Dockerize Laravel-Vite + React Application in Your Development Environment

With artisan commands, composer commands, npm commands, cron jobs, queues, database, and redis cache containers

Elvin Lari · Follow
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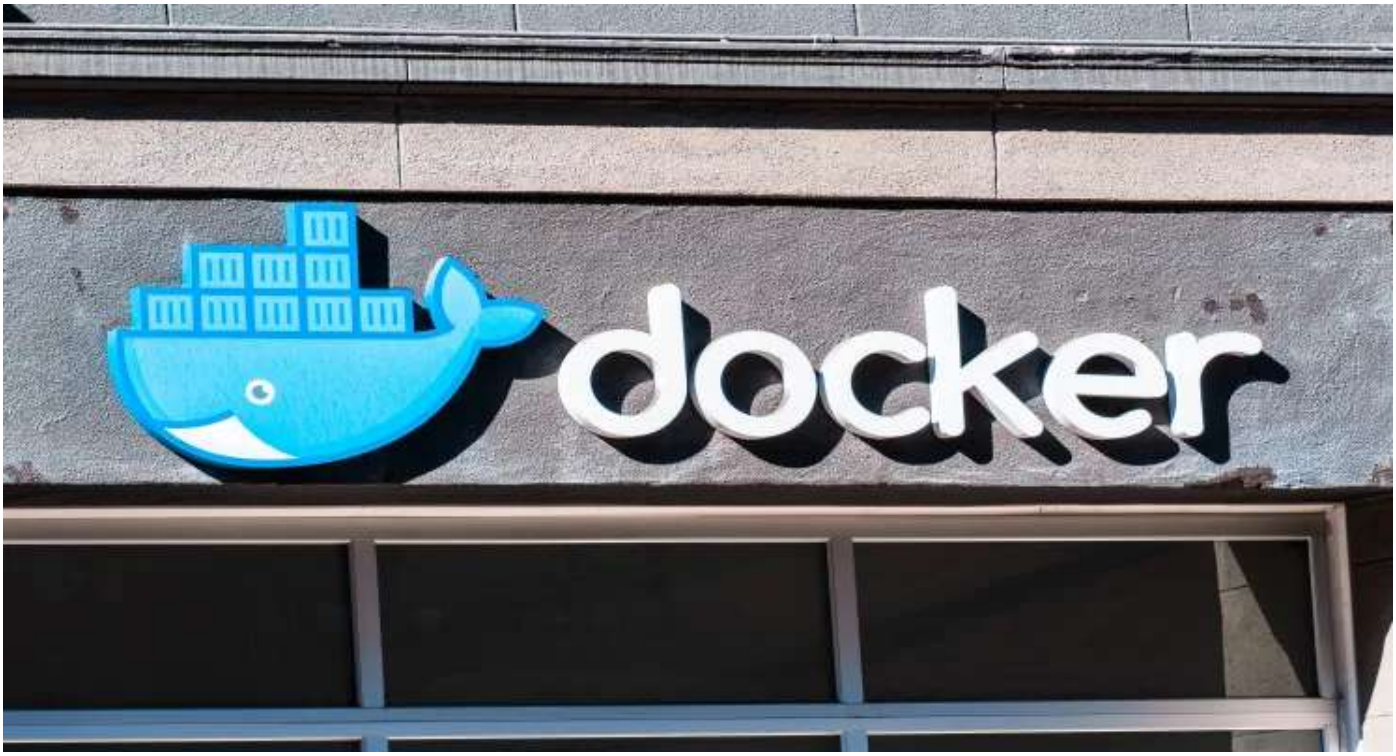

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1. Introduction

This guide will show you how to set up a Laravel-React stack development environment using Docker and incorporate some extra utility containers to round off your setup.

The setup is operating-system agnostic, with no dependencies besides Docker and Docker Compose. It can run on all the major operating systems, such as Microsoft's Windows, Apple's macOS, and Linux, as long as Docker and Docker compose are installed.

This setup lets you mix and match the versions of your services per your preference by just editing a line or two. For instance, you can combine PHP 7.4, 8.0, 8.1 or 8.2 with Laravel 7, 8, or 9 as you see fit.

We will containerize a Laravel 9 application and allow it to communicate with other main/utility containers forming a complete dockerized development environment.

The tables below show the services (containers) we'll be running in our Docker environment. I have grouped them into two (main containers and utility containers).

- Main containers — run continuously once started and often restart on failure unless stopped.
- Utility containers — these containers run commands for customization and optimization of the whole application. The containers get destroyed after running the commands.

Search this file…

main containers	description
NGINX	It is the webserver.
PHP	Runs PHP-FPM process manager.
Mysql	It is the database.
Redis	Store cache and sessions.
Cron jobs	Runs laravel cron jobs.
Queues	Runs laravel queues.
Mailhog	Local email testing. It is optional.
phpMyAdmin	Database management. It is optional.

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main containers

Search this file…

utility containers	description
Migrate-Seed	Runs migrations and seeders. Should be run just after starting the main containers.
Composer	Runs composer commands.
Artisan	Runs artisan commands.
Npm	Runs npm commands.

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utility containers

2. Prerequisites for This Guide

1. You should be conscious of the need to build containers and how they work.
2. Familiarity with ReactJS and an understanding of how Laravel works are needed.

Now let's dive into the code and docker commands.

3. Set up Git

To use Git on the command line, you need to set up Git on your computer. You will use Git for cloning the Laravel 9 application. Towards the end of this guideline, I will show you how to push the whole setup code to a GitHub repository using Git.

Set up Git by following this tutorial if it is not configured on your local machine.

4. Download and Install Docker and docker-compose

Download and install Docker from here. You can use either the Docker Desktop client or the Docker CLI client. Download and install docker-compose from here.

5. Clone Laravel Application and Create Root Folders

Go to a folder where you want to have your project stored locally and make the following folder/subfolders in the list below. You can open your project folder from Visual Studio IDE (VS Code) and do all your folder and file creations.

- docker/logs
- docker/mysql
- docker/nginx

We will use docker/logs folder to store container logs, docker/mysql to store mysql data and docker/nginx for NGINX configuration files. If these folders are not set up, data generated as the containers run gets destroyed every time they restart.

From the root of your project folder, clone the Laravel repository into a folder called src using Git. On VS Code, toggle the terminal and paste the below command.

```
git clone https://github.com/laravel/laravel.git src
```

NOTE: Delete the `.github` and `.git` folders within `src`. `.github` contains laravel's default GitHub actions while `.git` has Laravel's repository details. We will create a new git repository from our project directory's root. We will also create custom GitHub actions in a later tutorial.

6. Create .env, .env.example and .gitignore files

Copy .env.example from the `src` folder to the root of your project directory. This file is just an example of what might be in the .env file. You can version this file.

In the same directory, create a .env file. Your application's configuration variables will be stored here. This file may have different values for different servers and different developers when working as a team on a project. It should, therefore, not be versioned.

Create a .gitignore file and add the following code:

```
.env
docker/logs/*
docker/mysql/*
```

7. Docker Compose YAML File

> *Compose is a tool for defining and running multi-container Docker applications. With Compose, you use a YAML file to configure your application's services. Then, with a single command, you create and start all the services from your configuration. — Docker Compose*

Our `docker-compose.yml` file structure looks like this:

```
version: '3'

networks:
  laravel:

services:
  ... services go here
```

The `version: '3'` refers to the Docker compose version. Compared to version 2, version 3 is Swarm compatible; hence, you won't have to change anything if you decide to use the Docker Swarm orchestrator later.

A network called `laravel` is configured under `networks:` section. Containers that join this network will be reachable by other containers on the network. They are also discoverable at a hostname identical to the container name.

`services:` represents instances of images, for example, database service, Redis service, PHP service, etc.

