

LibreS3

Design, challenges and steps toward reusable libraries

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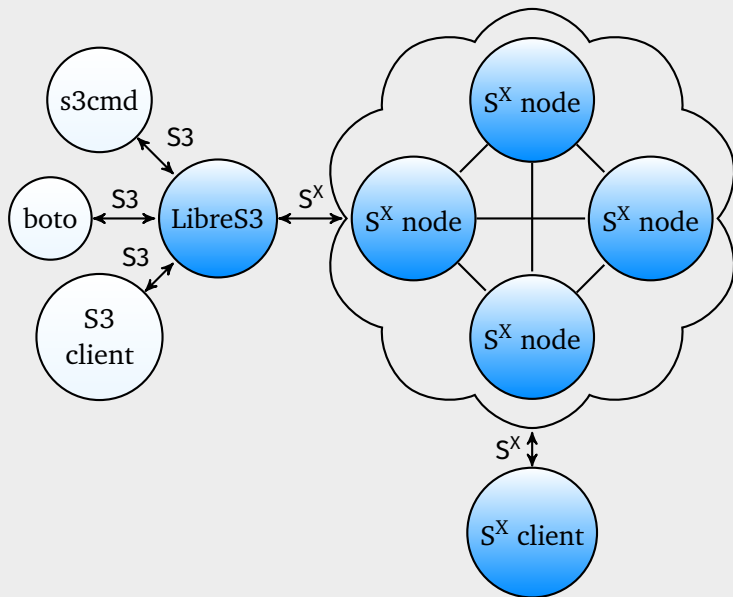
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Concepts

- Monads
 - ▶ deferred computations
 - ▶ result monad
- S3 server
 - ▶ proprietary: Amazon S3 server
 - ▶ FOSS replacements



S^X cluster, LibreS3 server



- some code in LibreS3 could be generalized
 - ▶ caching, json/xml parse to/generate from OCaml types, http, I/O
- available as sample code: any-cache, any-http



any-cache

```
val lookup_exn: ( $\alpha$ , exn) t  $\rightarrow$   
  string  $\rightarrow$  (string  $\rightarrow \alpha$  M.t)  $\rightarrow \alpha$  M.t
```

- Algorithm: Least Recently Used cache with 2 Queues
- Functorized interface, parameter: a result monad
- Functorized interface : monadic concurrency \rightarrow result monad
- Testing: a functor using OUnit, instantiated with Lwt/Async/immediate



any-http

- not novel, very similar to Mirage
- functor interface based on Cohttp API
- implementations: Lwt&Ocsigenserver, Lwt&Cohttp, Async&Cohttp
- use: write REST applications independent of HTTP/monadic concurrency library
- testing: compatibility testing between multiple HTTP implementations



Bugs

- double-release of OCaml runtime lock in OCamlNet, ocaml-ssl
 - ▶ debugging: patch OCaml's thread runtime (on mantis)
- `Unix.fork` vs `Lwt_unix.fork`
- ...



Packaging

- Easy if your user has OPAM, but ...
 - ▶ lack of "new enough" (RHEL/CentOS 6)
 - ▶ newer compiler versions: 3.12.1, 4.00.1
 - ▶ opam switches: 4.01.0+lsb, 4.01.0+musl+static
 - ▶ lack of complete packaging workflow (opam2rpm?)
 - ▶ ...



Summary

- LibreS3: a FOSS implementation of the S3 server protocol
- Reusable libraries: any-cache, any-http
- Bugs, packaging issues
- Future work
 - ▶ any-io, ioconvcomb
 - ▶ opam2release

Additional material: <http://goo.gl/jmF0cn>

