

# Stellar - A Library for API Programming.

API

API

Application

Programming

Interface

# API

program 1

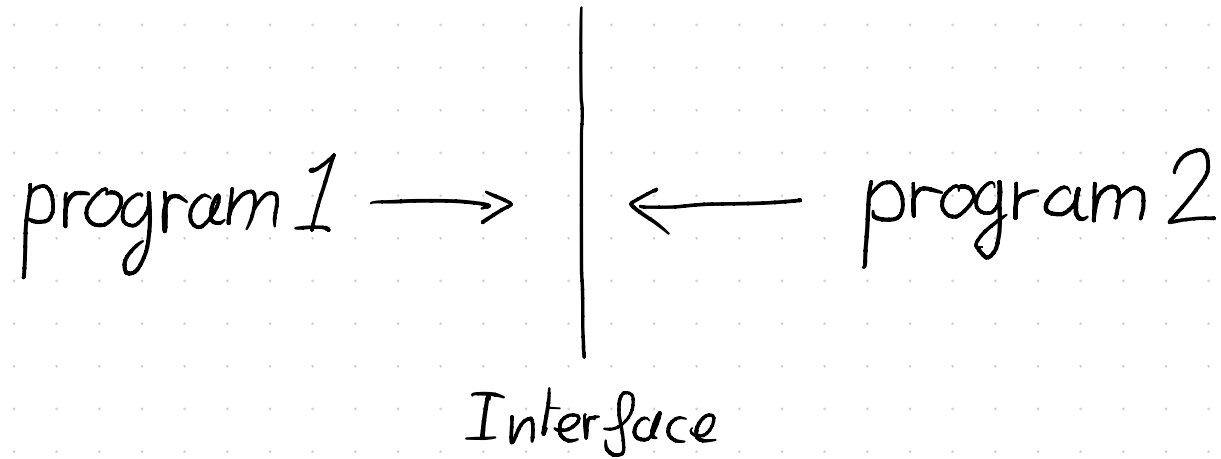
# API

program 1  $\longrightarrow$  program 2

# API

program 1  $\rightleftarrows$  program 2

# API



- Web
  - GET  $ooo/ooo?...$   $\vdash$  ListItem
  - POST  $ooo/ooo [ooo]$   $\vdash$   $\checkmark + \textcolor{violet}{X}$

- Web
  - GET .../...?...  $\vdash$  ListItem
  - POST .../... [ ... ]  $\vdash$   $\checkmark + \text{X}$
- POSIX
  - Libc (headers)  $\text{ret } f_n(\text{args})$
  - CLI (tools, utilities)  $\text{name } [\text{args}]$
  - Filesystem, signals, ...  $\text{kill, fork, ...}$

- Web
  - GET .../...?... ?...  $\vdash$  ListItem
  - POST .../... [ ... ]  $\vdash$   $\checkmark + \text{X}$
- POSIX
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  - Filesystem, signals, ...  $\text{kill, fork, ...}$
- Database
  - Schemas, Queries, Migrations

| ID | k | s |        |
|----|---|---|--------|
|    |   |   | Insert |
|    |   |   | Select |
|    |   |   | Update |

message

message

response

$m$ : message

response ( $m$ )

$\left( \begin{array}{l} m: \text{message} \\ \text{response}(m) \end{array} \right)$

Container

+ (Coproduct)

API1  
+  
API2

+ (Coproduct)

API1  
+  
API2

- GET /  $\vdash$  List Book
- POST /fav [ID]  $\vdash$  1
- POST /lib [Book]  $\vdash$  2

+ (Coproduct)

API1  
+  
API2

- GET /  $\vdash$  List Book
- +  
- POST /fav [ID]  $\vdash$  1
- +  
- POST /lib [Book]  $\vdash$  2

Open (Str :- Ptr)

?

Read (Ptr :- Str)

?

Close (Ptr :- 1)

Read ; Close

X no open

Open ; Close ; Close

X close twice

Open ; Close ; Read

X read after  
close

Open ; Open ; Close

X open twice

» (Sequencing)

API 1 » API 2

» (Sequencing)