Create a `docker-compose.yml` file in the project's root directory and put the following code in it:

```
1  version: '3'
2
```

```yaml

networks:
  laravel:

services:
  nginx:
    build:
      context: ./docker
      dockerfile: nginx.dockerfile
      args:
        - UID=${UID:-1000}
        - GID=${GID:-1000}
        - USER=${USER:-laravel}
    restart: unless-stopped
    container_name: nginx
    ports:
      - 8000:8000
    volumes:
      - ./src:/var/www/html
      - .env:/var/www/html/.env
    depends_on:
      - php
      - redis
      - mysql
      - laravel-queue
      - laravel-cron
      - phpmyadmin
      - mailhog
    networks:
      - laravel

  php:
    build:
      context: ./docker
      dockerfile: php.dockerfile
      args:
        - UID=${UID:-1000}
        - GID=${GID:-1000}
        - USER=${USER:-laravel}
    container_name: php
    ports:
      - ":9000"
    volumes:
      - ./src:/var/www/html
      - .env:/var/www/html/.env
```

```
    networks:
      - laravel

  mysql:
    image: mariadb:10.6
    container_name: mysql
    restart: unless-stopped
    tty: true
    ports:
      - 3307:3306
    environment:
      MYSQL_DATABASE: ${DB_DATABASE}
      MYSQL_USER: ${DB_USERNAME}
      MYSQL_PASSWORD: ${DB_PASSWORD}
      MYSQL_ROOT_PASSWORD: ${DB_PASSWORD}
      SERVICE_TAGS: dev
      SERVICE_NAME: mysql
    volumes:
      - ./docker/mysql:/var/lib/mysql
    networks:
      - laravel

  redis:
    image: redis:alpine
    container_name: redis
    restart: unless-stopped
    ports:
      - 6380:6379
    networks:
      - laravel

  laravel-cron:
    build:
      context: ./docker
      dockerfile: php.dockerfile
      args:
        - UID=${UID:-1000}
        - GID=${GID:-1000}
        - USER=${USER:-laravel}
    container_name: laravel-cron
    volumes:
      - ./src:/var/www/html
      - .env:/var/www/html/.env
    depends_on:
      - mysql
```

```
      - mysql
    working_dir: /var/www/html
    entrypoint: ['php', '/var/www/html/artisan', 'schedule:work']
    networks:
      - laravel

  laravel-queue:
    build:
      context: ./docker
      dockerfile: php.dockerfile
      args:
        - UID=${UID:-1000}
        - GID=${GID:-1000}
        - USER=${USER:-laravel}
    container_name: laravel-queue
    volumes:
      - ./src:/var/www/html
      - .env:/var/www/html/.env
    depends_on:
      - mysql
    working_dir: /var/www/html
    entrypoint: ['php', '/var/www/html/artisan', 'queue:work']
    networks:
      - laravel

  mailhog:
    image: mailhog/mailhog:latest
    container_name: mailhog
    logging:
      driver: 'none'
    ports:
      - 1025:1025
      - 8025:8025
    networks:
      - laravel

  phpmyadmin:
    image: phpmyadmin:5.2.0
    container_name: phpmyadmin
    environment:
      PMA_ARBITRARY: 1
      PMA_HOST: ${DB_HOST}
      PMA_USER: ${DB_USERNAME}
      PMA_PASSWORD: ${DB_PASSWORD}
      PMA_PORT: ${DB_PORT}
```

```
    depends_on:
      - mysql
    ports:
      - 8888:80
    networks:
      - laravel

  laravel-migrate-seed:
    build:
      context: ./docker
      dockerfile: php.dockerfile
      args:
        - UID=${UID:-1000}
        - GID=${GID:-1000}
        - USER=${USER:-laravel}
    container_name: laravel-migrate-seed
    volumes:
      - ./src:/var/www/html
      - .env:/var/www/html/.env
    depends_on:
      - mysql
    profiles: ["migrate-seed"]
    working_dir: /var/www/html
    entrypoint: ["/bin/sh","-c"]
    command:
    - |
      php artisan migrate
      php artisan db:seed
    networks:
      - laravel

  composer:
    build:
      context: ./docker
      dockerfile: composer.dockerfile
      args:
        - UID=${UID:-1000}
        - GID=${GID:-1000}
        - USER=${USER:-laravel}
    container_name: composer
    volumes:
      - ./src:/var/www/html
      - .env:/var/www/html/.env
    working_dir: /var/www/html
    depends_on:
```

```
      - php
    user: ${USER:-laravel} #system user
    profiles: ["composer"]
    entrypoint: ['composer', '--ignore-platform-reqs']
    networks:
      - laravel

  artisan:
    build:
      context: ./docker
      dockerfile: php.dockerfile
      args:
        - UID=${UID:-1000}
        - GID=${GID:-1000}
        - USER=${USER:-laravel}
    container_name: artisan
    volumes:
      - ./src:/var/www/html
      - .env:/var/www/html/.env
    depends_on:
      - mysql
    working_dir: /var/www/html
    profiles: ["artisan"]
    entrypoint: ['php', '/var/www/html/artisan']
    networks:
      - laravel

  npm:
    image: node:alpine
    container_name: npm
    volumes:
      - ./src:/var/www/html
      - .env:/var/www/html/.env
    ports:
      - 3000:3000
      - 3001:3001
    working_dir: /var/www/html
    profiles: ["npm"]
    entrypoint: ['npm']
    networks:
      - laravel

```

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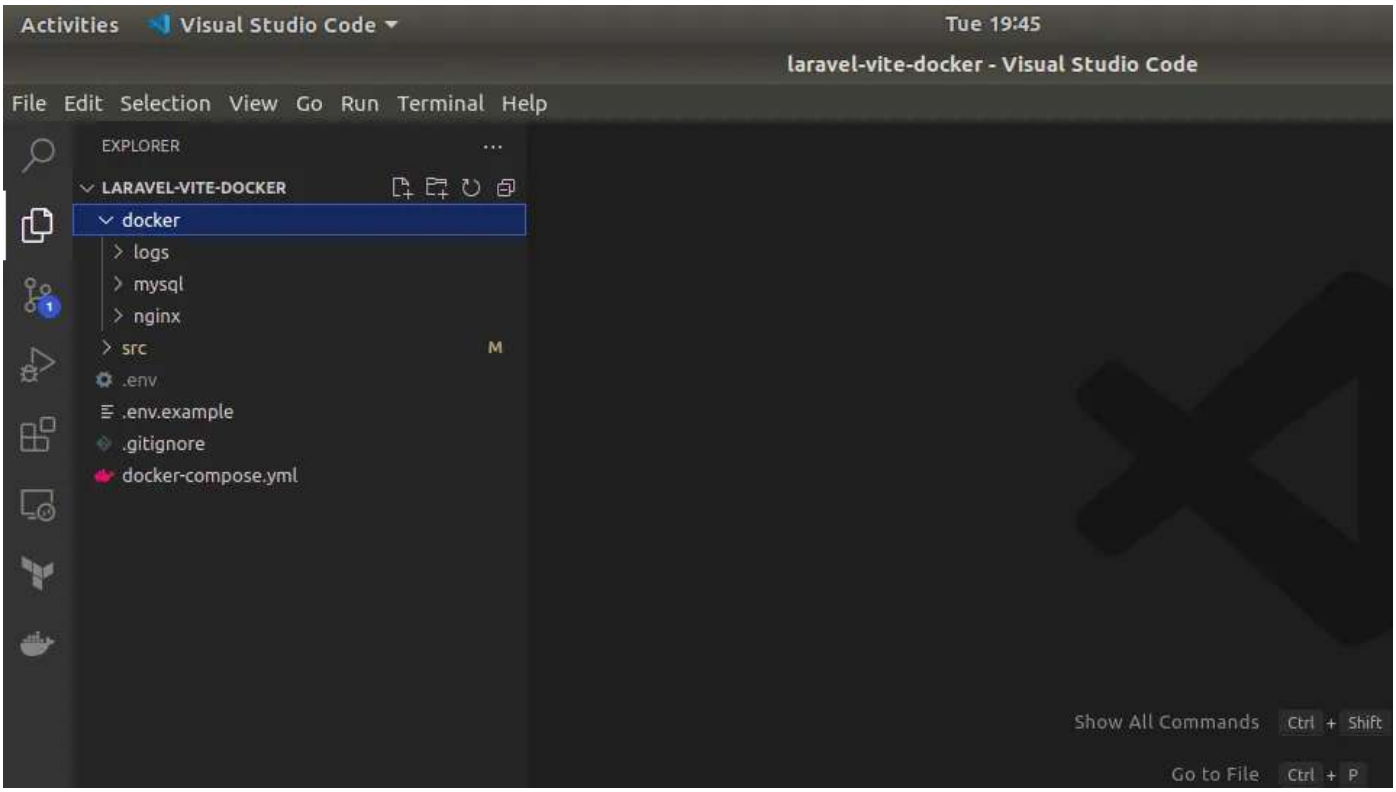
docker-compose.yml file

Don’t worry about the details in this file; we will go through them in later sections of this guideline.

The project’s folder structure now looks like this:



project folder-structure

8. Main Containers

8.1. NGINX service

Set up the container that will serve as the web server itself. It will receive HTTP requests from end users and send them to the PHP container that will process our Laravel code.

Here’s the NGINX service code:

```
1  nginx:
2    build:
```

```
    build:
      context: ./docker
      dockerfile: nginx.dockerfile
      args:
        - UID=${UID:-1000}
        - GID=${GID:-1000}
        - USER=${USER:-laravel}
    restart: unless-stopped
    container_name: nginx
    ports:
      - 8000:8000
    volumes:
      - ./src:/var/www/html
      - .env:/var/www/html/.env
    depends_on:
      - php
      - redis
      - mysql
      - laravel-queue
      - laravel-cron
      - phpmyadmin
      - mailhog
    networks:
      - laravel
```

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nginx service

Breakdown

- `build` — Defines configuration options that Compose applies to build a Docker image.
- `context` — Defines the path to our Nginx dockerfile.
- `dockerfile` — This is the Dockerfile used for creating the Nginx image and is resolved from the context.
- `args` — Defines build arguments i.e. `nginx.dockerfile` `ARG` values, as seen in the next section.
- `restart` — Defines the container's restart policy.
- `container_name` — Defines the container name.

