

Fetch, CRUD & REST

REST API with Node.js & Express.js

Web Development

```
index.html
85 }
86
87 /*
88  * Fetches post data from my headless cms
89 */
90 function getPersons() {
91   fetch('http://headlesscms.cederdorff.com/wp-json/wp/v2/posts?_embed')
92     .then(function(response) {
93       return response.json();
94     })
95     .then(function(persons) {
96       appendPersons(persons);
97     });
98 }
99 /*
100 Appends json data to the DOM
101 */
102 function appendPersons(persons) {
103   let htmlTemplate = '';
104   for (let person of persons) {
105     console.log();
106     htmlTemplate +=
107       `

108          Copenhagen

2 Girls - Alicia & Ida

From Holstebro

I'm into sports

Love (⌚{}) gadgets, to take pictures  
& interior design projects

What's with my arm?

A photograph of a man and a woman looking at a laptop screen. The man is in the foreground, wearing a light blue t-shirt with an Adidas logo. The woman is behind him, looking over his shoulder. They appear to be focused on the laptop screen, which is partially visible.

I can teach everyone  
how to code!

... as long as you are eager to learn

Webudvikling

kea  
KØBENHAVNS ERHVERVSAKADEMI

# Frontend (client)

User CRUD with Node.js REST API

| User ID | Name                  | Title           | Email        |
|---------|-----------------------|-----------------|--------------|
| 1       | Birgitte Kirk Iversen | Senior Lecturer | bki@mail.dk  |
| 4       | Rasmus Cederdorff     | Senior Lecturer | race@mail.dk |
| 5       | Dan Okkels Brendstrup | Lecturer        | dob@mail.dk  |
| 6       | Kasper Fischer Topp   | Lecturer        | kato@mail.dk |

# Backend (Server)

```
Raw Parsed
```

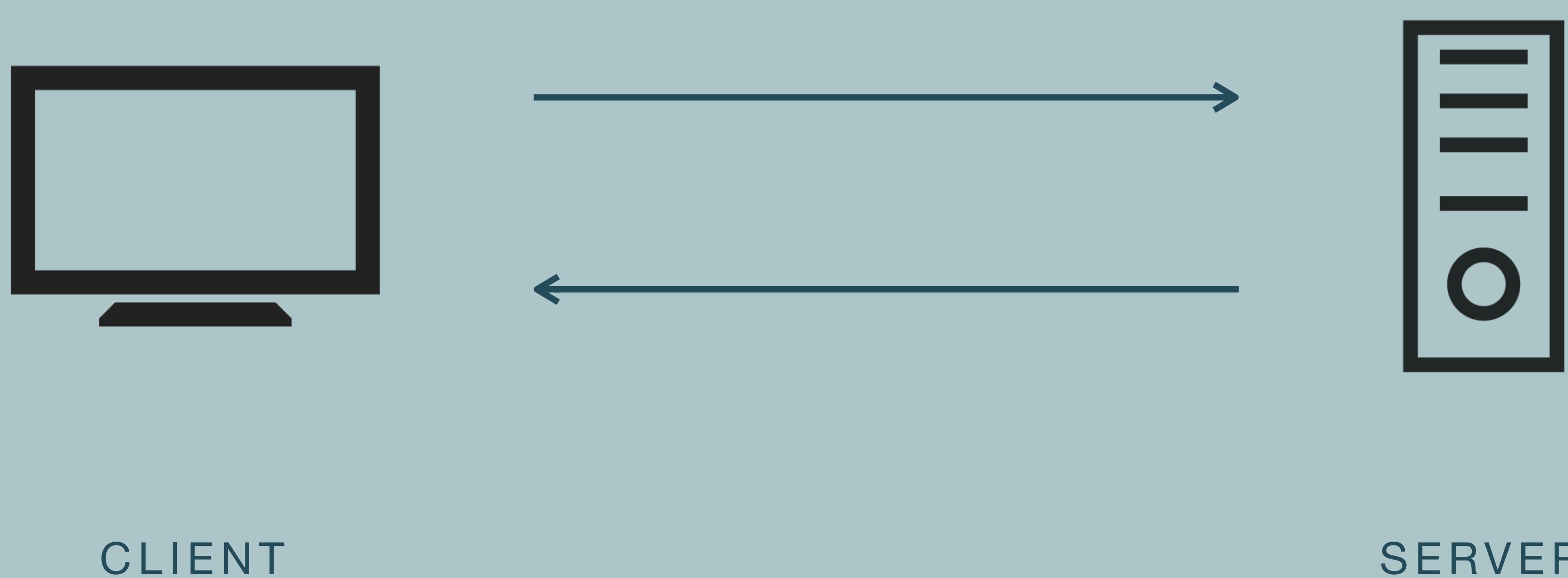
```
[{"id": 1, "name": "Birgitte Kirk Iversen", "mail": "bki@mail.dk", "title": "Senior Lecturer", "image": "https://www.baaa.dk/media/u4gorzsd/birgitte-kirk-iversen2.jpg?anchor=center&mode=crop&width=800&height=450&rnd=132792921541630000&format=webp"}, {"id": 4, "name": "Rasmus Cederdorff", "mail": "race@mail.dk", "title": "Senior Lecturer", "image": "https://www.baaa.dk/media/devlvgj/rasmus-cederdorff.jpg?anchor=center&mode=crop&width=800&height=450&rnd=132792921695570000&format=webp"}, {"id": 5, "name": "Dan Okkels Brendstrup", "mail": "dob@mail.dk", "title": "Lecturer", "image": "https://www.eaaa.dk/media/bdoje141/dan-okkels-brendstrup.jpg?anchor=center&mode=crop&width=800&height=450&rnd=132792921559630000&format=webp"}, {"id": 6, "name": "Kasper Fischer Topp", "mail": "kato@mail.dk", "title": "Lecturer", "image": "https://www.eaaa.dk/media/lxzcybme/kasper-topp.jpg?anchor=center&mode=crop&width=800&height=450&rnd=132792921618200000&format=webp"}, {"id": 7, "name": "Line Skjødt", "mail": "lskj@mail.dk", "title": "Senior Lecturer & Internship Coordinator", "image": "https://www.eaaa.dk/media/14qpfeq4/line-skj%C3%B8dt.jpg?anchor=center&mode=crop&width=800&height=450&rnd=132792921638700000&format=webp"}, {"id": 8, "name": "Martin Aagaard Nøhr", "mail": "mnor@mail.dk", "title": "Lecturer", "image": "https://www.eaaa.dk/media/oayjq02h/martin-n%C3%B8hr.jpg?anchor=center&mode=crop&width=800&height=450&rnd=132792921658800000&format=webp"}]
```

<https://github.com/cederdorff/rest-user-crud-frontend>

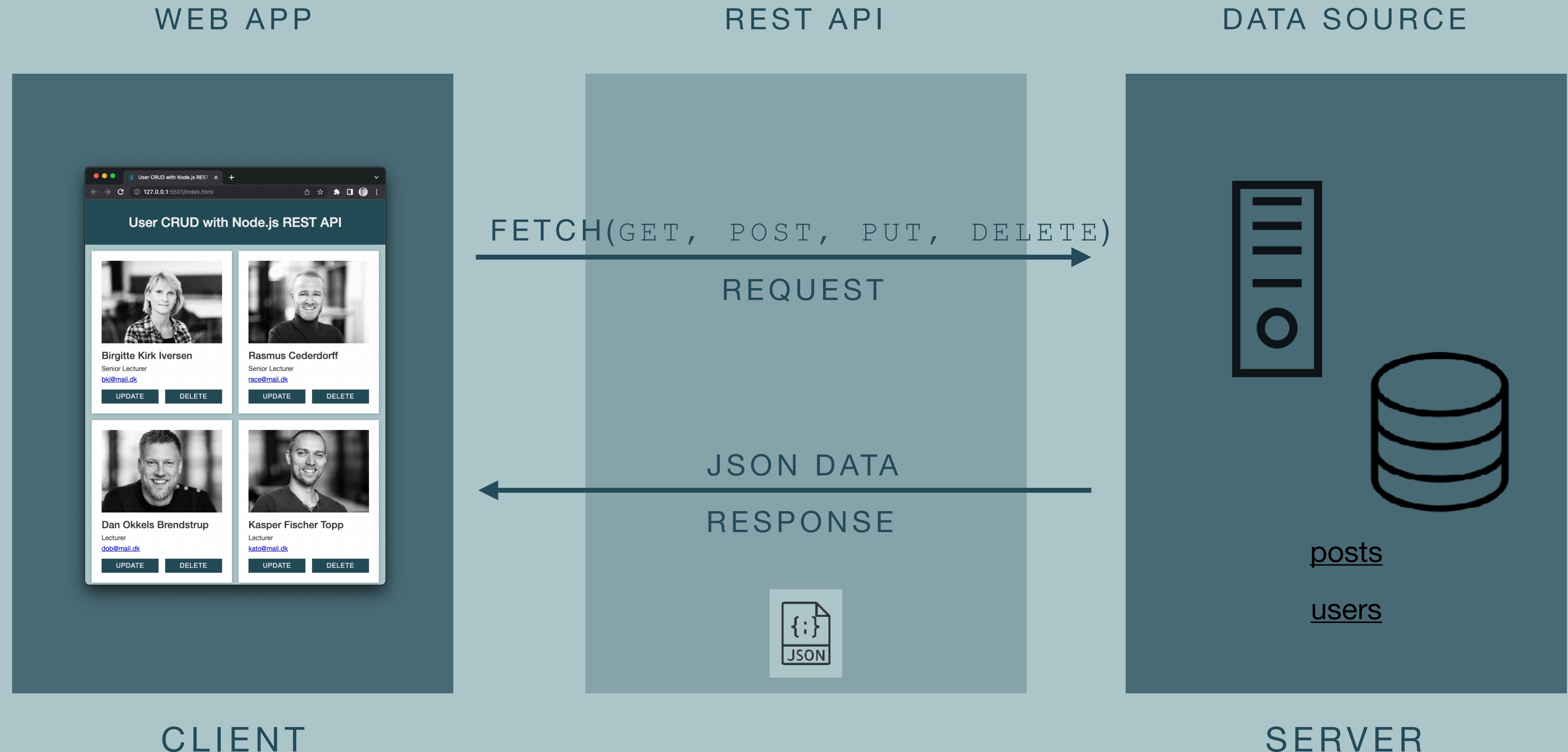
<https://github.com/cederdorff/rest-user-crud-backend>

# Client-Server Model

... how to communicate with backend/ data source (server)

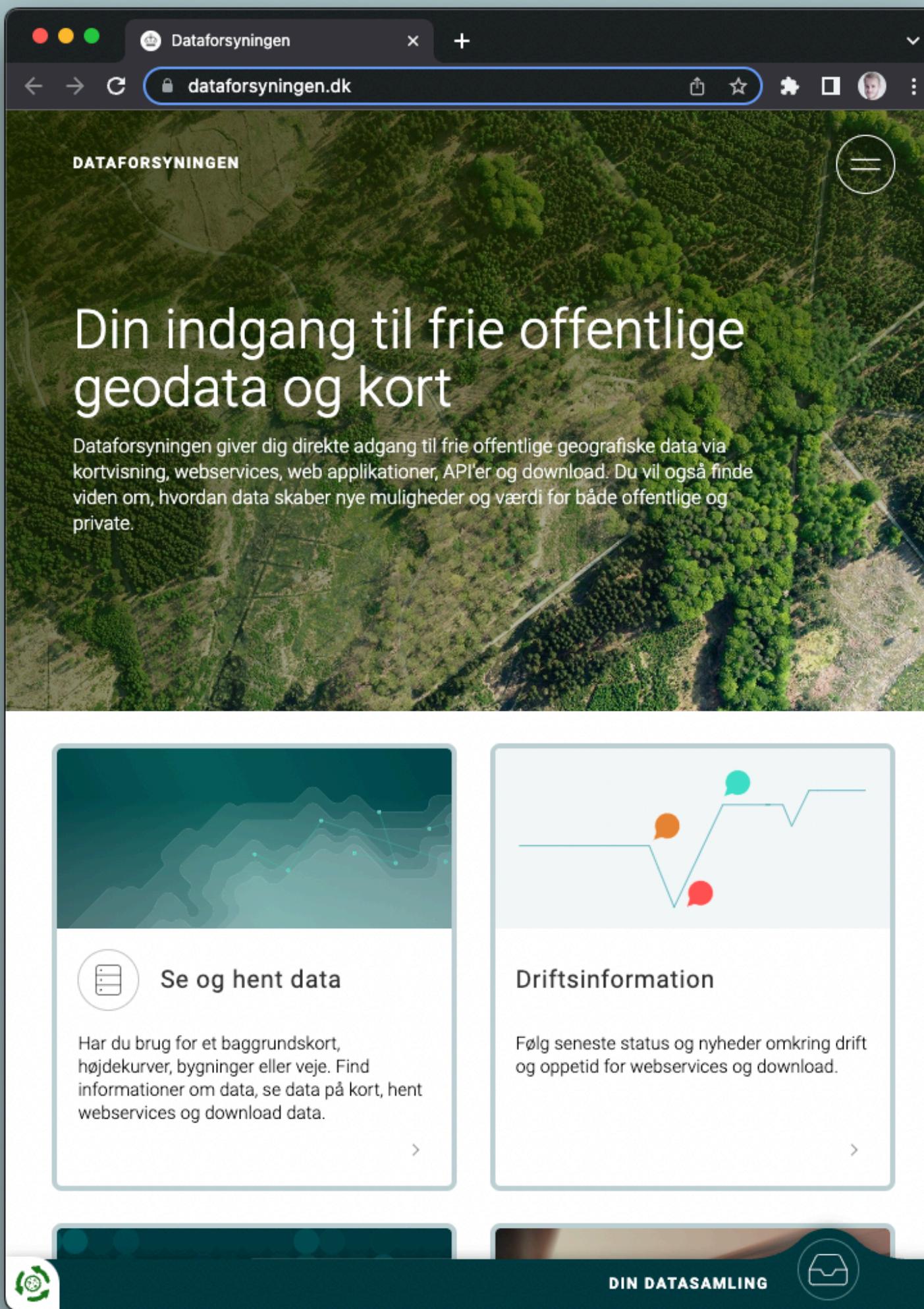


# Fetch, HTTP Request & Response



# Dataforsyningen REST API

... an example of a REST API

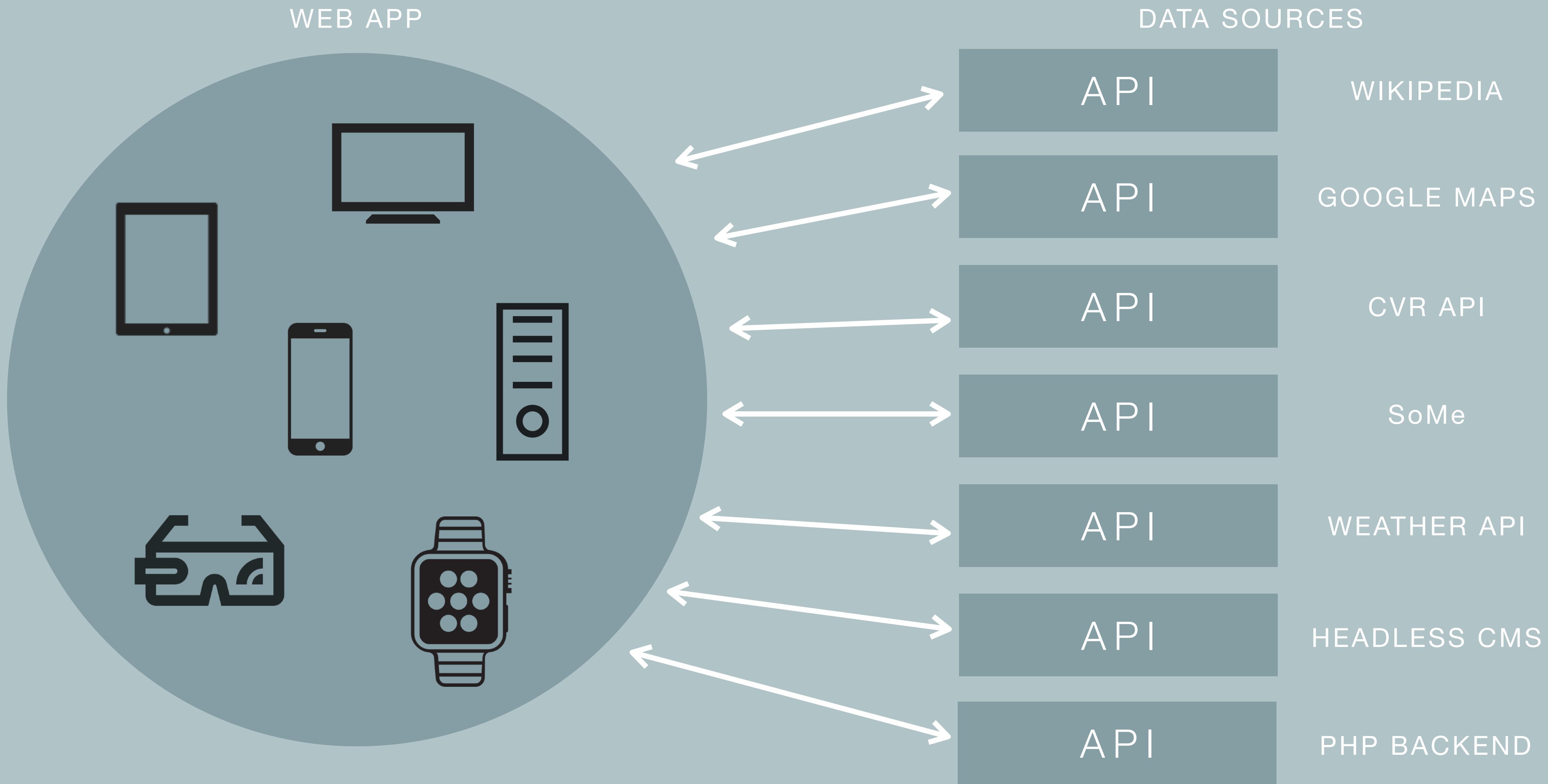


<https://dataforsyningen.dk/>

The screenshot shows the REST API documentation page. The title is "Dataforsyningen REST API". It provides links to the API (<https://api.dataforsyningen.dk/>), documentation (<https://dataforsyningen.dk/>), and a data overview (<https://dataforsyningen.dk/data>). Below this, examples of calls are shown: "Eksempel på kald" (Call example) for "Danmarks adresser og vejnavne" (<https://dataforsyningen.dk/data/4729>) and "Docs (REST Services)" (<https://dawadocs.dataforsyningen.dk/dok/api>). The "Regioner" (Regions) section lists "alle regioner" (all regions) with a GET call to <https://api.dataforsyningen.dk/regioner> and "en region" (one region) with a GET call to <https://api.dataforsyningen.dk/regioner/1082>.

[Dataforsyningen REST API](#)

# API



# React CRUD

React Firebase REST Post App https://race-rest.web.app

POSTS CREATE

 Morten Algy Bonderup  
Senior Lecturer



**Qui est esse**

Est rerum tempore vitae sequi sint nihil reprehenderit dolor beatae ea dolores neque fugiat blanditiis voluptate porro vel nihil molestiae ut reiciendis qui aperiam non debitis possimus qui neque nisi nulla

 Dan Okkels Brendstrup  
Lecturer



**Consequuntur deleniti eos quia temporibus ab aliquid at**

Voluptatem cumque tenetur consequatur expedita ipsum nemo quia explicabo aut eum minima consequatur tempore cumque quae est et et in consequuntur voluptatem voluptates aut

 Kim Elkjær Marcher-Jepsen  
Senior Lecturer



**At nam consequatur ea labore ea harum**

Cupiditate quo est a modi nesciunt soluta ipsa voluptas error itaque dicta in autem qui minus magnam et distinctio eum accusamus ratione error aut

 Birgitte Kirk Iversen  
Senior Lecturer



**Jes Arbov**  
Lecturer



 Maria Louise Bendixen  
Senior Lecturer

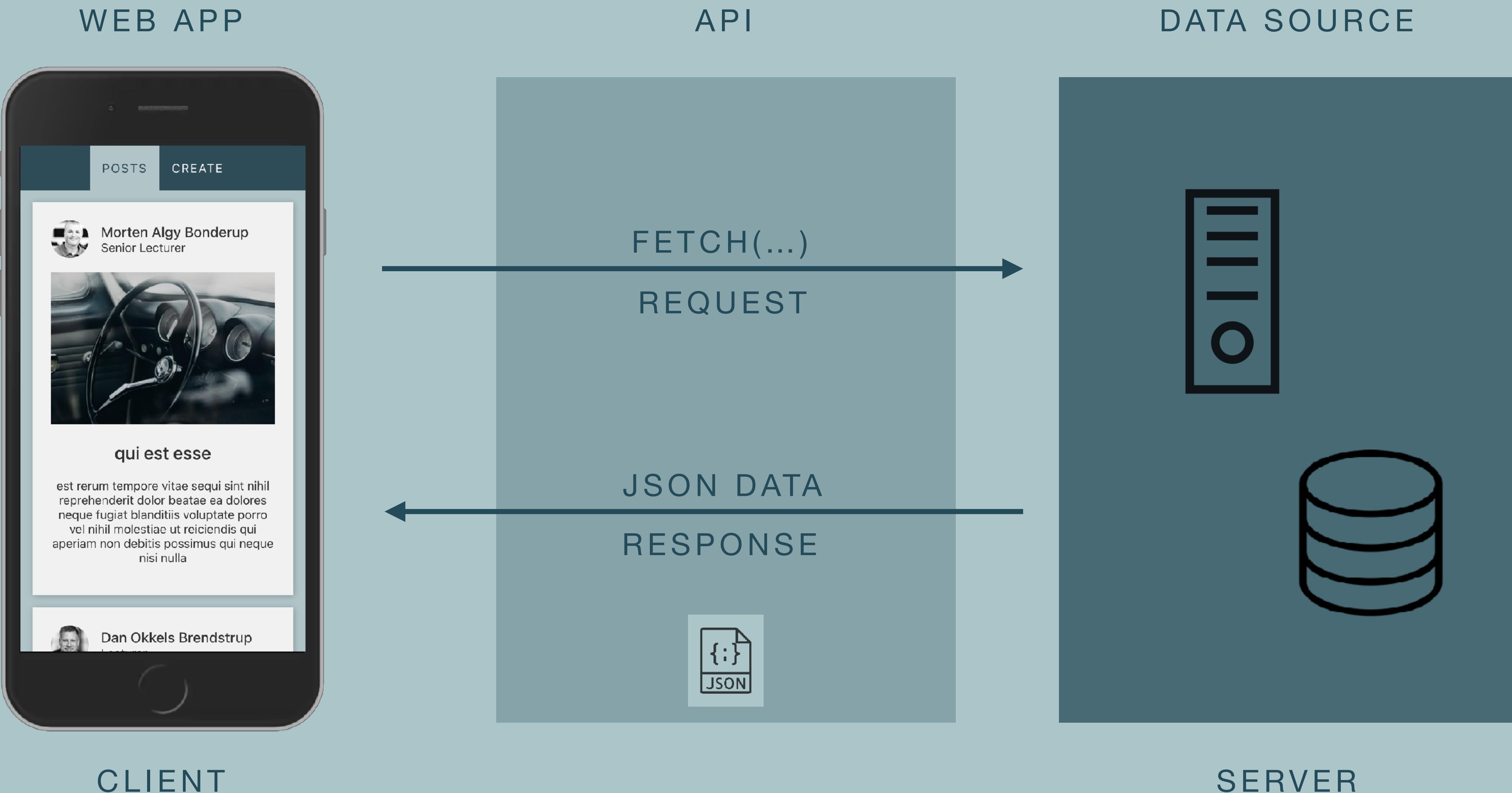


<https://race-rest.web.app/>

# Content

- Client-Server Model
- Web Development
- Fetch
- Async JS & await/sync
- What's a Data Source?
- API
- JSON
- CRUD
- REST
- HTTP Request Methods & Verbs
- CRUD vs REST & HTTP Verbs
- What's Firebase?
- npm, Node & Express

# Web Development



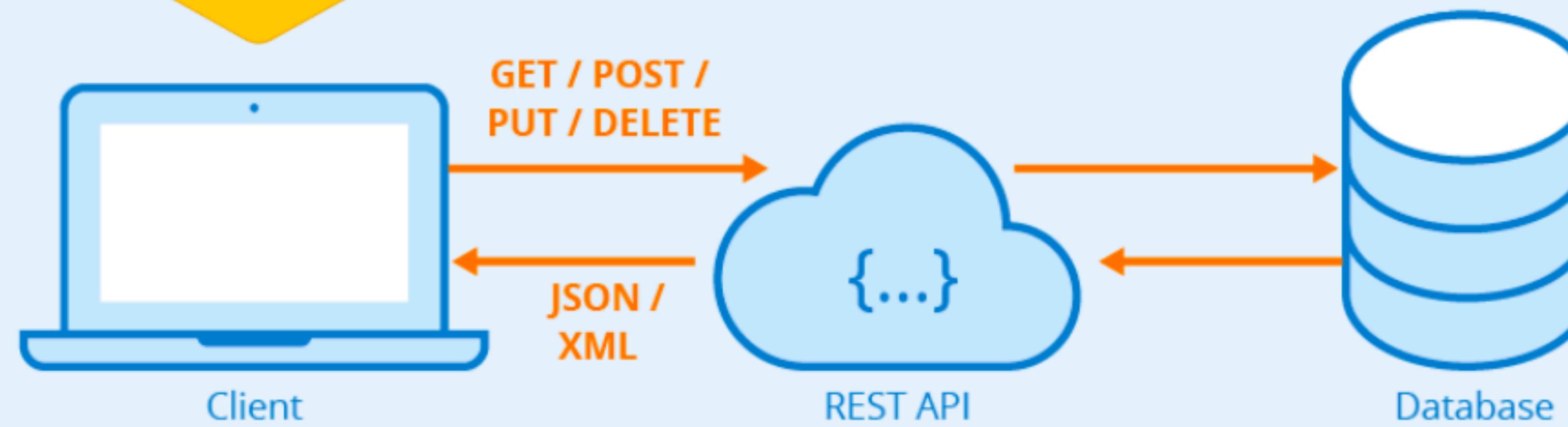
When someone asks you how to get data from a database in a js code



made with mematic

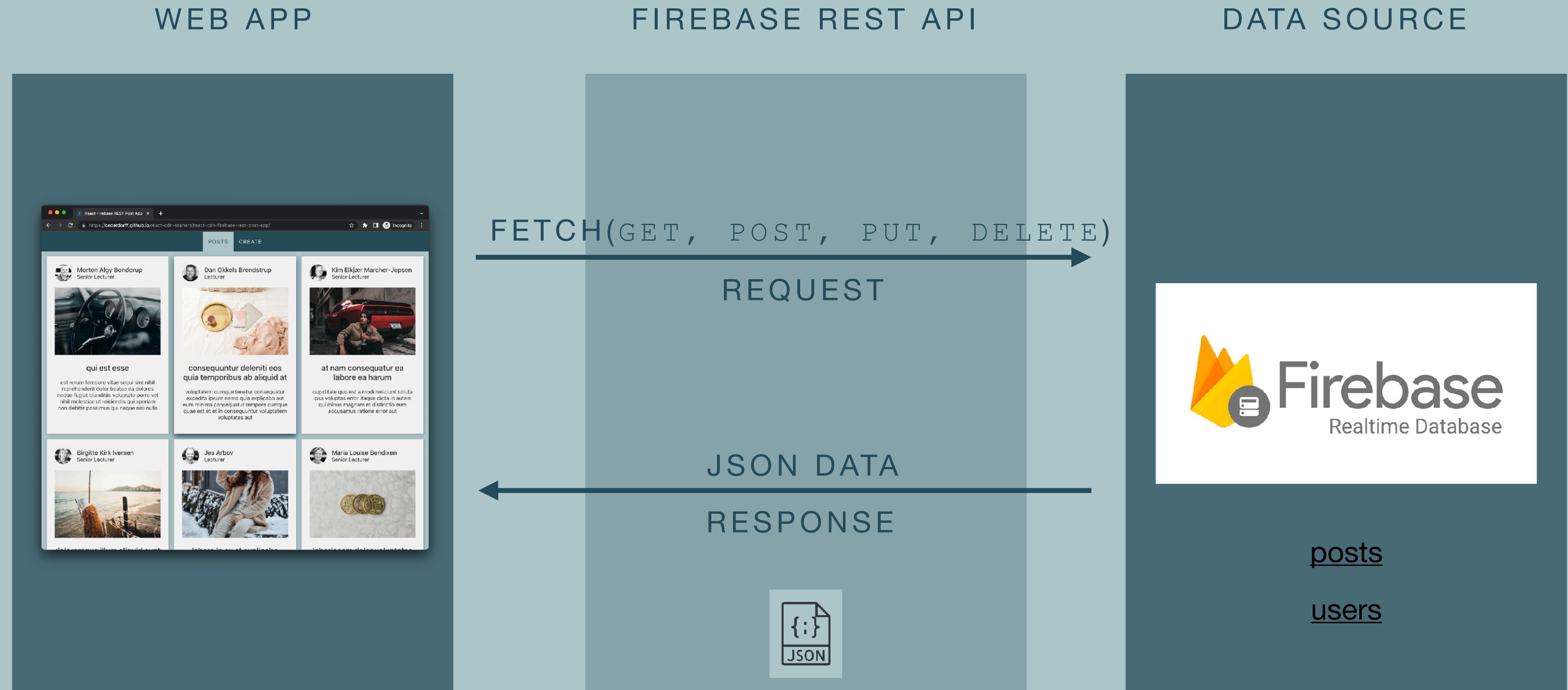


# Firebase





# Fetch, HTTP Request & Response



# fetch(...)

HTTP Requests in  
JavaScript.

A way to get and post data  
from and to data sources.

```
// fetch with callbacks
fetch("https://cederdorff.github.io/web-frontend/callback.js")
 .then(function (response) {
 return response.json();
 })
 .then(function (data) {
 console.log(data);
 });
// or with promises
const response = fetch("https://cederdorff.github.io/web-frontend/promise.js");
const data = response.json();
console.log(data);
```

# fetch(...)

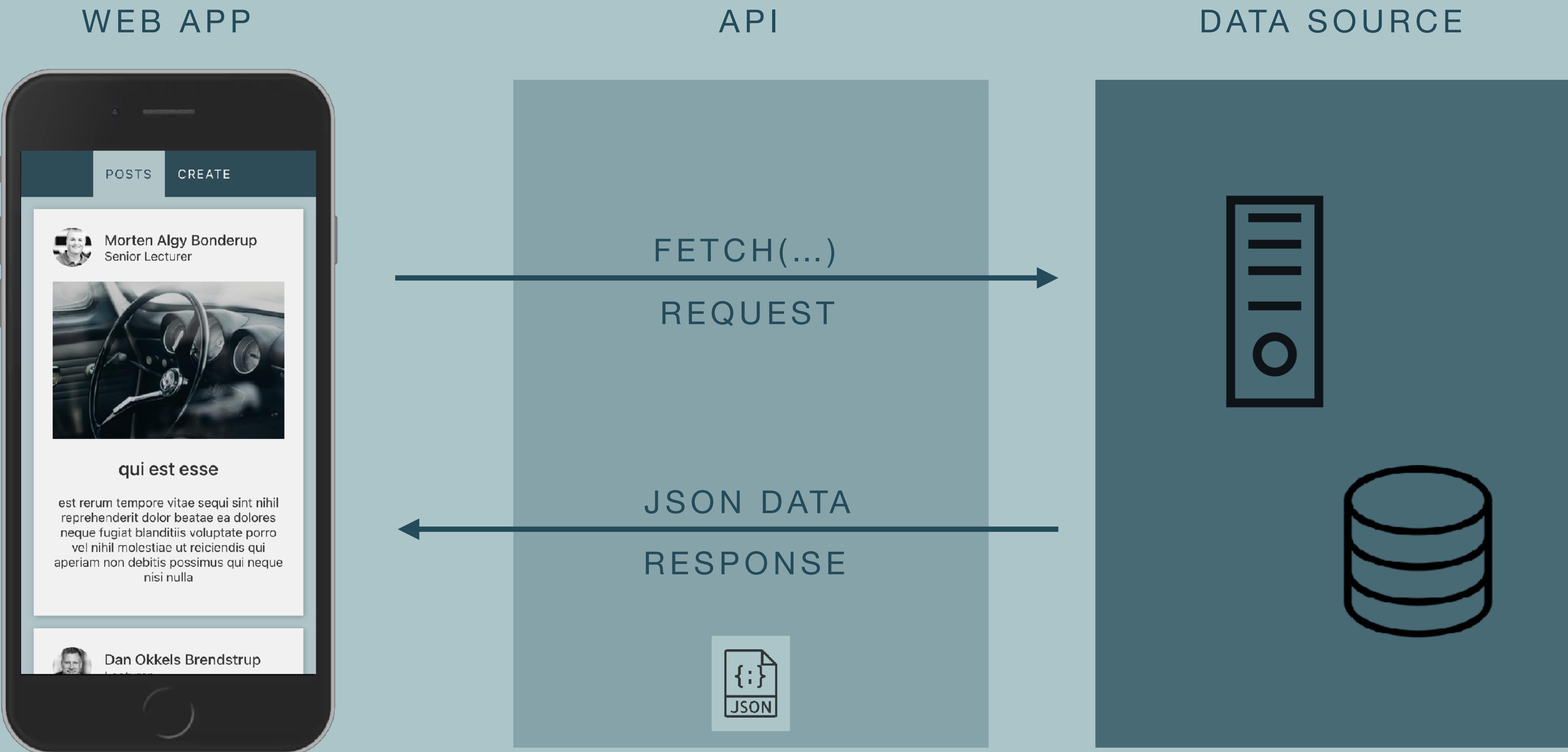
... get & post data from and to a data source  
... can perform network requests to a server