Open » Read » Close

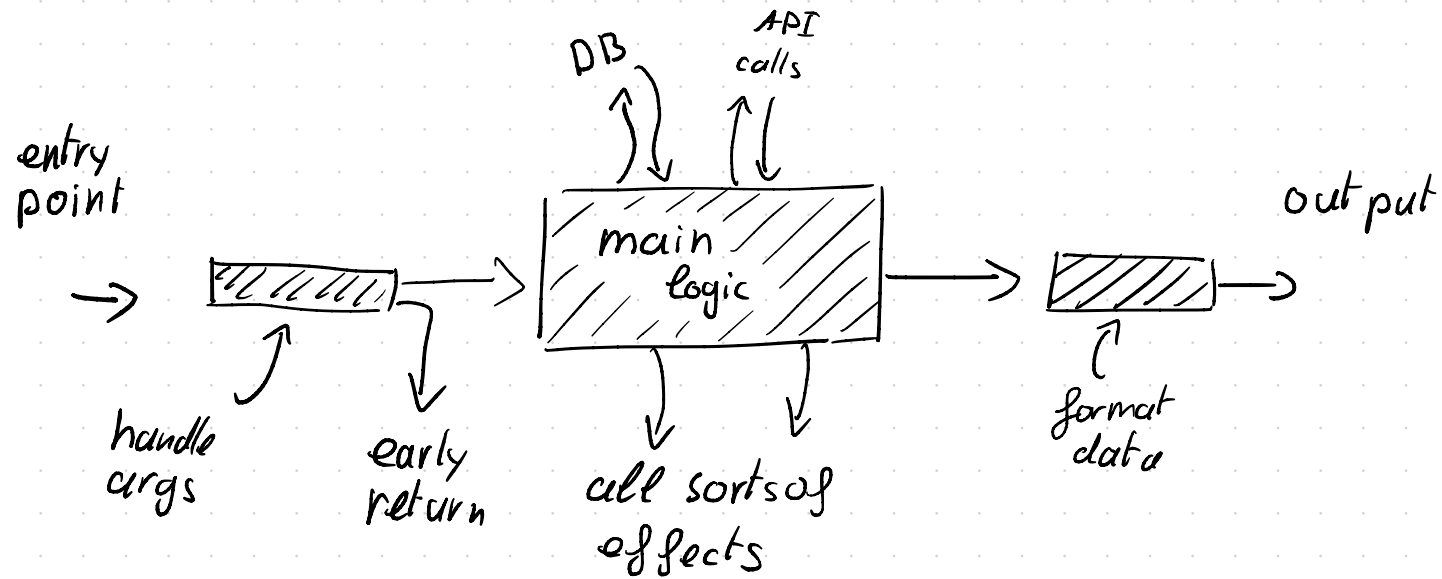
\* (Kleene Star)

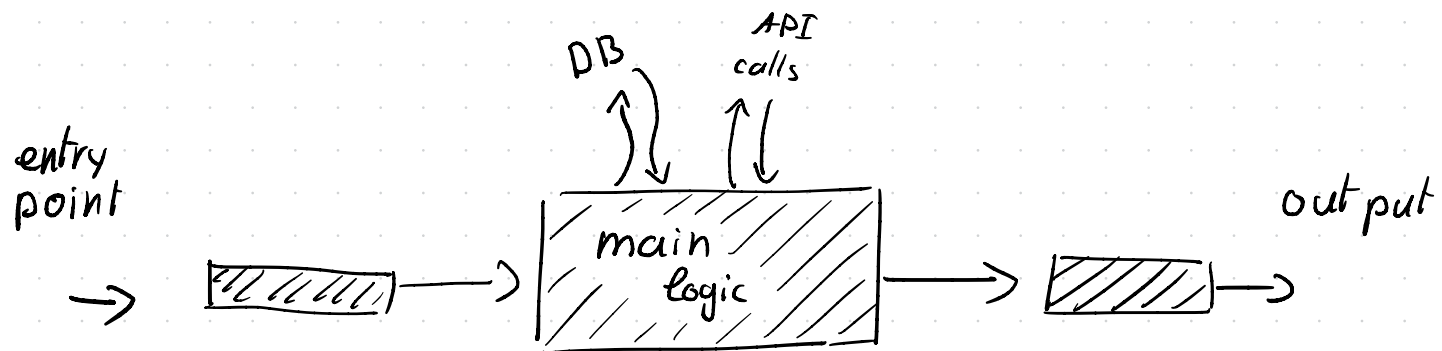
Open  $\gg$  Read\*  $\gg$  Close

# Morphisms of APIs

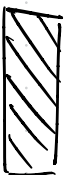
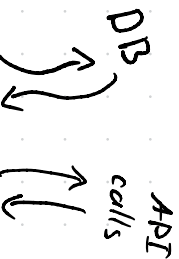
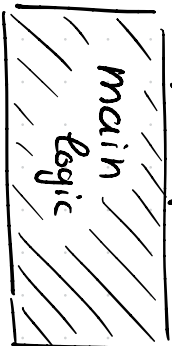
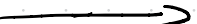
$$A1 \Rightarrow A2$$