- `ports` — Maps the host machine's port to the container's port.
- `volumes` — Mounts the project directory contents to the containers `/var/www/html` directory and the `.env` file to the container's location `/var/www/html/.env`. Any project content change made on the host machine will reflect in the container and vice versa.
- `depends_on` — This defines a dependency on another service to be running before building this service.
- `networks` — The service will directly communicate with other services within the `laravel` network.

nginx.dockerfile

The context of this file is the docker folder of the project. Below is our `nginx.dockerfile` file. It is based on the nginx:stable-alpine image, which is very lightweight, only ~5MB in size.

```
FROM nginx:stable-alpine

# environment arguments
ARG UID
ARG GID
ARG USER

ENV UID=${UID}
ENV GID=${GID}
ENV USER=${USER}

# Dialout group in alpine linux conflicts with MacOS staff group's gid, whis is 20. So we
RUN delgroup dialout

# Creating user and group
RUN addgroup -g ${GID} --system ${USER}
RUN adduser -G ${USER} --system -D -s /bin/sh -u ${UID} ${USER}

# Modify nginx configuration to use the new user's priviledges for starting it.
RUN sed -i "s/user nginx/user '${USER}'/g" /etc/nginx/nginx.conf

# Copies nginx configurations to override the default.
ADD ./nginx/*.conf /etc/nginx/conf.d/
```

```
24
25  # Make html directory
26  RUN mkdir -p /var/www/html
```

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nginx.dockerfile file

In the above dockerfile, we are copying the `default.conf` file from our project's nginx directory to the container's directory. It will override the default Nginx configurations.

Below is our `default.conf` file:

```
1   server {
2       listen 8000;
3       index index.php index.html;
4       server_name _;
5       root /var/www/html/public;
6
7       error_log  stderr warn;
8       access_log /dev/stdout main;
9
10      # error_log /var/log/nginx/error.log;
11      # access_log /var/log/nginx/access.log;
12
13      location / {
14          try_files $uri $uri/ /index.php?$query_string;
15      }
16
17      location ~ \.php$ {
18          try_files $uri =404;
19          fastcgi_split_path_info ^(.+\.php)(/.+)$;
20          fastcgi_pass php:9000;
21          fastcgi_index index.php;
22          include fastcgi_params;
23          fastcgi_param SCRIPT_FILENAME $document_root$fastcgi_script_name;
24          fastcgi_param PATH_INFO $fastcgi_path_info;
25      }
26  }
```

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default.conf file

The configuration that allows the Nginx container to pass requests to PHP FPM (FastCGI Process Manager) is `fastcgi_pass php:9000` . These requests are passed to the container called `php` through port `9000` .

8.2. PHP service

Unlike Apache web server, Nginx has to use PHP-FPM as a separate process to handle PHP client requests.

Below is the PHP service section:

```yaml
php:
  build:
    context: ./docker
    dockerfile: php.dockerfile
    args:
      - UID=${UID:-1000}
      - GID=${GID:-1000}
      - USER=${USER:-laravel}
  container_name: php
  ports:
    - ":9000"
  volumes:
    - ./src:/var/www/html
    - .env:/var/www/html/.env
  networks:
    - laravel
```

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PHP service

Breakdown

Here we are using a custom dockerfile called `php.dockerfile` . The `container_name` is `php` and this container is only reachable internally by other containers through the port `9000` .

php.dockerfile

The context of this file is also the docker folder of the project. Below is our `php.dockerfile` file. It is based on the alpine image (it is lightweight) `php:8.1-fpm-alpine` .

```
FROM php:8.1-fpm-alpine

# environment arguments
ARG UID
ARG GID
ARG USER

ENV UID=${UID}
ENV GID=${GID}
ENV USER=${USER}

# Dialout group in alpine linux conflicts with MacOS staff group's gid, whis is 20. So we
RUN delgroup dialout

# Creating user and group
RUN addgroup -g ${GID} --system ${USER}
RUN adduser -G ${USER} --system -D -s /bin/sh -u ${UID} ${USER}

# Modify php fpm configuration to use the new user's priviledges.
RUN sed -i "s/user = www-data/user = '${USER}'/g" /usr/local/etc/php-fpm.d/www.conf
RUN sed -i "s/group = www-data/group = '${USER}'/g" /usr/local/etc/php-fpm.d/www.conf
RUN echo "php_admin_flag[log_errors] = on" >> /usr/local/etc/php-fpm.d/www.conf

# Installing php extensions
RUN apk update && apk upgrade
RUN docker-php-ext-install pdo pdo_mysql bcmath

# Installing redis extension
RUN mkdir -p /usr/src/php/ext/redis \
    && curl -fsSL https://github.com/phpredis/phpredis/archive/5.3.4.tar.gz | tar xvz -C /
    && echo 'redis' >> /usr/src/php-available-exts \
    && docker-php-ext-install redis

CMD ["php-fpm", "-y", "/usr/local/etc/php-fpm.conf", "-R"]
```

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php.dockerfile file

8.3. Mysql service

For our database container running Mysql, we'll use DockerHub's MariaDB official image directly in our `docker-compose.yml` file. It comes preconfigured and is supported by the community using best practices.

Here is what it looks like:

```yaml
mysql:
  image: mariadb:10.6
  container_name: mysql
  restart: unless-stopped
  tty: true
  ports:
    - 3307:3306
  environment:
    MYSQL_DATABASE: ${DB_DATABASE}
    MYSQL_USER: ${DB_USERNAME}
    MYSQL_PASSWORD: ${DB_PASSWORD}
    MYSQL_ROOT_PASSWORD: ${DB_PASSWORD}
    SERVICE_TAGS: dev
    SERVICE_NAME: mysql
  volumes:
    - ./docker/mysql:/var/lib/mysql
  networks:
    - laravel
```

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MySQL service

In this service, we have to define the environment variables: `${DB_DATABASE}`, `${DB_USERNAME}`, and `${DB_PASSWORD}`. They are defined from the `.env` file that we had created earlier. Below is an example `.env` configuration.

```
DB_CONNECTION=mysql
DB_HOST=mysql
DB_PORT=3306
DB_DATABASE=laravel
DB_USERNAME=laravel_user
DB_PASSWORD=%6larav31
```

Typically, in Laravel, the `DB_HOST` is usually configured to be the database IP address i.e `DB_HOST=127.0.0.1`. However, in this case, we will use the mysql service name i.e `DB_HOST=mysql`.

The MySQL service can be accessed by other containers internally through port `3306` which has been exposed to the host machine at port `3307`.

To avoid losing database data on container restart, the volume `./docker/mysql` is mounted to `/var/lib/mysql` within the container. Mysql data will therefore persist in the host machine within `./docker/mysql` directory.

8.4. Redis service

We will add a Redis service based on `redis:alpine` image to get Redis to work. The service will look like the one below:

```
redis:
  image: redis:alpine
  container_name: redis
  restart: unless-stopped
  ports:
    - 6380:6379
  networks:
    - laravel
```

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Redis service

We also need to update our `.env` file to use this redis service for queue and session management. Update the following sections of the `.env` file. We are using our Redis service name as the redis host, `REDIS_HOST=redis`.

```
QUEUE_CONNECTION=redis
SESSION_DRIVER=redis

REDIS_HOST=redis
REDIS_PASSWORD=null
REDIS_PORT=6379
```

8.5. Cron jobs service

This service will be based on `php.dockerfile` that we had created earlier.

Here is the service file:

```yaml
laravel-cron:
  build:
    context: ./docker
    dockerfile: php.dockerfile
    args:
      - UID=${UID:-1000}
      - GID=${GID:-1000}
      - USER=${USER:-laravel}
  container_name: laravel-cron
  volumes:
    - ./src:/var/www/html
    - .env:/var/www/html/.env
  depends_on:
    - mysql
  working_dir: /var/www/html
  entrypoint: ['php', '/var/www/html/artisan', 'schedule:work']
  networks:
    - laravel
```

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laravel-cron service

We use the `schedule:work` command instead of `schedule:run` running in the foreground and invoke the scheduler every minute. The `entrypoint` command executes when the container runs.

8.6. Queues service

This service is also based on `php.dockerfile`. The service configurations will look like this:

```yaml
laravel-queue:
  build:
    context: ./docker
    dockerfile: php.dockerfile
    args:
      - UID=${UID:-1000}
      - GID=${GID:-1000}
      - USER=${USER:-laravel}
  container_name: laravel-queue
  volumes:
    - ./src:/var/www/html
    - .env:/var/www/html/.env
```

```
    depends_on:
      - mysql
    working_dir: /var/www/html
    entrypoint: ['php', '/var/www/html/artisan', 'queue:work']
    networks:
      - laravel
```


laravel-queue service

The `entrypoint` of this service will run the Laravel command `php artisan queue:work`. This command runs Laravel's base queue service, which processes all queued jobs. It is the default way of processing queues in Laravel. You can also set up Horizon and use it instead.

Horizon provides a beautiful dashboard and code-driven configuration for your Laravel-powered Redis queues. When using Horizon, you will update the entry point to `entrypoint: ['php', '/var/www/html/artisan', 'horizon']`.

8.7. Mailhog service

Mailhog is an excellent tool for confirming if your mailing works as expected in a development environment. It has a web-based user interface from where you can check your emails.

```
mailhog:
  image: mailhog/mailhog:latest
  container_name: mailhog
  logging:
    driver: 'none'
  ports:
    - 1025:1025
    - 8025:8025
  networks:
    - laravel
```


mailhog service

This service is based on `mailhog/mailhog:latest` image. It is not an official image, but the Mailhog team supports it, so you're in good hands. Unlike official images where the

image repository is specified like so {repository}:{tag}. Here we have to identify the user as well, {user}/{repository}:{tag}.

By default, Mailhog stores logs. These aren't useful to us, so we'll set the `logging driver` to none.

Port `8025` is for connecting to the user interface dashboard, while the port `1025` is for connecting to the mailing server. You can access the dashboard via `http://localhost:8025` on your host machine.

8.8. PhpMyAdmin service

PhpMyAdmin will provide us with a GUI for managing our database without having to access it via shell/terminal. The following are its service configurations:

```yaml
phpmyadmin:
  image: phpmyadmin:5.2.0
  container_name: phpmyadmin
  environment:
    PMA_ARBITRARY: 1
    PMA_HOST: ${DB_HOST}
    PMA_USER: ${DB_USERNAME}
    PMA_PASSWORD: ${DB_PASSWORD}
    PMA_PORT: ${DB_PORT}
  depends_on:
    - mysql
  ports:
    - 8888:80
  networks:
    - laravel
```

docker-compose.yml hosted with ❤️ by GitHub view raw

PhpMyAdmin service

This service is based on `phpmyadmin:5.2.0` which is a preconfigured official docker image.

The environment variables `${DB_HOST}`, `${DB_USERNAME}`, `${DB_PASSWORD}` and `${DB_PORT}` will be picked by Compose automatically from our `.env` file. This service depends on `mysql` hence the database needs to be running before spinning up our GUI.

The host machine uses the port `8888` to connect to our interface. You can access the PhpMyAdmin dashboard via `http://localhost:8888`.

9. Utility Containers

When starting docker containers using the command `docker-compose up`, all the services in the `docker-compose.yml` file will be started. However, you should only run utility containers when needed.

To start only the main containers, we use the command `docker-compose up build nginx`. It will ensure that only the containers that `nginx service` depend on will start. These are the containers listed in the `depends_on` section of `nginx service`.

We will also use `profiles` to lock utility services such that they only start if the individual profile has been activated or when running the particular service using `docker-compose run service_name`.

When running utility containers, the command `docker-compose run --rm` is used instead of `docker-compose up`. And service/container arguments are tacked on the end. The `run` is used to run a one-time command against a service and `--rm` removes a container after running a command. If you need to connect to other docker containers, use the `--service-ports` option. For example `docker-compose run --rm --service-ports service_name argument`.

9.1. Migrate-seed service

This service runs migrations and seeders. It is also based on `php.dockerfile`.

```
laravel-migrate-seed:
  build:
    context: ./docker
    dockerfile: php.dockerfile
    args:
      - UID=${UID:-1000}
      - GID=${GID:-1000}
      - USER=${USER:-laravel}
  container_name: laravel-migrate-seed
  volumes:
    - ./src:/var/www/html
    - .env:/var/www/html/.env
  depends_on:
```

```
    - mysql
  profiles: ["migrate-seed"]
  working_dir: /var/www/html
  entrypoint: ["/bin/sh","-c"]
  command:
  - |
     php artisan migrate
     php artisan db:seed
  networks:
    - laravel
```

docker-compose.yml hosted with ❤️ by GitHub view raw

laravel-migrate-seed service

The entry point of this service will run the commands `php artisan migrate` and `php artisan db:seed` sequentially when the container starts.

Running laravel-migrate-seed command

```
docker-compose run --rm laravel-migrate-seed
```

9.2. Composer service

Composer is a dependency manager for PHP. Composer service is used for running composer commands. It uses a custom dockerfile called `composer.dockerfile` whose context is the docker folder of our project.

Here is the service configuration:

```
composer:
  build:
    context: ./docker
    dockerfile: composer.dockerfile
    args:
      - UID=${UID:-1000}
      - GID=${GID:-1000}
      - USER=${USER:-laravel}
  container_name: composer
  volumes:
    - ./src:/var/www/html
    - .env:/var/www/html/.env
```

```
    working_dir: /var/www/html
    depends_on:
      - php
    user: ${USER:-laravel} #system user
    profiles: ["composer"]
    entrypoint: ['composer', '--ignore-platform-reqs']
    networks:
      - laravel
```

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composer service

composer.dockerfile

```
FROM composer:2

# environment arguments
ARG UID
ARG GID
ARG USER

ENV UID=${UID}
ENV GID=${GID}
ENV USER=${USER}

# Dialout group in alpine linux conflicts with MacOS staff group's gid, whis is 20. So we
RUN delgroup dialout

# Creating user and group
RUN addgroup -g ${GID} --system ${USER}
RUN adduser -G ${USER} --system -D -s /bin/sh -u ${UID} ${USER}

WORKDIR /var/www/html
```

composer.dockerfile hosted with ❤️ by GitHub view raw

composer.dockerfile

This dockerfile is based on the composer:2 image, an official prebuild composer version 2 docker image file.

Running composer commands

Composer commands are started using the command `docker-compose run --rm` and tacking composer arguments on the end. Check out the table below for examples:

Search this file…

docker service composer command	normal composer command
docker-compose run --rm composer create-project laravel/laravel project-name	composer create-project laravel/la
docker-compose run --rm composer install	composer install
docker-compose run --rm composer update	composer update
docker-compose run --rm composer dump-autoload	composer dump-autoload
docker-compose run --rm composer require laravel/breeze --dev	composer require laravel/breeze --

composer commands

9.3. Artisan service

This service runs Laravel artisan commands. It is based on `php.dockerfile`.

```yaml
artisan:
  build:
    context: ./docker
    dockerfile: php.dockerfile
    args:
      - UID=${UID:-1000}
      - GID=${GID:-1000}
      - USER=${USER:-laravel}
  container_name: artisan
  volumes:
    - ./src:/var/www/html
    - .env:/var/www/html/.env
  depends_on:
    - mysql
  working_dir: /var/www/html
  profiles: ["artisan"]
  entrypoint: ['php', '/var/www/html/artisan']
  networks:
    - laravel
```

docker-compose.yml hosted with ❤️ by GitHub view raw

artisan service

Running artisan commands

Like composer commands, artisan commands are started using the command `docker-compose run --rm` and tacking artisan arguments on the end. Below are examples:

Search this file…

docker service artisan command	normal artisan command
docker-compose run --rm artisan config:cache	php artisan config:cache
docker-compose run --rm artisan optimize	php artisan optimize
docker-compose run --rm artisan serve	php artisan serve
docker-compose run --rm artisan route:list	php artisan route:list

artisan-commands.csv hosted with ❤ by GitHub view raw

artisan commands

9.4. Npm service

We will use this service for running npm commands. It is based on the official node:alpine docker image.

```yaml
npm:
  image: node:alpine
  container_name: npm
  volumes:
    - ./src:/var/www/html
    - .env:/var/www/html/.env
  ports:
    - 3000:3000
    - 3001:3001
  working_dir: /var/www/html
  profiles: ["npm"]
  entrypoint: ['npm']
  networks:
    - laravel
```

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npm service

Running npm commands

NPM commands are also started using the command `docker-compose run --rm` and tacking npm arguments on the end. However, when running `npm run dev`,

communication needs to be established between this npm container and the PHP container for hot-reloading to take place. We, therefore, include the `--service-ports` option in our command.

Examples of npm commands:

Search this file…

	docker service npm command	normal npm command
2	docker-compose run --rm npm install	npm install
3	docker-compose run --rm npm install @myorg/privatepackage	npm install @myorg/privatepackage
4	docker-compose run --rm npm run build	npm run build
5	docker-compose run --rm --service-ports npm run dev	npm run dev

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npm commands

10. Configuring Vite Asset Bundler and InertiaJS

As from Laravel 9, developer experience has improved by introducing **Vite**, a frontend asset bundler. Previously, Laravel was using webpack as its default asset bundler. In this guide, we will use Vite for integrating ReactJS into Laravel.

InertiaJS will help us contain the React and Laravel stack in one project. You can think of it as the glue sticking our frontend and backend stacks together. Install InertiaJS by typing the below command in your terminal:

```
docker-compose run --rm composer require inertiajs/inertia-laravel
```

Let's install inertia middleware within our project using the artisan command below:

```
docker-compose run--rm artisan inertia: middleware
```

Head over to `src/app/Http` directory, then within `Kernel.php` file, add the following line in the `$middlewareGroups[]` array within its `web[]` array.

```
'web' => [
  // ...
  \App\Http\Middleware\HandleInertiaRequests::class,
],
```

For our routes to be recognized in the front end while rendering it with JavaScript instead of blade, we will use a special package called ziggy. Let's install it using composer.

```
docker-compose run --rm composer require tightenco/ziggy
```

For we are going to create a single-page application (SPA), we need to set up a `blade` entry-point for our application's UI.

Let's create a new blade file `app.blade.php`. It will be our entry-point `blade`. Put the following code in the file:

```
<!DOCTYPE html>
<html lang="{{ str_replace('_', '-', app()->getLocale()) }}">
    <head>
        <meta charset="utf-8">
        <meta name="viewport" content="width=device-width, initial-scale=1">
<title inertia>{{ config('app.name', 'Laravel') }}</title>
<!-- Scripts -->
        @routes
        @viteReactRefresh
        @vite('resources/js/app.jsx')
        @inertiaHead
    </head>
    <body>
        @inertia
    </body>
</html>
```

app.blade.php hosted with ❤️ by GitHub view raw

`@vite()` and `@viteReactRefresh` are telling the Laravel app that Vite is compiling our assets (JS and CSS files) and that we will use JSX for our front end. The CSS file can also be called from this file by adding the line `@vite('resources/css/app.css')`. However, it is ideal to call it from the `resources/js/app.jsx` file and call this file in `blade`, as shown above.

Setting up React frontend

We will use the `npm container` to install our frontend dependencies.

Run the following command on your terminal:

```
docker-compose run --rm npm i react react-dom @inertiajs/inertia
@inertiajs/inertia-react jsconfig.json @inertiajs/progress
```

The above command will install React, react-dom, inertia frontend dependencies, inertia progress bar for page loading, and a `jsconfig.json` file.

Next, we'll add the vite plugin for React.

```
docker-compose run --rm npm add @vitejs/plugin-react
```

Go to the `src/resources/js/app.js` file, and add the following script below the `import "./bootstrap"` statement. Then rename the file to `app.jsx`. As you can see `app.css` gets imported from this file.

```jsx
import "../css/app.css";
import React from "react";
import { render } from "react-dom";
import { createInertiaApp } from "@inertiajs/inertia-react";
import { InertiaProgress } from "@inertiajs/progress";
import { resolvePageComponent } from "laravel-vite-plugin/inertia-helpers";

const appName =
    window.document.getElementsByTagName("title")[0]?.innerText || "Laravel";

createInertiaApp({
    title: (title) => `${title} - ${appName}`,
    resolve: (name) =>
        resolvePageComponent(
            `./Pages/${name}.jsx`,
            import.meta.glob("./Pages/**/*.jsx")
        ),
    setup({ el, App, props }) {
        return render(<App {...props} />, el);
    },
});

// you can specify any color of choice
InertiaProgress.init({ color: "#4B5563" });
```

app.jsx hosted with ❤️ by GitHub view raw

Finally, we need to tell Vite we are using React and specify our entry-point file. We will put our configuration in `src/vite.config.js`, a file installed in Laravel 9 by default. Let's head there, modify and add the following lines:

```
import { defineConfig } from "vite";
import laravel from "laravel-vite-plugin";
import react from "@vitejs/plugin-react";
export default defineConfig({
    plugins: [
        laravel({
            input: "resources/js/app.jsx",
        }),
        react(),
    ],
    server: {
       host: '0.0.0.0',
       port: 3000,
       open: false,
    }
});
```

vite.config.js hosted with ❤️ by GitHub view raw

The `input: "resources/js/app.jsx",` line specifies our JSX entry point. The `server settings` specifies the `npm container` address and service port. The `npm container` is accessible through the port `3000` as seen in our docker file.

Creating a welcome page and welcome route

Let's now create the route for our welcome page. Head to the file `src/routes/web.php` and add the following lines to make Laravel aware of the route to our welcome page.

```
Route::get('/', function () {
   return inertia('Welcome');
}
```

Then we will create our frontend welcome page. Create a new folder `Pages` and add a `Welcome.jsx` file to the `src/resources/js/` directory. Put the following code in the file.

```
export default function Welcome () {
    return (
        <>
            <div>Hello Docker Multiverse!</div>
        </>
```

```
        );
    }
```

11. Starting Your Containers

Running migrations

Create database tables by running the following command:

```
docker-compose run --rm laravel-migrate-seed
```

It will create default database tables that come configured in Laravel migration files.

Starting main containers

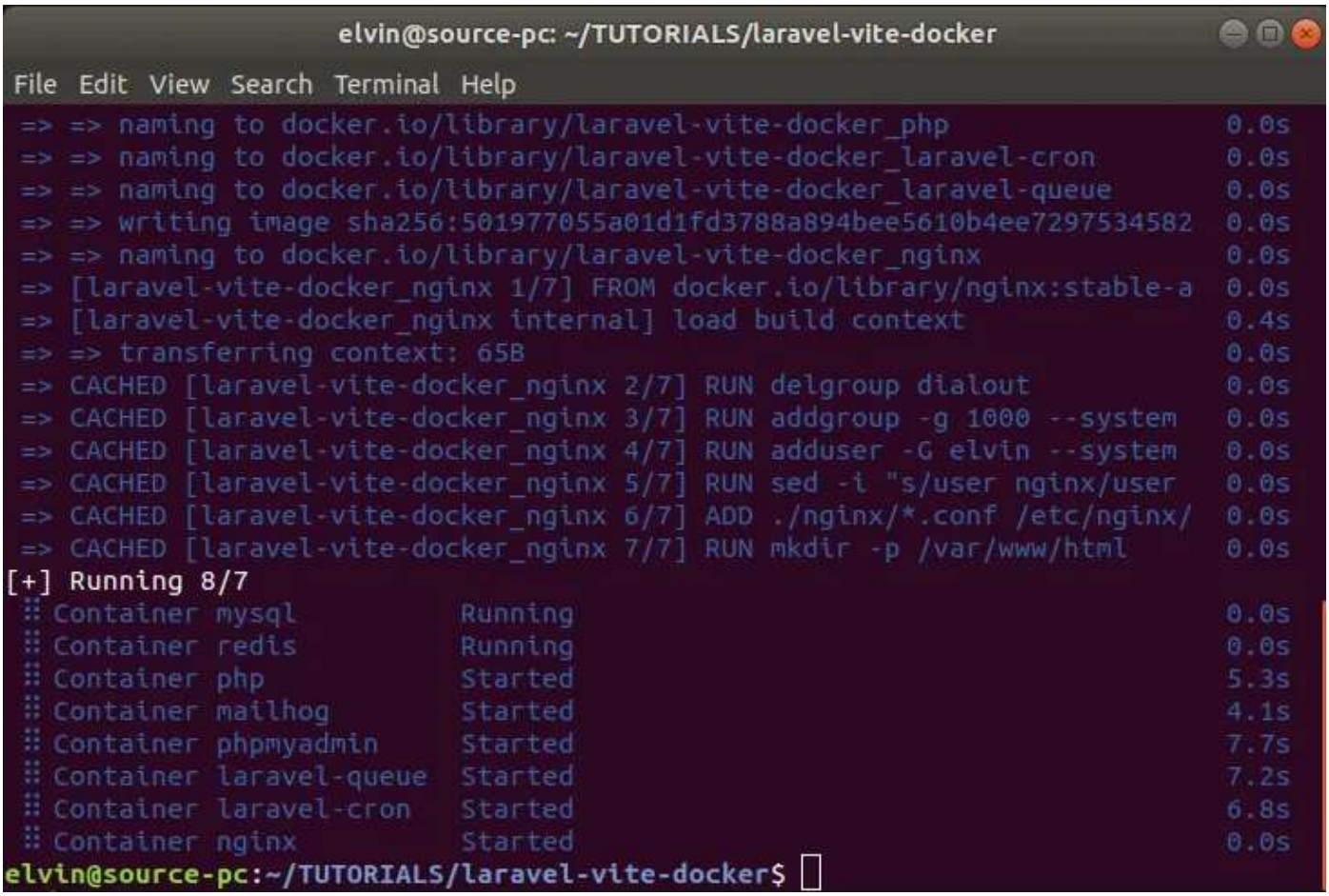
To start the `main containers` go to the root of your project directory and run the following command:

```
docker-compose up --build nginx -d
```

We are running the above command instead of just `docker-compose up --build -d` because we want only to start the `main containers`. Our `nginx container` depends on all the other main containers; hence it will start them first.

The `-d` argument runs the command in Daemon mode silently without outputting logs on your terminal.

After the docker images building, the containers will come online one by one.



starting main containers

You can check out the running containers by running the command `docker ps` on your terminal, as shown in the image below.

running containers

Laravel application configurations

Install PHP packages using composer by running the following command:

```
docker-compose run --rm composer install
```

Let's wrap up our application config by setting the application key and clearing any cached config files. We can achieve this by running the following commands.

```
docker-compose run --rm artisan key:generate
docker-compose run --rm artisan optimize
```

Our local application code gets mounted in artisan and composer containers when the containers start. Therefore, running the above commands will update both the containers' code and the code local to your machine as if you run the commands locally.

Running React frontend

We will run our React frontend in development mode with hot-reloading enabled using the following command.

```
docker-compose run --rm --service-ports npm run dev
```

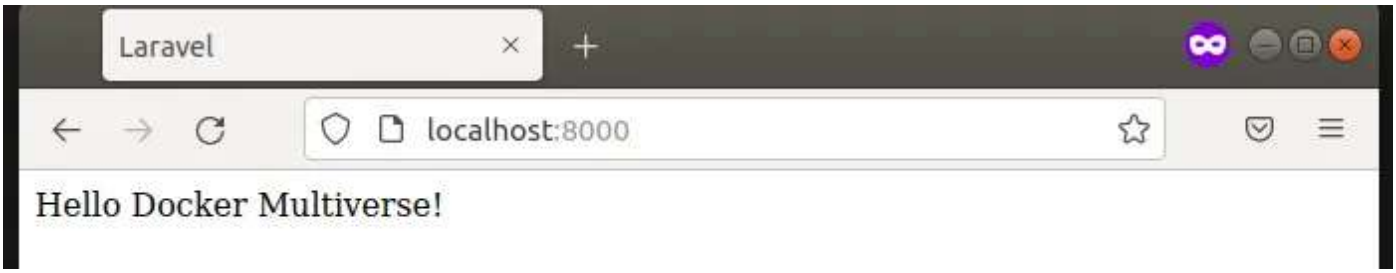
Note: Ensure that you update your application's `.env` file to reflect the correct `APP_URL`. The exposed port determines the specified URL in our `nginx service`. In our case, we are using port `8000` .We will update `APP_URL` to `APP_URL=http://localhost:8000`.

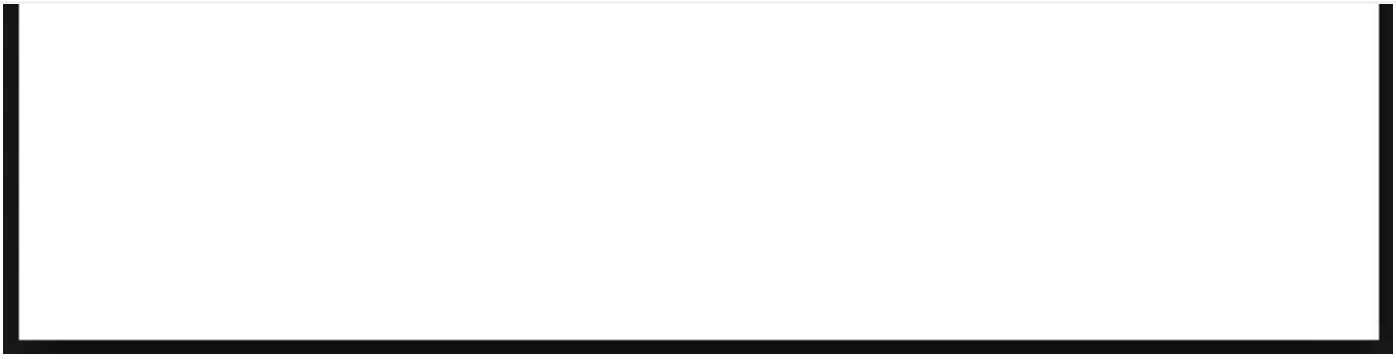
Let's now check out our application:

Insert any of the following URLs in your browser.

Application — http://localhost:8000

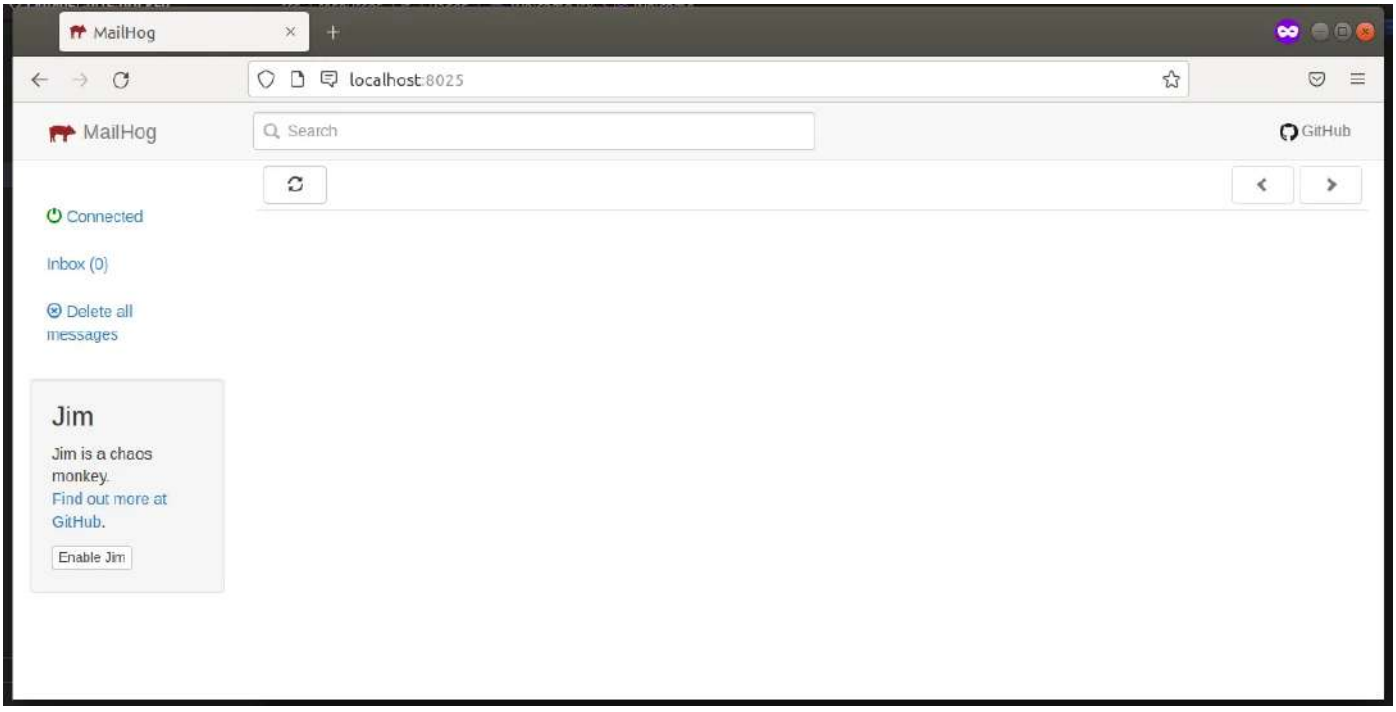
The `src/resources/js/Pages/Welcome.jsx` page should render.





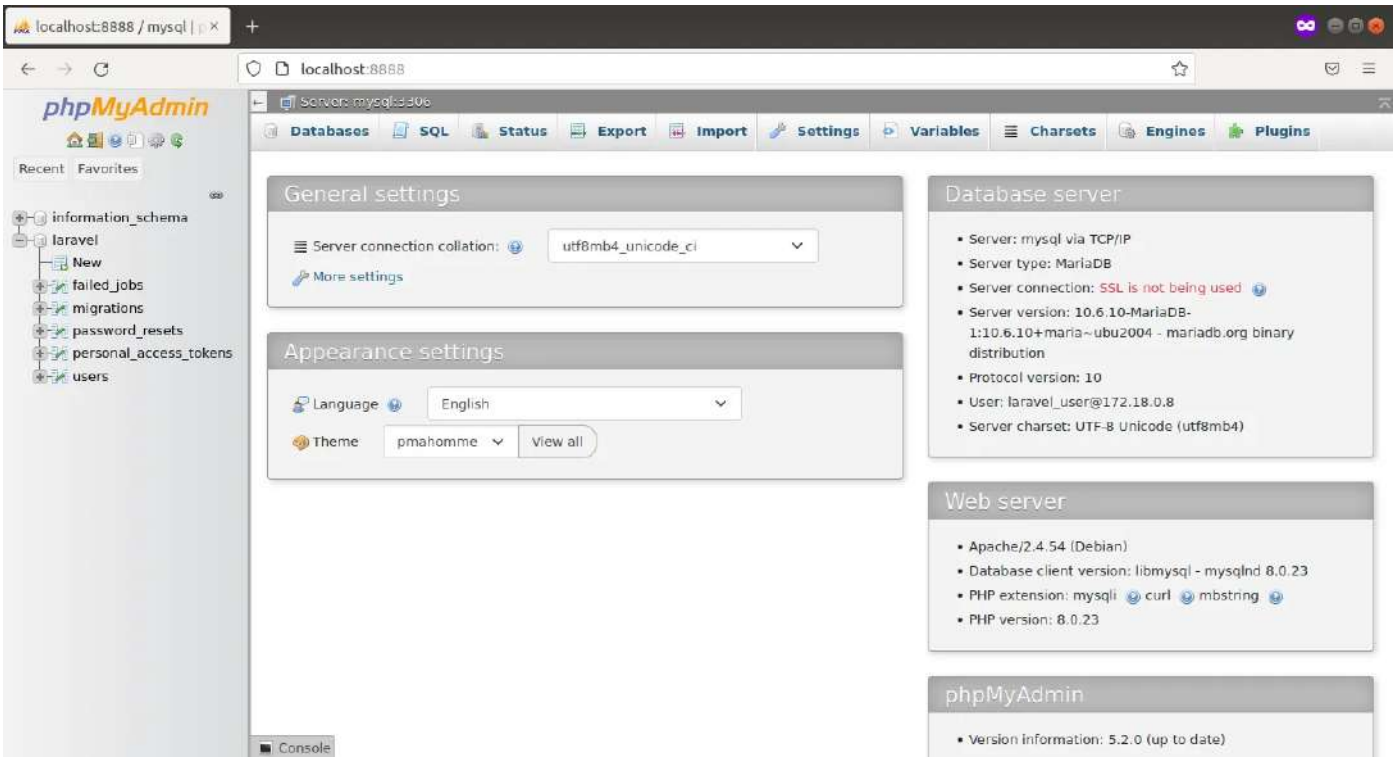
Application Welcome Page

Mailhog — http://localhost:8025



Mailhog Page

PhpMyAdmin — http://localhost:8888



phpMyAdmin Page

12. Pushing Code to GitHub

To be able to track the project, we will push it to GitHub.

Creating local repository

- Go into our project's parent directory.
- Type `git init .`
- Type `git add .` to add all the relevant files. Files specified in `.gitignore` will be ignored.
- Type `git commit -m "first commit".`

Connecting repository to GitHub

- Go to GitHub.
- Log in to your account.
- Click the new repository button in the top-right and initialize an empty repository.
- Click the "Create repository" button.
- Copy the repository's URL.

- On your terminal, at the root of your project's directory, type the below commands and replace the repository URL with yours.

```
git remote add origin https://github.com/username/new_repo.git
git branch -M main
git push -u origin main
```

- You can finally add a LICENSE file and a README file for describing the project. You can do this directly from GitHub or by creating the files locally and pushing the changes to GitHub.

