Deploying a Laravel Application with Docker on EC2 (Without `docker-compose.yml`)

1. Launch EC2 Instance

- Launch an EC2 instance with Ubuntu 24.04 LTS.

2. Install Docker on EC2

```
# Update package list and install dependencies
sudo apt update
sudo apt install -y apt-transport-https ca-certificates curl software-properties-comm

# Add Docker's official GPG key
curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo apt-key add -

# Add Docker repository
sudo add-apt-repository "deb [arch=amd64] https://download.docker.com/linux/ubuntu $(

# Install Docker
sudo apt update
sudo apt install -y docker-ce

# Start and enable Docker service
sudo systemctl start docker
sudo systemctl enable docker
```

3. Clone Your Laravel Repository

```
# Navigate to your home directory or desired location
cd /home/ubuntu

# Clone the Laravel application repository
git clone https://github.com/yourusername/your-laravel-repo.git
cd your-laravel-repo
```

4. Create Dockerfile

Create a `Dockerfile` in your project root with the following content:

```
# Use the official PHP image with Apache for PHP 8.1
FROM php:8.1-apache

# Install necessary PHP extensions and tools
RUN apt-get update && apt-get install -y \
    libpng-dev libjpeg-dev libfreetype6-dev \
    libzip-dev unzip git libicu-dev \
    && docker-php-ext-configure gd --with-freetype --with-jpeg \
    && docker-php-ext-install gd zip pdo pdo_mysql \
    && apt-get clean && rm -rf /var/lib/apt/lists/*

# Enable Apache mod_rewrite
RUN a2enmod rewrite

# Set the working directory to the root of your Laravel project
WORKDIR /var/www/html

# Copy the Laravel project into the container
COPY . /var/www/html

# Install Composer
RUN curl -sS https://getcomposer.org/installer | php \
    && mv composer.phar /usr/local/bin/composer

# Install PHP dependencies
RUN composer install

# Copy .env.example to .env
RUN cp .env.example .env

# Generate Laravel application key
RUN php artisan key:generate

# Set proper permissions for the entire project directory
RUN chown -R www-data:www-data /var/www/html
RUN find /var/www/html -type f -exec chmod 644 {} \;
RUN find /var/www/html -type d -exec chmod 755 {} \;

# Set correct permissions for storage and cache directories
RUN chown -R www-data:www-data /var/www/html/storage /var/www/html/bootstrap/cac
RUN chmod -R 775 /var/www/html/storage /var/www/html/bootstrap/cache

# Expose port 80
EXPOSE 80
# Add this line to your Dockerfile before the CMD ["apache2-foreground"]
RUN sed -i 's|DocumentRoot /var/www/html|DocumentRoot /var/www/html/public|' /et

# Add this to your Dockerfile before the CMD ["apache2-foreground"]
```

```
RUN echo "<Directory /var/www/html>\n\
AllowOverride All\n\
Require all granted\n\
</Directory>" > /etc/apache2/conf-available/laravel.conf \
&& a2enconf laravel

# Start Apache
CMD ["apache2-foreground"]
```

5. Create Dockerfile for MySQL

Create a `Dockerfile` for MySQL in a separate directory (optional, if you need custom configuration):

```
# Use an official MySQL runtime as a parent image
FROM mysql:5.7

# