Speed up the monolith

building a smart reverse proxy in Go

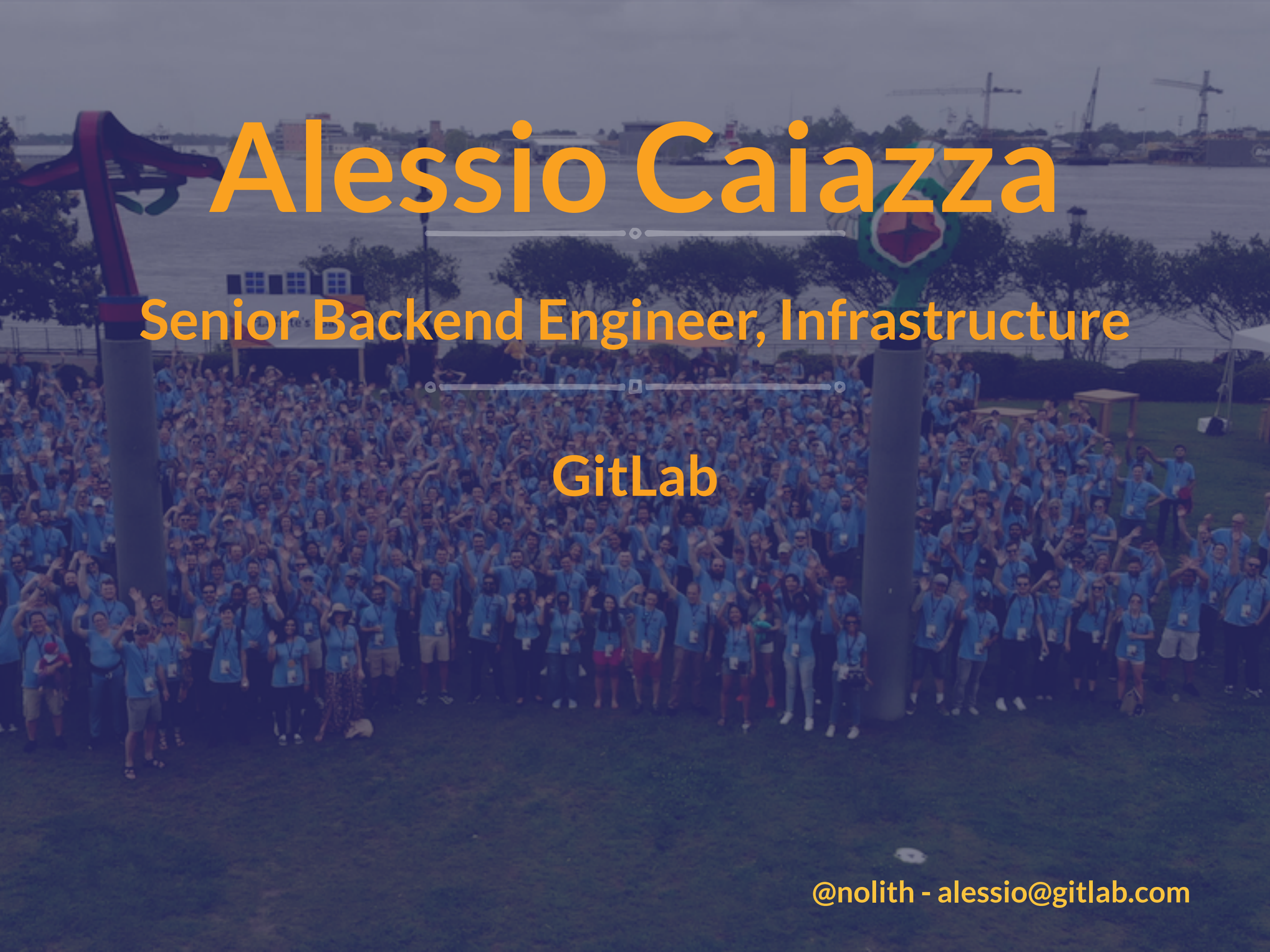

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Photo by Joseph Barrientos on Unsplash

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We are a Ruby shop

Why Go ?

