



# Databases & ORMs

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# Sequelize

- **Sequelize is an Object-Relational Mapper (ORM)**
- **Access SQL databases from Node.js**
- **Sequelize features:**
  - Schema modeling/validation
  - Data casting (convert SQL types to powerful JS types)
  - Query building
  - Hooks (code that runs pre/post save/delete/update)
  - Class and instance methods of models
  - Getters, setters, and virtual fields



**Tables**

**Models**

**+**

**=**

**+**

**Rows**

**Instances**

# Sequelize Basics

- Make a **Model** (interactive blueprint object)
- Extend the **Model** with **Hooks**, **Class & Instance Methods**, **Getters**, etc.
- Connect/sync the completed **Model** to an *actual* table in an *actual* SQL database
- Use the **Model** (Table) to create/find **Instances** (row)
- Use the **Instances** to save/update/delete



# Create a Model

```
const Sequelize = require('sequelize');
const db = new Sequelize('postgres://localhost:5432/twitter');
const User = db.define('user', {
  name: Sequelize.STRING,
  pictureUrl: Sequelize.STRING
});
```



# Sync Model to Table

```
User.sync().then(...);
```



# Model & Instance Usage

```
const person = User.build({  
  name: "Kate",  
  pictureUrl: "http://fillmurray.com/10/10"  
});
```

```
person.save()  
  .then(...);
```

```
User.findAll()  
  .then(...);
```

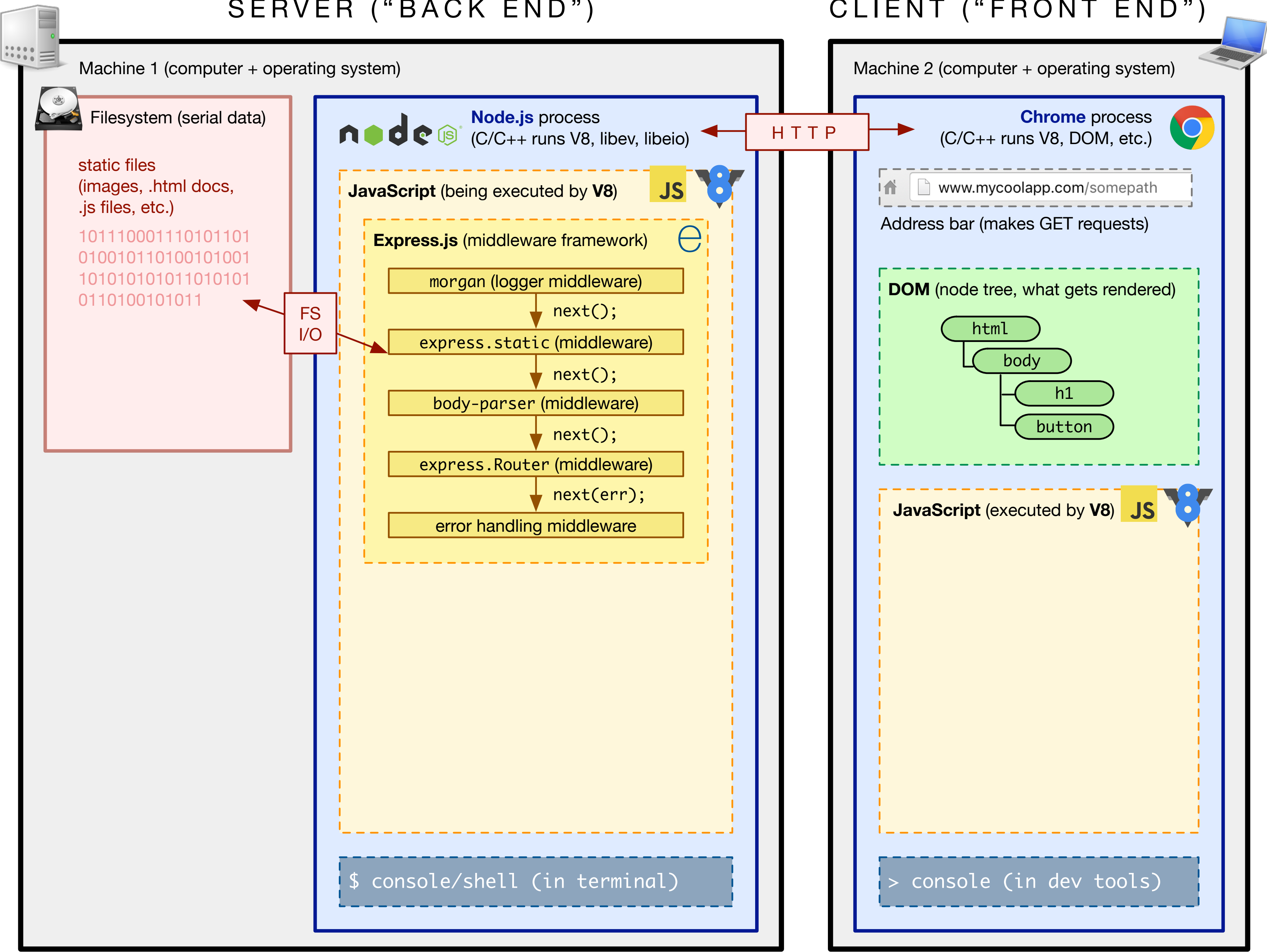
# Sequelize

- Lives inside Node.js process
- Knows how to communicate to a few SQL DBMSs, including PostgreSQL and sqlite3



