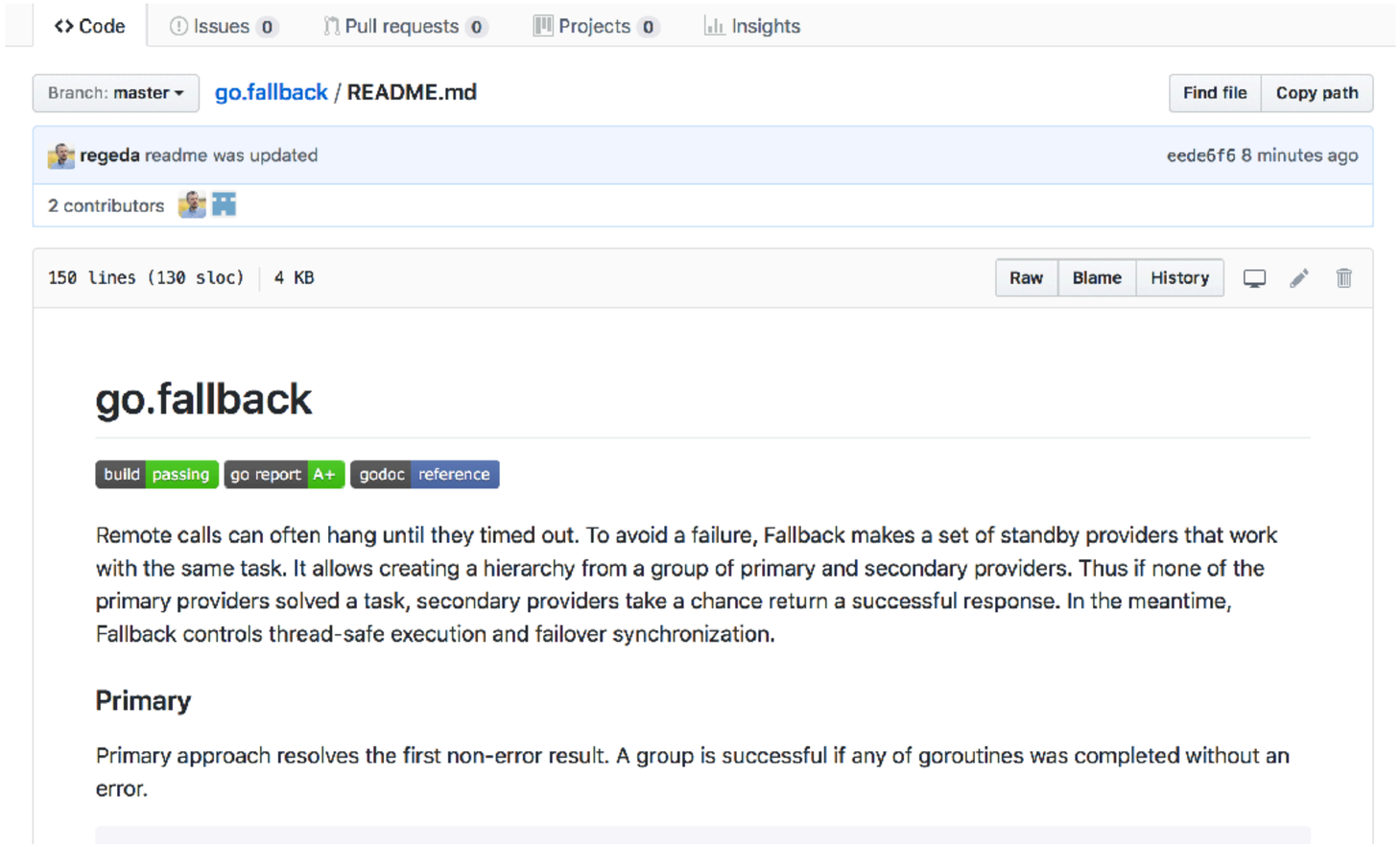


Brainy approach – shifted fallback

Brainy approach – shifted fallback

Brainy approach – shifted fallback




<> Code
Issues 0
Pull requests 0
Projects 0
Insights
Branch: master
go.fallback / README.md
Find file
Copy path
regeda readme was updated
eede6f6 8 minutes ago
2 contributors
150 lines (130 sloc)
4 KB
Raw
Blame
History
go.fallback
build passing
go report A+
godoc reference
Remote calls can often hang until they timed out. To avoid a failure, Fallback makes a set of standby providers that work with the same task. It allows creating a hierarchy from a group of primary and secondary providers. Thus if none of the primary providers solved a task, secondary providers take a chance return a successful response. In the meantime, Fallback controls thread-safe execution and failover synchronization.
Primary
Primary approach resolves the first non-error result. A group is successful if any of goroutines was completed without an error.

go.fallback

Ingredients

Ingredients

- sync.WaitGroup

Ingredients

- sync.WaitGroup
- sync.Cond

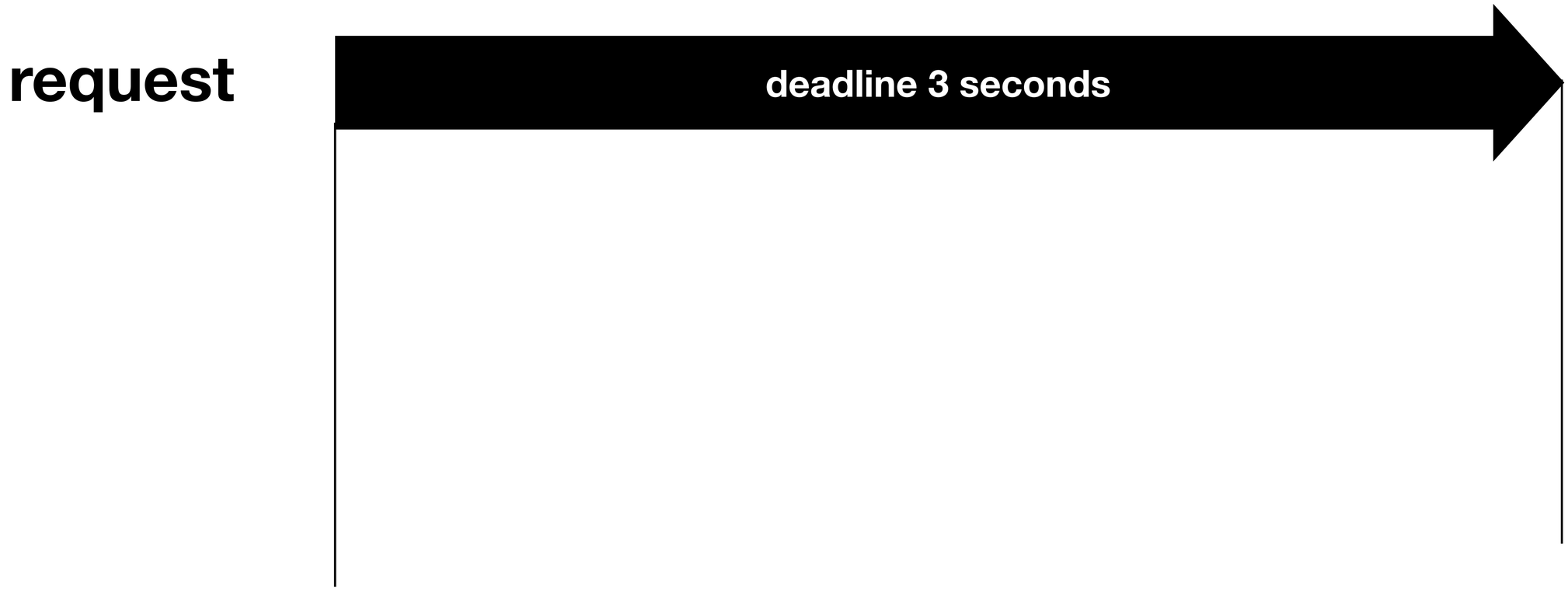
Ingredients

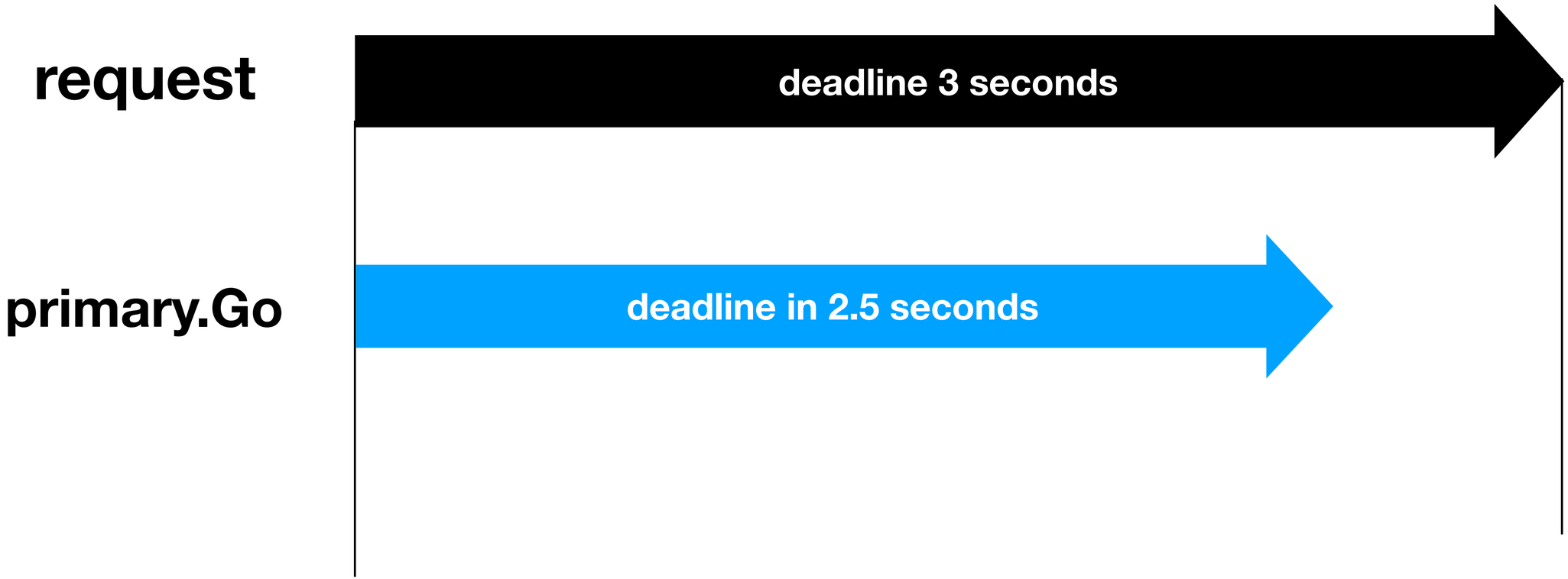
- sync.WaitGroup
- sync.Cond
- context.Context