# Typical program

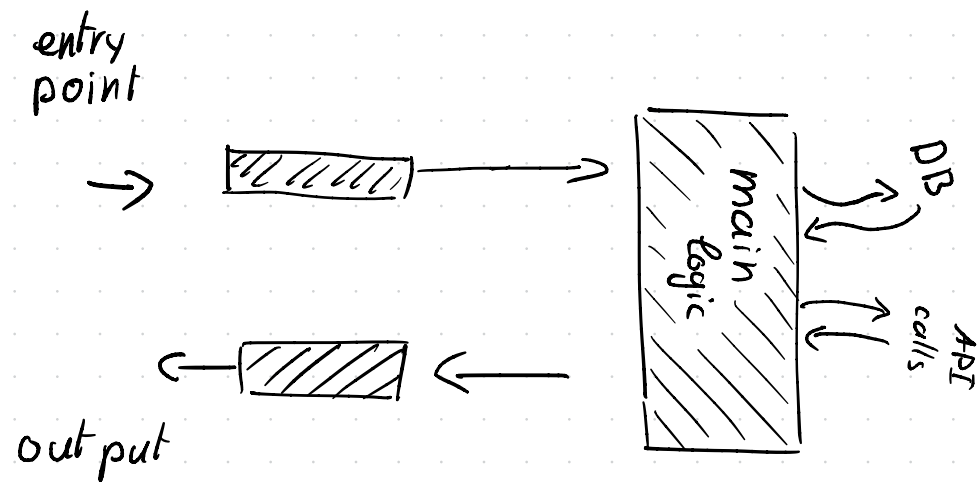




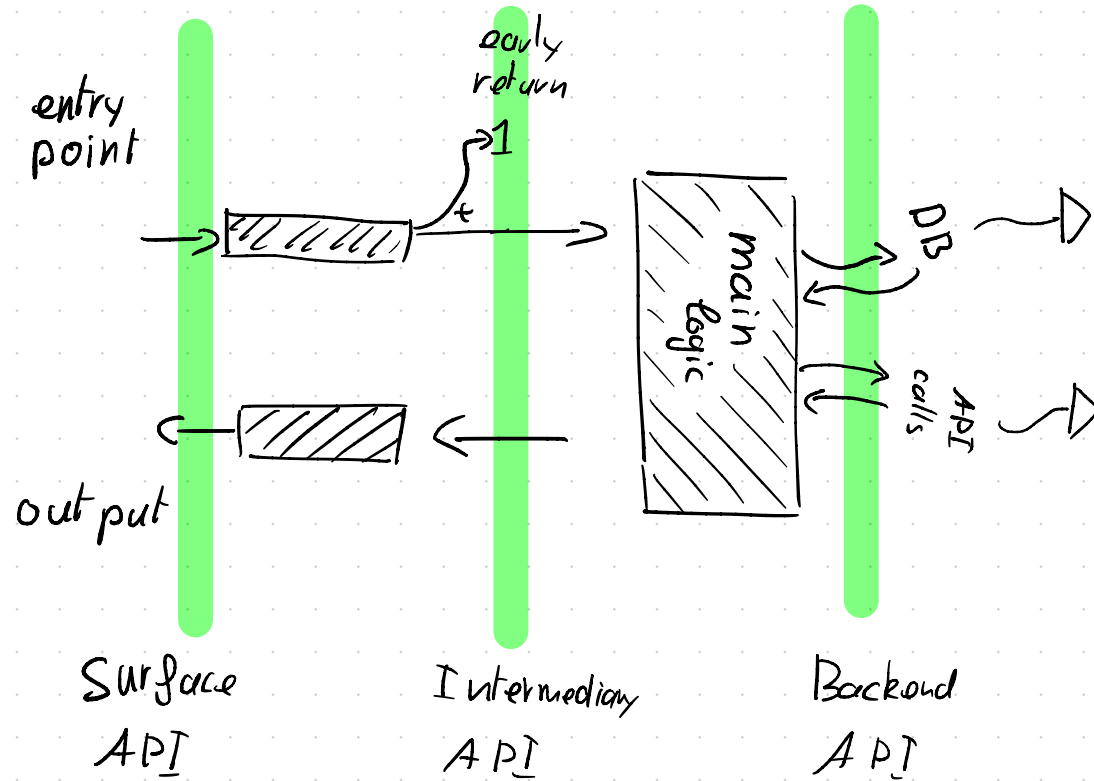
entry  
point



output



# API-based Architecture



# Stellar

- Generic Combinators `stellar-api`
- HTTP server `stellar-http`
- SQL bindings `stellar-sql`
- HTTP client `stellar-browser`

$$A \Rightarrow M(B)$$

$$HTTP \Rightarrow A$$

$$A \Rightarrow SQL, SQL \Rightarrow I$$

$$A \Rightarrow HTTP, HTTP \Rightarrow I$$

# API-based Programming

UI  $\Rightarrow$  API    API  $\Rightarrow$  SQL    SQL  $\Rightarrow$  I

front end

backend

database

bedankt!

ありがとう

obrigado!

grazie!

Thank you!

merci!

gracias!

danke!