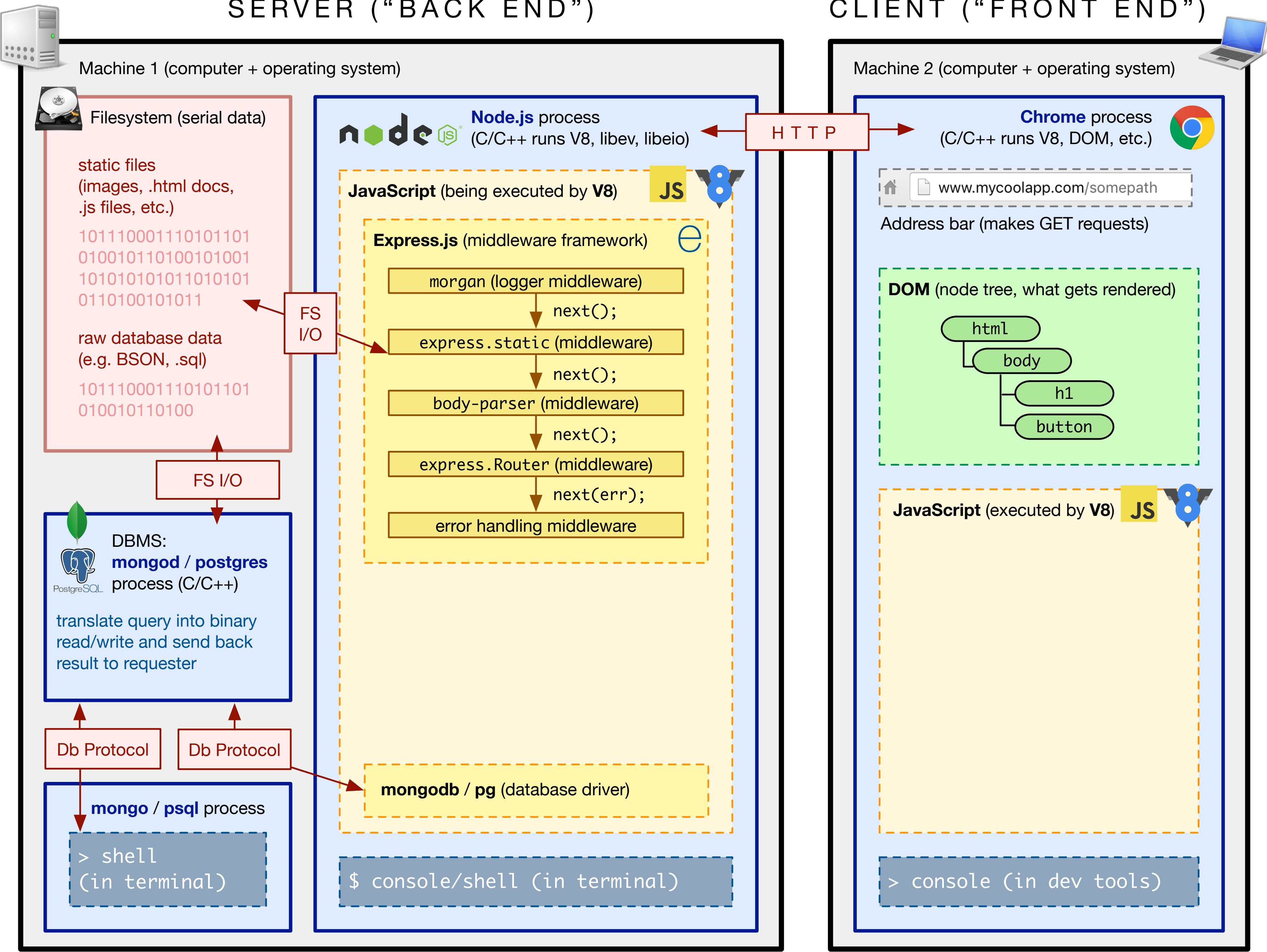
SERVER ("BACK END")

CLIENT ("FRONT END")