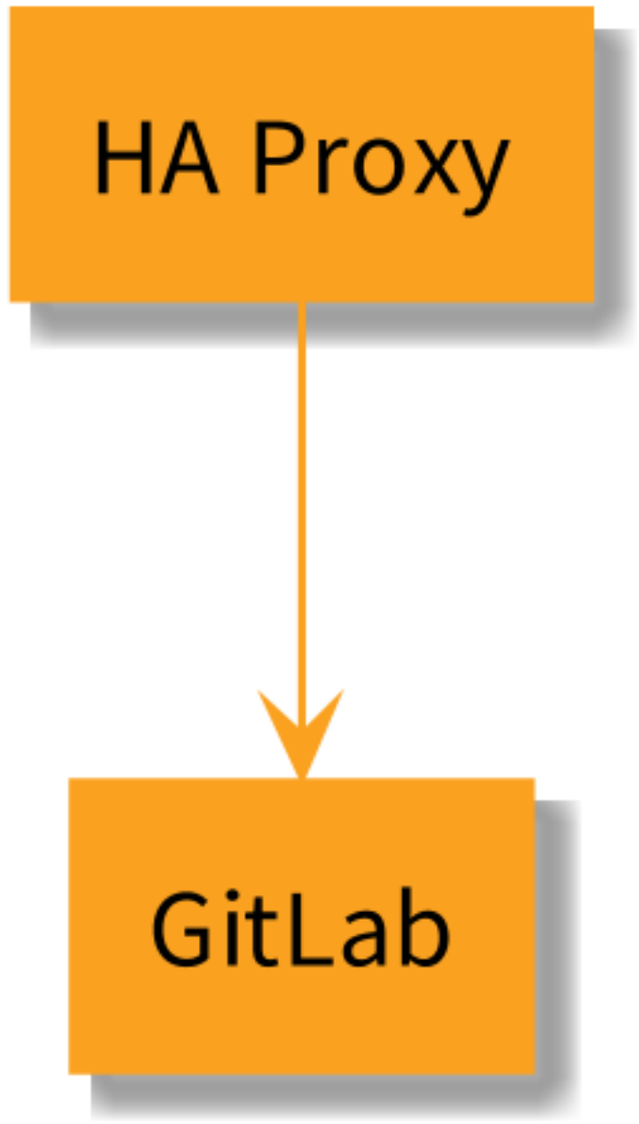
Slow requests

unicorn 

Rack HTTP server for fast clients and Unix

unicorn is an HTTP server for Rack applications *designed to only serve fast clients* on low-latency, high-bandwidth connections and take advantage of features in Unix/Unix-like kernels.

— bogomips.org/unicorn


HA Proxy
GitLab

Workhorse

a smart reverse proxy

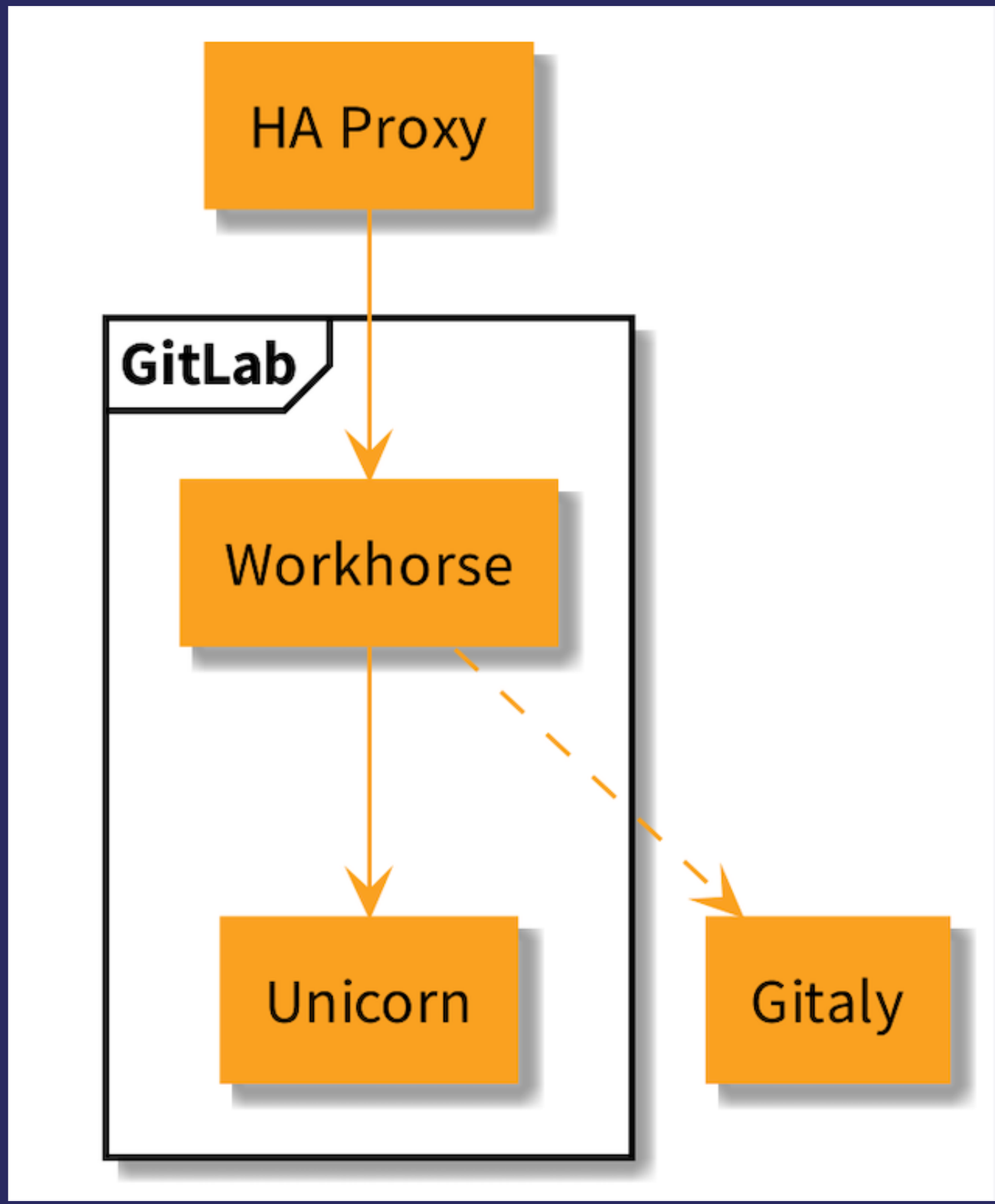
```go
package main

import (
    "log"
    "net/http"
    "net/http/httputil"
    "net/url"
)

func main() {
    upstream, err := url.Parse("https://httpbin.org")
    if err != nil {
        log.Fatal(err)
    }

    proxy := httputil.NewSingleHostReverseProxy(upstream)

    err = http.ListenAndServe(":8080", proxy)
    log.Fatal(err)
}
```

Speed up a slow request

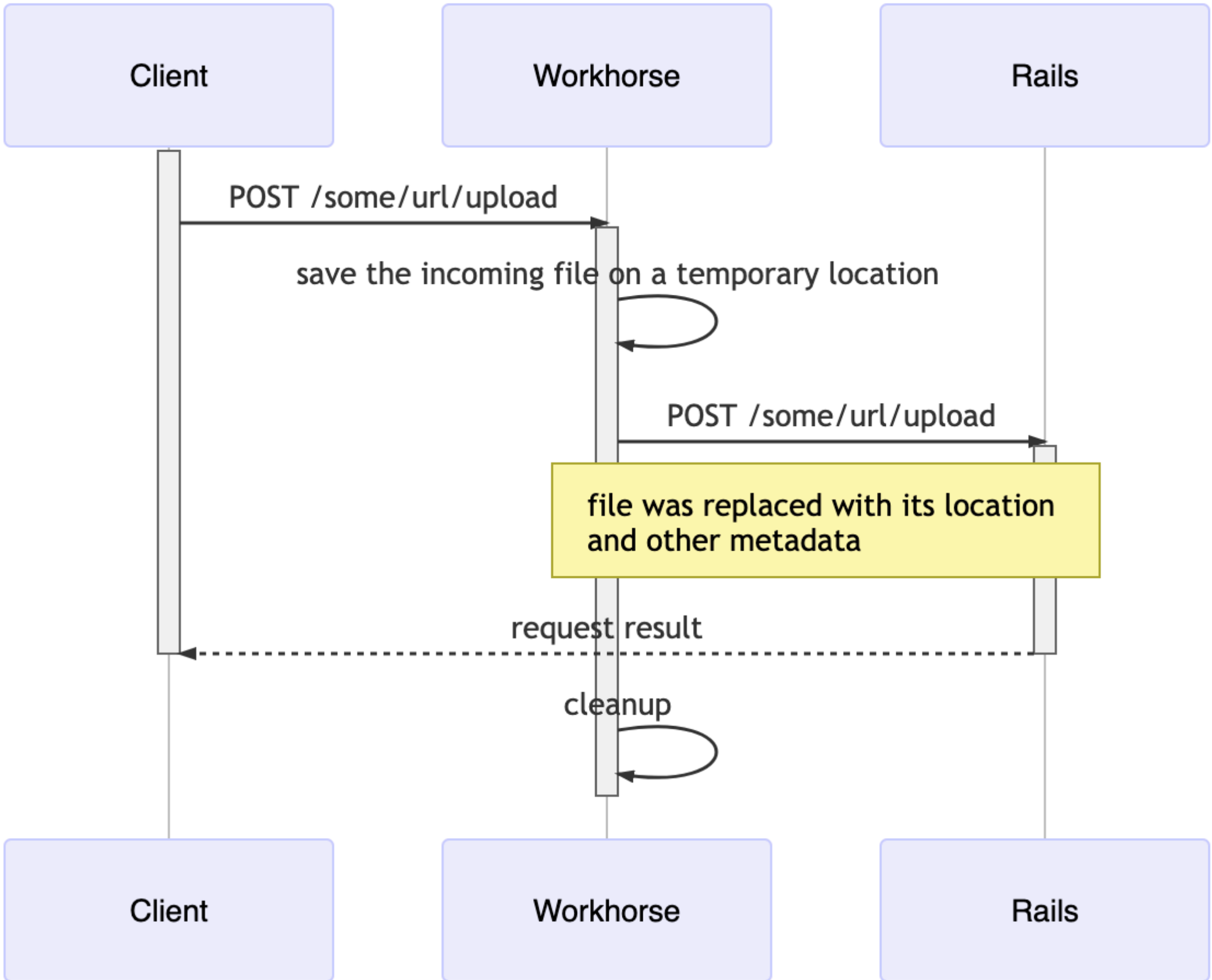
```go
func main() {
    r := mux.NewRouter() // import "github.com/gorilla/mux"
    r.Use(proxyHeadersMiddleware)
    r.HandleFunc("/slow", func(w http.ResponseWriter, r *http.Request) {
        w.Write([]byte("Now faster!"))
    })

    upstream, err := url.Parse("https://httpbin.org")
    if err != nil {
        log.Fatal(err)
    }

    proxy := httputil.NewSingleHostReverseProxy(upstream)
    r.PathPrefix("/").Handler(proxy)

    err = http.ListenAndServe(":8080", r)
    log.Fatal(err)
}

func proxyHeadersMiddleware(next http.Handler) http.Handler {
    return http.HandlerFunc(func(w http.ResponseWriter, r *http.Request) {
        r.Header.Set("X-Forwarded-For", r.RemoteAddr)
        r.Header.Set("X-Forwarded-Proto", r.URL.Scheme)
        r.Header.Set("X-Forwarded-Host", r.Header.Get("Host"))

        next.ServeHTTP(w, r)
    })
}
```

Speed up git

👋 Slow request

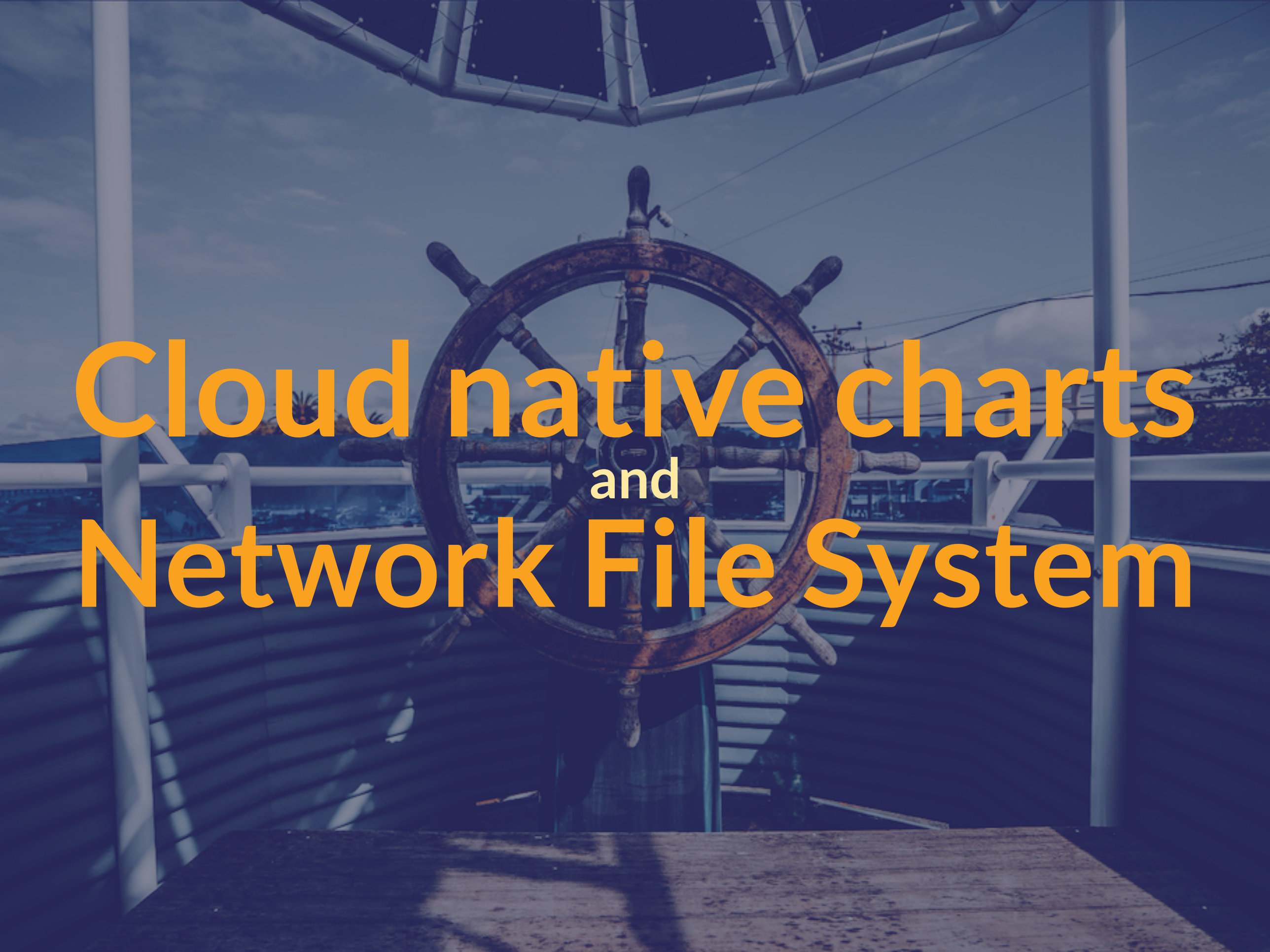


Body Hijacking

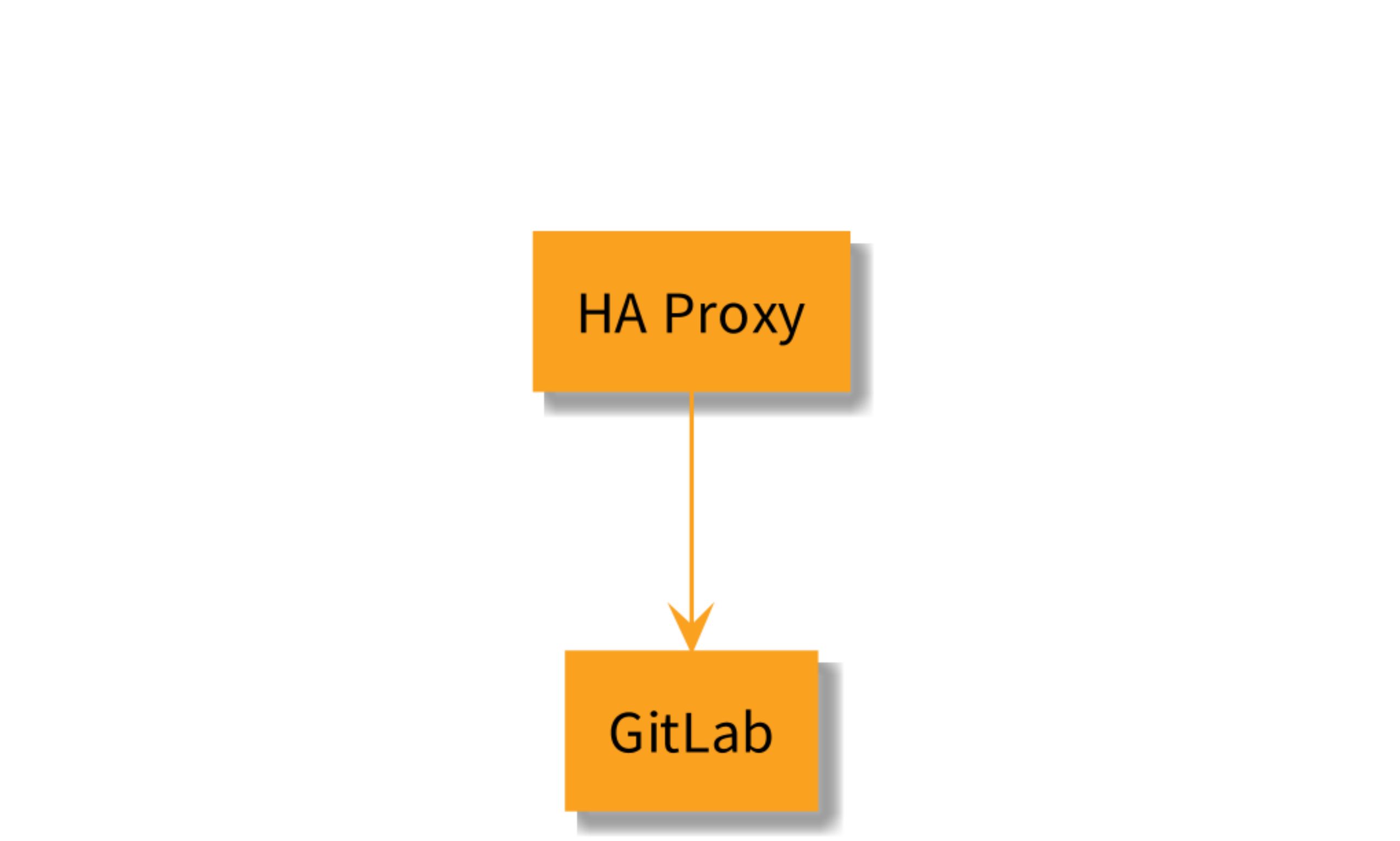

Client
Workhorse
Rails
POST /some/url/upload
save the incoming file on a temporary location
POST /some/url/upload
file was replaced with its location
and other metadata
request result
cleanup
Client
Workhorse
Rails

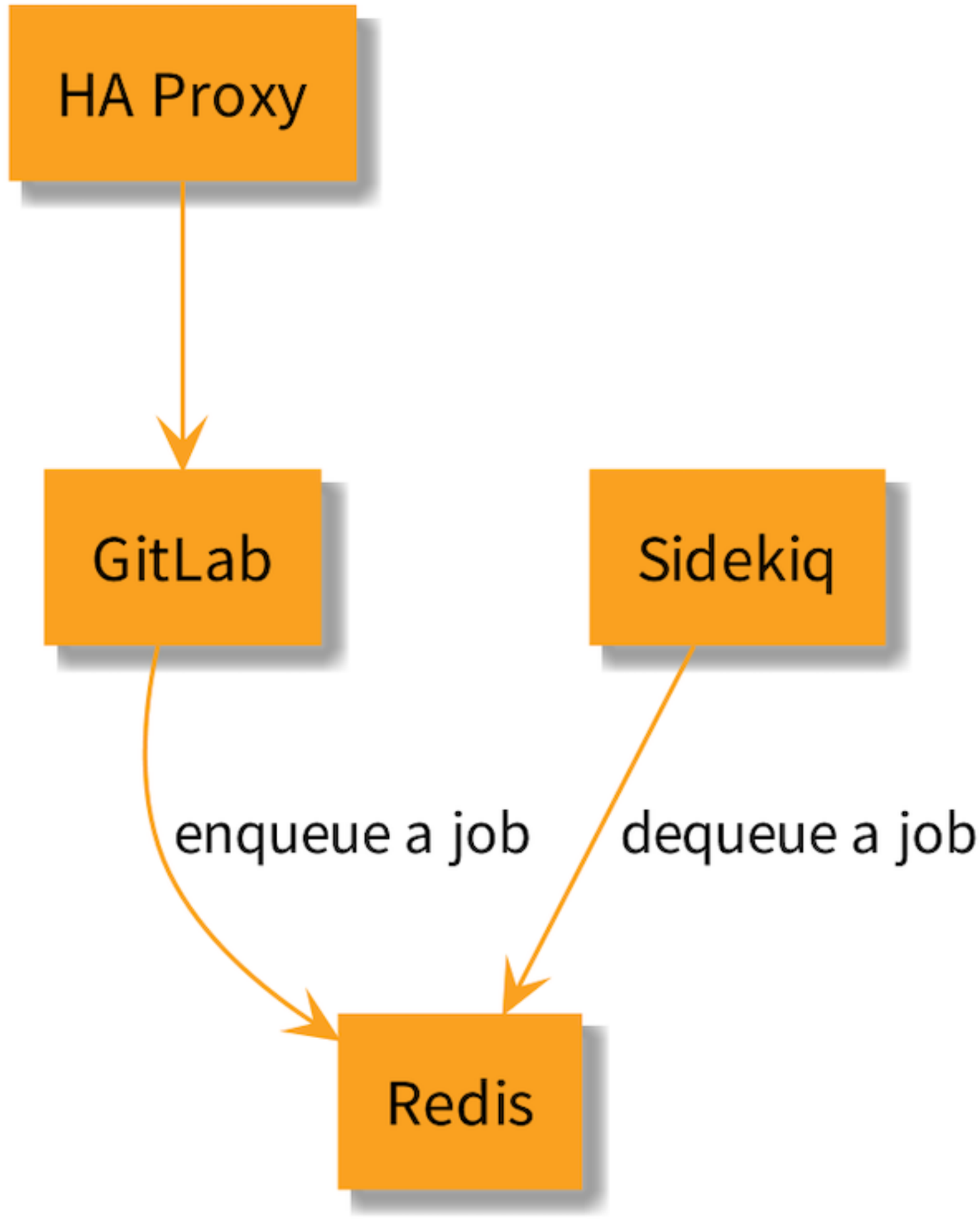
Speed up uploads

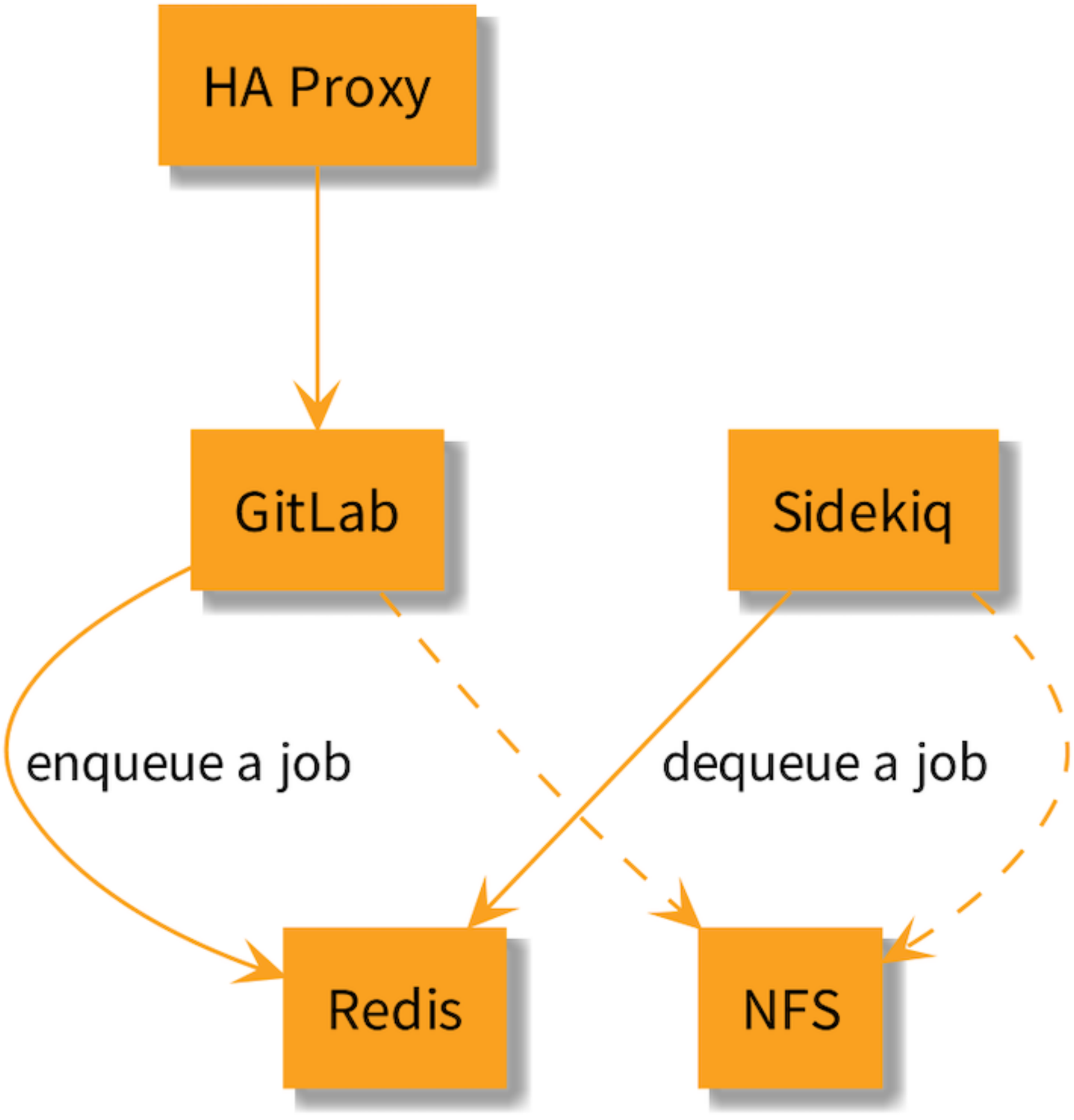
👋 Slow request



Cloud native charts and Network File System


HA Proxy
GitLab

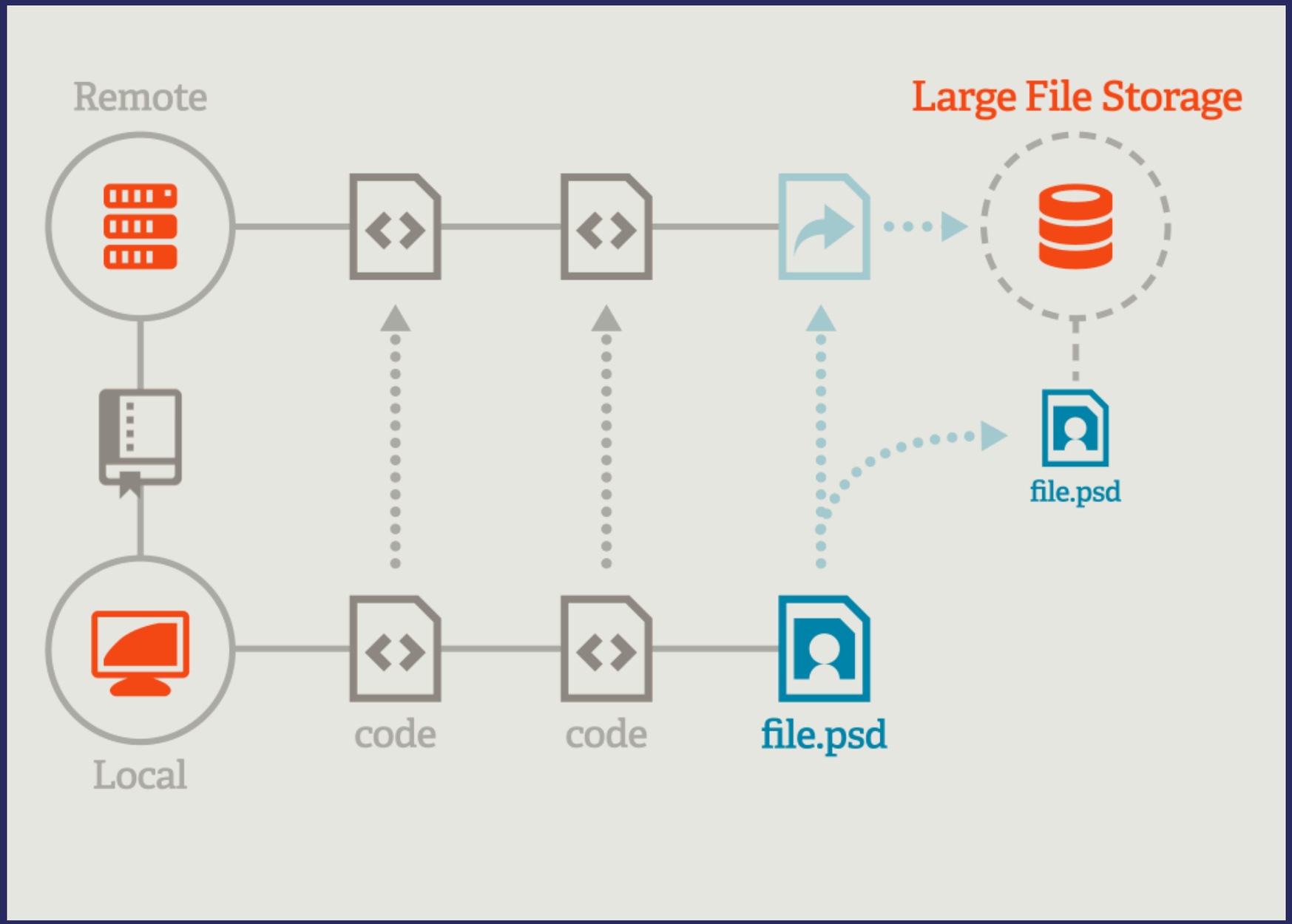

HA Proxy
GitLab
Sidekiq
enqueue a job
dequeue a job
Redis


HA Proxy
GitLab
Sidekiq
enqueue a job
dequeue a job
Redis
NFS

Object Storage in Workhorse

NFS

git LFS



io package

`io.Reader | io.Writer` = ❤

```go
// install route with r.Handle("/upload/{file}", body.HijackHandler(proxy)).Methods("PUT")
func HijackHandler(next http.Handler) http.Handler {
    return http.HandlerFunc(func(w http.ResponseWriter, r *http.Request) {
        presigned, err := api.AuthorizeUpload(r)
        if err != nil {
            http.Error(w, err.Error(), 503)
            return
        }

        upload, err := http.NewRequest("POST", presigned.String(), ioutil.NopCloser(r.Body))
        if err != nil {
            http.Error(w, err.Error(), 500)
            return
        }
        upload.ContentLength = r.ContentLength

        resp, err := http.DefaultClient.Do(upload)
        if err != nil {
            http.Error(w, err.Error(), 503)
            return
        }
        defer resp.Body.Close()

        if resp.StatusCode != http.StatusOK {
            http.Error(w, resp.Status, 503)
            return
        }

        toProxy := r.Clone(r.Context())
        toProxy.Body = nil
        toProxy.ContentLength = 0
        toProxy.Header.Set("X-My-File-Path", presigned.Path) // sign this

        next.ServeHTTP(w, toProxy)
    })
}
```

Mission Complete!

~~Mission Complete!~~

Not exactly

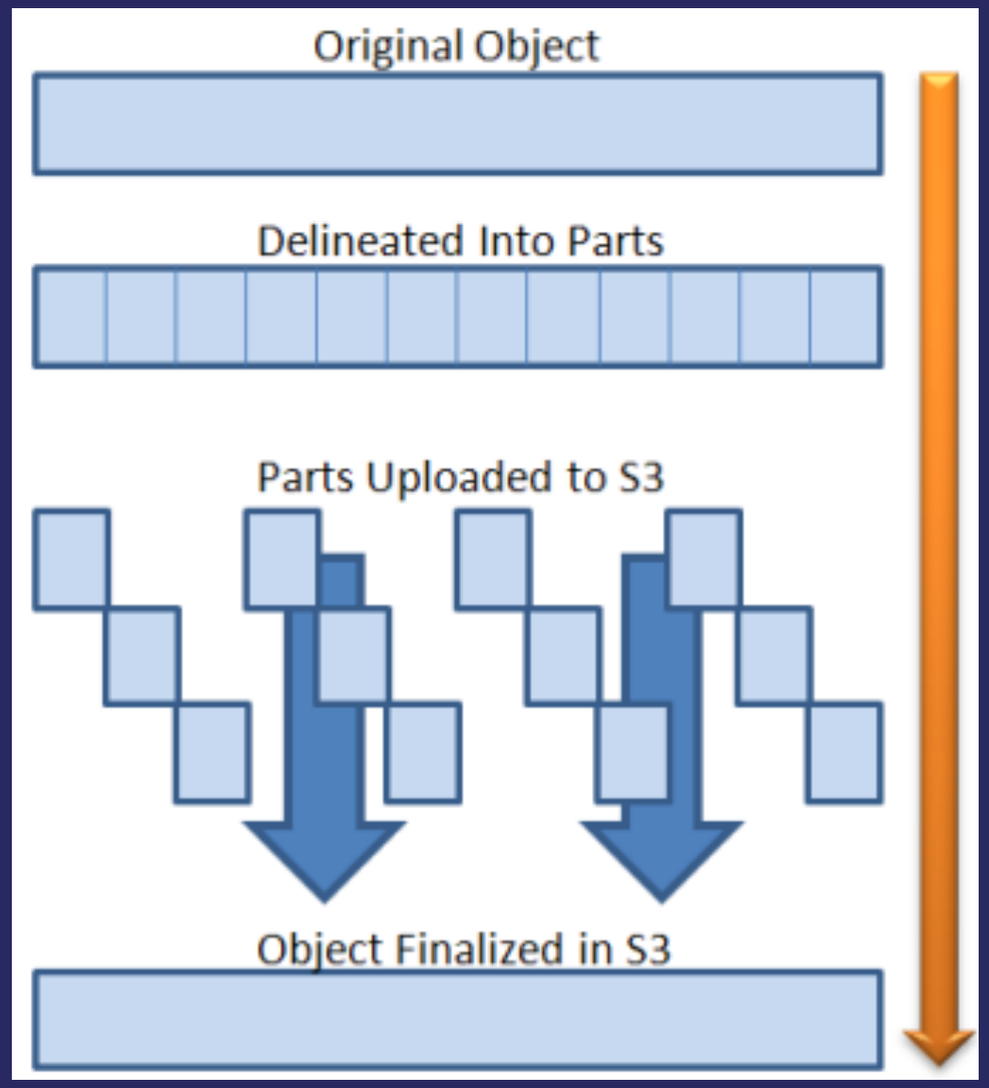
Unknown length requests

from

~35k CI runners

Multipart Upload

divide and upload



Keep memory usage under control

process a chunk at time

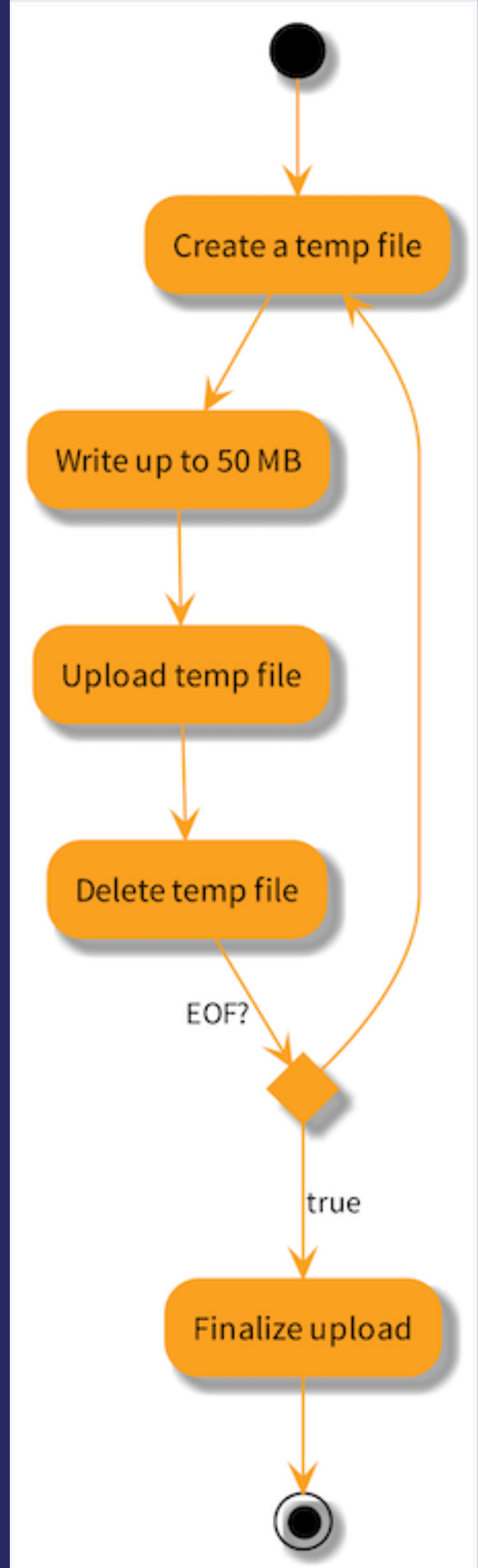


Photo by Bobby Burch on Unsplash

Thanks!

- You can speed up a web application writing a reverse proxy in Go
- An iterative approach
- Rewrite only slow endpoints
- Forward to another service if needed
- Sign modified requests

Workhorse source code is available at gitlab.com/gitlab-org/gitlab-workhorse under MIT license.

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