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OOP

Architectures for Modern Web Front Ends

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INNOQ

Annoying your app users in 10 easy steps

1.
Forbid the use of the back and forward buttons

2.

Send them to the home page when they hit "refresh" …

3.

… or at least ensure the browser pops up a warning window

4.

Make sure they can’t open a second browser window

5.
Let them see UI decoration and ads first, content last

6.
Make sure they can't bookmark or send a link

7.
Don't let Google index anything

8.

Show users a picture of your app – it's surely better than nothing

9.

Disable assistive technologies. Who needs a screen reader, anyway?

10.
Ensure non-functioning JavaScript gives them a blank page

History repeating …

Web

CORBA

WS-*

REST

What’s the client side analogy?

"Web service"[1)]

- Uses HTTP as transport
- Ignores HTTP verbs
- Ignores URIs
- Exposes single "endpoint"
- Fails to embrace the Web

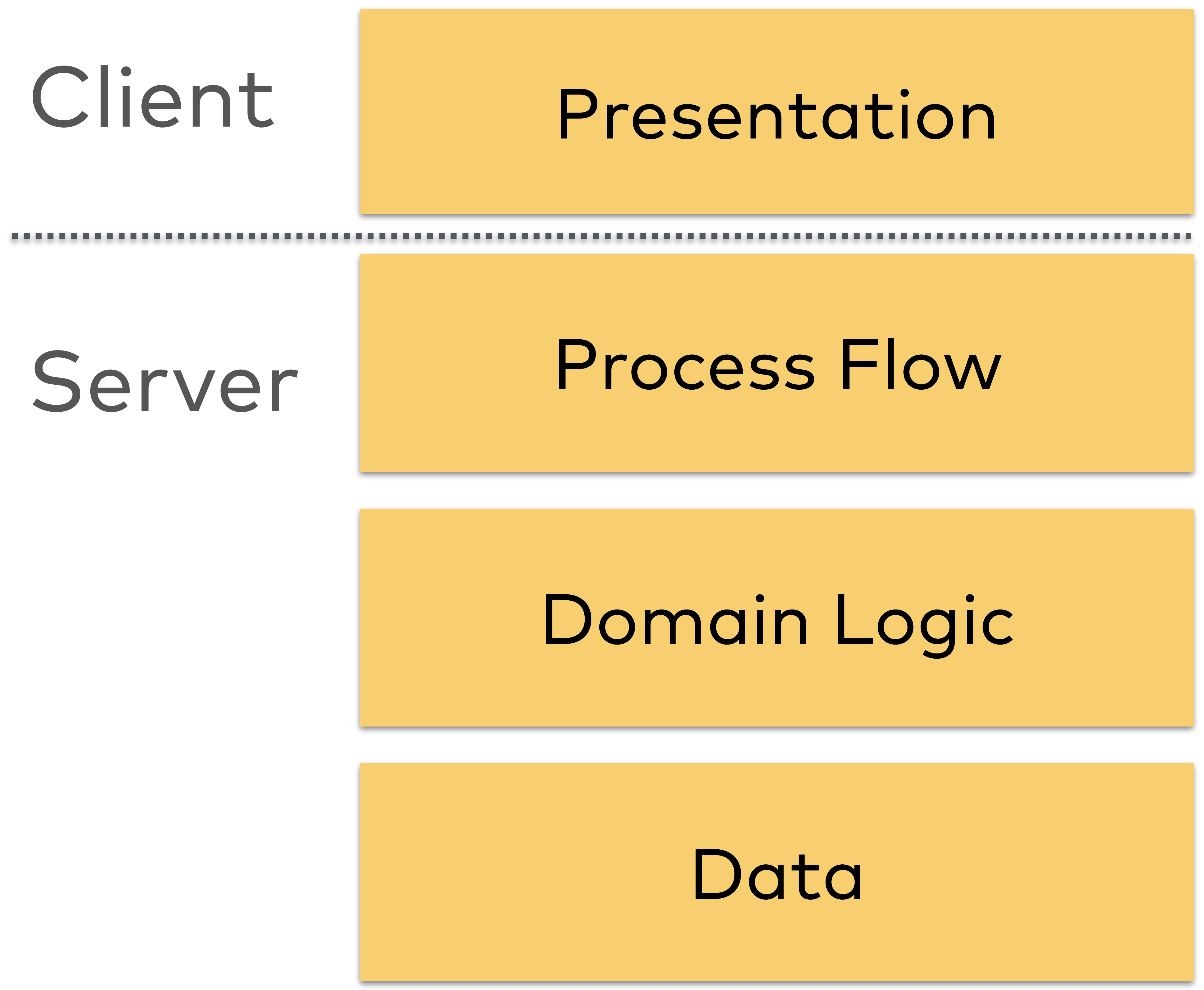
"Web app"[2)]

- Uses browser as runtime
- Ignores forward, back, refresh
- Does not support linking
- Exposes monolithic "app"
- Fails to embrace the browser

1) in the SOAP/WSDL sense

2) built as a careless SPA

The web-native way of distributing logic



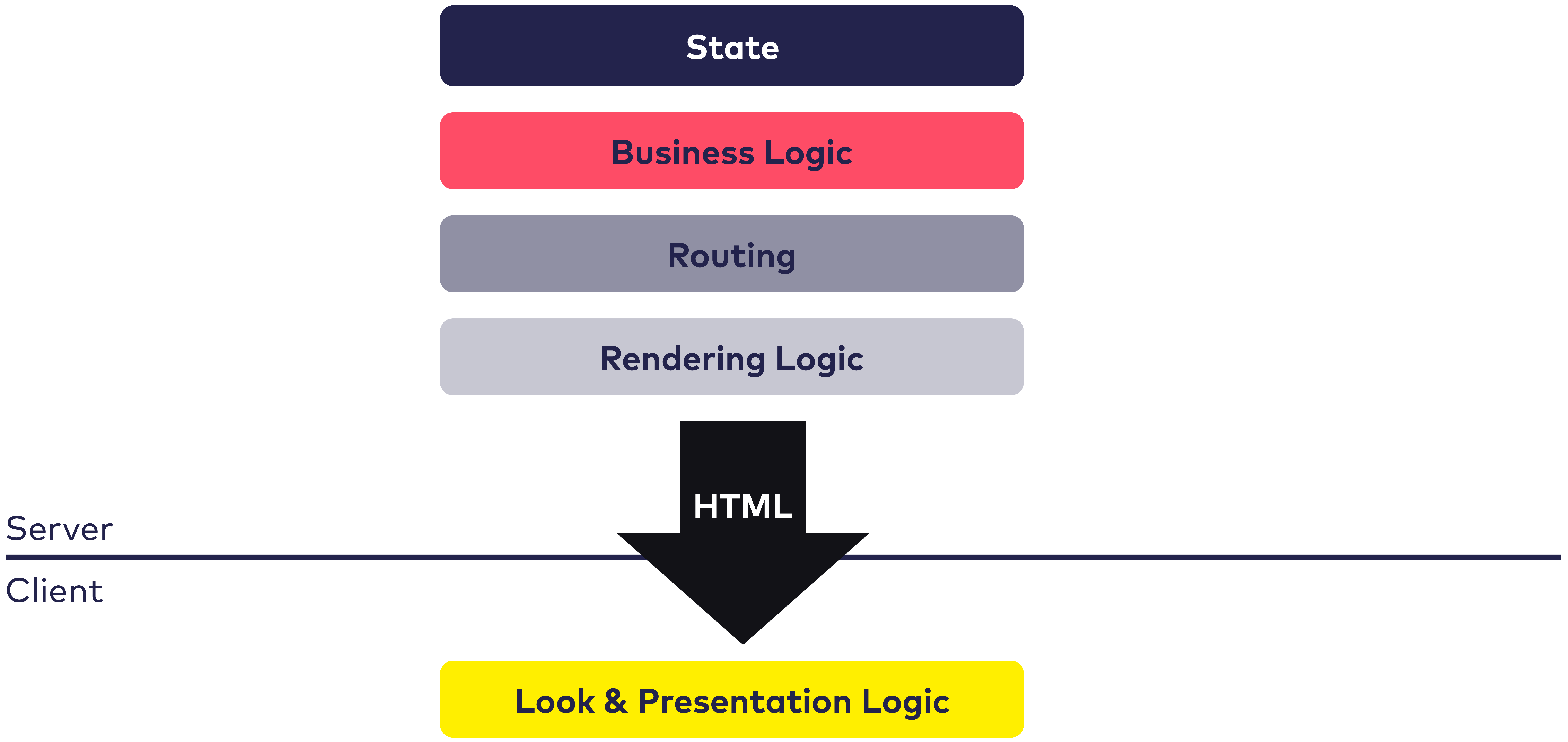
- Rendering, layout, styling on an unknown client
- Logic & state machine on server
- Client user-agent extensible via code on demand

HTML & Hypermedia

- In REST, servers expose a hypermedia format
  - Option 1: Just invent your own JSON-based, incomplete clone
  - Option 2: Just use HTML
- Clients need to be RESTful, too
  - Option 1: Invent your own, JS-based, buggy, incomplete implementation
  - Option 2: Use the browser

A great REST hypermedia API is very similar to a simple, server-sided rendered web application

The role of JS in modern Web applications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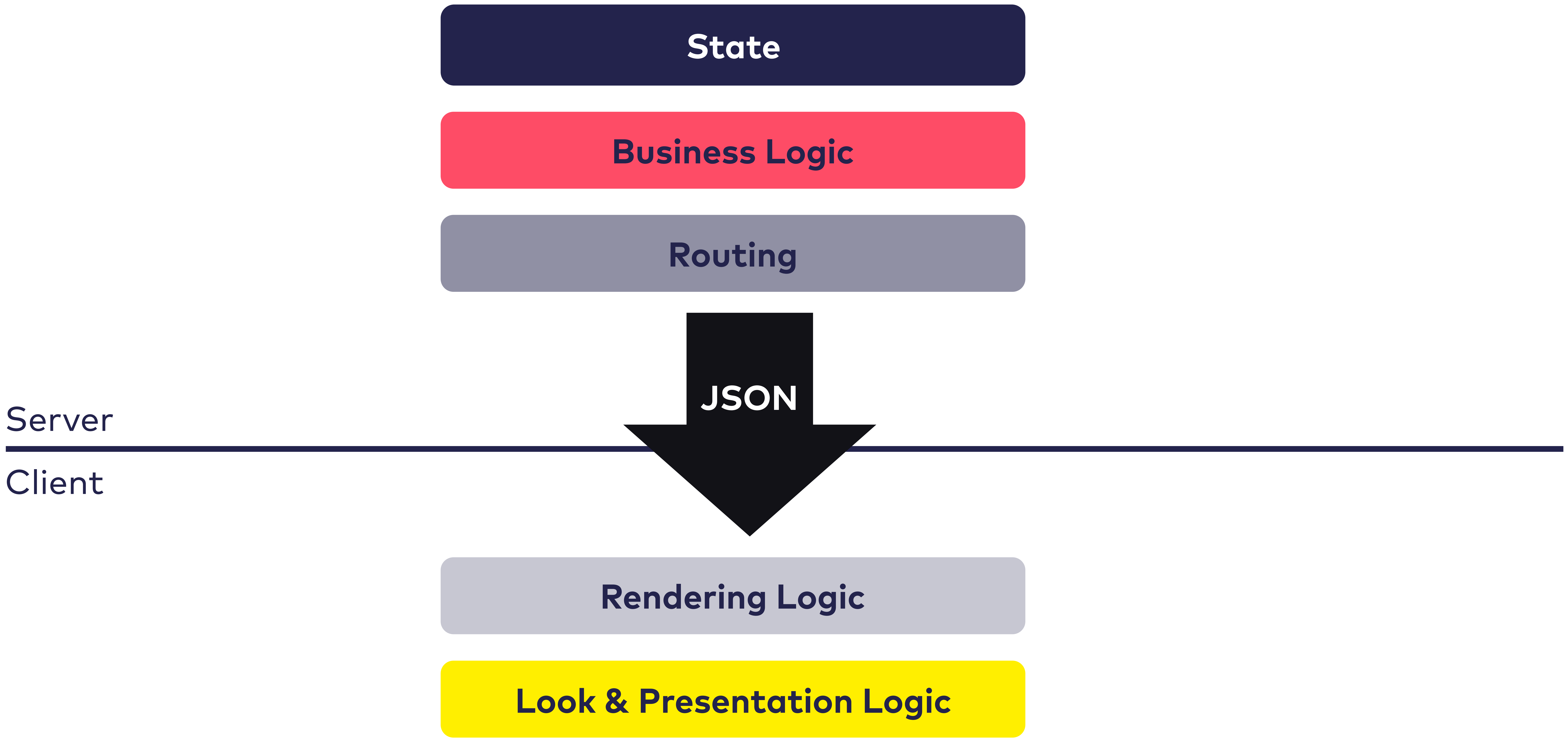
Look & Presentation Logic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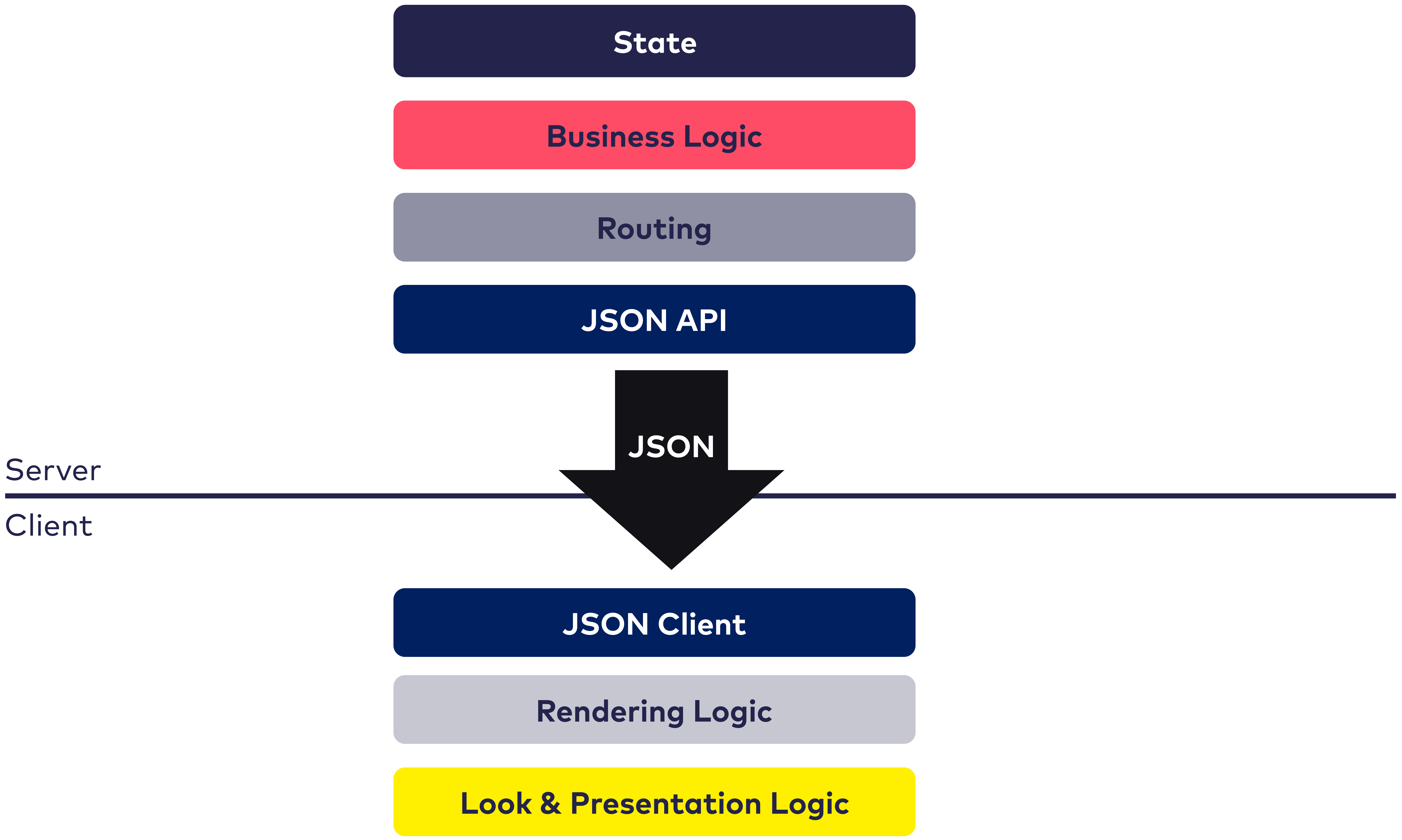
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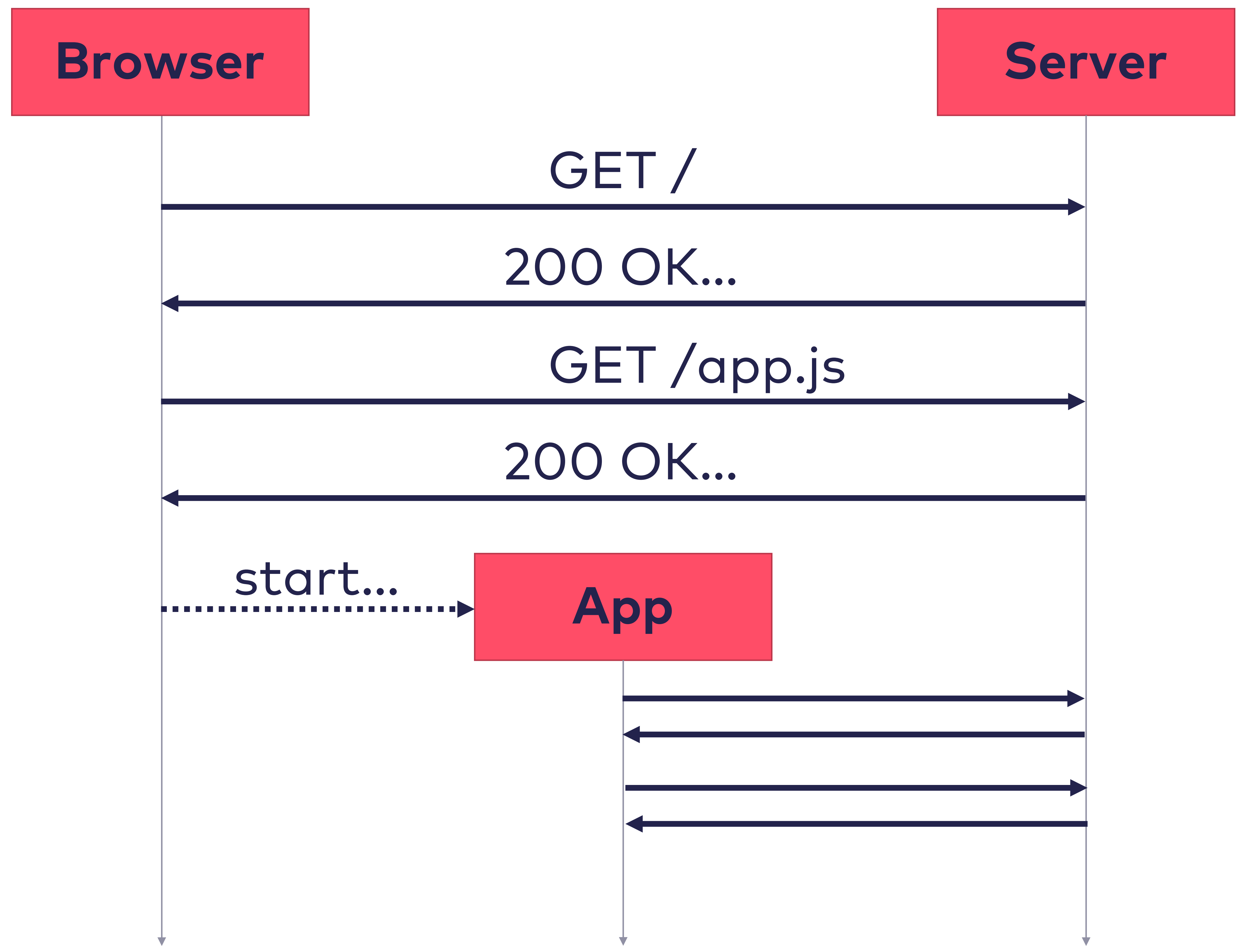
Why Routing?

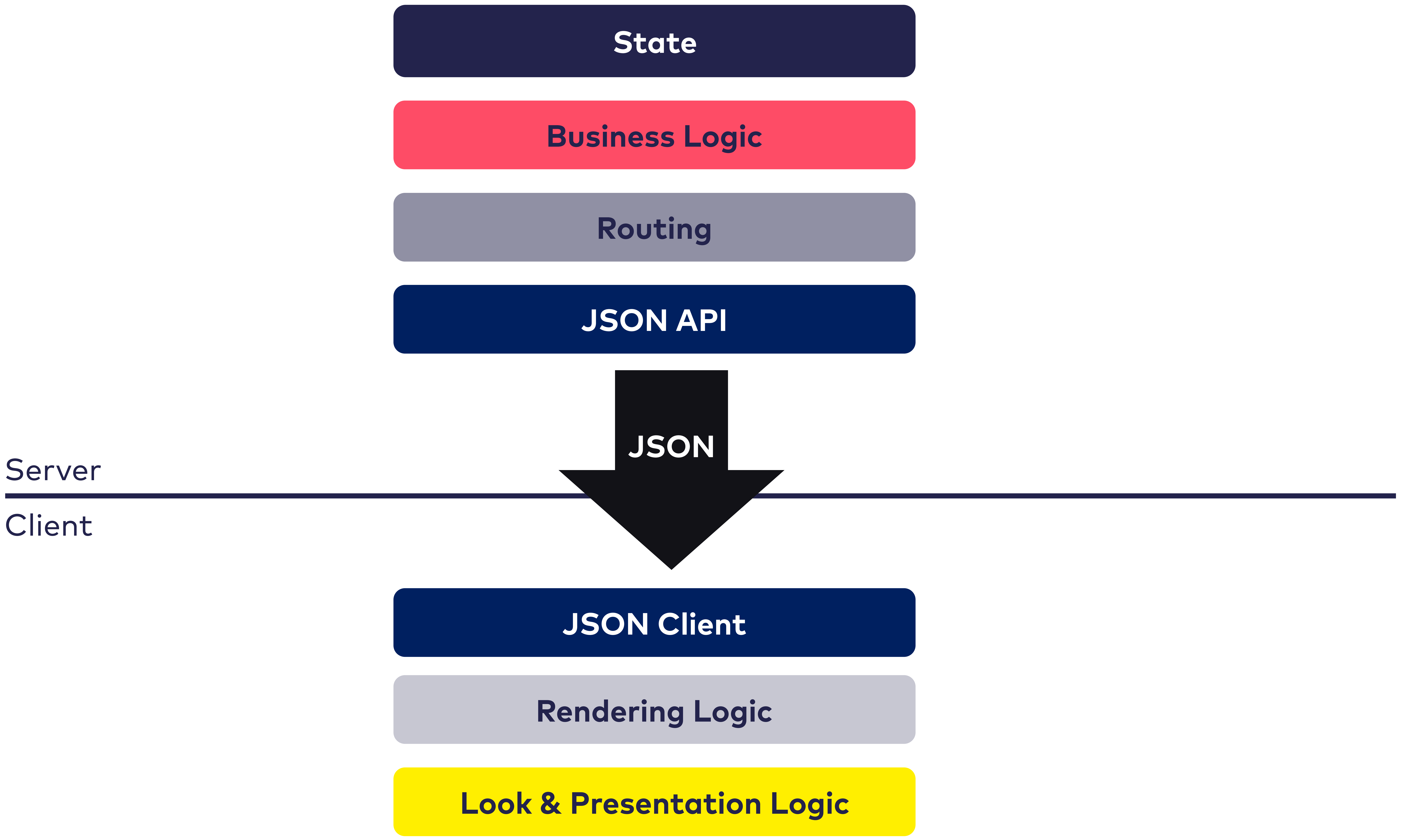


Bookmarks?

Deep links?

Reload?

Solution:
Store some app state in the URI!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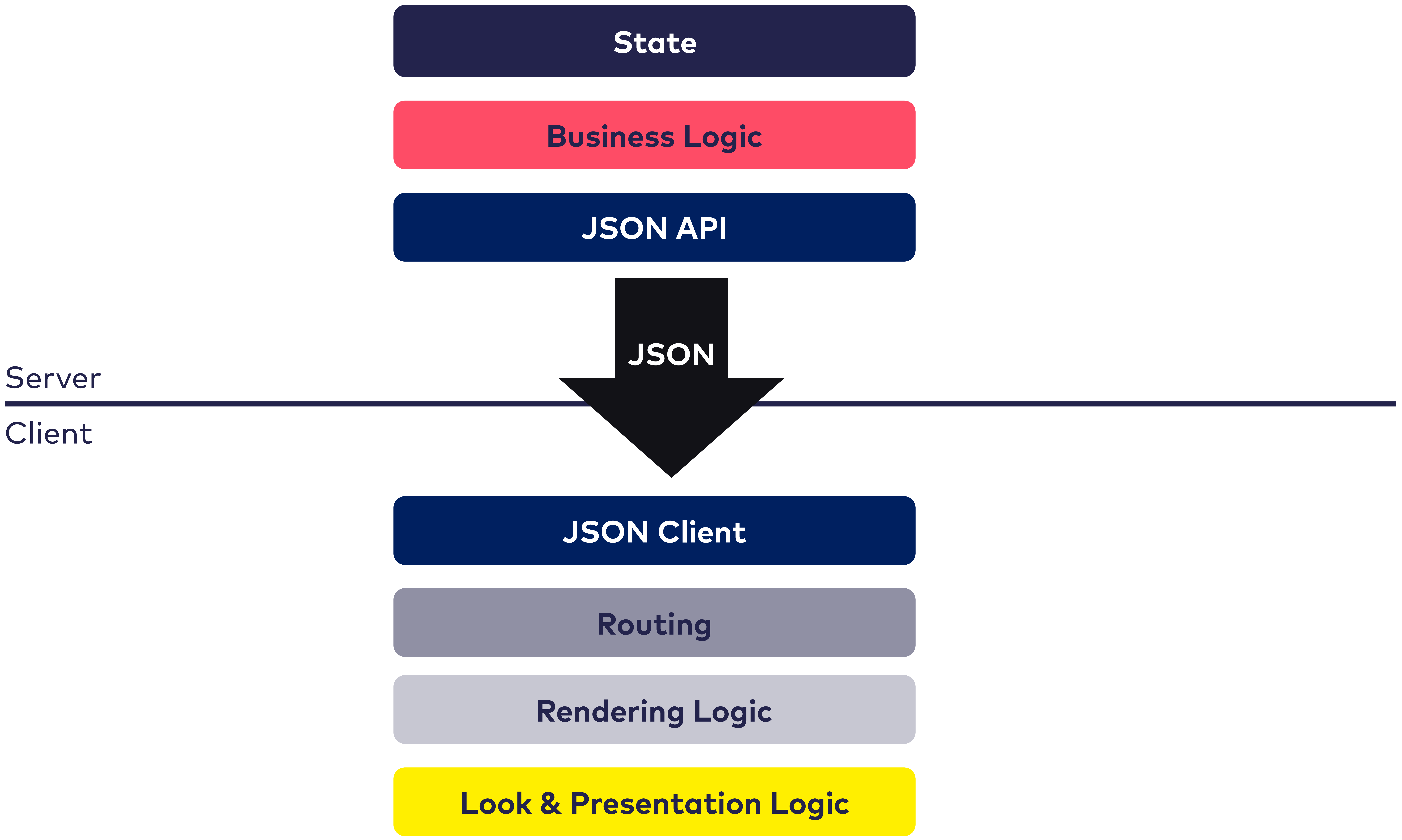
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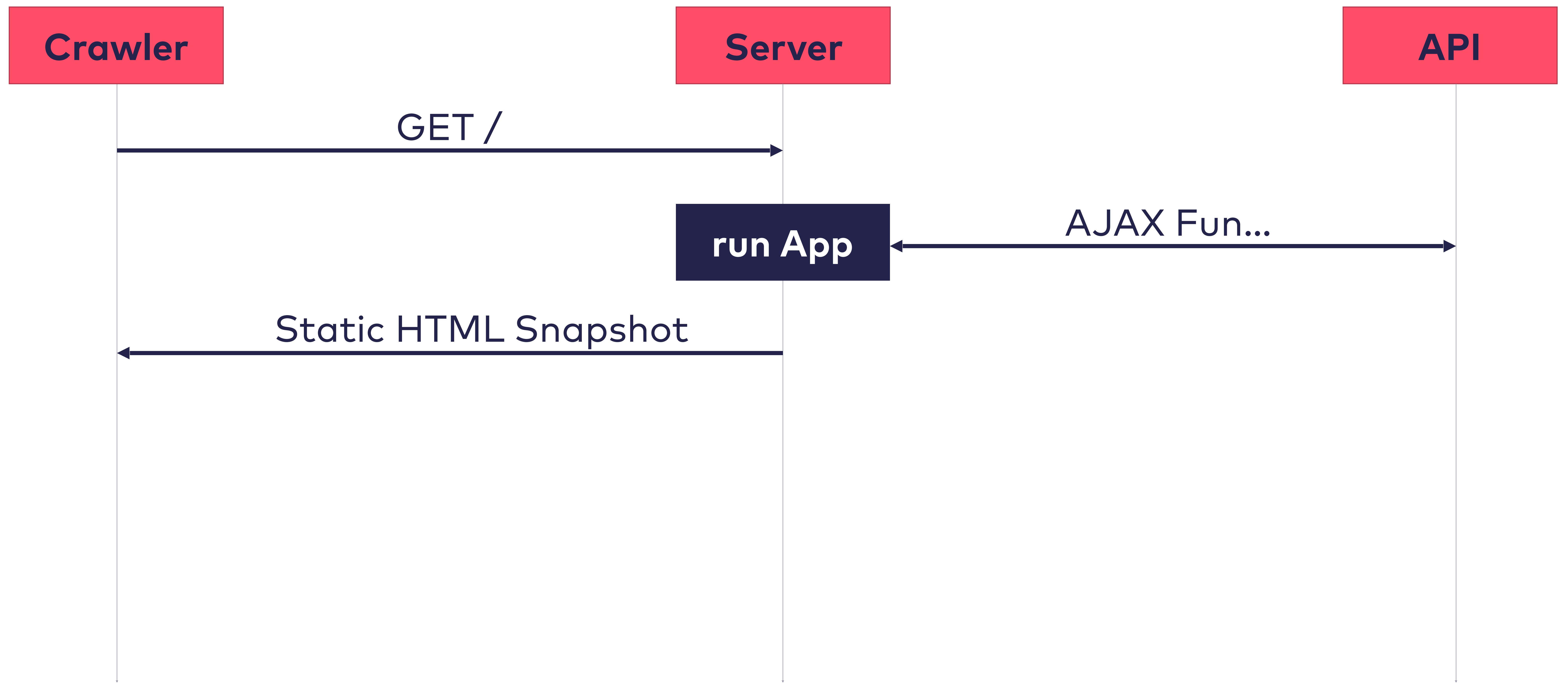
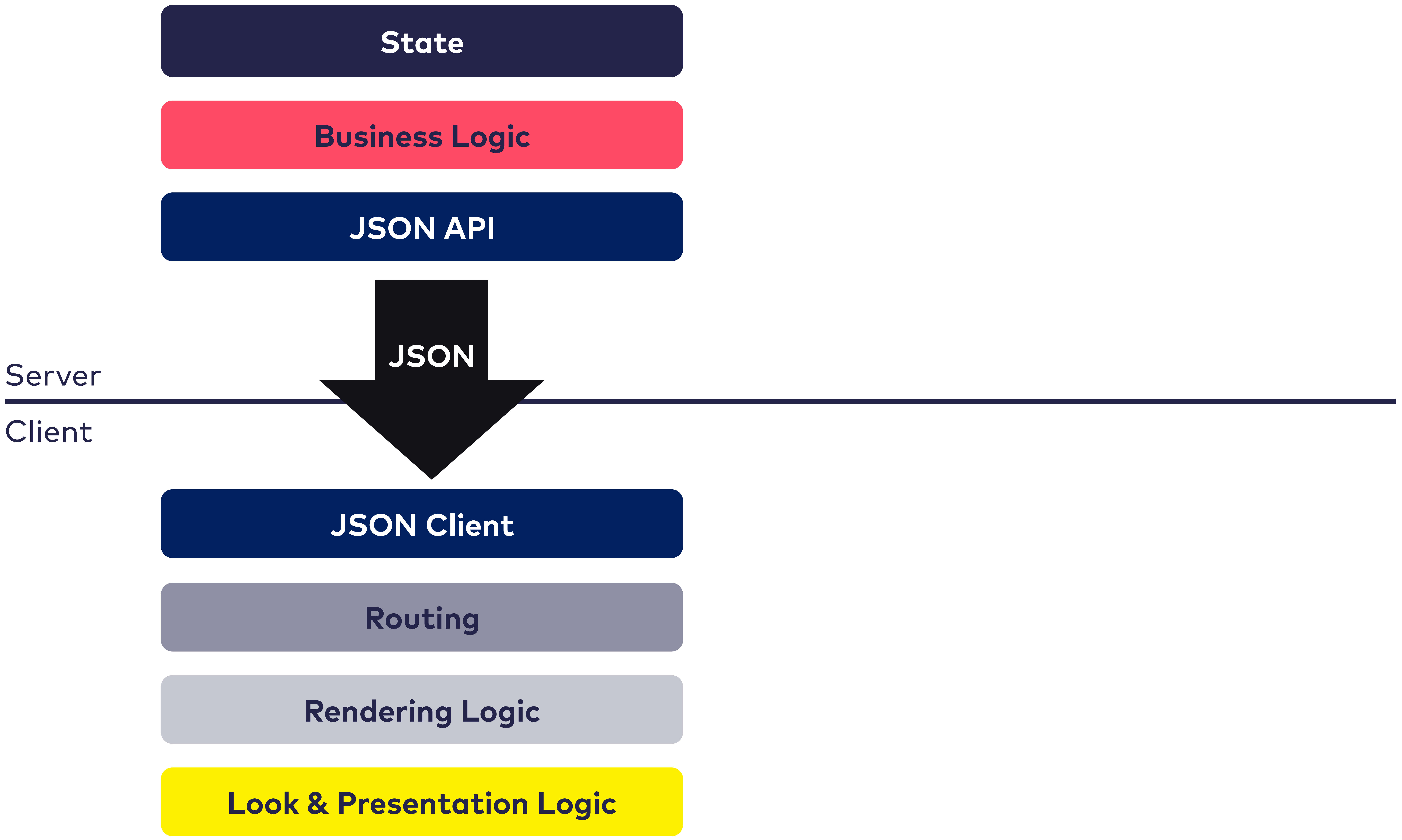
Searchability

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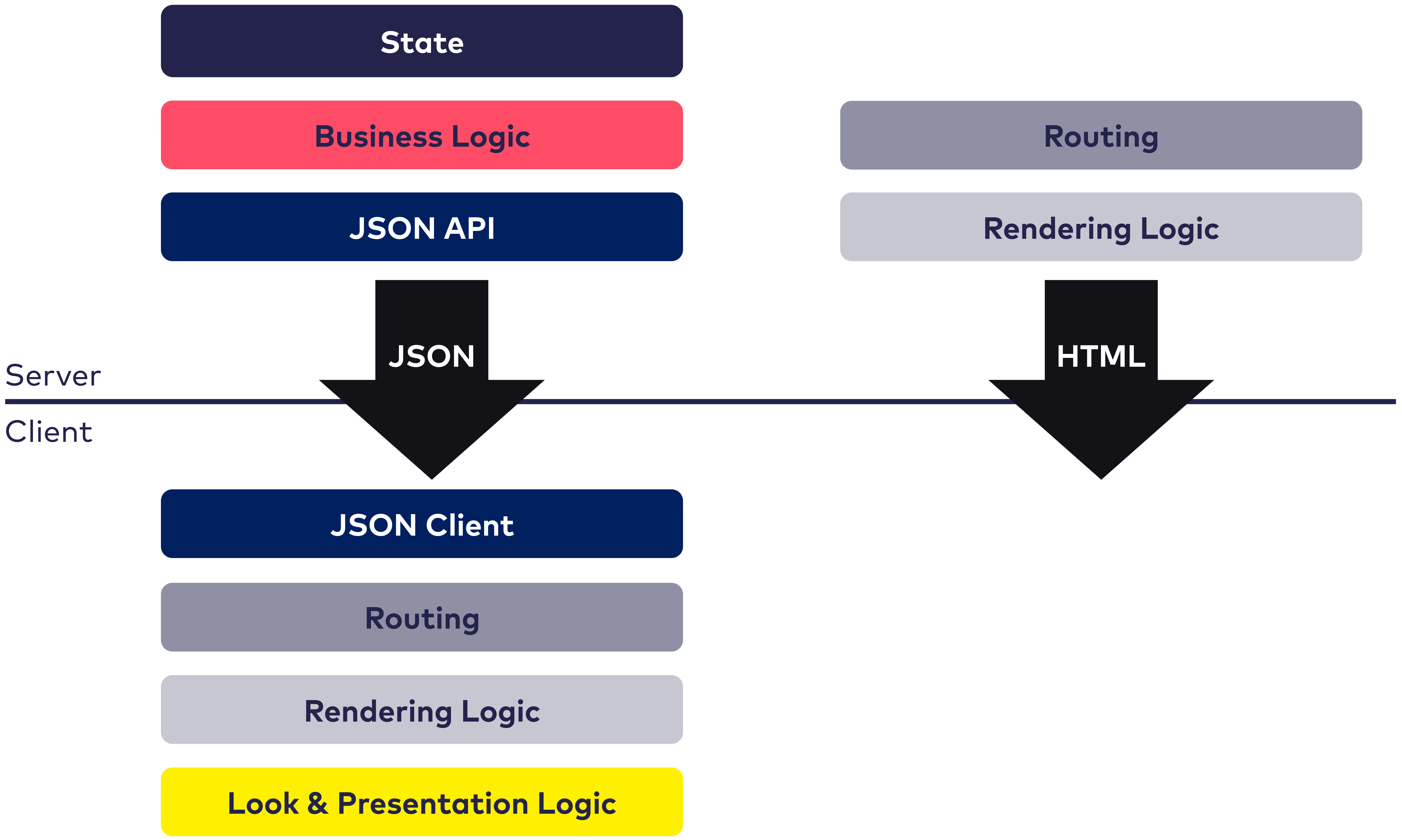
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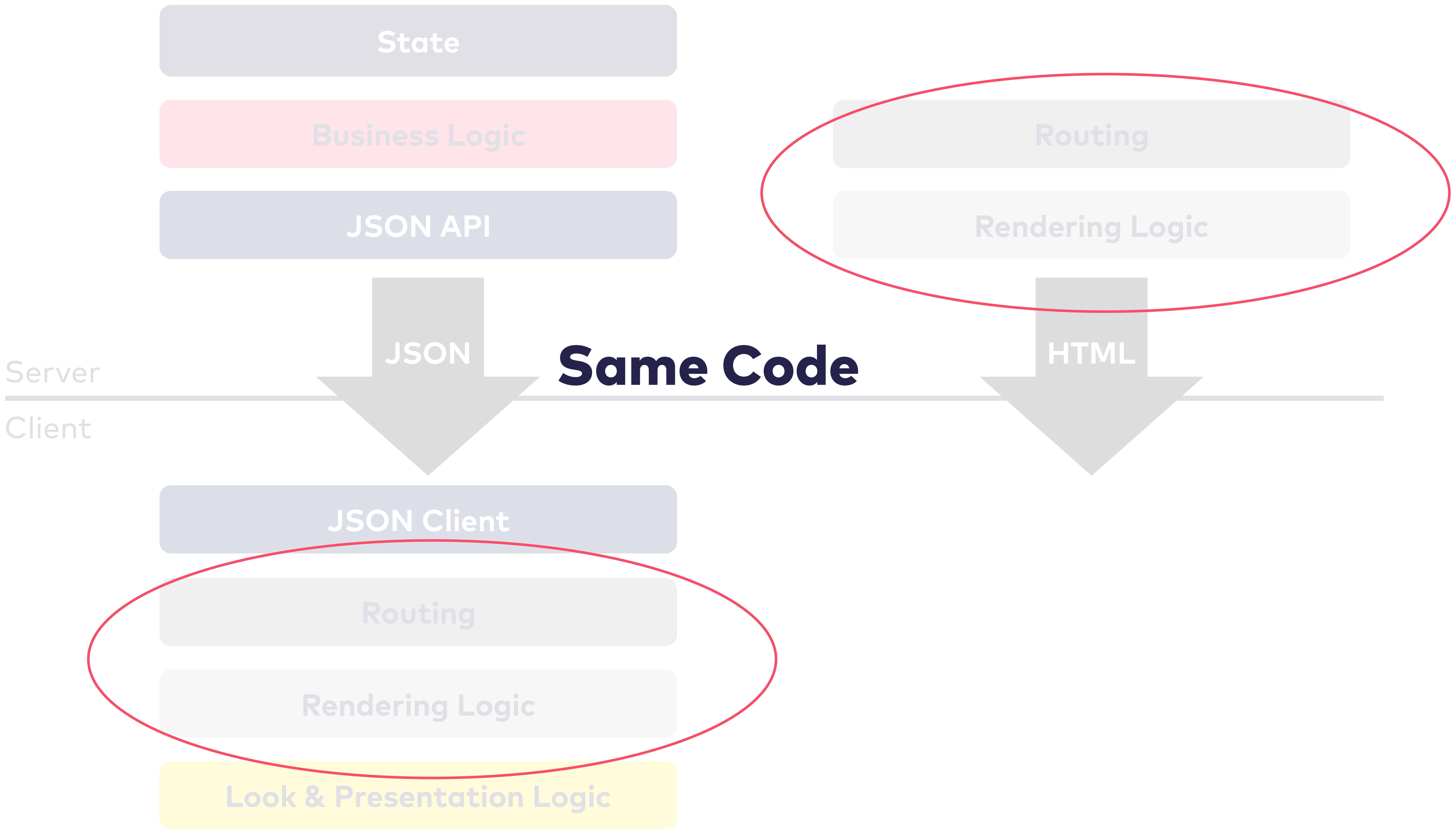
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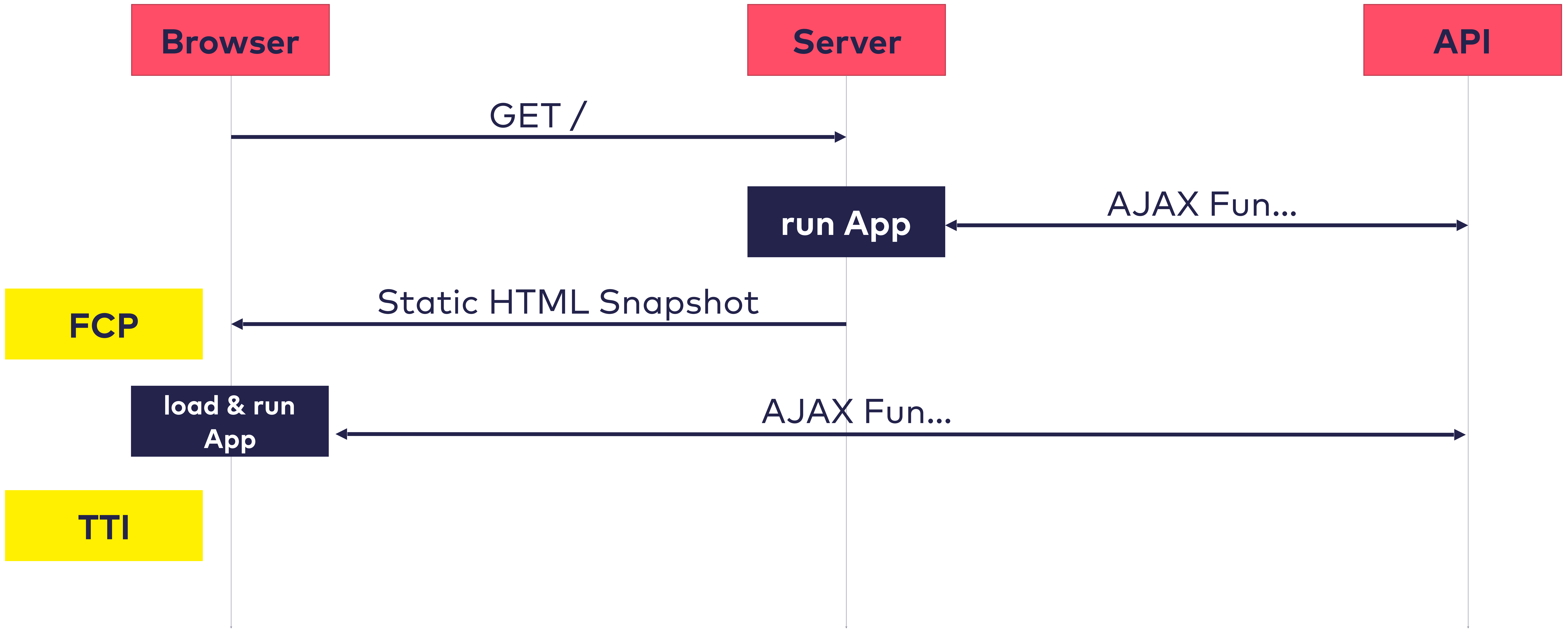
Same Code

"All your users are non-JS users while they're downloading your JS"

Jake Archibald, developer advocate for Google Chrome

Prerendering

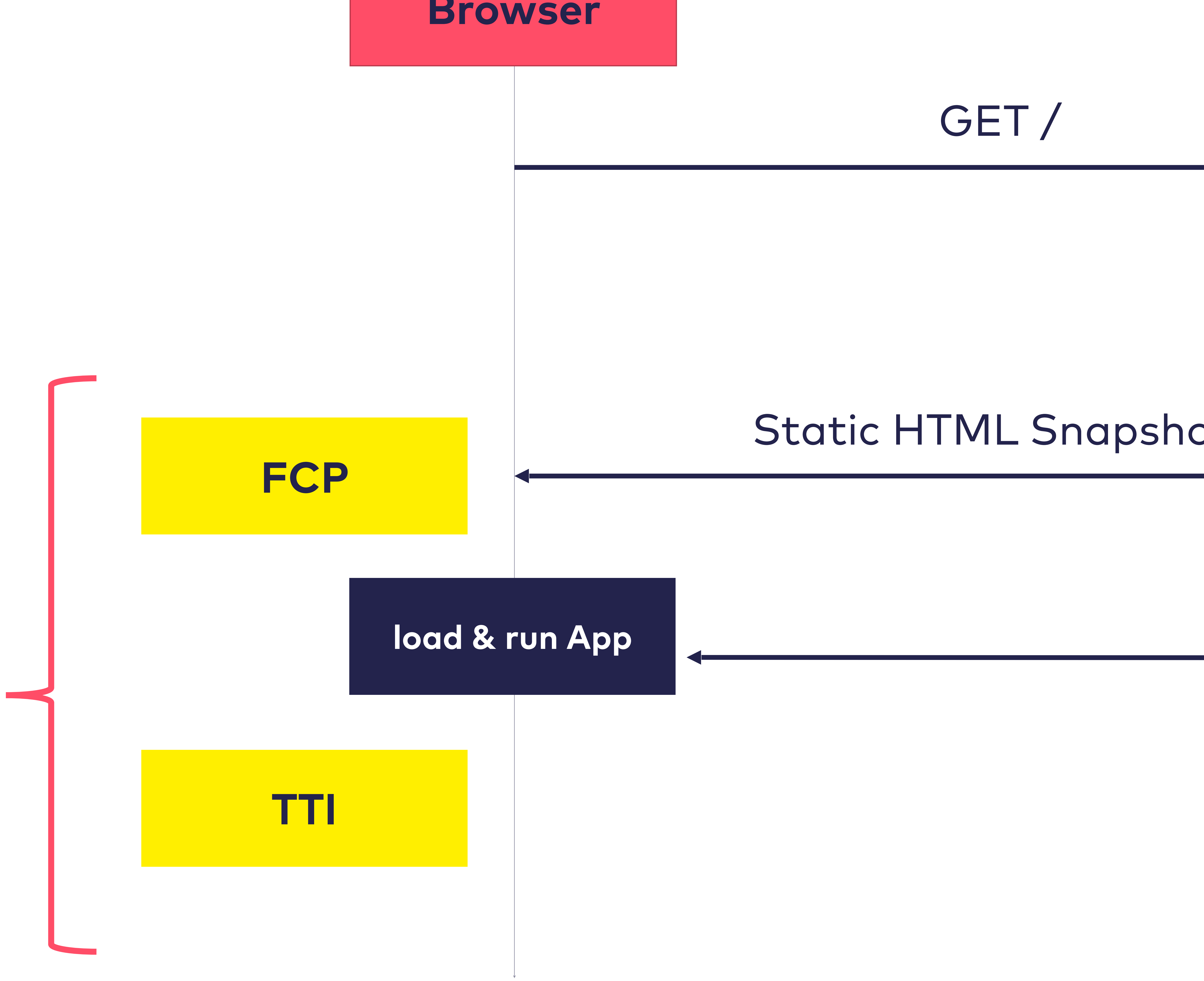


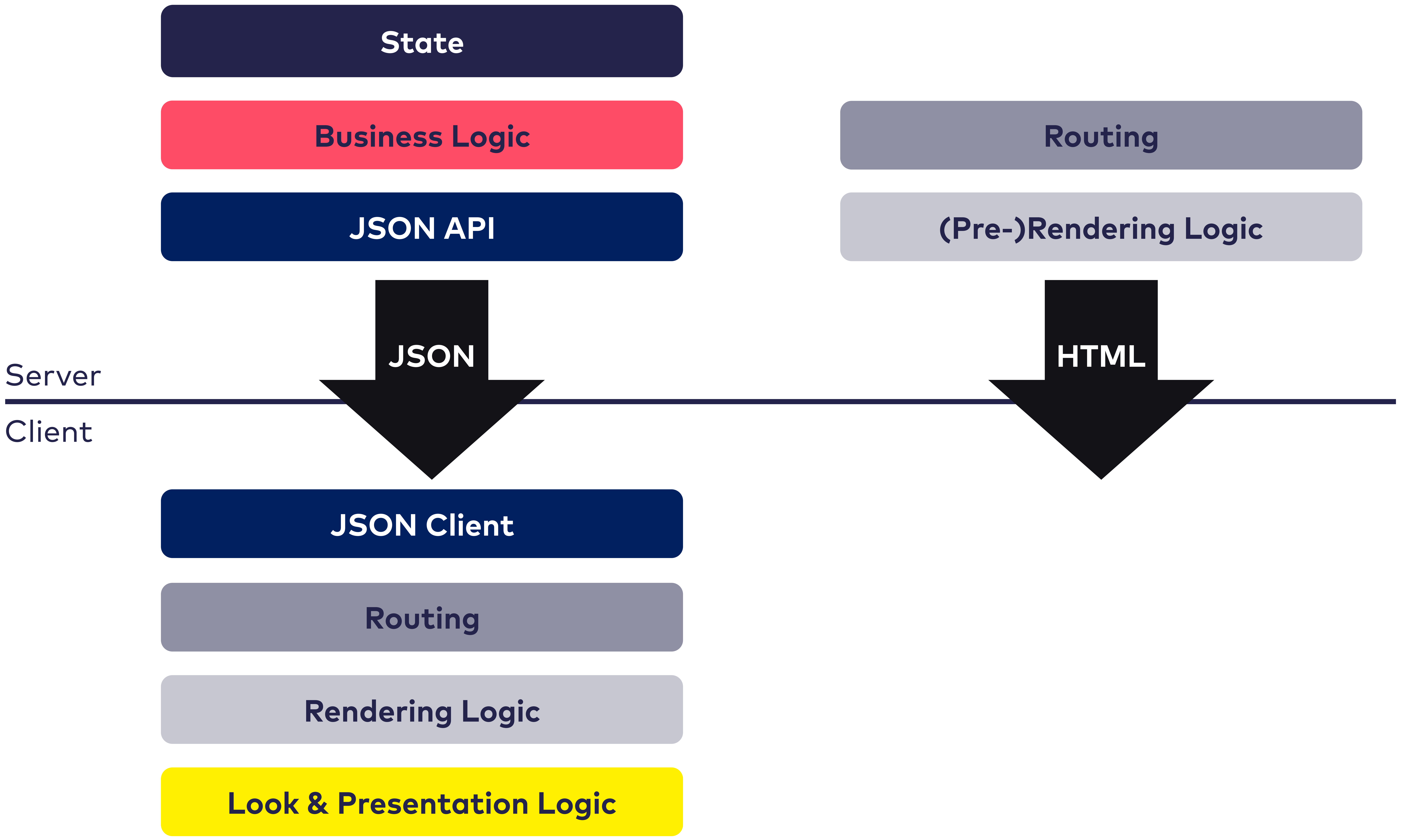
Hydration

How to simulate readiness?

What about Events (Clicks etc)?

How to match server-side HTML to client-side DOM?

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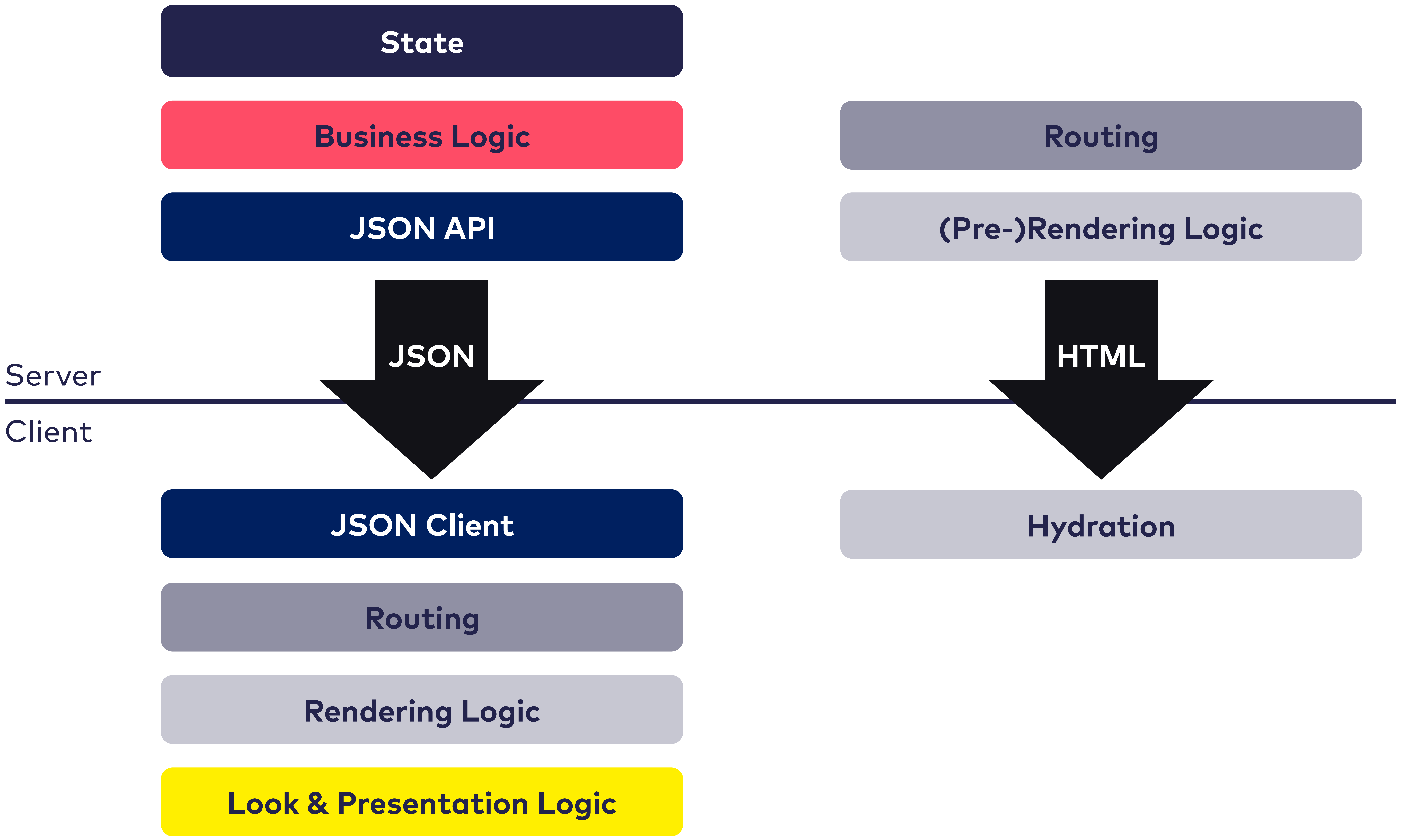
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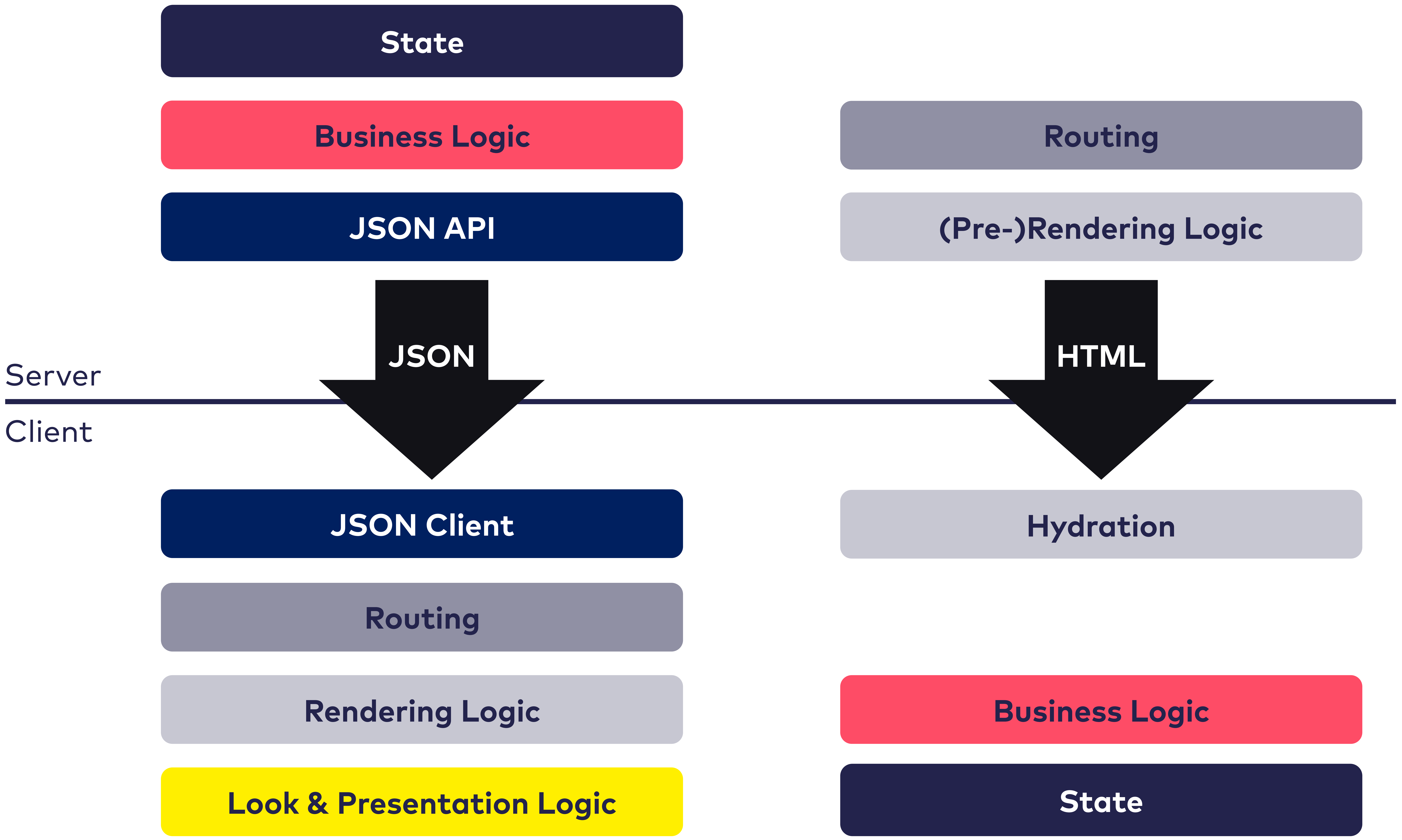
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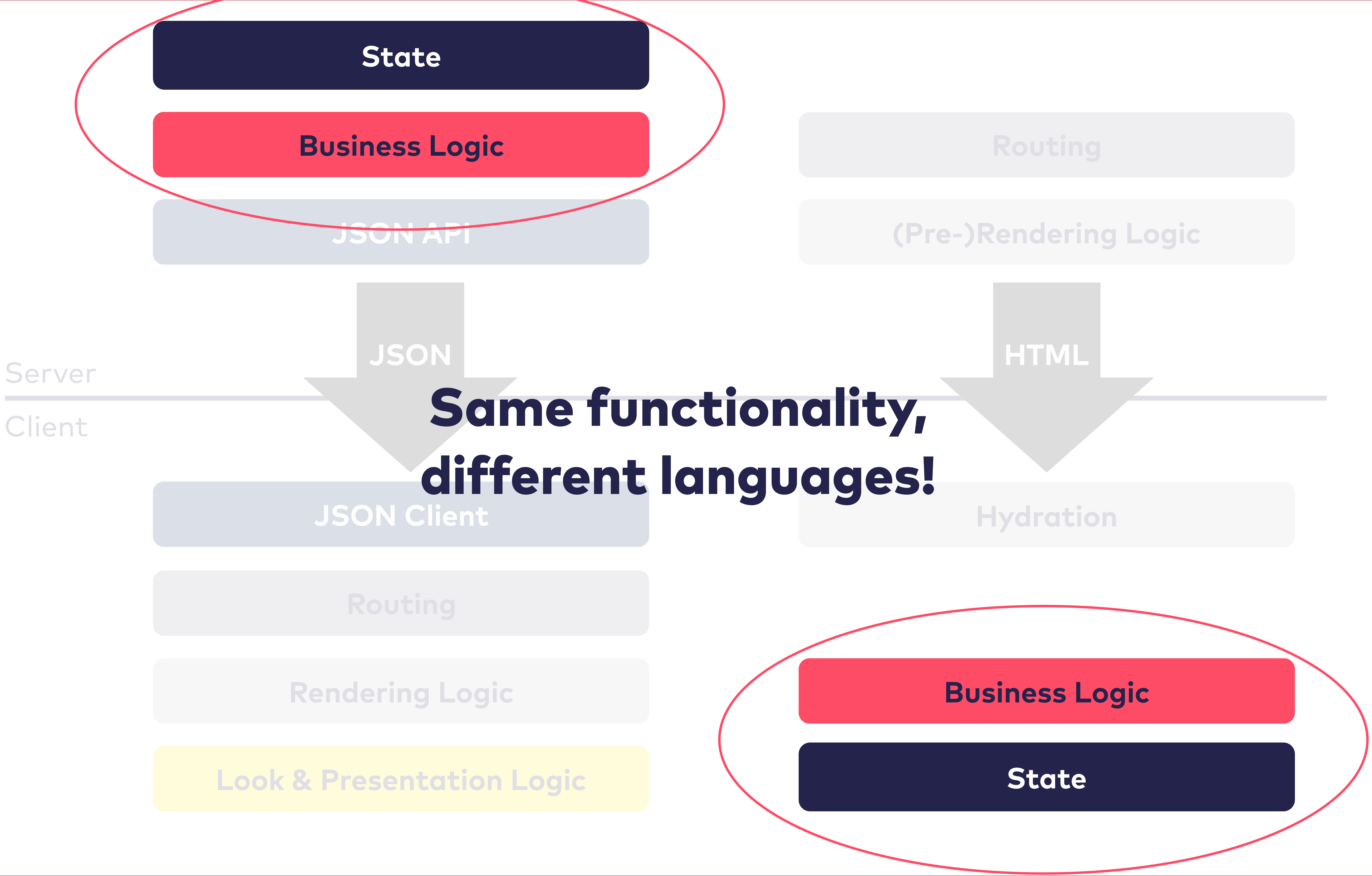
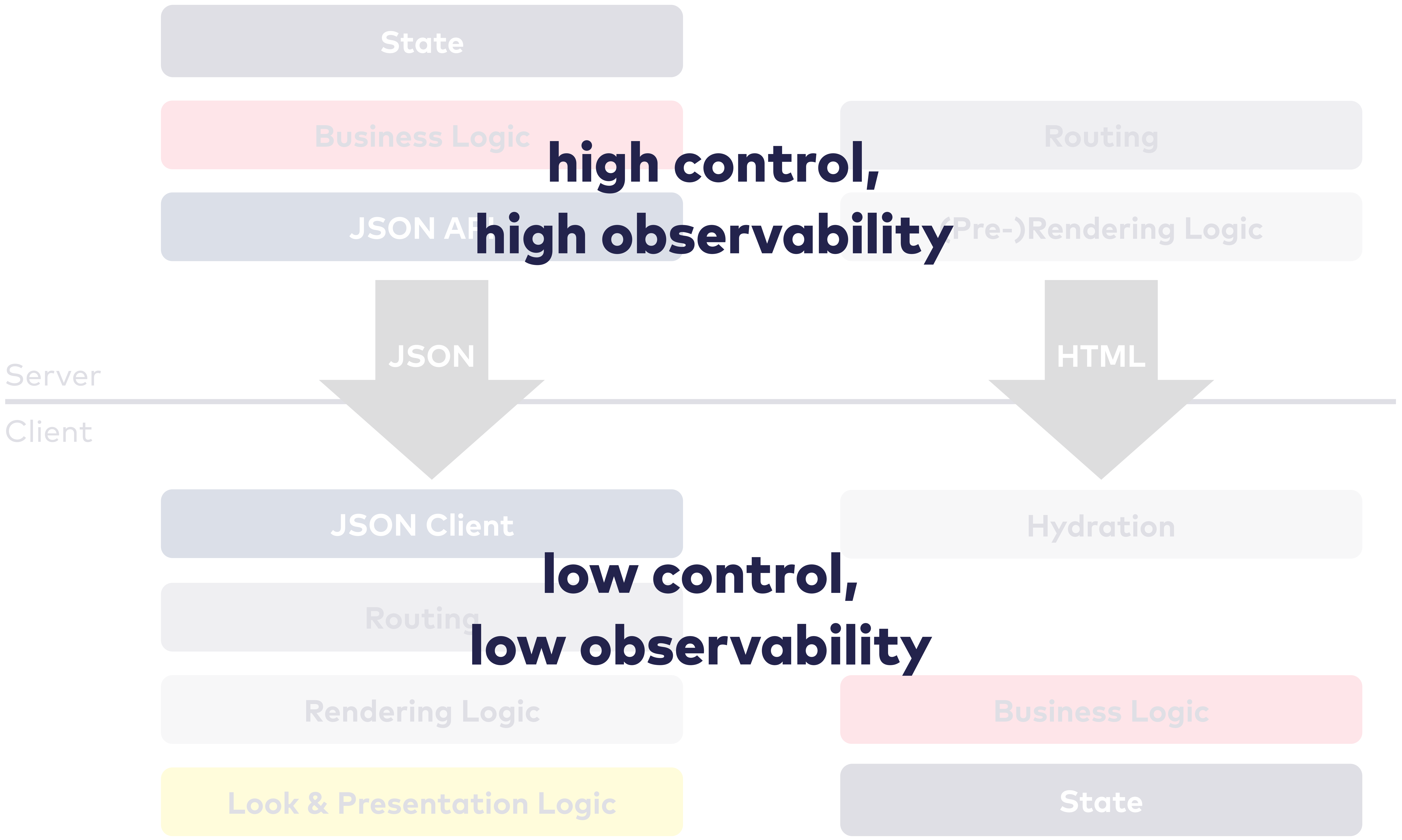
Hydration
Business Logic
State



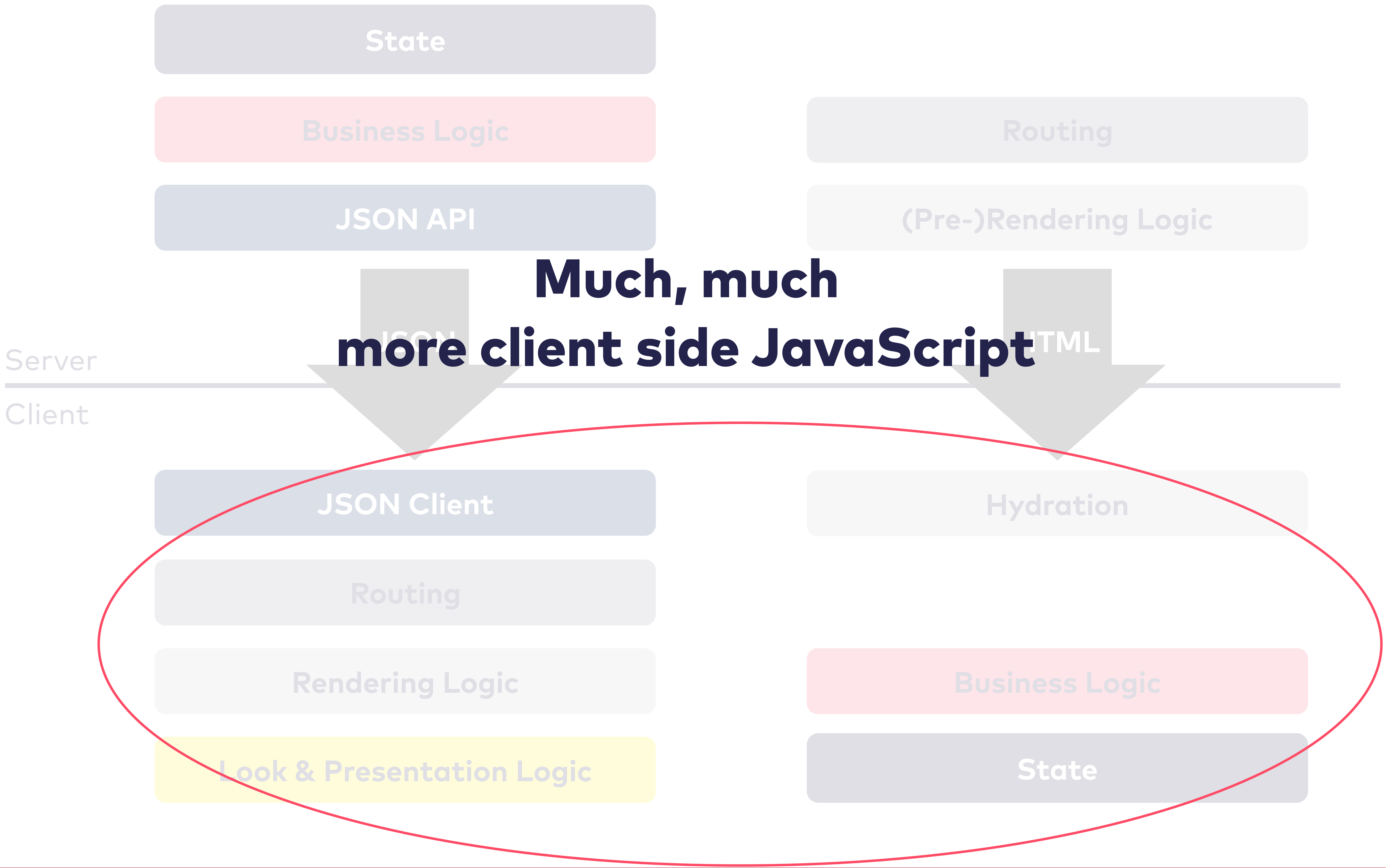
Same functionality, different languages!



high control,
high observability

low control,
low observability

Much, much more client side JavaScript



Resilience

Modern API in JS

```
customElement.define(
  "my-element",
  MyElement
);
```

Firefox 63: It works

Chrome 69: Exception

Modern API in CSS

```
.item {
  display: contents;
}
```

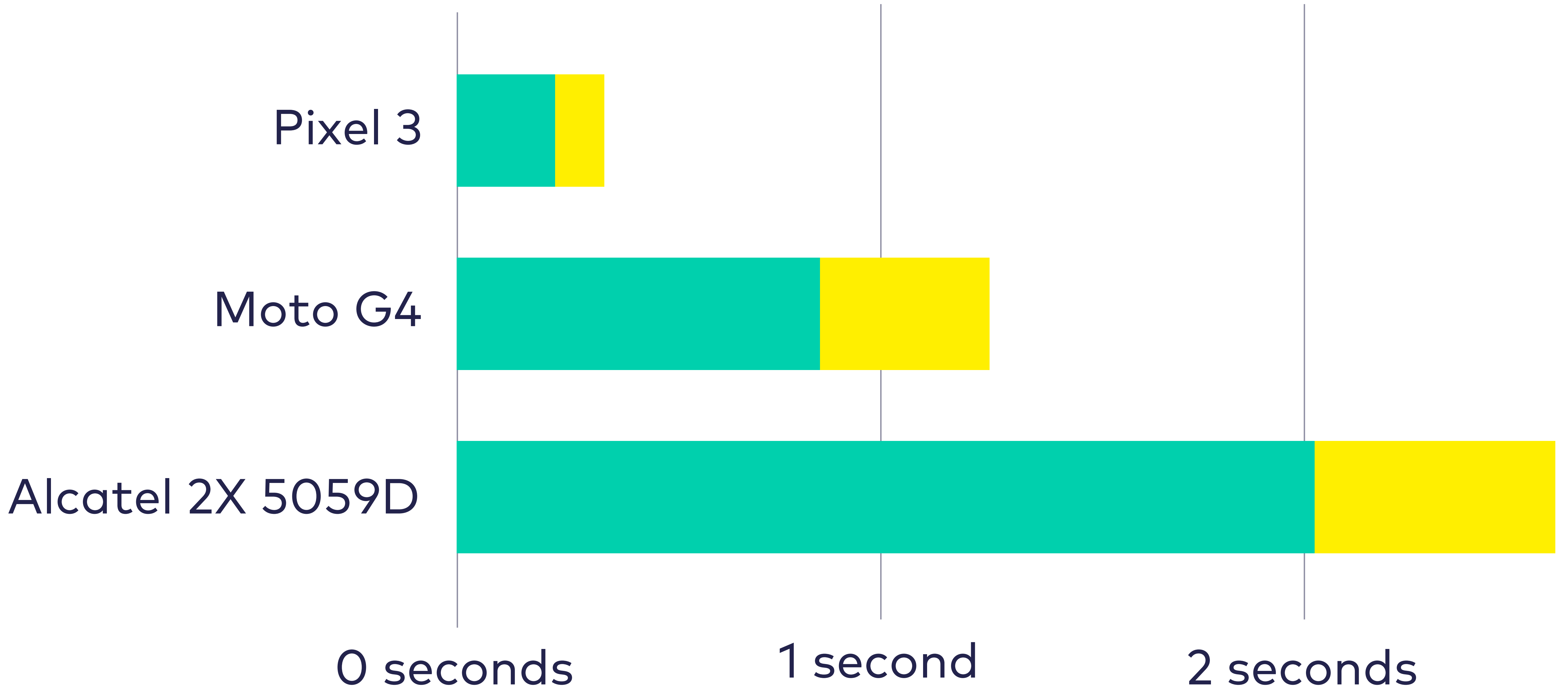
Firefox 63: It works

Chrome 69: Skips that line

“JavaScript is the most expensive part of your page”

Addy Osmani, Speed team lead for Google Chrome

Cost of JavaScript on Reddit.com



🟩 Main thread   🟨 Worker thread

The cost of JavaScript in 2019

Test your app on
real, low-cost devices and slow networks

(No, an emulator is not enough)

DuckDuckGo — Privacy, simpl
duckduckgo.com
Privacy, simplified.
DuckDuckGo
Elements
Console
Sources
Network
Performance
Memory
Application
Security
Audits
top
Filter
Default levels

```
> for(let i=0; i<1000000000; i++) {
      Math.pow(i, i);
  }
```

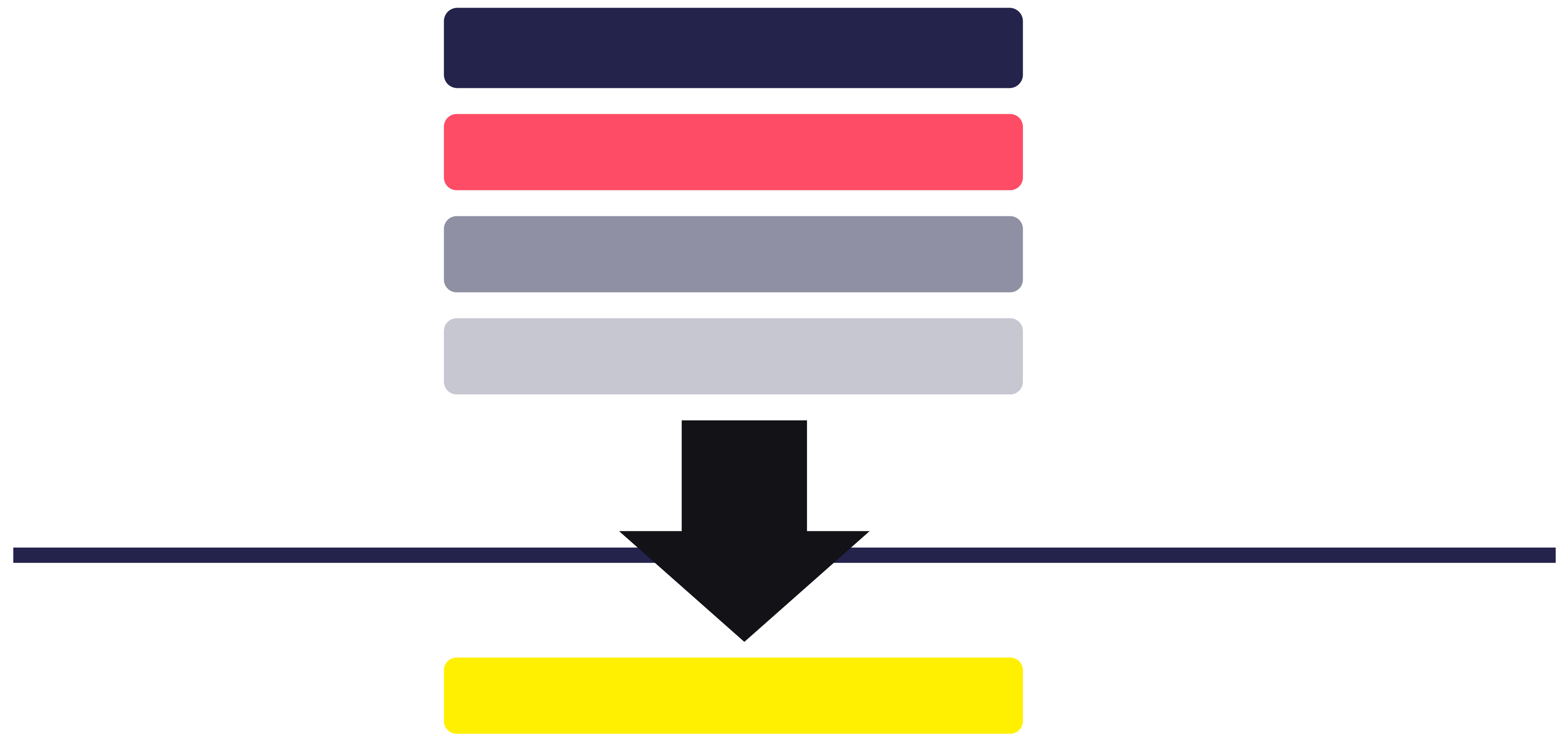
RAGE CLICKS

"15% of users tried to interact sometime between onload and interactive."

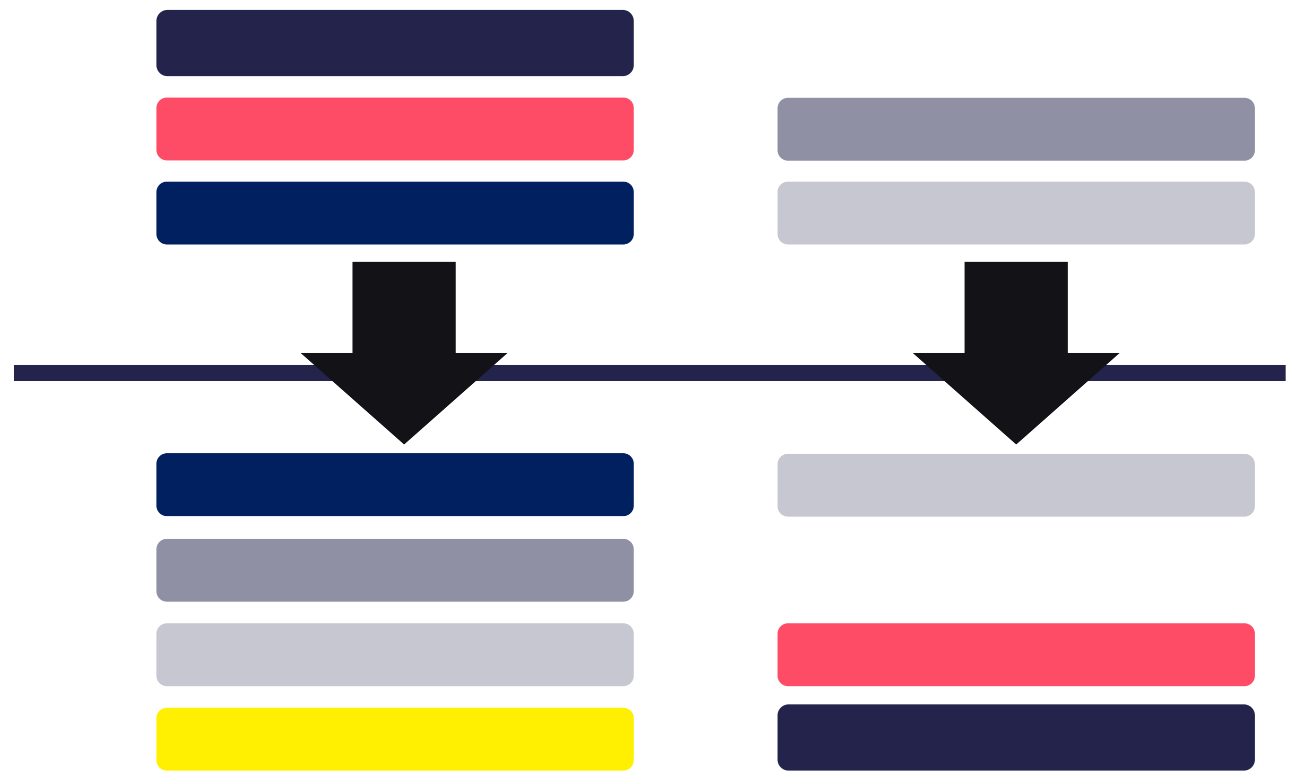
Akamai: Metrics That Matter

Hydration is not
a progressive enhancement,
it's an **uncanny valley**

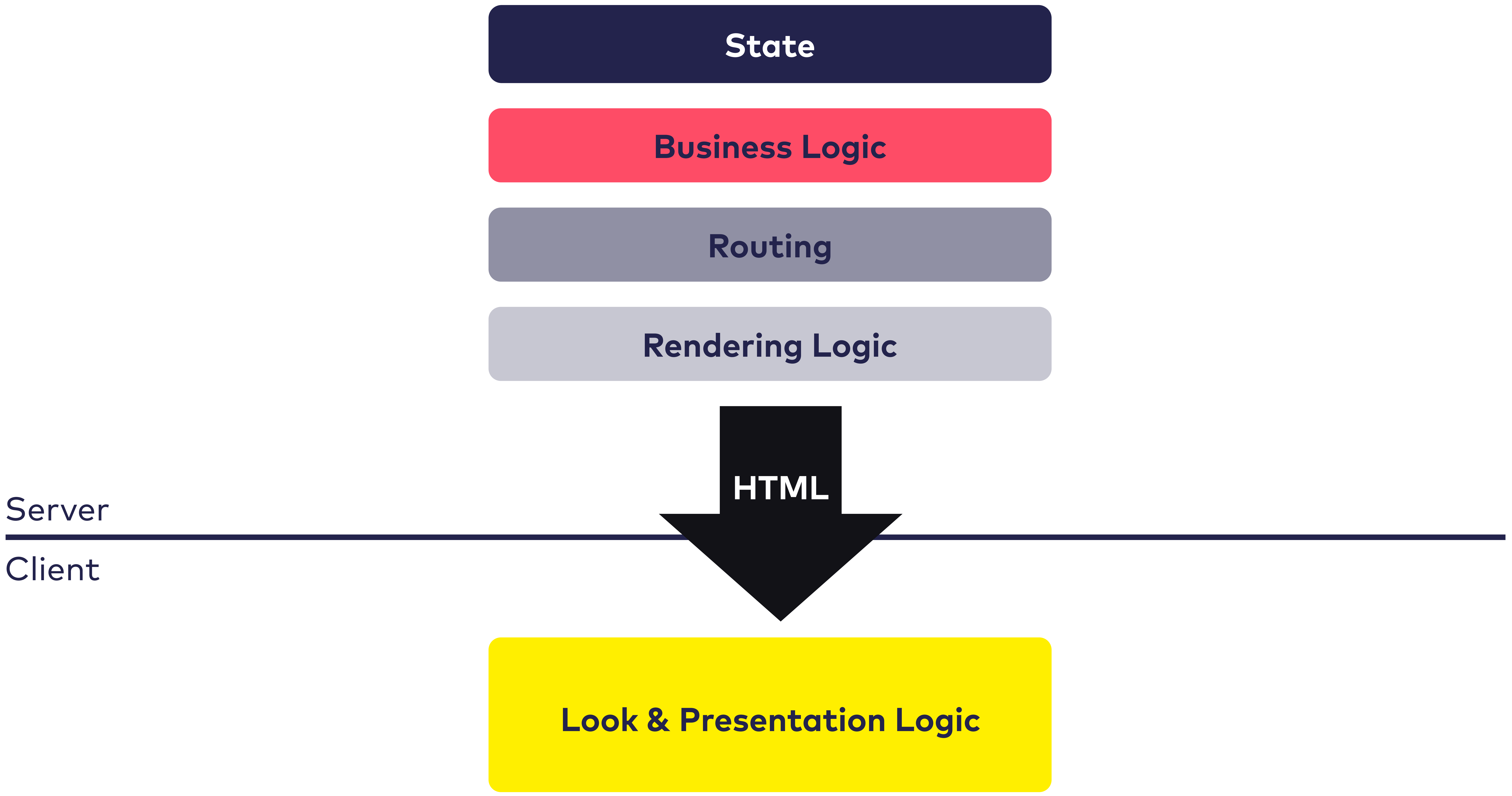
Now what?



- Server-side state handling
- Simpler
- More resilient & observable
- Smaller client footprint
- Better performance



- Client-side state handling
- Better offline support
- Closer to desktop model
- Better performance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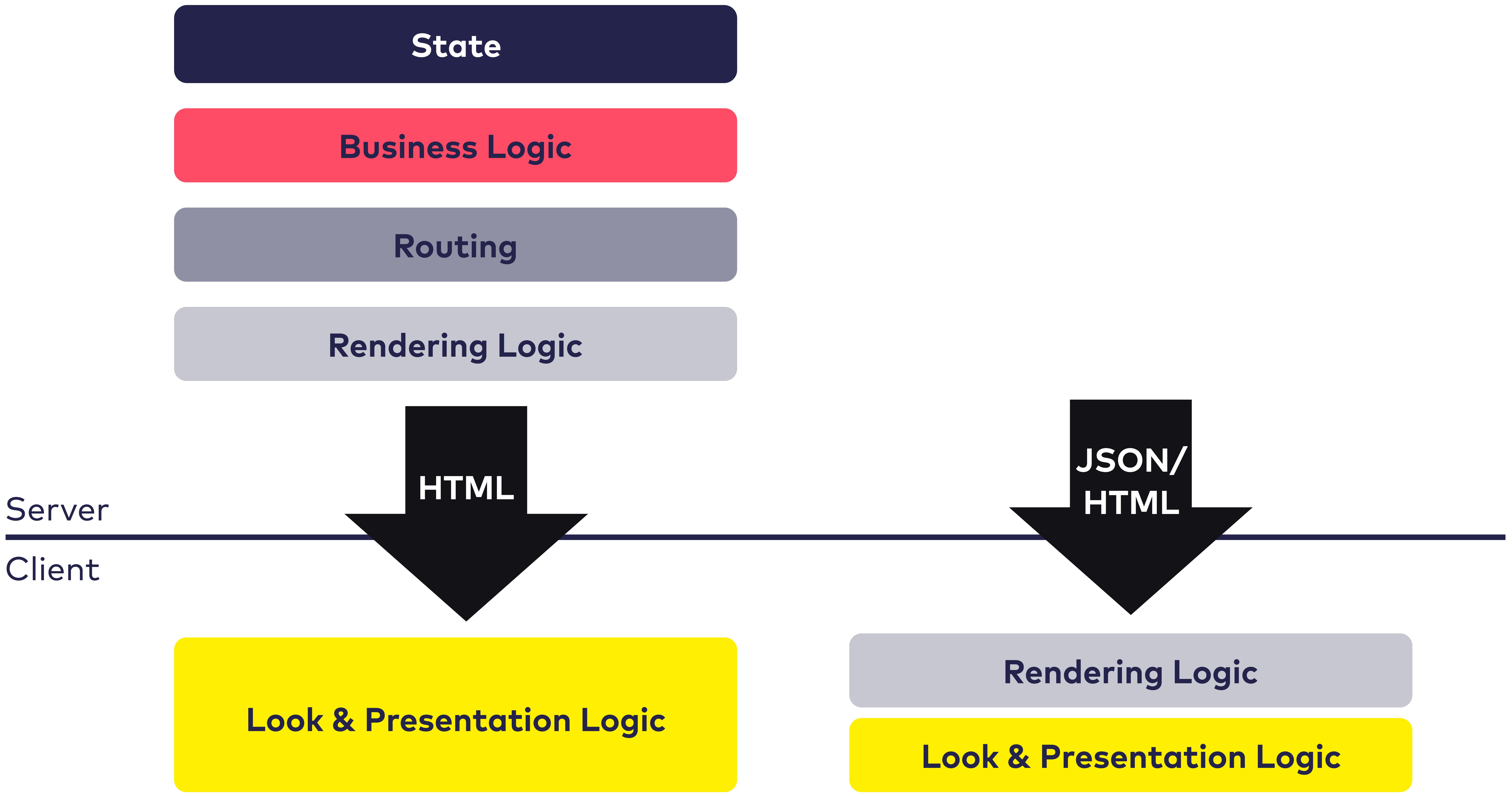
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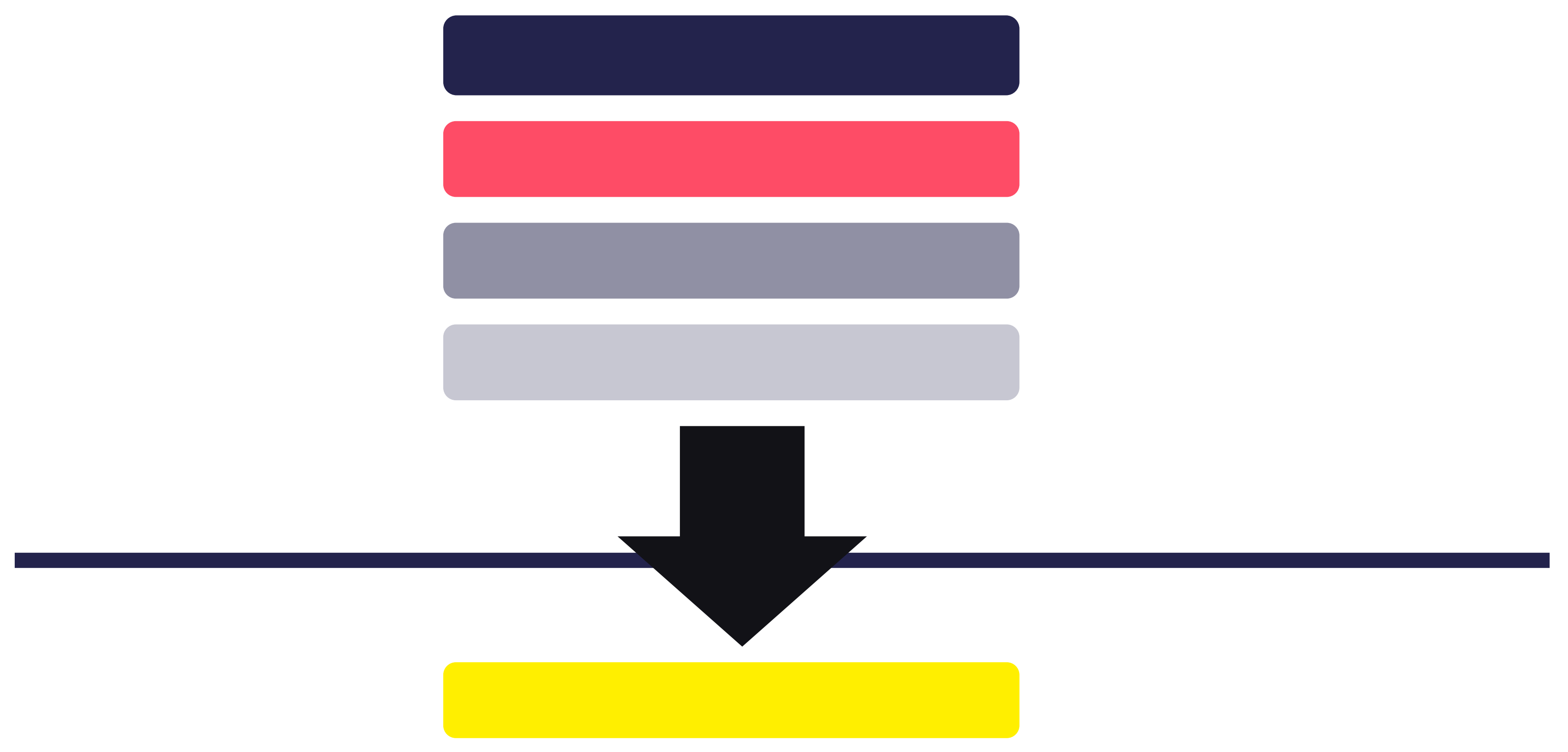
Let's use the **technologies from SPAs**,
but keep the **architecture of the Web.**

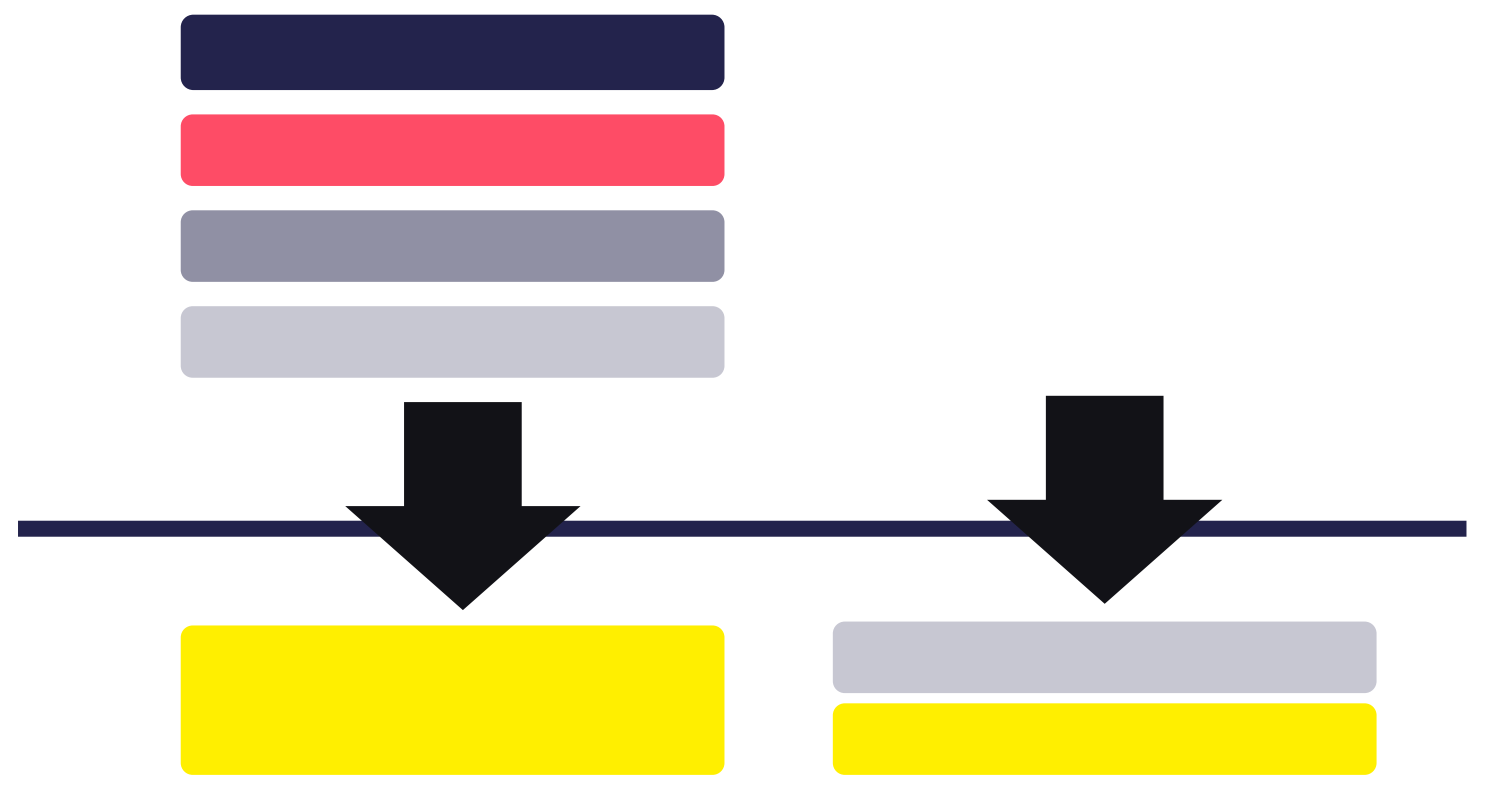
- Large number of users
- Basic UX needs
- Support for past, present and future devices

Pure SSR



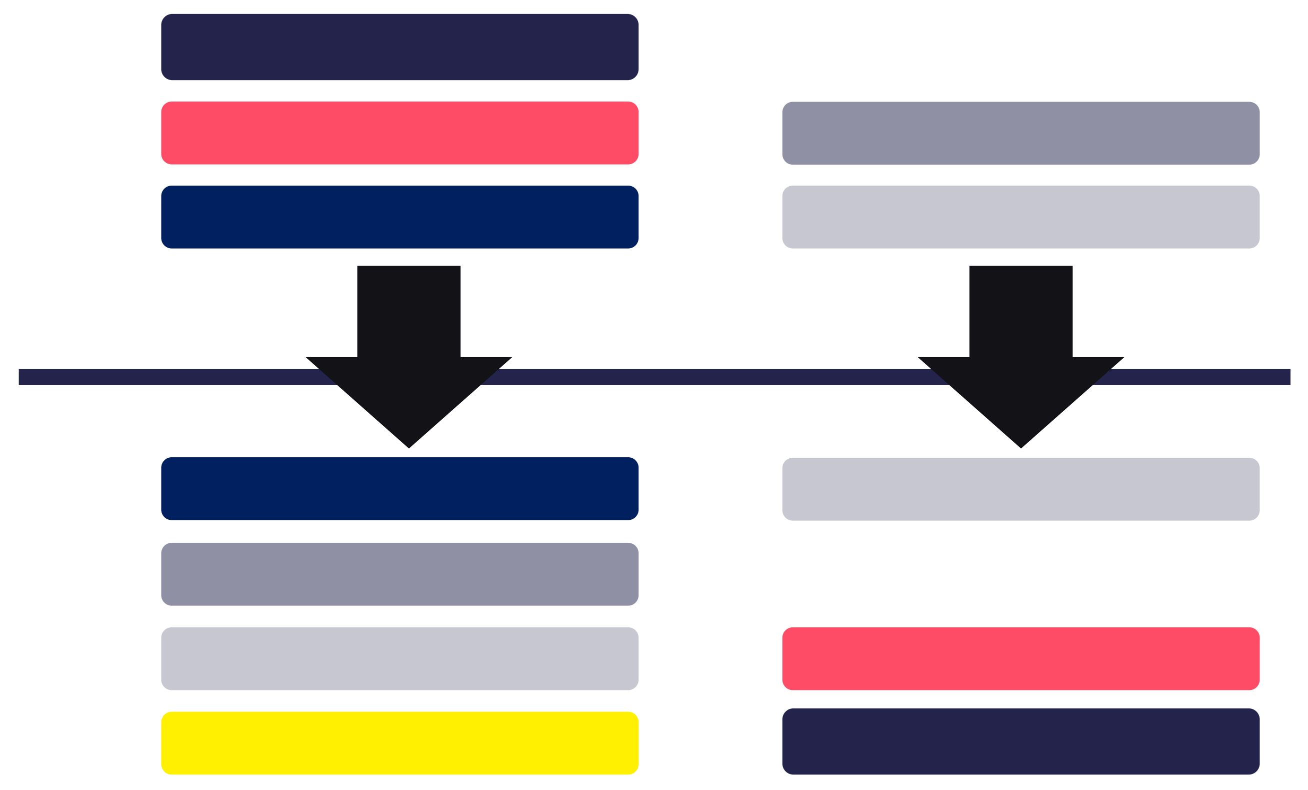
- Like SSR, but with
  - more UX needs
  - Complex component state
  - Basic offline support

SSR+RC



- Complex global client state
- Offline support
- Controlled device landscape

Pure SPA



Thanks! Questions?

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