13. Resources/Links

GitHub — Laravel 9 plus React project with preconfigured Docker setup.

Conclusion

I hope this has been a helpful guide. Thank you for reading!

PHP Programming React Docker Laravel

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I'm a software engineer, with a passion for computer science, electrical engineering and embedded systems. Spreading knowledge through writing is my mission.

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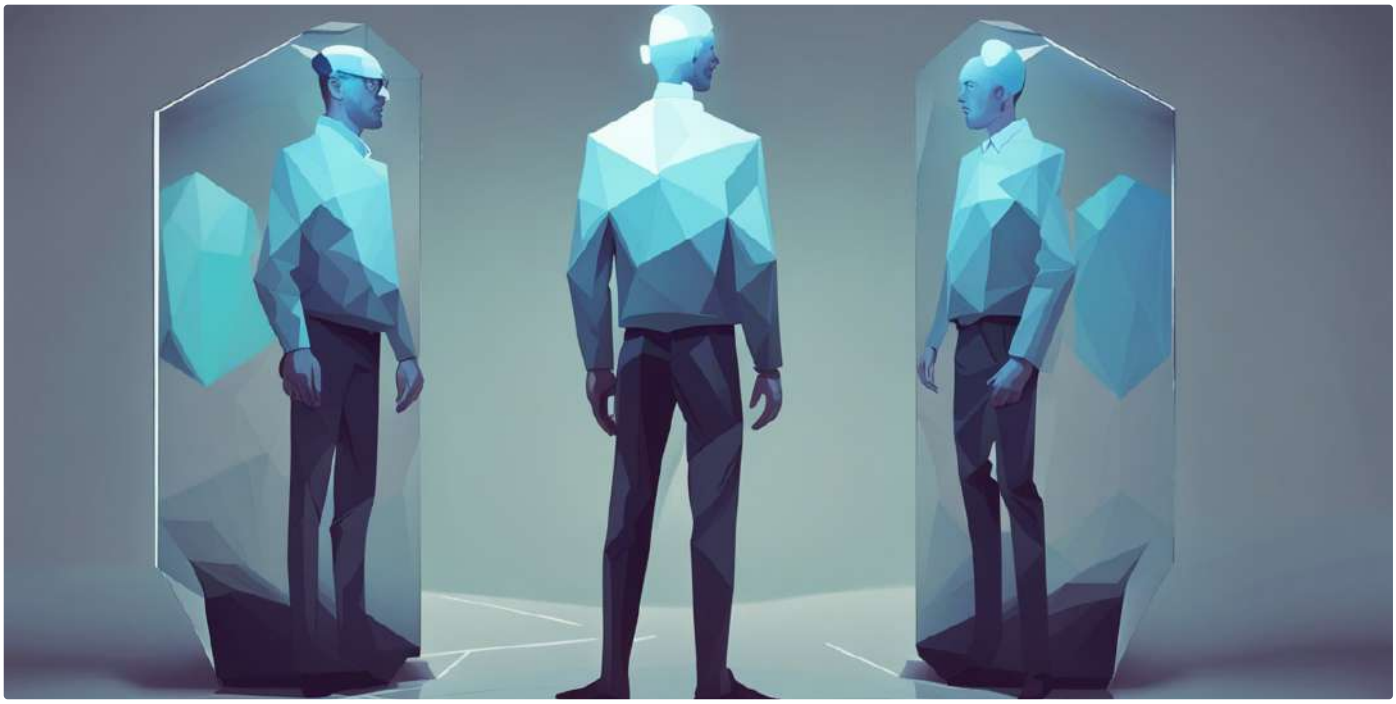

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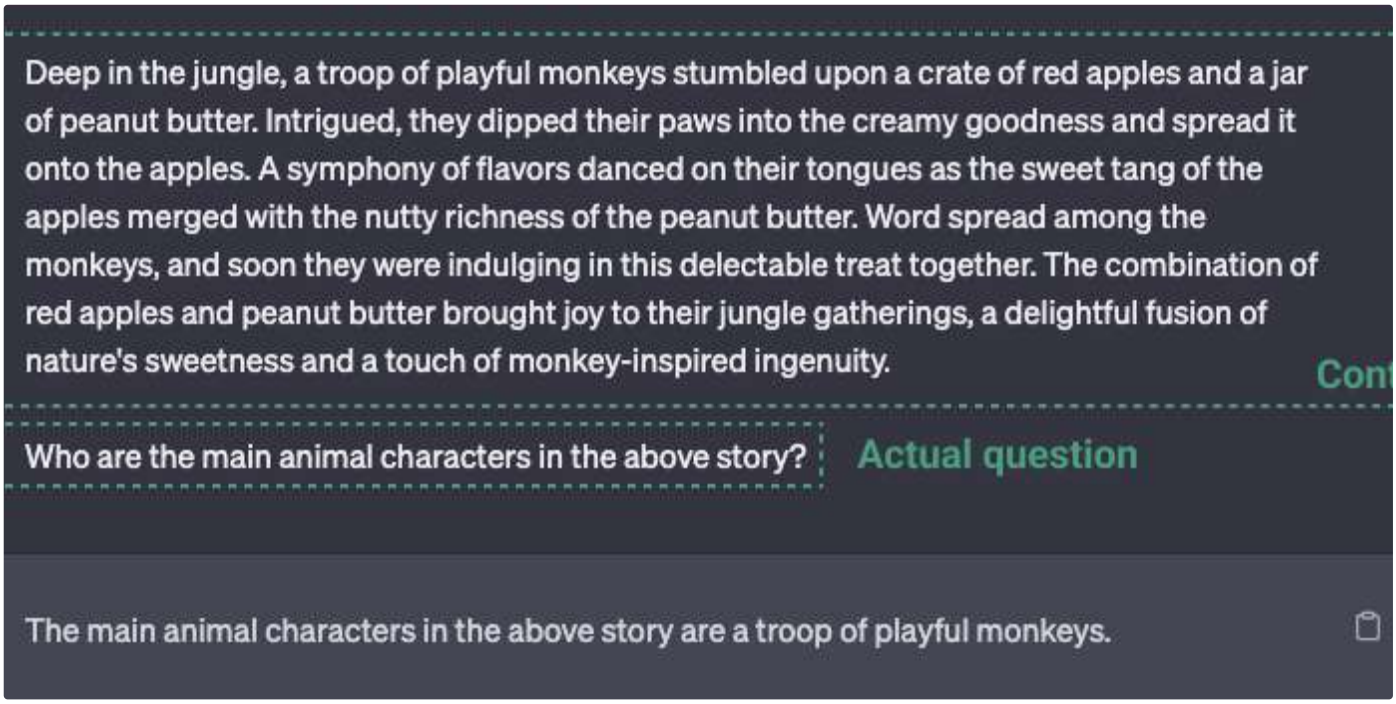

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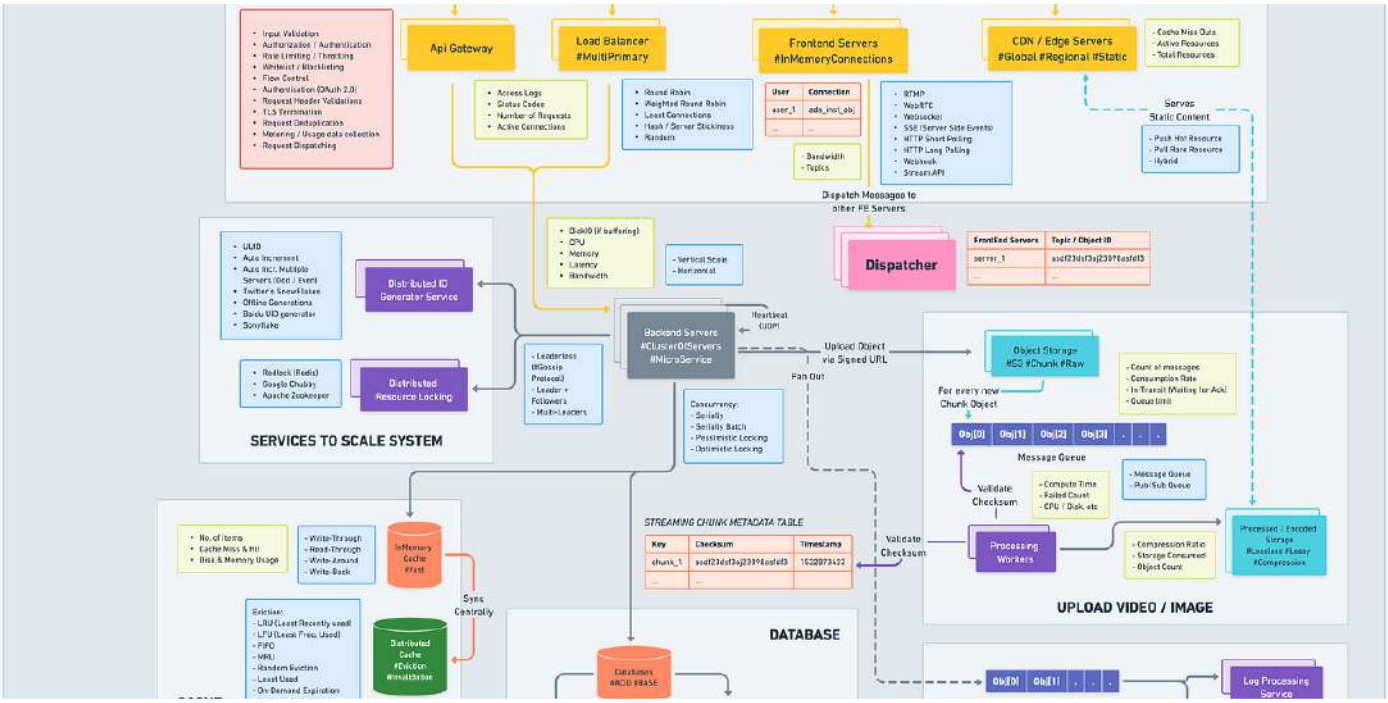