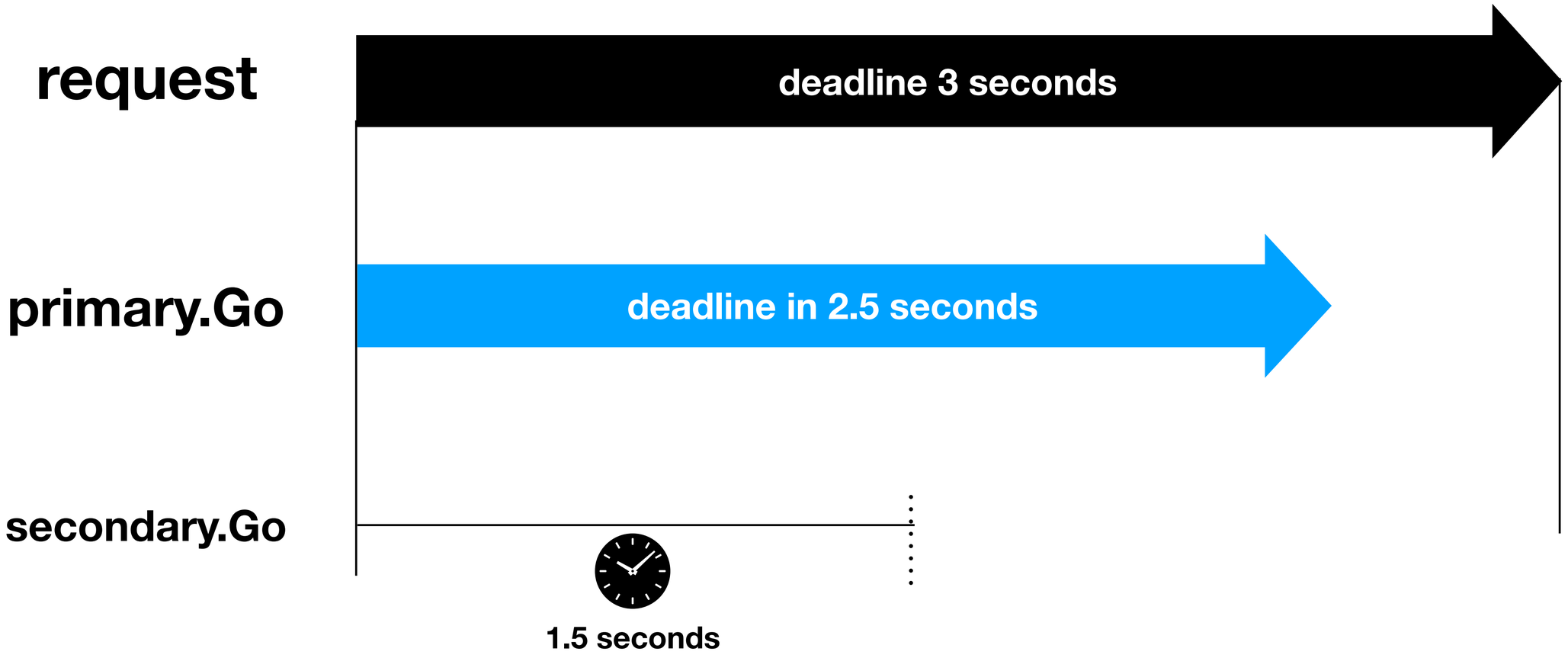
```
type Func func() (func(), error)

type Group interface {
    Go(Func)
    Wait() bool
}
```

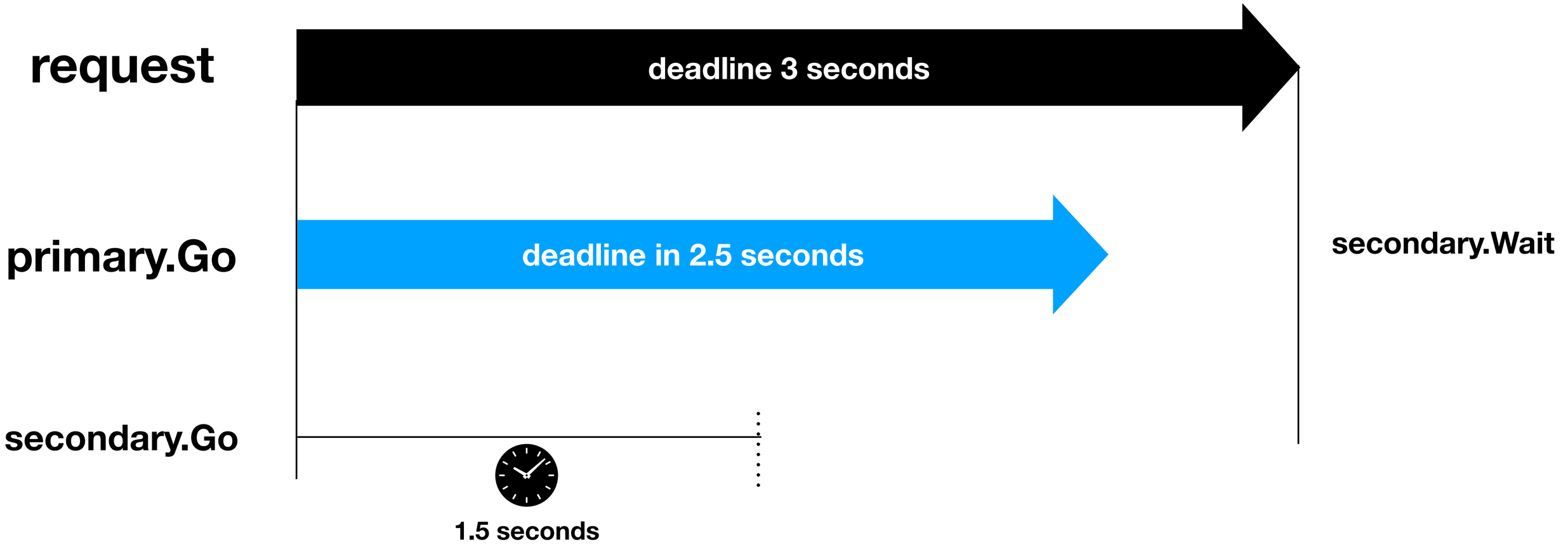
```
func NewPrimary() *Primary
func NewSecondary(Group) *Secondary
```