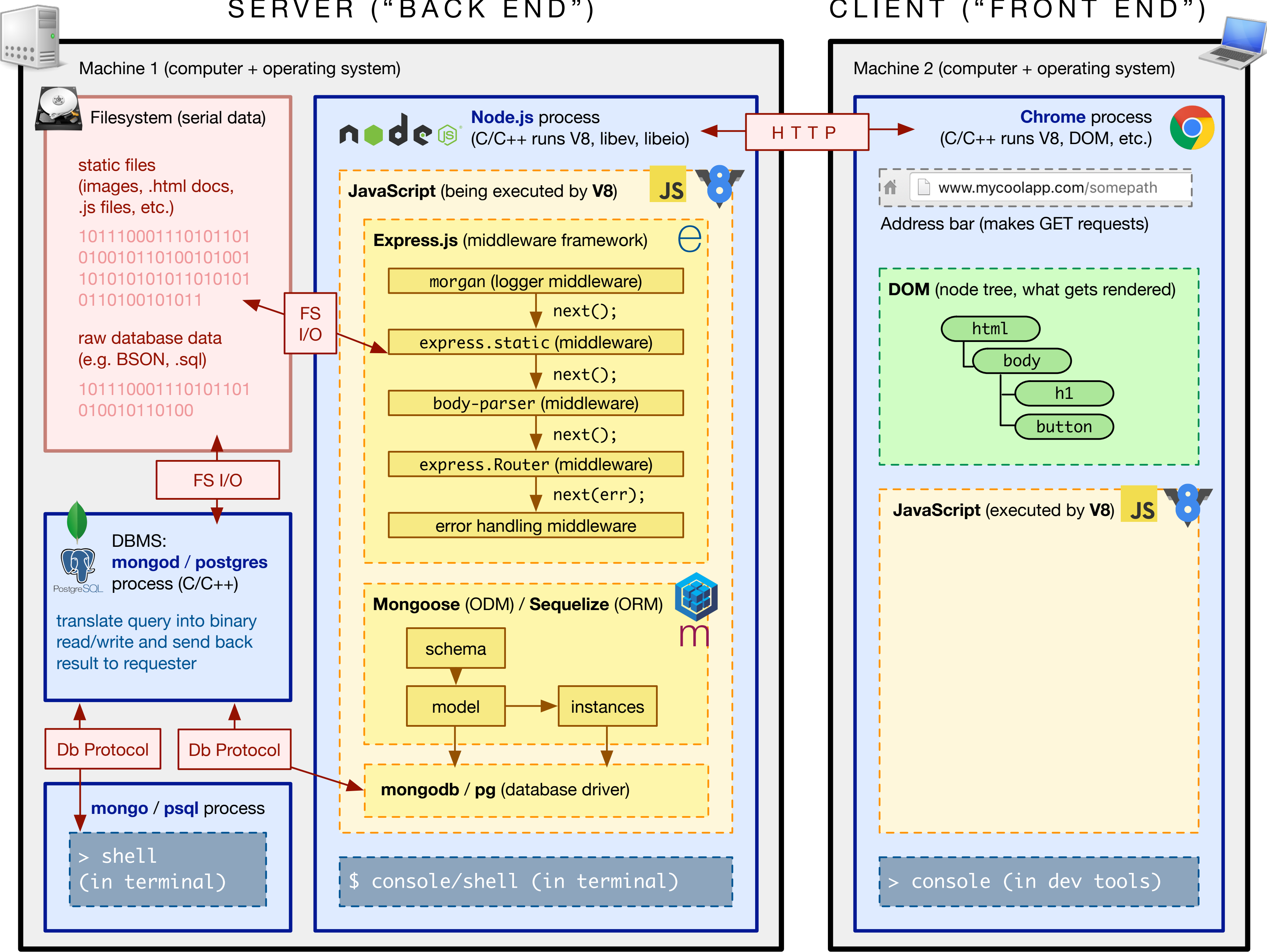
SERVER ("BACK END")

CLIENT ("FRONT END")



SERVER ("BACK END")

CLIENT ("FRONT END")



# Let's Walk Through What Happens



## Sequelize — ORM

- Reads the JS code `Users.create({name: 'Kate'})` =>
- Constructs the string SQL (postgres dialect) query `INSERT INTO users (id, name) VALUES (1, "Kate") RETURNING (id, name)` =>
- Passes that SQL query to the JS library `pg` =>



 &  PostgreSQL = `pg` — protocol

- ◉ Connects via TCP/IP to PostgreSQL =>
- ◉ Uses the postgres protocol to tell PostgreSQL it has an incoming SQL query =>
- ◉ Sends the SQL query to PostgreSQL =>

 PostgreSQL — dialect, database process

- ◉ Parses the query =>
- ◉ Changes the data on disk =>
- ◉ Sends a response back to `pg` via the postgres protocol on the TCP connection =>

 &  PostgreSQL = ``pg`` — protocol

- Receives raw string data, perhaps something like  
“created 1 row in users table (id, name) values (1, Kate)” =>
- Turns raw string into an array of row objects  
``[{id: 1, name: Kate}]`` and hands it to Sequelize =>

 Sequelize  
(ORM)

- Mutates the returned data and constructs new, powerful objects with prototypal methods, e.g. ``save`` =>
- Resolves the promise it returned from ``create`` with this array of Sequelize instance objects.

# Wikistack

- Build a Wikipedia clone
- Walk you through installing and using sequelize
- Application of everything we've learned so far