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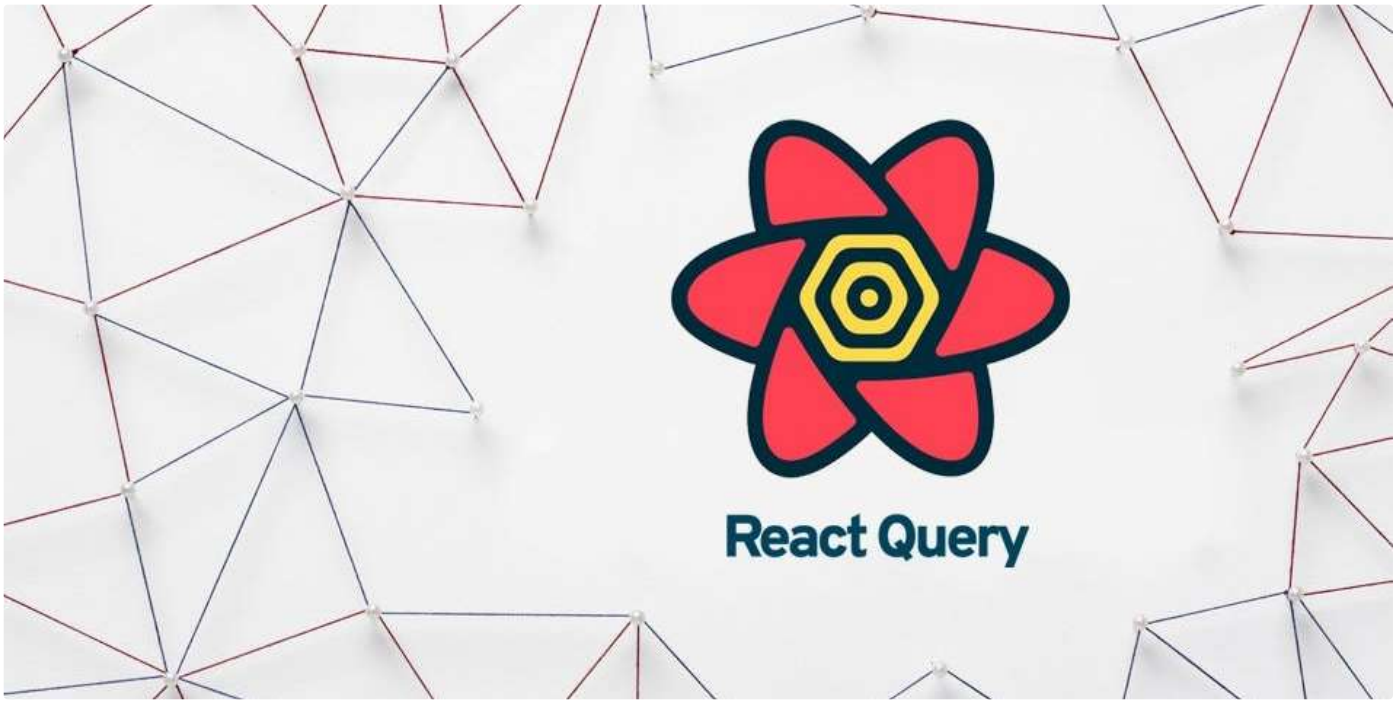

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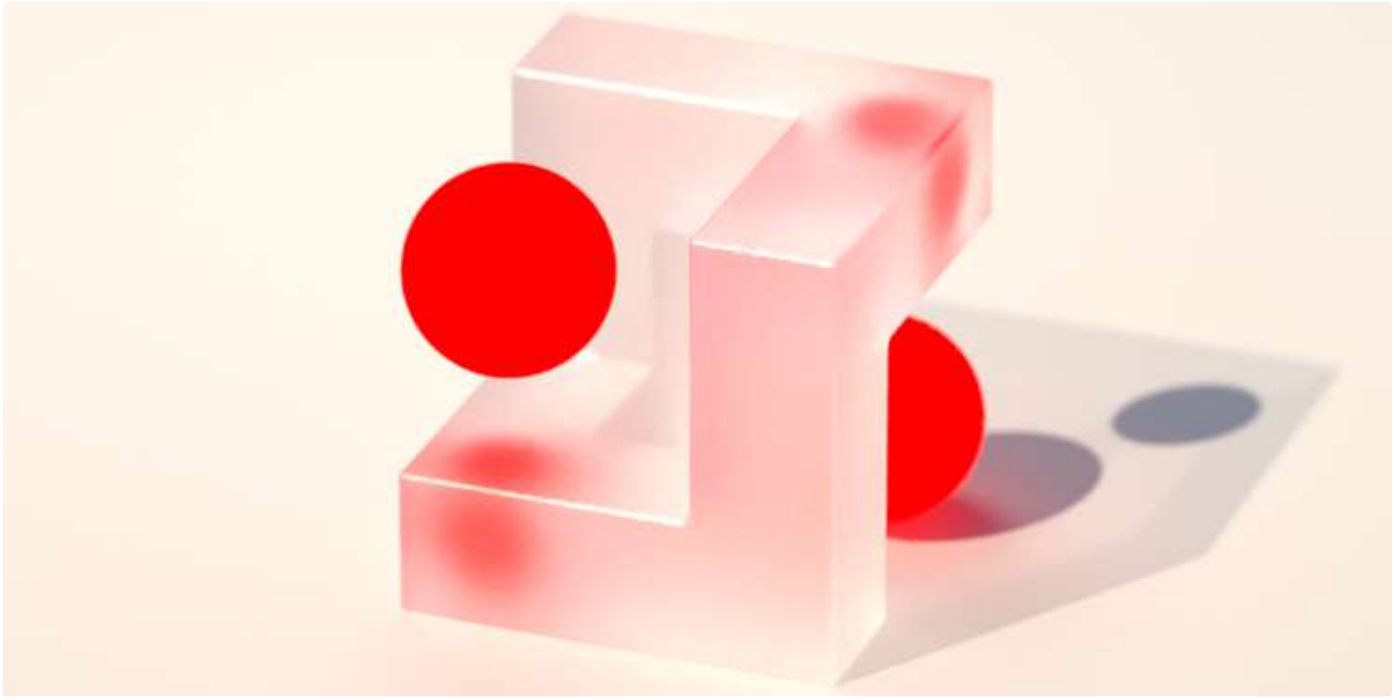

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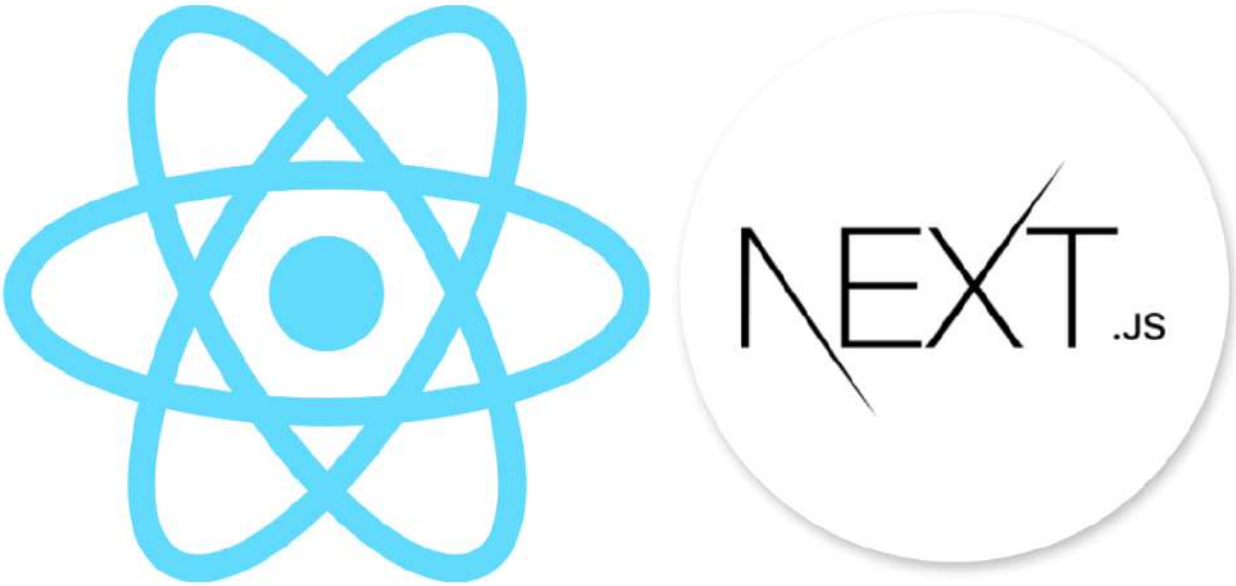

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