```
1 let promise = fetch(url, [options])
```

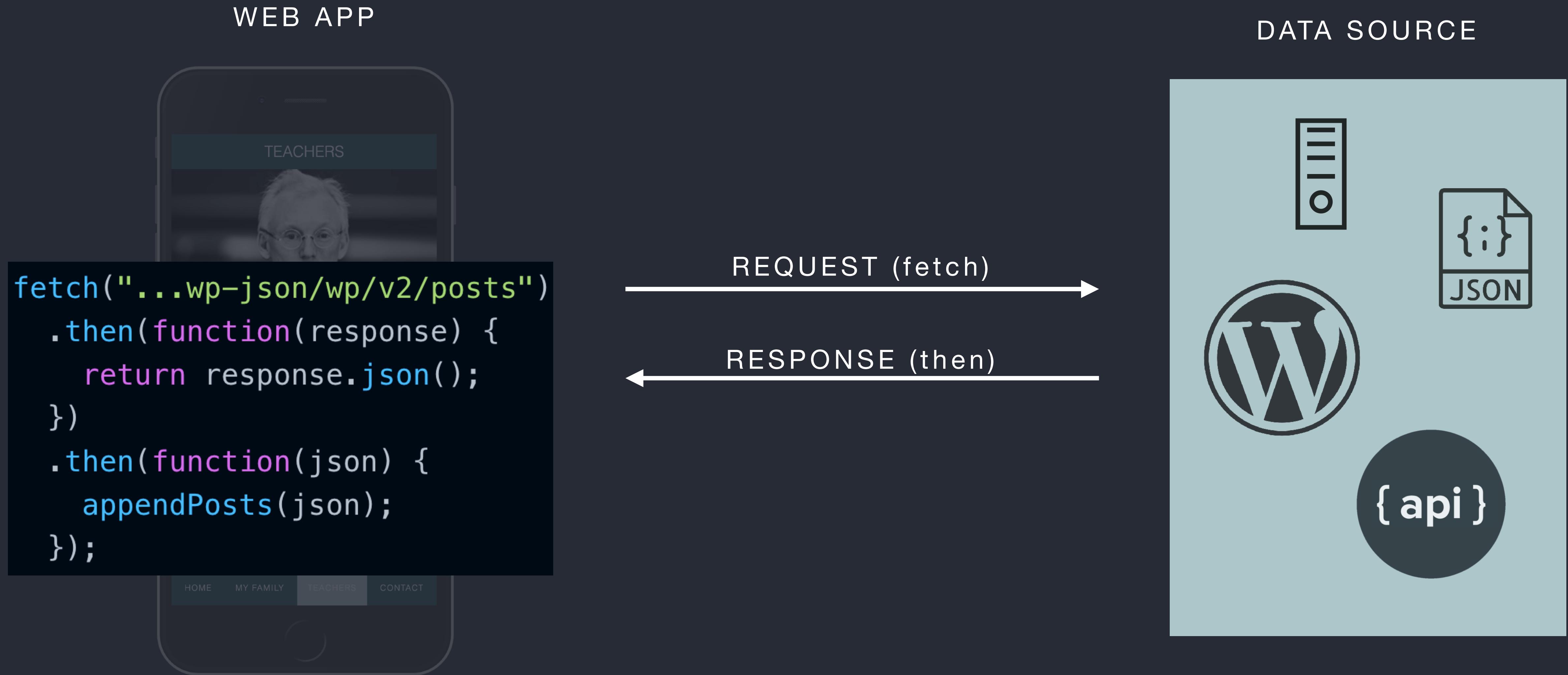
- `url` – the URL to access.
- `options` – optional parameters: method, headers etc.

Without `options`, this is a simple GET request, downloading the contents of the `url`.

# Fetch, fetch, fetch



# Fetch



```
/*
Fetches json data from the file persons.json
*/
fetch('json/persons.json')
 .then(function (response) {
 return response.json();
 })
 .then(function (jsonData) {
 console.log(jsonData);
 appendPersons(jsonData)
 });

/*
Appends json data to the DOM
*/
function appendPersons(persons) {
 let htmlTemplate = "";
 for (let person of persons) {
 htmlTemplate += /*html*/
 `

 <h4>${person.name}</h4>
 <p>${person.age} years old</p>
 <p>Hair color: ${person.hairColor}</p>
 <p>Relation: ${person.relation}</p>

`;
 }
 document.querySelector("#persons").innerHTML = htmlTemplate;
}
```

```
[{
 "name": "Peter Madsen",
 "age": 52,
 "hairColor": "blonde",
 "relation": "dad",
 "img": "img/dad.jpg"
},
{
 "name": "Ane Madsen",
 "age": 51,
 "hairColor": "brown",
 "relation": "mom",
 "img": "img/ane.jpg"
},
{
 "name": "Rasmus Madsen",
 "age": 28,
 "hairColor": "blonde",
 "relation": "brother",
 "img": "img/IMG_0526_kvadrat.jpg"
},
{
 "name": "Mie Madsen",
 "age": 25,
 "hairColor": "brown",
 "relation": "blonde",
 "img": "img/mie.jpg"
},
{
 "name": "Mads Madsen",
 "age": 18,
 "hairColor": "dark",
 "relation": "blonde",
 "img": "img/mads.jpg"
},
{
 "name": "Jens Madsen",
 "age": 14,
 "hairColor": "blonde",
 "relation": "uncle",
 "img": "img/jenspeter.jpg"
}]
```

```
/*
Fetches json data from the file persons.json
*/
fetch('json/persons.json')
 .then(function (response) {
 return response.json();
 })
 .then(function (jsonData) {
 console.log(jsonData);
 appendPersons(jsonData);
 });

/*
Appends json data to the DOM
*/
function appendPersons(persons) {
 let htmlTemplate = '';
 for (let person of persons) {
 htmlTemplate += /*html*/
 <article>

 <h4>${person.name}</h4>
 <p>${person.age} years old</p>
 <p>Hair color: ${person.hairColor}</p>
 <p>Relation: ${person.relation}</p>
 </article>
 }
 document.querySelector("#persons").innerHTML = htmlTemplate;
}
```

REQUEST (fetch)

RESPONSE (then)

```
[{
 "name": "Peter Madsen",
 "age": 52,
 "hairColor": "blonde",
 "relation": "dad",
 "img": "img/dad.jpg"
},
{
 "name": "Ane Madsen",
 "age": 51,
 "hairColor": "brown",
 "relation": "mom",
 "img": "img/ane.jpg"
},
{
 "name": "Rasmus Madsen",
 "age": 28,
 "hairColor": "blonde",
 "relation": "brother",
 "img": "img/IMG_0526_kvadrat.jpg"
},
{
 "name": "Mie Madsen",
 "age": 25,
 "hairColor": "brown",
 "relation": "blonde",
 "img": "img/mie.jpg"
},
{
 "name": "Mads Madsen",
 "age": 18,
 "hairColor": "dark",
 "relation": "blonde",
 "img": "img/mads.jpg"
},
{
 "name": "Jens Madsen",
 "age": 14,
 "hairColor": "blonde",
 "relation": "uncle",
 "img": "img/jenspeter.jpg"
}]
```

```
/*
Fetches json data from the file persons.json
*/
fetch('json/persons.json')
 .then(function (response) {
 return response.json();
 })
 .then(function (jsonData) {
 console.log(jsonData);
 appendPersons(jsonData)
 });

/*
Appends json data to the DOM
*/
function appendPersons(persons) {
 let htmlTemplate = "";
 for (let person of persons) {
 htmlTemplate += /*html*/
 `

 <h4>${person.name}</h4>
 <p>${person.age} years old</p>
 <p>Hair color: ${person.hairColor}</p>
 <p>Relation: ${person.relation}</p>

`;
 }
 document.querySelector("#persons").innerHTML = htmlTemplate;
}
```

```
},
{
 "name": "Rasmus Madsen",
 "age": 28,
 "hairColor": "blonde",
 "relation": "brother",
 "img": "img/IMG_0526_kvadrat.jpg"
},
{
 "name": "Mie Madsen",
 "age": 25,
 "hairColor": "brown",
 "relation": "blonde",
 "img": "img/mie.jpg"
},
{
 "name": "Mads Madsen",
 "age": 18,
 "hairColor": "dark",
 "relation": "blonde",
 "img": "img/mads.jpg"
},
{
```

# Fetch

... get & post data from and to a data source

```
// Simple javascript 😞

//Synchronous fetch using async/await.

// Usual way
✓ const jsonData = fetch('URL')
 .then(response => response.json())
 .then(json => console.log(json));

// Using await
✓ const jsonData = await fetch('URL').then(res => res.json())

// Shorter syntax 😊
✓ const jsonData = await (await fetch('URL')).json();
```

<https://www.instagram.com/p/B0nxQjXj9Zi/>

# Async JS

JavaScript reads and runs the script from top to bottom.

JavaScript functions are executed in the sequence they are called. Not in the sequence they are defined.

... by default JavaScript is synchronous.

# JS is Synchronous & Single-Threaded

```
function myFirst() {
 console.log("Hello");
}
```

```
function mySecond() {
 console.log("Goodbye");
}
```

```
mySecond();
myFirst();
```

```
/* ----- Global Variables ----- */
let _users = [];
let _selectedUserId;

/* ----- */

async function fetchUsers() { ... }
function appendUsers(usersArray) { ... }
}

// ===== INIT APP =====

async function initApp() {
 await fetchUsers();
 appendUsers(_users);
}

initApp();
```

# With callbacks, we can make JS Asynchronous

```
setTimeout(() => {
 console.log("Hey, I'm async!");
}, 3000);

btn.addEventListener('click', () => {
 alert("Hey, you clicked me!");
});
```

```
// fetch with callbacks
fetch("https://cederdorff.github.io/web-frontend/canvas")
 .then(function (response) {
 return response.json();
 })
 .then(function (data) {
 console.log(data);
 });
});
```

# Fetch is Asynchronous

And it's about making HTTP requests in JavaScript.  
... and a way to get & post data from and to a data source.

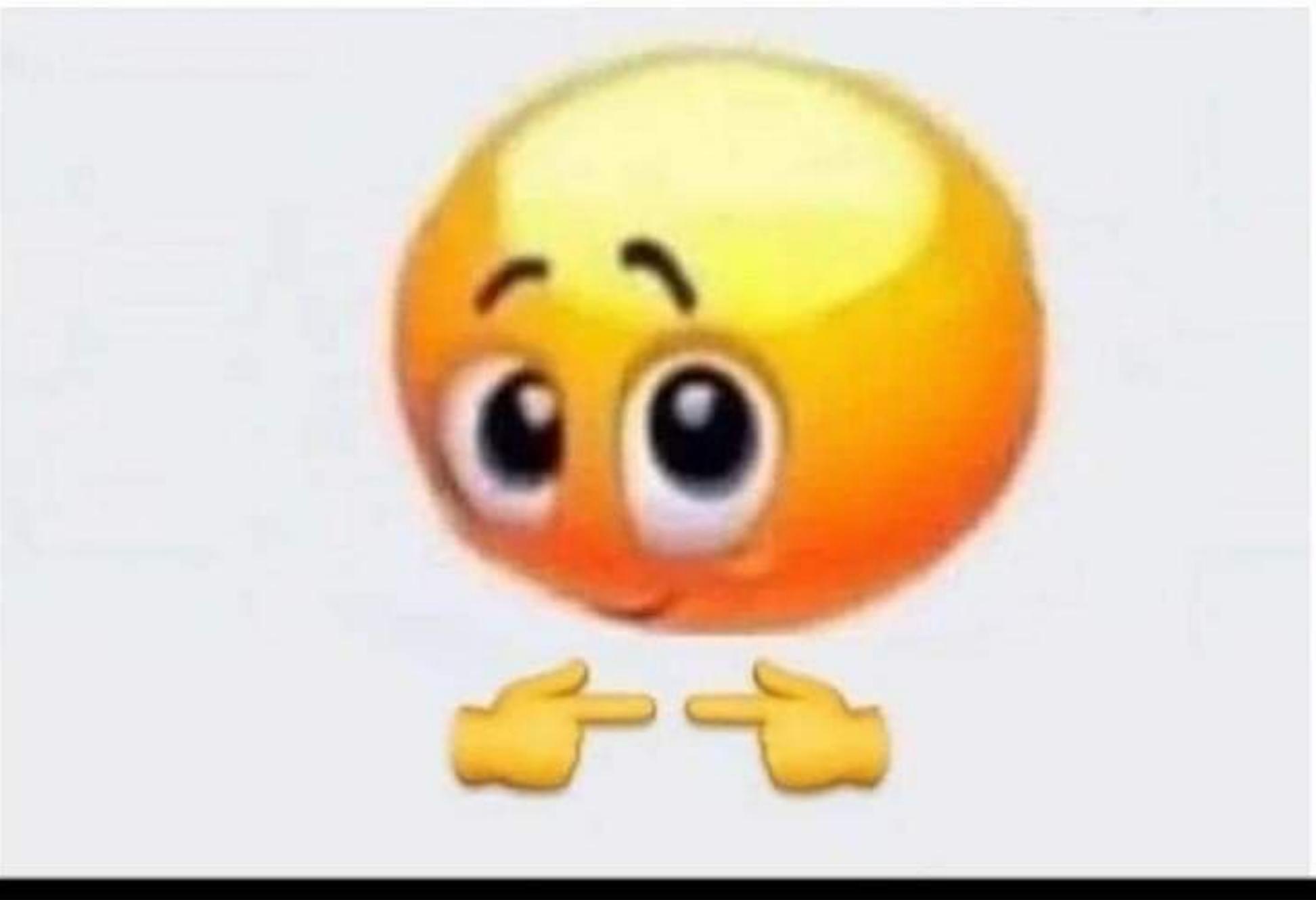
```
// fetch with callbacks
fetch("https://cederdorff.github.io/web-frontend/canvas-users/data.json")
 .then(function (response) {
 return response.json();
 })
 .then(function (data) {
 console.log(data);
 });

```

# Fetch: callback (then) vs async/await

```
// fetch with callbacks
fetch("https://cederdorff.github.io/web-frontend/canvas-users/data.json")
 .then(function (response) {
 return response.json();
 })
 .then(function (data) {
 console.log(data);
 });
//
//
// or with async/await
const response = await fetch("https://cederdorff.github.io/web-frontend/canvas-users/data.json");
const data = await response.json();
console.log(data);
```

will you be async to my await?



# async & await

- Use await to tell JS to wait for a fetch call to finish and to wait for JSON to parse.
- When using await you must tell JS that inside of the function goes some asynchronous code by wrapping it in an async function.