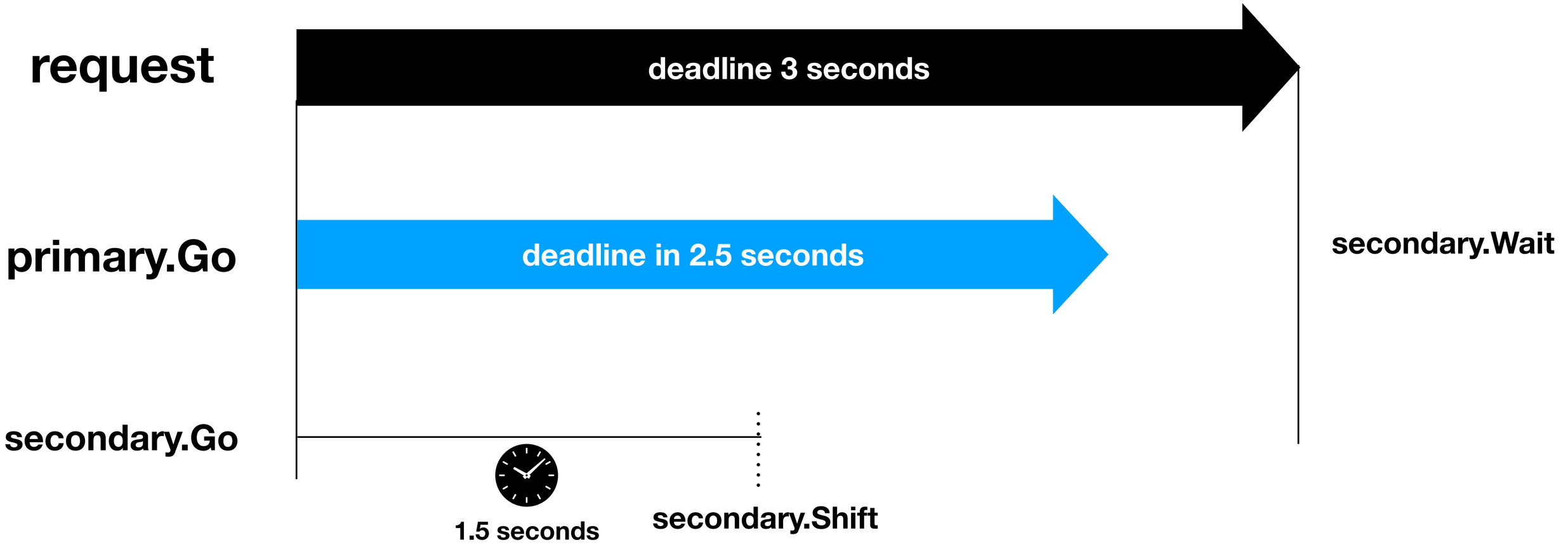
```
func (*Primary) Go(Func)
func (*Primary) Wait() bool


func (*Secondary) Go(Func)
func (*Secondary) Wait() bool
func (*Secondary) Shift()
```