```
async function getPosts() {
 const url = "https://raw.githubusercontent.com/.../data.json";
 const response = await fetch(url);
 const data = await response.json();
 setPosts(data);
}

getPosts();
```

**"async and await makes promises  
easier to write"**

**async** makes a function return a Promise

**await** makes a function wait for a Promise

[https://www.w3schools.com/js/js\\_async.asp](https://www.w3schools.com/js/js_async.asp)

# Fetch returns a promise

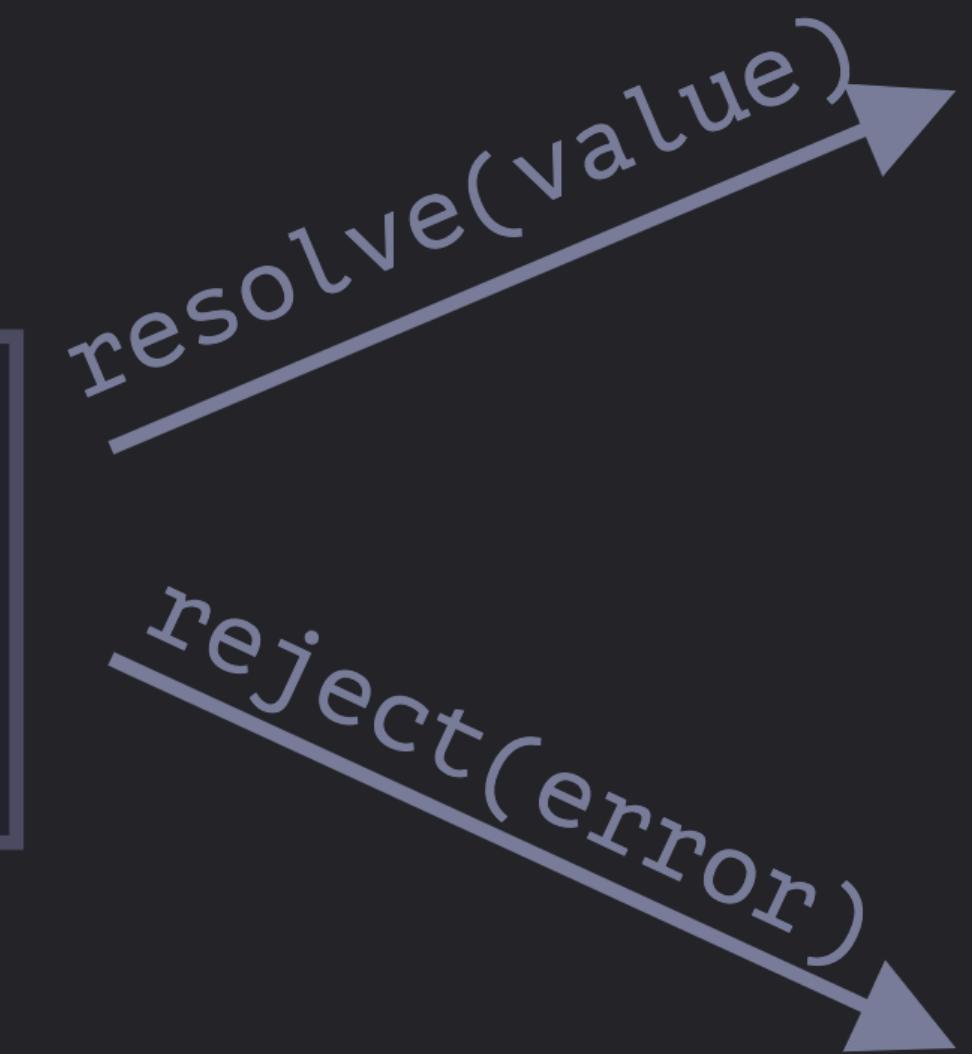
We can use `await` to wait for `fetch` to finish



[https://www.w3schools.com/js/js\\_async.asp](https://www.w3schools.com/js/js_async.asp)

```
new Promise(executor)
```

state: "pending"  
result: undefined



state: "fulfilled"  
result: value

state: "rejected"  
result: error

# All you need to know

- Use await to tell JS to wait for a fetch call to finish.
- When using await you must tell JS that here goes some asynchronous code by wrapping it in an async function.

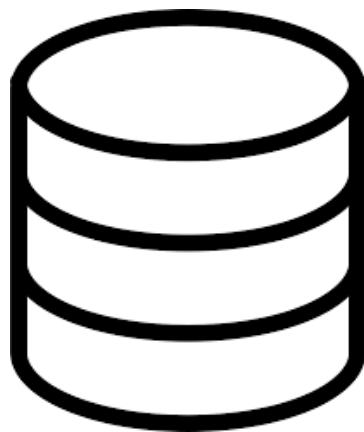
```
function PostsPage() {
 const [posts, setPosts] = useState([]);

 useEffect(() => {
 async function getPosts() {
 const url = "https://raw.githubusercontent.com";
 const response = await fetch(url);
 const data = await response.json();
 setPosts(data);
 }
 getPosts();
 }, []);

 return (
 <section className="page">
 <h1>Posts</h1>
 <section className="grid-container">
 {posts.map(post => (
 <PostItem post={post} key={post.id} />
))}
 </section>
 </section>
);
}
```

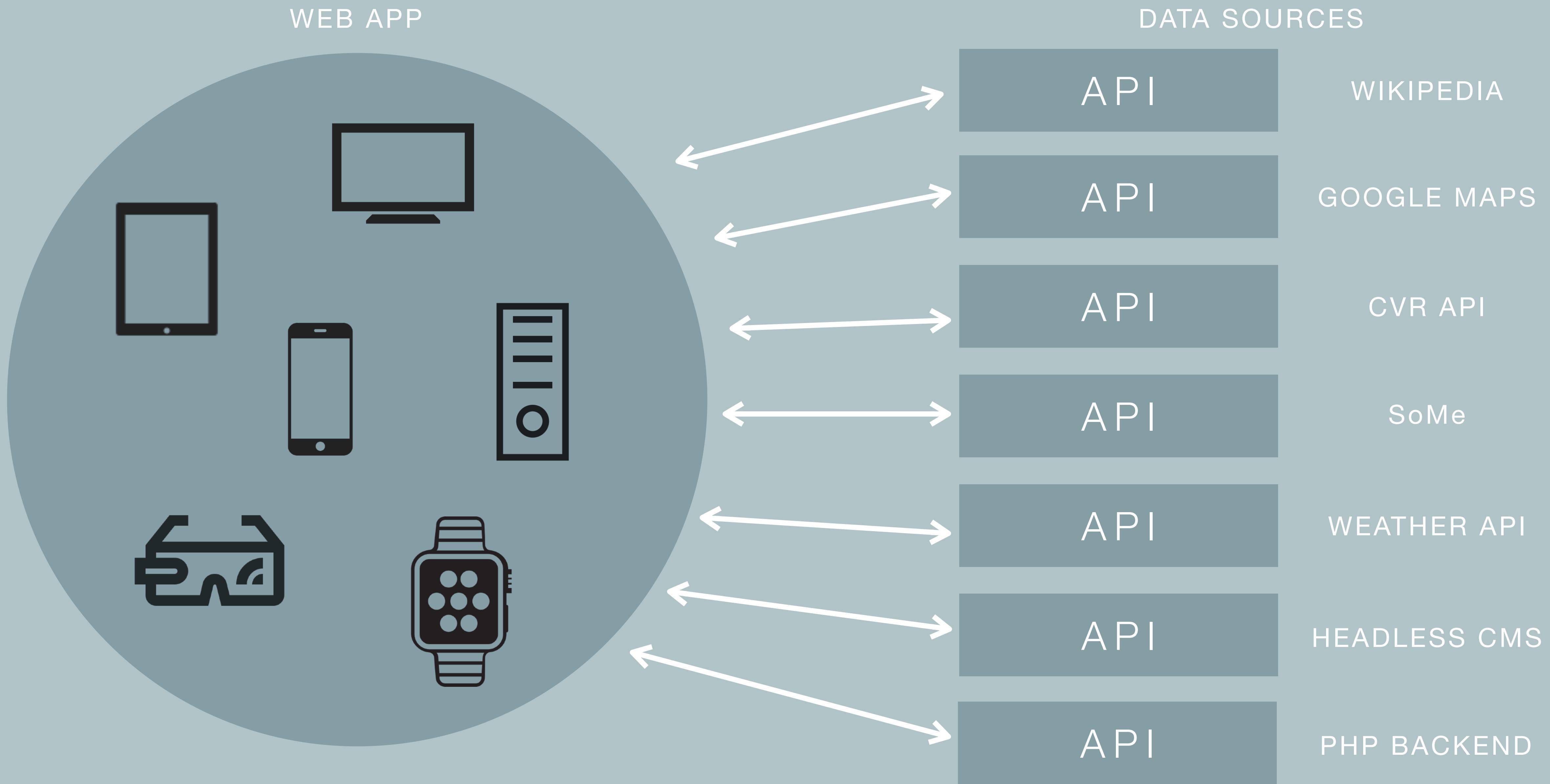
# What's a Data Source?

- Location of data
- Where data is coming from
- Can be any kind of data of any file format
- Database, a file, data sheet, spreadsheet, XML, JSON



{JSON}

# API



# API

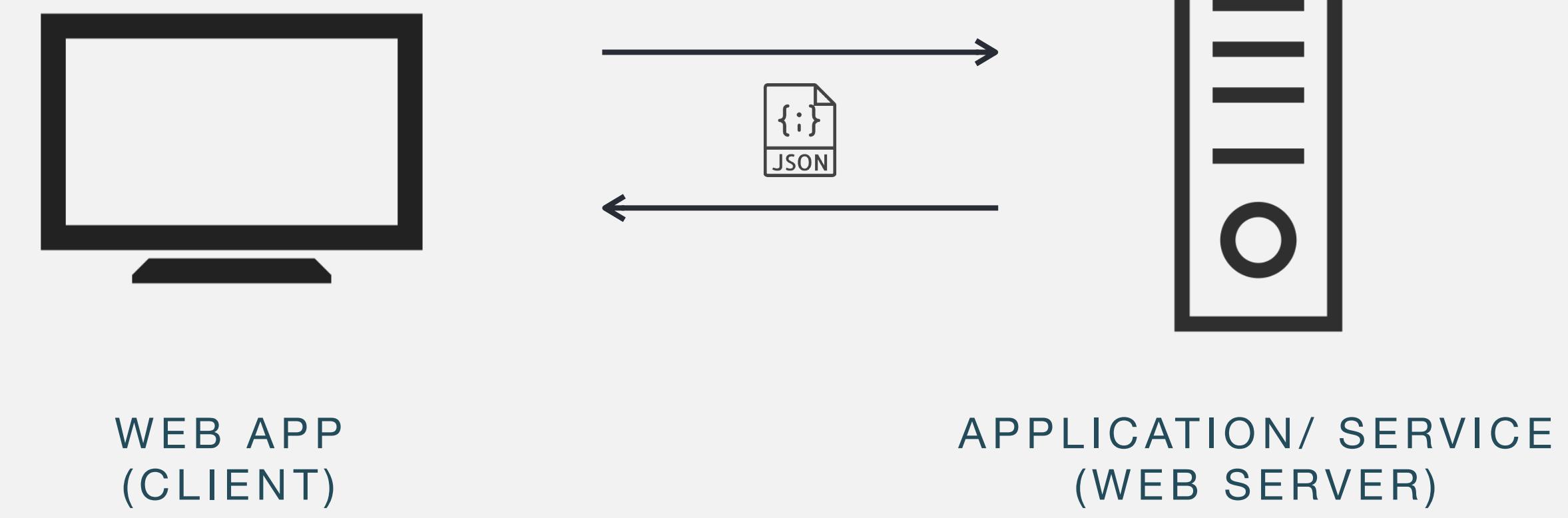
GET, POST & INTERACT WITH DATA & CONTENT

# WHAT IS AN API?

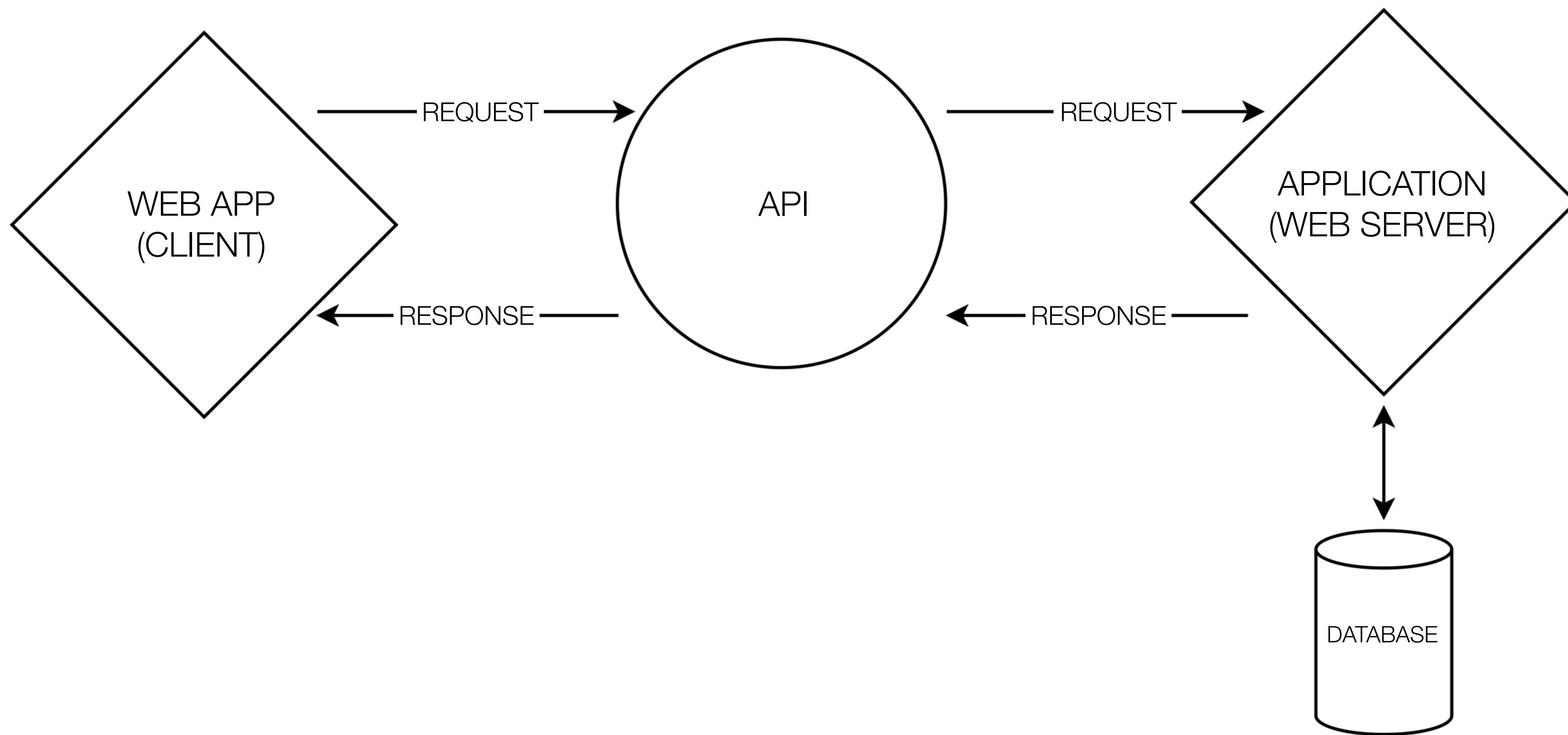
<https://www.youtube.com/watch?v=s7wmiS2mSXY>

# APPLICATION PROGRAMMING INTERFACE

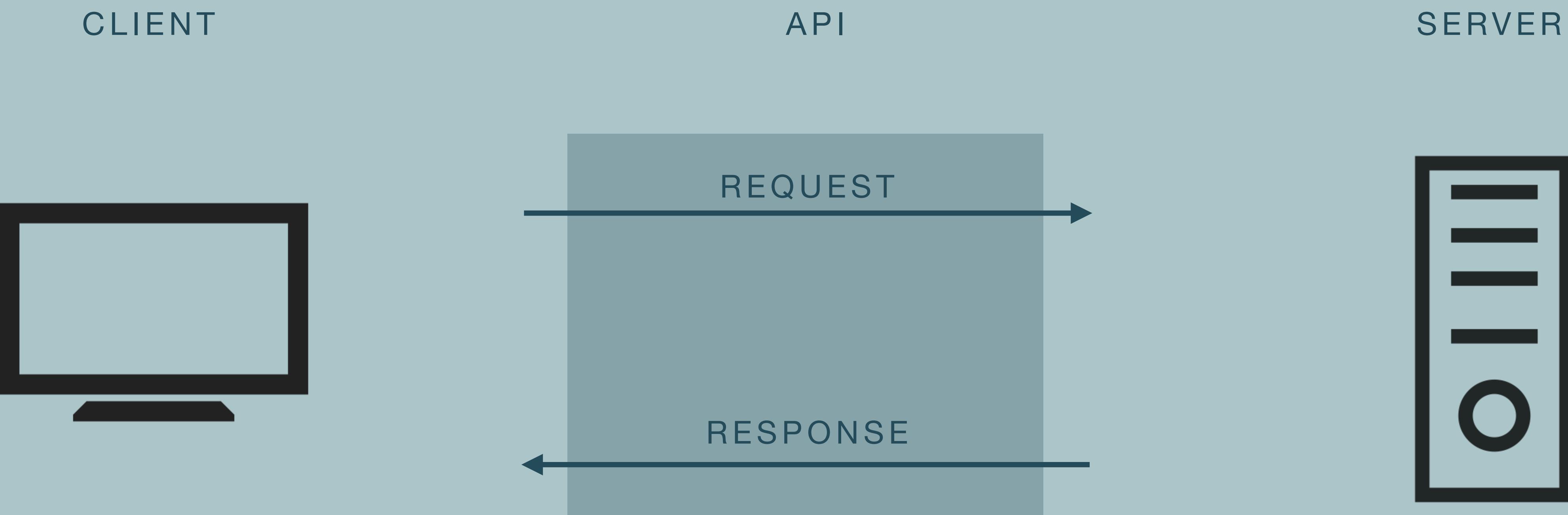
- An interface that makes it possible to access data in a controlled way.
- Communication between two (web) applications = Makes is possible for two programs to interact with each other.
- Platform independent: Can be used by different clients, devices and users: websites, web apps, mobile apps, webshops and other clients.
- The client does not need to know anything about the service or program provided by the API and visa versa.



# APPLICATION PROGRAMMING INTERFACE

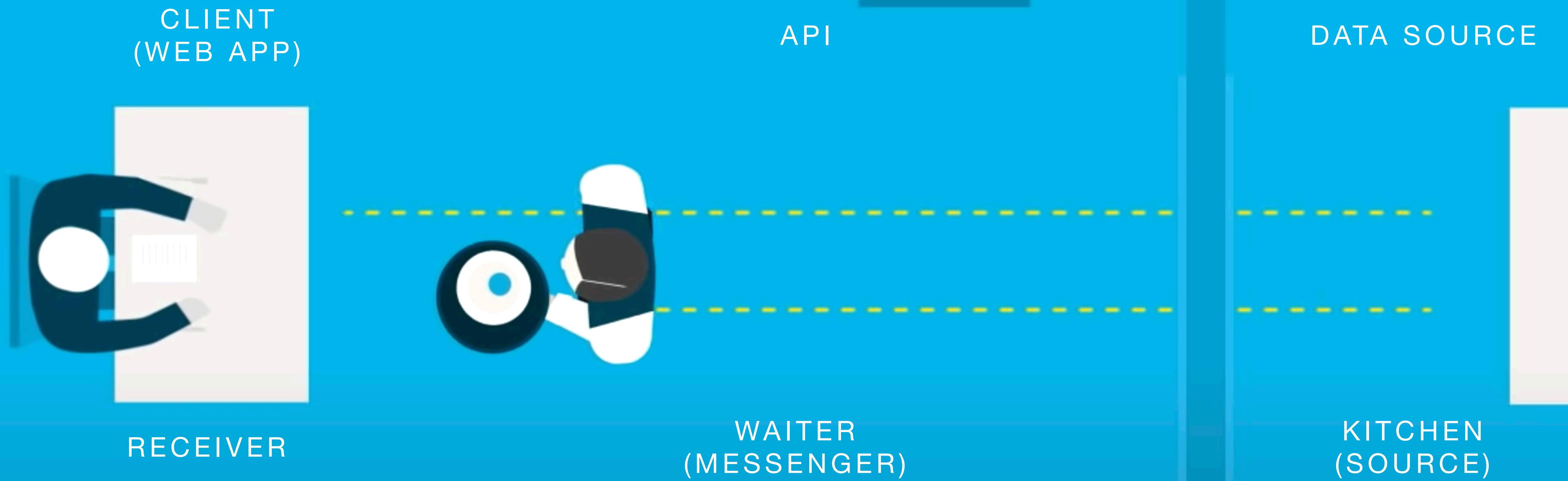


# APPLICATION PROGRAMMING INTERFACE





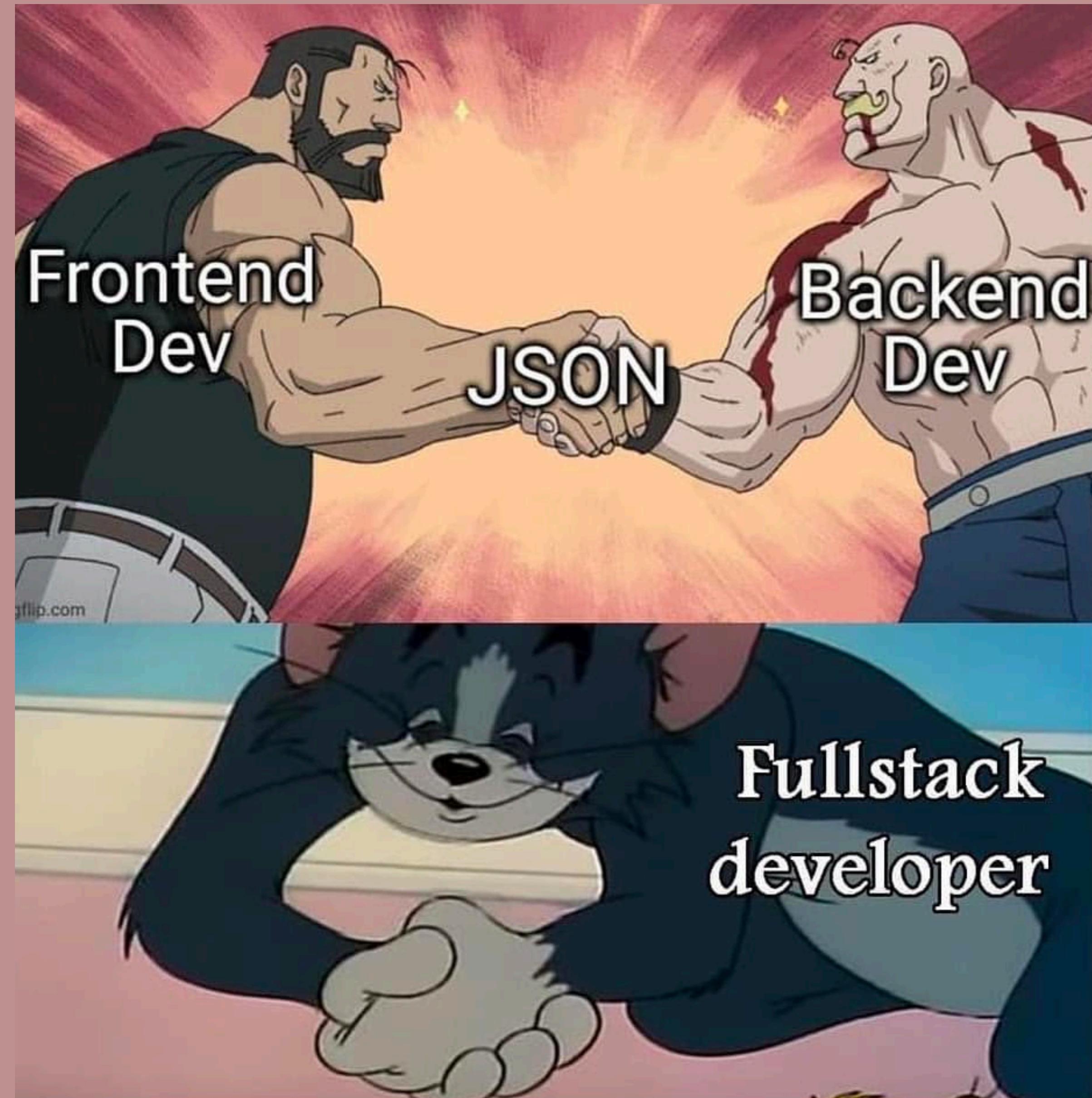
<https://www.youtube.com/watch?v=s7wmiS2mSXY>



# JSON

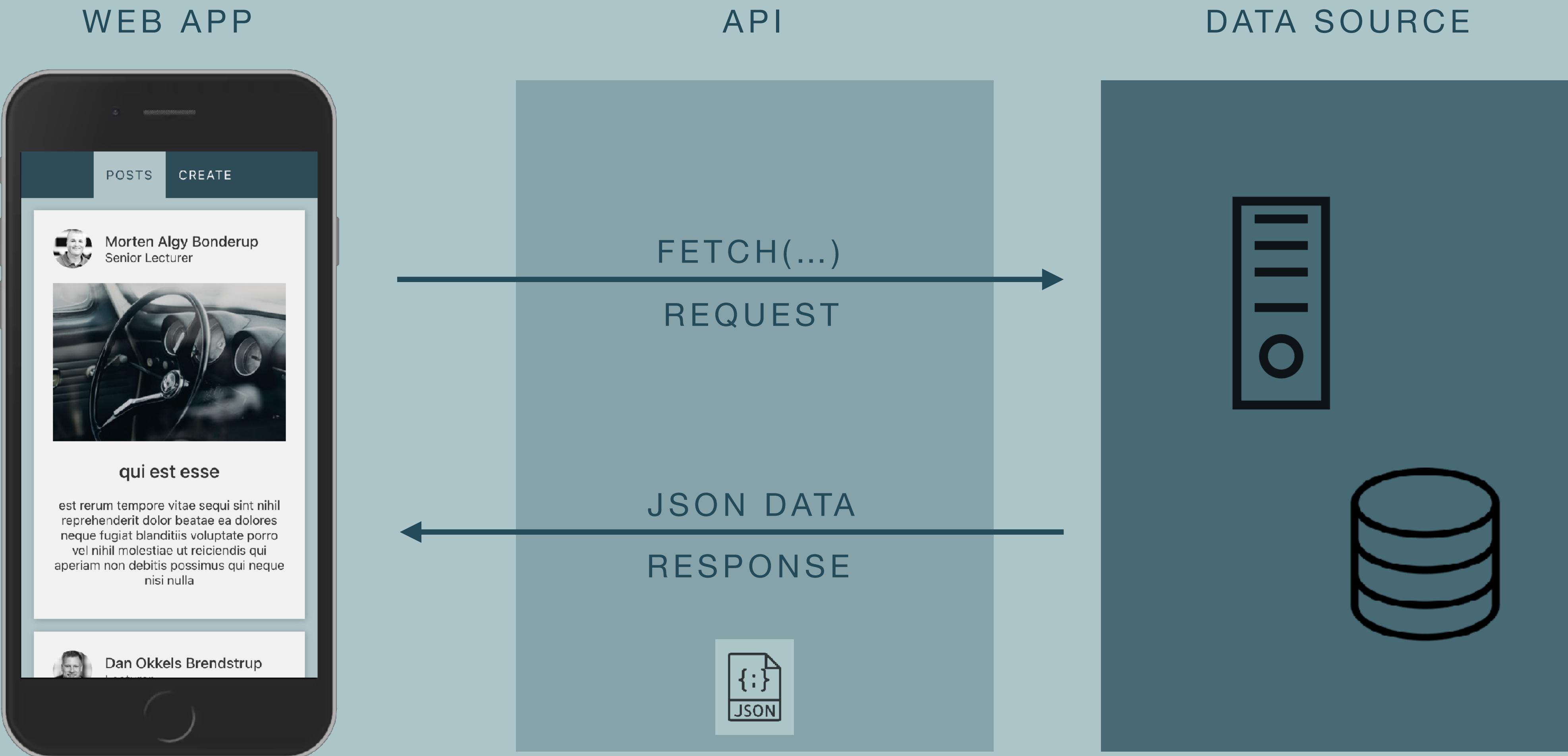
## JavaScript Object Notation

... a syntax for storing & exchanging data  
over the web



<https://www.instagram.com/p/CVqbCzgsZUF/>

# JSON (& API) is the glue



# JSON

... a syntax for storing and exchanging data over the web

```
{
 "name": "Alicia",
 "age": 6
}
```

JSON OBJECT

```
[{
 "name": "Alicia",
 "age": 6
, {
 "name": "Peter",
 "age": 22
}]
```

LIST OF JSON OBJECTS

# JAVASCRIPT OBJECT NOTATION

- Collection of key-value pair: “key” : “value”
- List of values, collections or objects
- Lightweight data-interchange format
- Syntax / text format for storing and exchanging data over the web
- Human and machine readable **text**: small, fast and simple
- Language independent
- Can be parsed directly to JavaScript Object
- JavaScript Objects can be converted directly to JSON
- The glue between programs (interface between frontend and backend)

```
[
 {
 "id": "1",
 "firstname": "Kasper",
 "lastname": "Topp",
 "age": "34",
 "haircolor": "Dark Blonde",
 "countryName": "Denmark",
 "gender": "Male",
 "lookingFor": "Female"
 },
 {
 "id": "2",
 "firstname": "Nicklas",
 "lastname": "Andersen",
 "age": "22",
 "haircolor": "Brown",
 "countryName": "Denmark",
 "gender": "Male",
 "lookingFor": "Female"
 },
 {
 "id": "3",
 "firstname": " Sarah",
 "lastname": "Dybvad ",
 "age": "34",
 "haircolor": "Blonde",
 "countryName": "Denmark",
 "gender": "Female",
 "lookingFor": "Male"
 },
 {
 "id": "4",
 "firstname": "Alex",
 "lastname": "Hansen",
 "age": "21",
 "haircolor": "Blonde",
 "countryName": "Denmark",
 "gender": "Male",
 "lookingFor": "Female"
 }]
```

# JSON METHODS

```
const user = {
 name: "John",
 age: 30,
 gender: "male",
 lookingFor: "female"
};

// === JSON.stringify === //
const jsonUser = JSON.stringify(user);
console.log(jsonUser); // {"name":"John","age":30,"gender":"male","lookingFor":"female"}

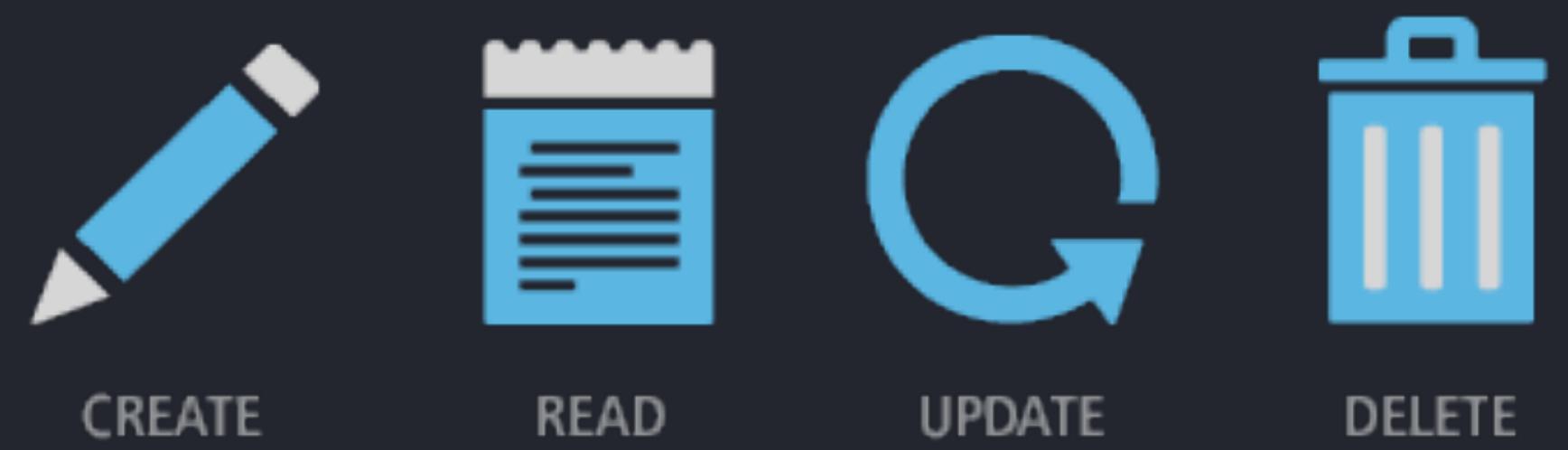
// === JSON.parse === //
const jsonString = '{"name":"John","age":30,"gender":"male","lookingFor":"female"}';
const userObject = JSON.parse(jsonString);
console.log(userObject); // logging userObject
```

# Fetch and create post

newPost object is parsed  
to JSON and posted to the  
ressource wrapped on  
body

```
// new post object
const newPost = {
 title: "My new post",
 body: "Body description of a new post",
 image: "image url or image data string"
};

const url = "https://race-rest-default-firebaseio.com/posts.json";
const response = await fetch(url, {
 method: "POST", // fetch request using POST
 body: JSON.stringify(newPost) //←newPost object to JSON
});
```



C R U D

# What's CRUD?

- CREATE objects like a post, user, movie, product, etc.
- READ objects like an array (or object) of objects (posts, users, movies, products, etc)
- UPDATE an object, often given by a unique id.
- DELETE an object, often given by a unique id.

# What's REST?

GET

POST

PUT

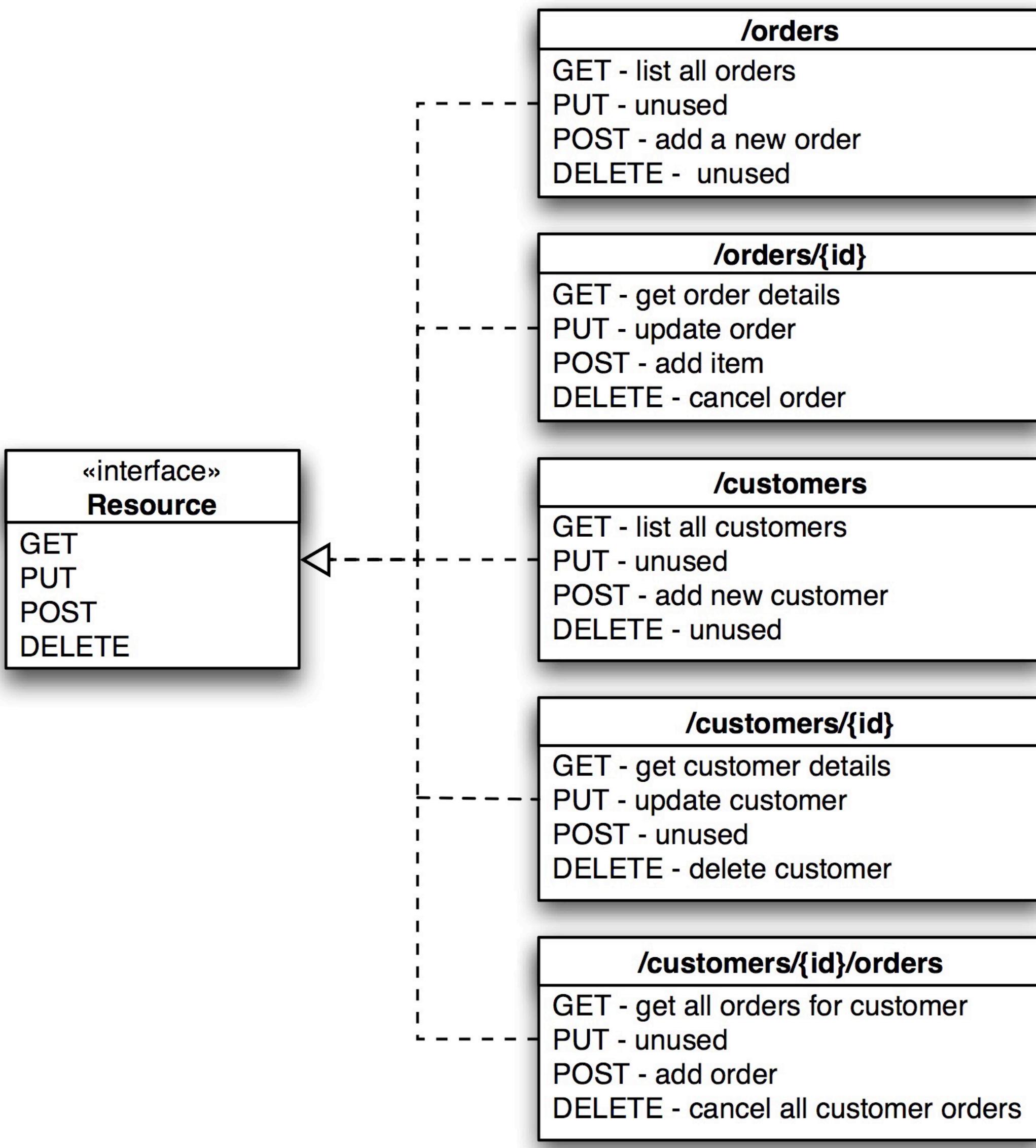
DELETE

- REpresentational State Transfer
- A standard for systems (client & server) to communicate over HTTP in order to retrieve or modify (data) resources.
- Stateless, meaning the two systems doesn't need to know anything about the state.
- The client makes the requests using the 4 basic HTTP verbs to define the operation.

# REpresentational State Transfer

- Clean, semantic URL:
  - <http://example.com/products/2/25> instead of:
  - [http://example.com/products?  
category=2&id=25](http://example.com/products?category=2&id=25)
- Basic HTTP requests to perform create, read, update and delete with the HTTP methods GET, POST, PUT and DELETE

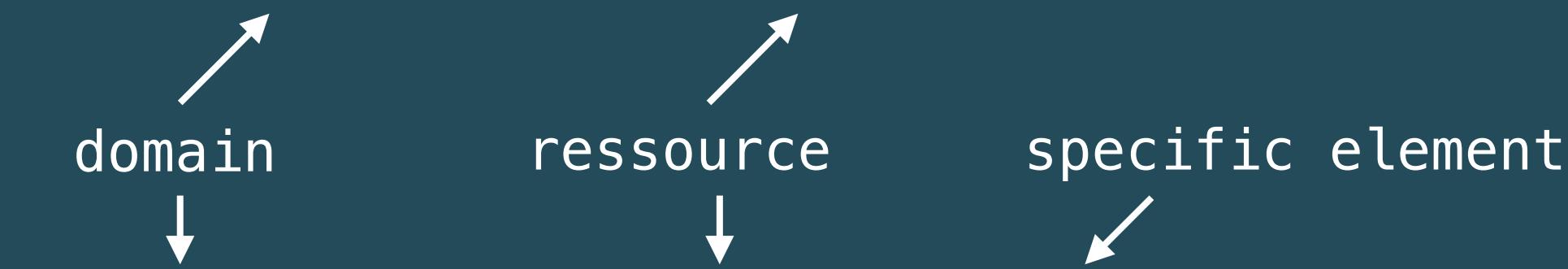
# Principles of REST



- Ressources and endpoints:
  - <http://example.com/products>
  - <http://example.com/users>
  - <http://domain.com/orders>
- IDs:
  - <http://example.com/products/2/25>
  - <http://example.com/users/7503>
  - <http://domain.com/orders/2014/06/4022>
- Connect data
  - <http://example.com/users/7503/orders/3/item/1>
- Standard HTTP request methods (GET, POST, PUT, DELETE)
- Exchanges data, often JSON (oldschool: XML)
- Stateless Communication

# RESTful API

- Base URL (endpoint): http://some-url.com/products



- http://some-url.com/products/product1

- Data type → JSON

| Ressource                                                | GET                              | POST                                          | PUT                                      | DELETE               |
|----------------------------------------------------------|----------------------------------|-----------------------------------------------|------------------------------------------|----------------------|
| Collection:<br><u>http://some-url.com/products</u>       | Returns a list with all products | Creates new product, added to the collections | Replaces a collection with a another     | Deletes all products |
| Element:<br><u>http://some-url.com/products/product1</u> | Returns a specific product       | ÷                                             | Replaces product with new (updated) data | Deletes product      |

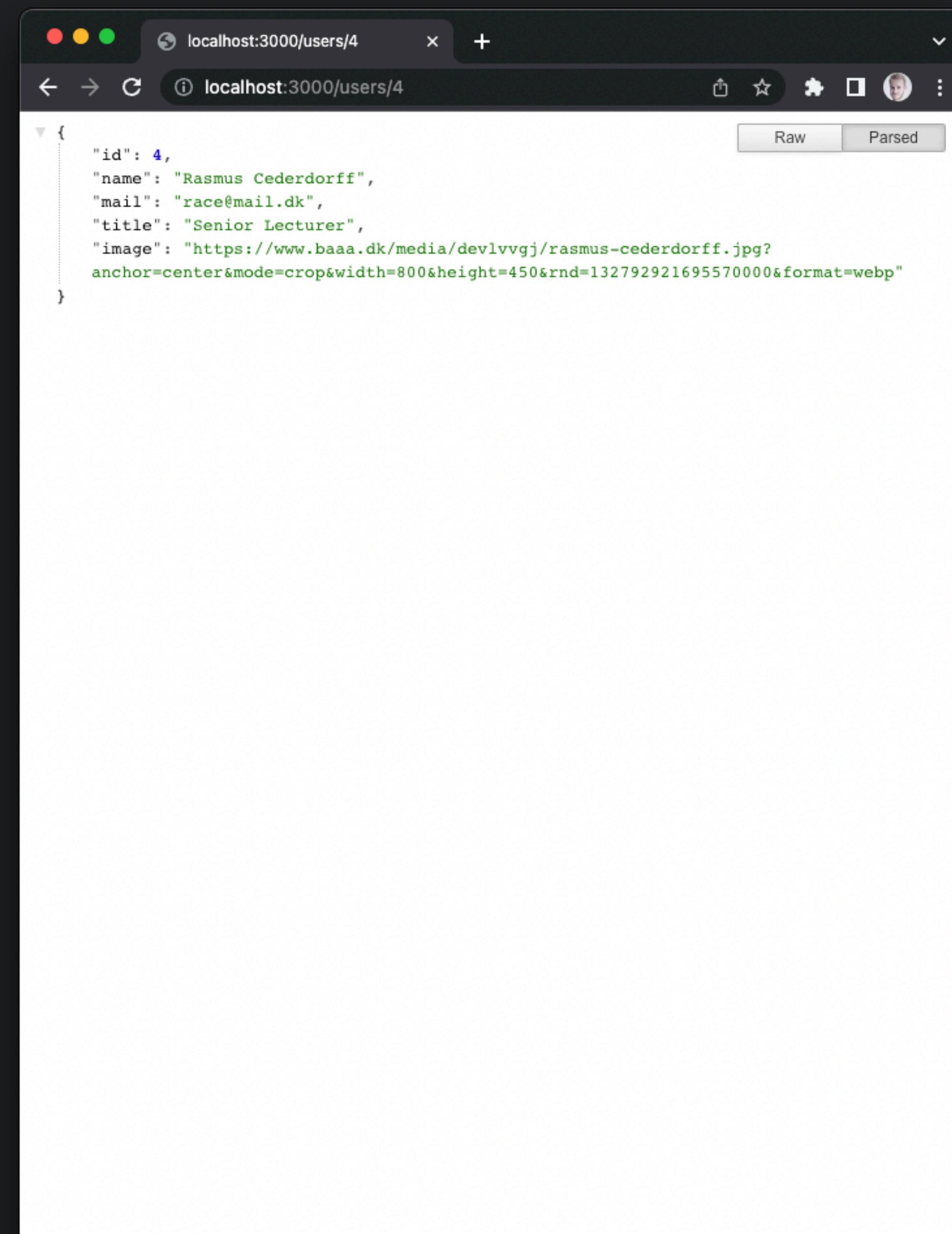
# Collections (JSON Array)



A screenshot of a web browser window titled "localhost:3000/users". The page displays a JSON array of user objects. Each object contains fields: id, name, mail, title, and image. The image field includes a URL and a query string for image processing. The browser interface shows a "Raw" and "Parsed" button.

```
[{"id": 1, "name": "Birgitte Kirk Iversen", "mail": "bki@mail.dk", "title": "Senior Lecturer", "image": "https://www.baaa.dk/media/u4gorzsd/birgitte-kirk-iversen2.jpg?anchor=center&mode=crop&width=800&height=450&rnd=132792921541630000&format=webp"}, {"id": 4, "name": "Rasmus Cederdorff", "mail": "race@mail.dk", "title": "Senior Lecturer", "image": "https://www.baaa.dk/media/devlvgj/rasmus-cederdorff.jpg?anchor=center&mode=crop&width=800&height=450&rnd=132792921695570000&format=webp"}, {"id": 5, "name": "Dan Okkels Brendstrup", "mail": "dob@mail.dk", "title": "Lecturer", "image": "https://www.eaaa.dk/media/bdojel41/dan-okkels-brendstrup.jpg?anchor=center&mode=crop&width=800&height=450&rnd=132792921559630000&format=webp"}, {"id": 6, "name": "Kasper Fischer Topp", "mail": "kato@mail.dk", "title": "Lecturer", "image": "https://www.eaaa.dk/media/lxzcybme/kasper-topp.jpg?anchor=center&mode=crop&width=800&height=450&rnd=132792921618200000&format=webp"}, {"id": 7, "name": "Line Skjødt", "mail": "lskj@mail.dk", "title": "Senior Lecturer & Internship Coordinator", "image": "https://www.eaaa.dk/media/14qpfeq4/line-skj%C3%B8dt.jpg?anchor=center&mode=crop&width=800&height=450&rnd=132792921638700000&format=webp"}, {"id": 8, "name": "Martin Aagaard Nøhr", "mail": "mnor@mail.dk", "title": "Lecturer", "image": "https://www.eaaa.dk/media/oayjq02h/martin-n%C3%B8hr.jpg?anchor=center&mode=crop&width=800&height=450&rnd=132792921658800000&format=webp"}]
```

# Element (JSON Object)



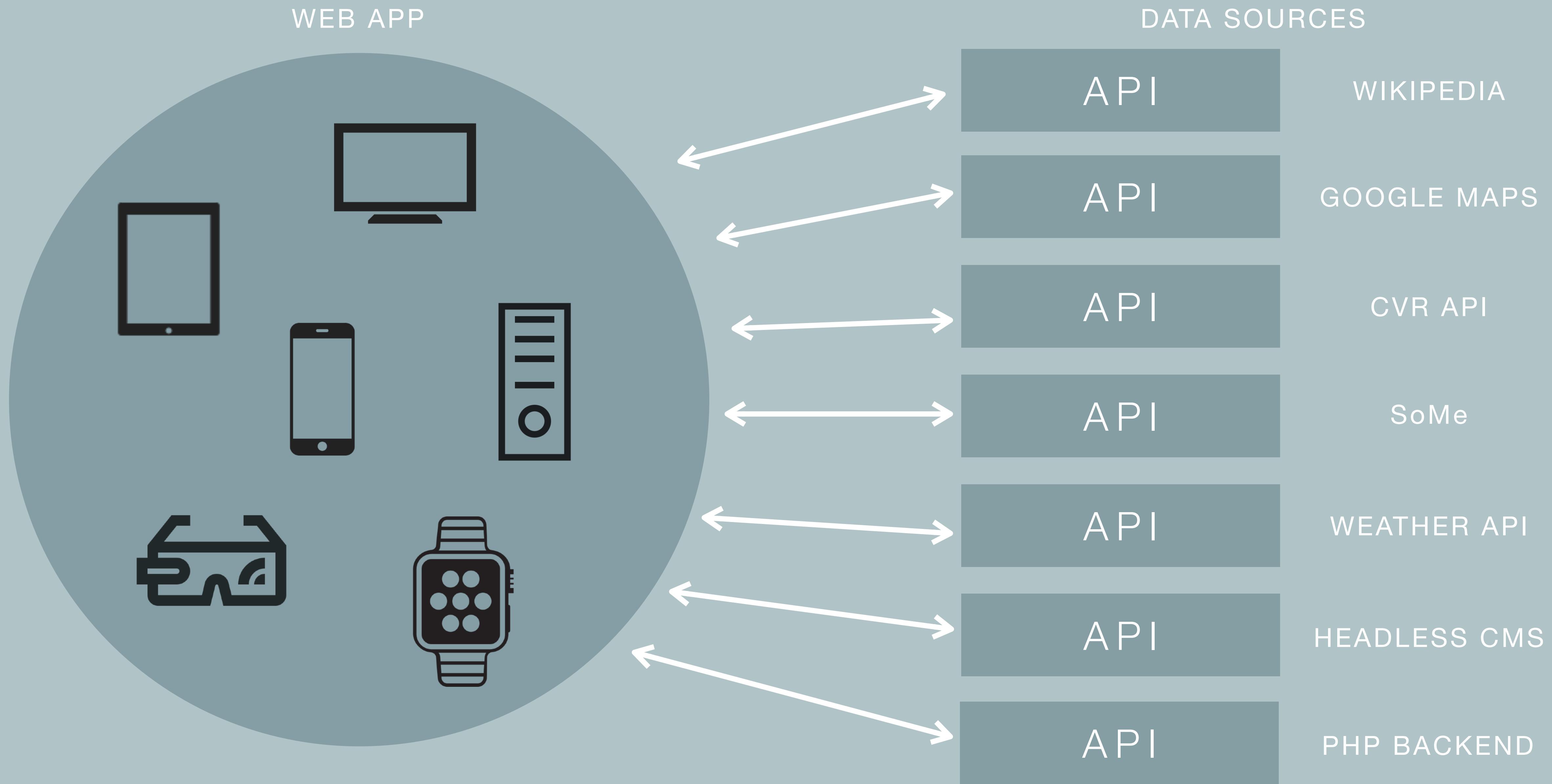
A screenshot of a web browser window titled "localhost:3000/users/4". The page displays a single JSON object representing a user with id 4. The object includes fields: id, name, mail, title, and image. The image field includes a URL and a query string for image processing. The browser interface shows a "Raw" and "Parsed" button.

```
{"id": 4, "name": "Rasmus Cederdorff", "mail": "race@mail.dk", "title": "Senior Lecturer", "image": "https://www.baaa.dk/media/devlvgj/rasmus-cederdorff.jpg?anchor=center&mode=crop&width=800&height=450&rnd=132792921695570000&format=webp"}
```

# Advantages of REST

- Independent of platform and programming language
- Based on existing standards (on top of HTTP)
- Semantic URL → Nice and clean URLs → SEO
- Restful API
- Scalable
- Performance
- Exchange formats like JSON, XML, or both

# API



# HTTP REQUEST METHODS (verbs)

GET - POST - PUT - DELETE

HTTP (Hypertext Transfer Protocol) is the standard way to communicate between clients and servers (request-response protocol).

"HTTP defines a set of **request methods** to indicate the desired action to be performed for a given resource."

[https://www.w3schools.com/tags/ref\\_httpmethods.asp](https://www.w3schools.com/tags/ref_httpmethods.asp)

<https://developer.mozilla.org/en-US/docs/Web/HTTP/Methods>

# CRUD vs REST & HTTP Verbs

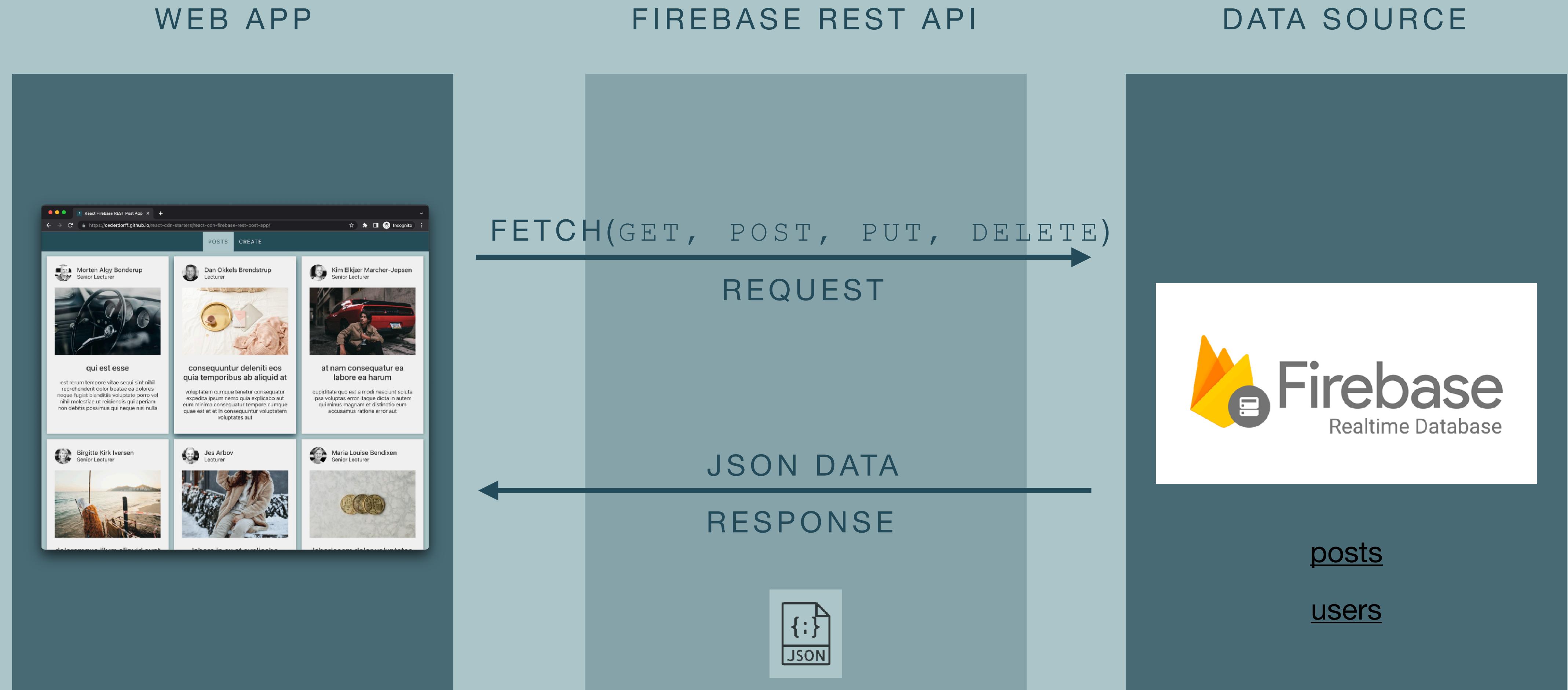
**CREATE** -> POST: create a new resource (object)

**READ** -> GET: retrieve a specific resource or a collection

**UPDATE** -> PUT: update a specific resource (by id)

**DELETE** -> DELETE: remove a specific resource by id

# Fetch, HTTP Request & Response



# Fetch and read posts

GET is the default request method for fetch.

```
async function getPosts() {
 const url = "https://race-rest-default-rtbd.firebaseio.com/posts.json";
 const response = await fetch(url);
 const data = await response.json();
 const postsArray = Object.keys(data).map(key => ({ id: key, ...data[key] })); // from object to array
 return postsArray
}
```

# REQUEST headers

“[...] contain more information about the resource to be fetched, or about the client requesting the resource.”

"A request header is an HTTP header that can be used in an HTTP request to provide information about the request context, so that the server can tailor the response. For example, the Accept-\* headers indicate the allowed and preferred formats of the response. Other headers can be used to supply authentication credentials (e.g. Authorization), to control caching, or to get information about the user agent or referrer, etc."

<https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers>

[https://developer.mozilla.org/en-US/docs/Glossary/Request\\_header](https://developer.mozilla.org/en-US/docs/Glossary/Request_header)

# REQUEST body

When making HTTP requests we sometimes need to send data.

The data is wrapped inside of the request body.

The request body is one of the following:

a string (often JSON encoded string with data, object, arrays, etc.)

form data (form/multipart)

blob/ buffer source - binary data

URL search params (x-www-form-urlencoded)

<https://javascript.info/fetch#post-requests>

# Today the slides is your documentation

Read and use  
them carefully

when you ask Rasmus  
for help and he says  
"Read documentation"



# REQUEST body

```
const url = "http://localhost:3000/json-api/posts/";
await fetch(url, {
 method: "POST",
 body: JSON.stringify(newPost)
});
```

```
async function savePost(postToUpdate) {
 const response = await fetch(url, {
 method: "PUT",
 body: JSON.stringify(postToUpdate)
 });
 const data = await response.json();
 console.log(data);
 navigate("/");
}
```

# Fetch and create post

Using POST to create a new post object in the resource.

```
// new post object
const newPost = {
 title: "My new post",
 body: "Body description of a new post",
 image: "image url or image data string"
};

const url = "https://race-rest-default-firebaseio.com/posts.json";
const response = await fetch(url, {
 method: "POST", // fetch request using POST
 body: JSON.stringify(newPost) // newPost object to JSON
});
```

# Fetch and update post

Using PUT to an existing post object by given id.

```
const postId = "5tl4jHHSRaKEB0UW9nQd"; // id of the object to update
const postToUpdate = { title: "...", body: "...", image: "..." };

const url = `https://race-rest-default-firebase.firebaseio.com/posts/${postId}.json`;
const response = await fetch(url, {
 method: "PUT", // using HTTP method PUT
 body: JSON.stringify(postToUpdate)
});
```

# Fetch and delete post

Using DELETE to an object by given id.

```
const postId = "5tl4jHHSRaKEB0UW9nQd"; // id of the object to update
const url = `https://race-rest-default-rtdb.firebaseio.com/posts/${postId}.json`;

const response = await fetch(url, {
 method: "DELETE"
});
```

# Fetch & useEffect in React

In useEffect, perform the sideeffect (fetch) to get data from a data source.  
And save the response data in a state using useState.

```
function PostsPage() {
 const [posts, setPosts] = useState([]);

 useEffect(() => {
 async function getPosts() {
 const url = "https://raw.githubusercontent.com/cederdorff/web-frontend/main/data/posts.json";
 const response = await fetch(url);
 const data = await response.json();
 setPosts(data);
 }
 getPosts();
 }, []);

 return (
 <section className="page">
 {posts.map(post => (
 <div>
 <h2>{post.title}</h2>
 <p>{post.content}</p>
 </div>
))}
 </section>
);
}
```

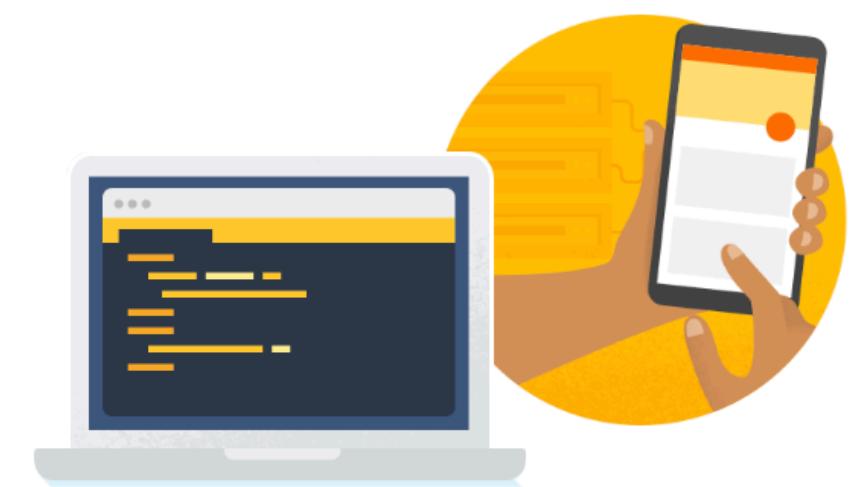


# What is Firebase?

Platform & Backend-as-a-Service  
for Web & App Development



# Introducing Firebase



## Build better apps



### Cloud Firestore

Store and sync app data at global scale



### ML Kit BETA

Machine learning for mobile developers



### Cloud Functions

Run mobile backend code without managing servers



### Authentication

Authenticate users simply and securely



### Hosting

Deliver web app assets with speed and security



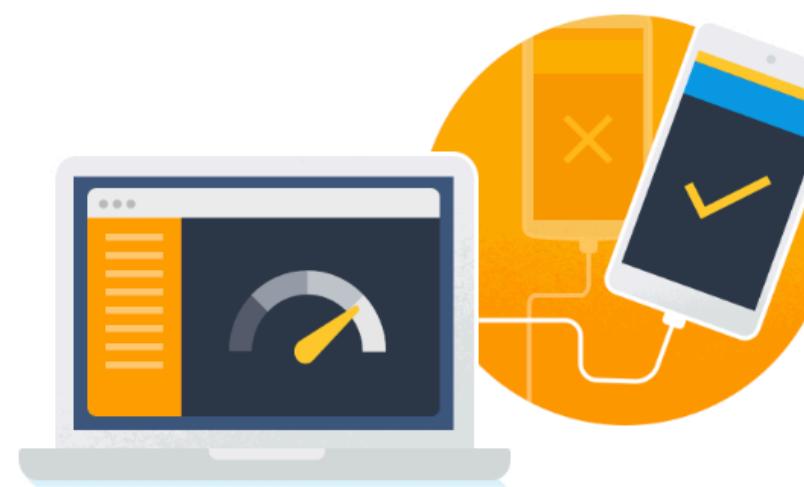
### Cloud Storage

Store and serve files at Google scale



### Realtime Database

Store and sync app data in milliseconds



## Improve app quality



### Crashlytics

Prioritize and fix issues with powerful, realtime crash reporting



### Performance Monitoring

Gain insight into your app's performance



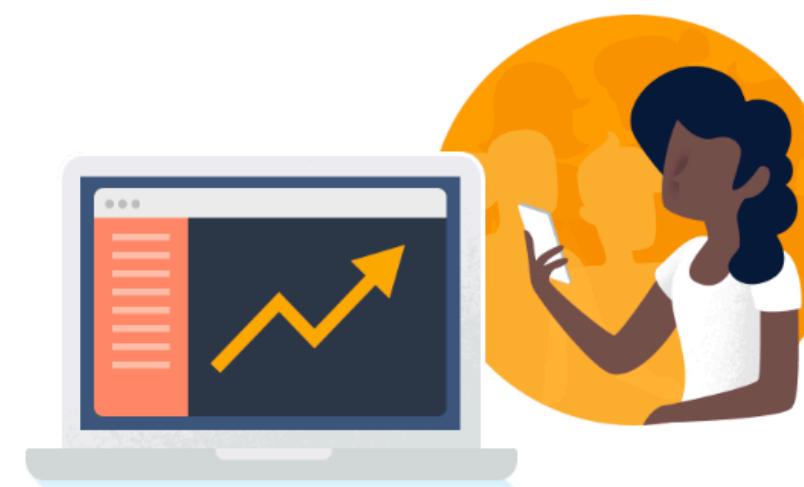
### Test Lab

Test your app on devices hosted by Google



### App Distribution BETA

Distribute pre-release versions of your app to your trusted testers



## Grow your business



### In-App Messaging BETA

Engage active app users with contextual messages



### Google Analytics

Get free and unlimited app analytics



### Predictions

Smart user segmentation based on predicted behavior



### A/B Testing BETA

Optimize your app experience through experimentation



### Cloud Messaging

Send targeted messages and notifications



### Remote Config

Modify your app without deploying a new version



### Dynamic Links

Drive growth by using deep links with attribution



# Realtime Database & REST API

Store and sync data in real time  
REST API or SDK

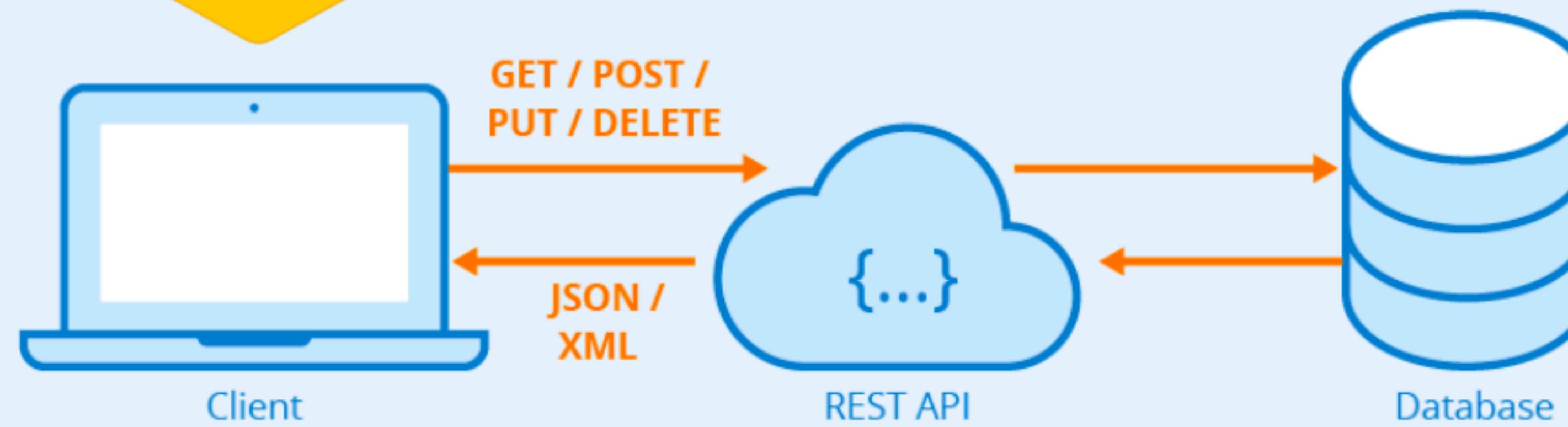
<https://firebase.google.com/products/realtime-database>



# Database



# Firebase



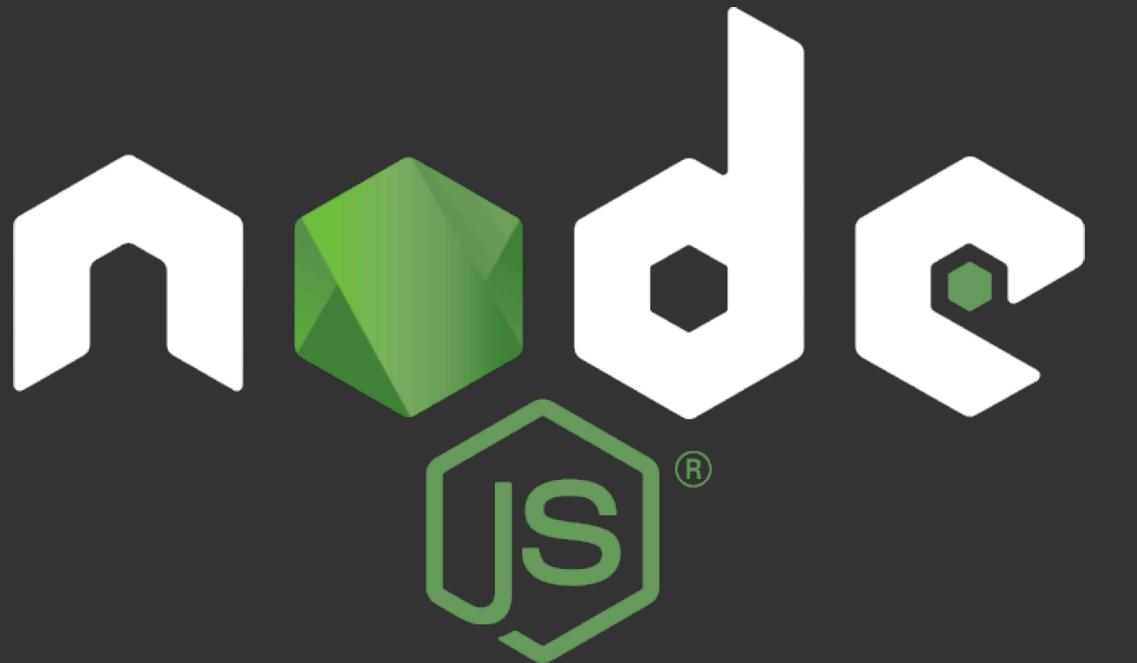
# Realtime Database REST API

[https://firebase.google.com/docs/  
database/rest/start](https://firebase.google.com/docs/database/rest/start)

```
export default function PostsPage() {
 const [posts, setPosts] = useState([]);
 const [showLoader, dismissLoader] = useIonLoading();

 async function getPosts() {
 const response = await fetch("https://race-rest-default-rtbd.firebaseio.com/posts.json");
 const data = await response.json();
 // map object into an array with objects
 const postsArray = Object.keys(data).map(key => ({ id: key, ...data[key] }));
 return postsArray;
 }

 async function getUsers() {
 const response = await fetch("https://race-rest-default-rtbd.firebaseio.com/users.json");
 const data = await response.json();
 // map object into an array with objects
 const users = Object.keys(data).map(key => ({ id: key, ...data[key] }));
 return users;
 }
}
```



# Getting started

Download & install Node.js & npm: [nodejs.org/en/](https://nodejs.org/en/)

Builds tools,  
Package Managers,  
Compilers, Transpilers,  
Module Bundlers &  
Command-line Interface (CLI)



It is simply just tools!



JavaScript runtime environment.

Executes JavaScript outside of the browser.

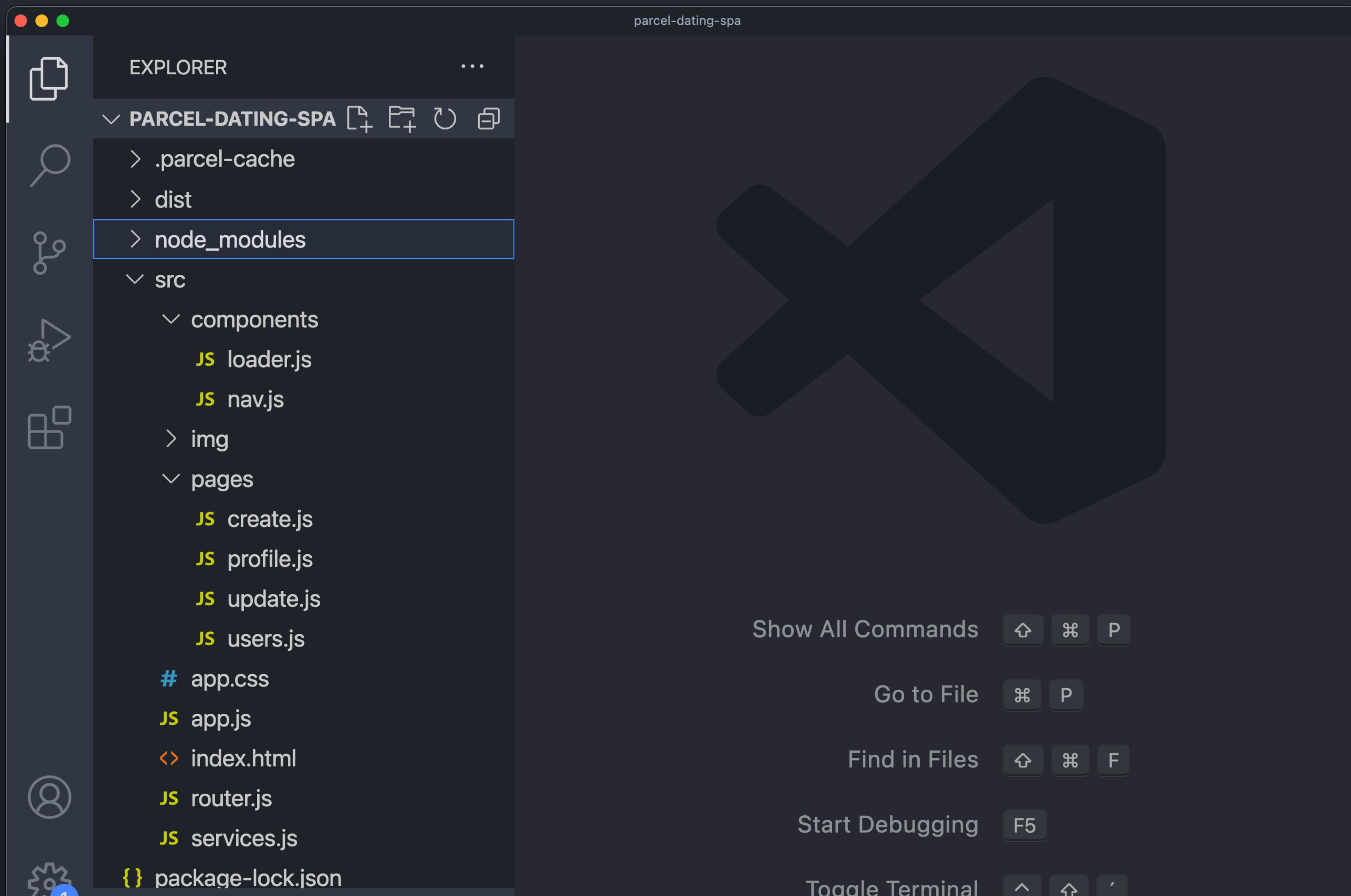
A tool for running JavaScript on your computer - instead of in your browser. A tool to run server-side tools and applications in JavaScript.

npm is a package manager for node.js packages  
- or modules 🤔

Node.js packages contain all the files you need for  
a module.

Modules are JavaScript libraries you can include in  
your project.

# node\_modules



# npm consists of

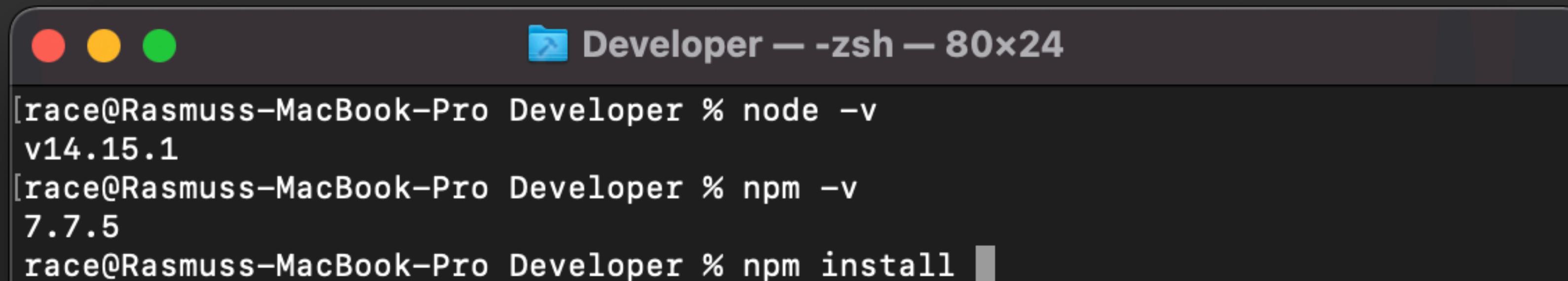
1. Website to discover packages
2. Command line interface (cli)
3. A registry - database with JS software / node modules

<https://docs.npmjs.com/about-npm/>

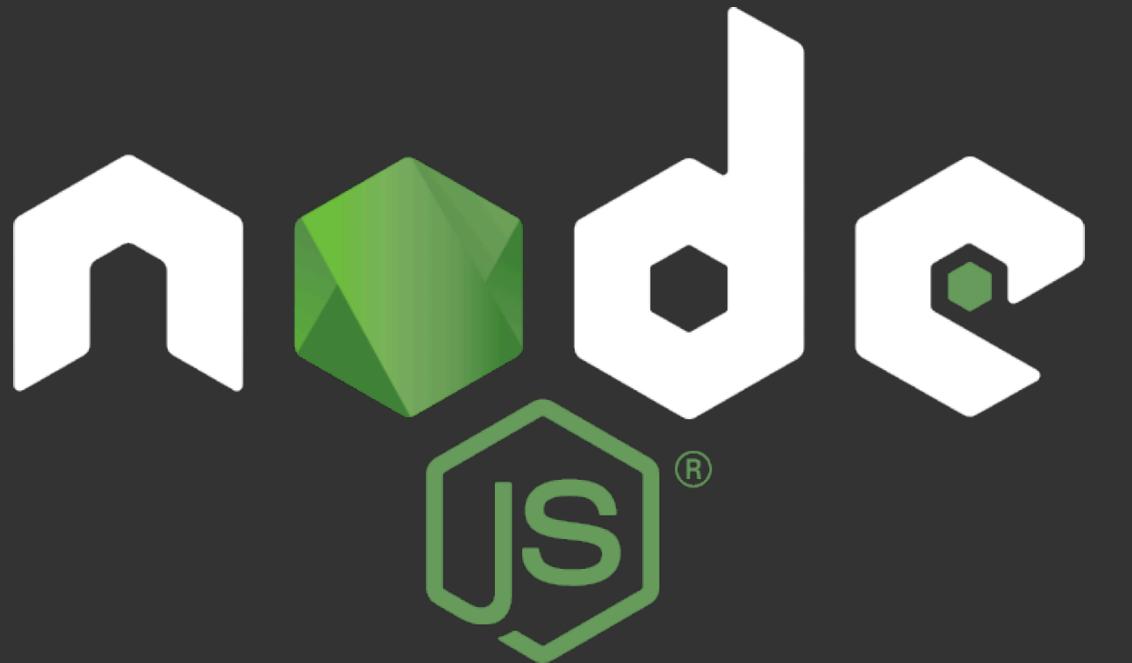
# Command Line Interface

... a program that allows users to type text commands to execute functions.

npm uses CLI to install software & packages.

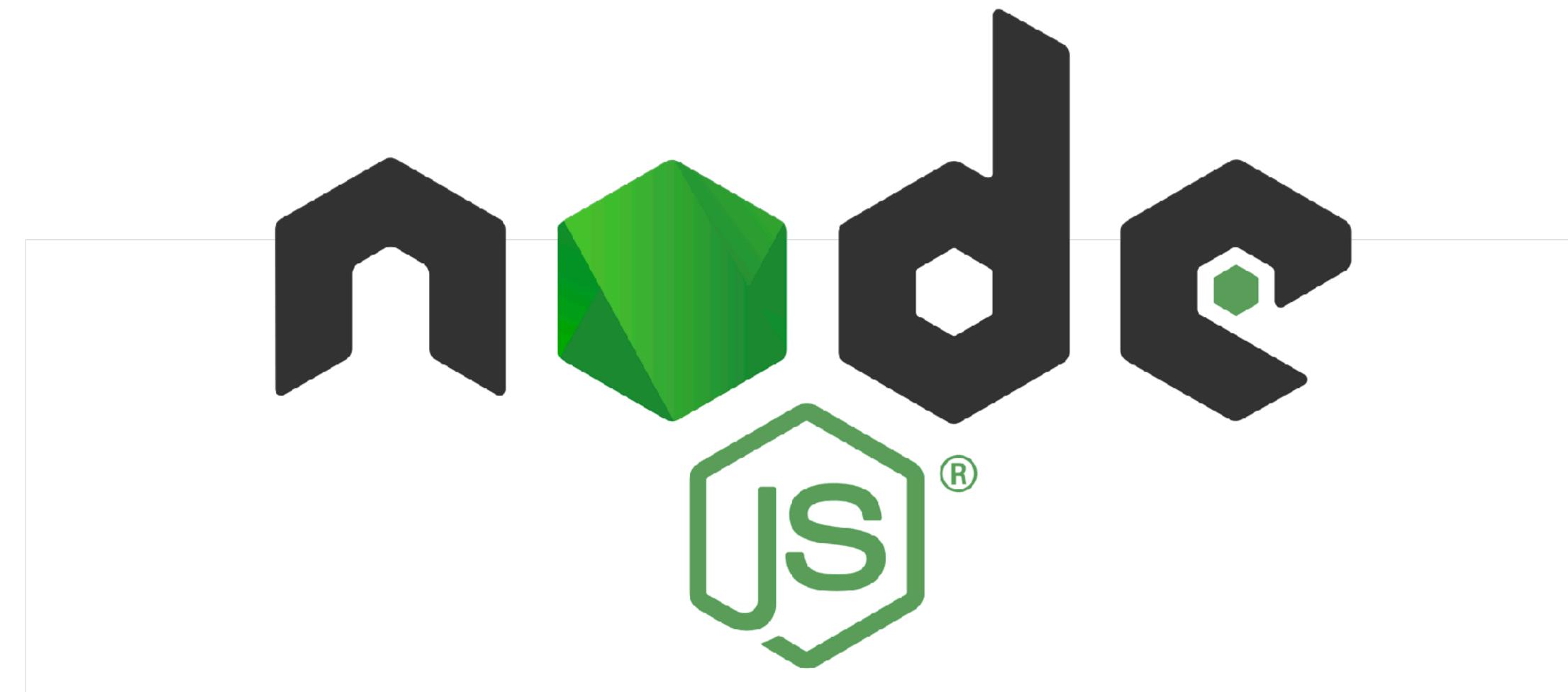


```
[race@Rasmuss-MacBook-Pro Developer % node -v
v14.15.1
[race@Rasmuss-MacBook-Pro Developer % npm -v
7.7.5
race@Rasmuss-MacBook-Pro Developer % npm install]
```



1. Download & install Node.js & npm: [nodejs.org/en/](https://nodejs.org/en/)
2. Check your version of npm & Node.js

```
race@macbookpro-9720 ~ % node -v
v16.13.1
race@macbookpro-9720 ~ % npm -v
8.6.0
race@macbookpro-9720 ~ %
```



# express

**Express** is the most popular **Node** web framework. Fast,  
unopinionated, minimalist web framework.

“Makes it easier for developers to write server-side JS and  
implement routing, handle HTTP requests and responses, etc.”



Code  
Every  
Day