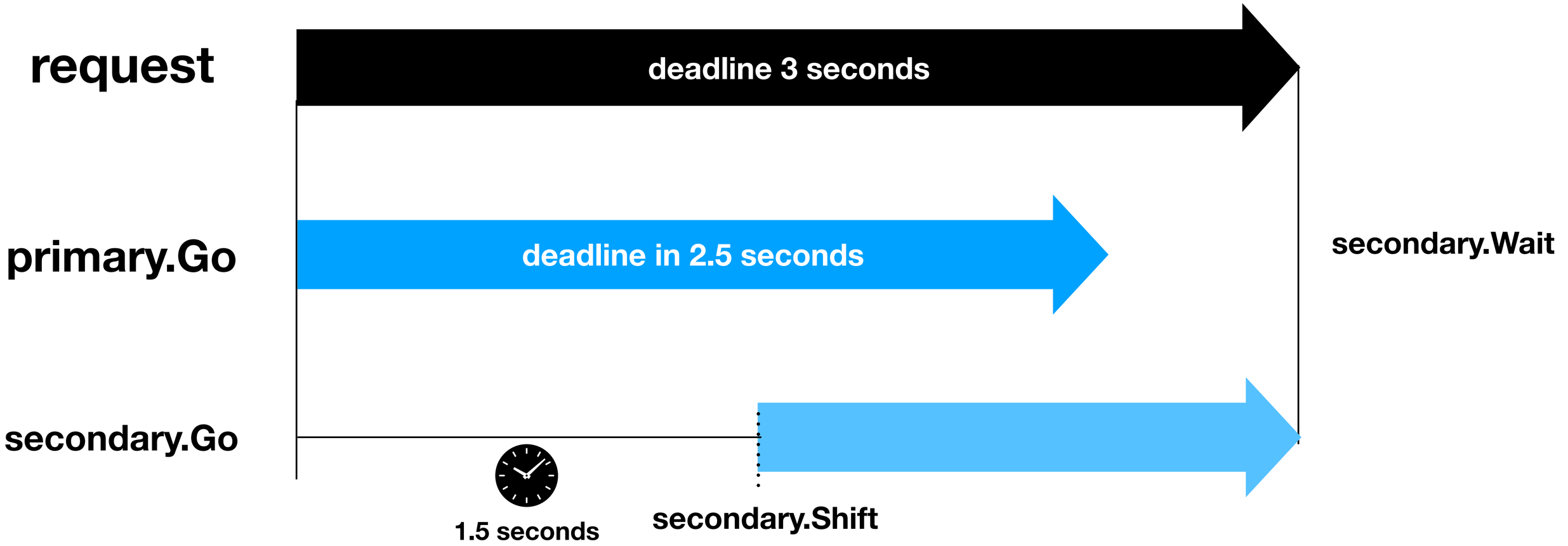

request
deadline 3 seconds


request
deadline 3 seconds
primary.Go
deadline in 2.5 seconds


request
deadline 3 seconds
primary.Go
deadline in 2.5 seconds
secondary.Go
1.5 seconds


request
deadline 3 seconds
primary.Go
deadline in 2.5 seconds
secondary.Wait
secondary.Go
1.5 seconds


request
deadline 3 seconds
primary.Go
deadline in 2.5 seconds
secondary.Wait
secondary.Go
1.5 seconds
secondary.Shift


request
deadline 3 seconds
primary.Go
deadline in 2.5 seconds
secondary.Wait
secondary.Go
1.5 seconds
secondary.Shift

Demo

“Anything that can go wrong will go wrong.”

–Murphy's law

@regeda

https://github.com/regeda/go.fallback

Use fallbacks!


@regeda


https://github.com/regeda/go.fallback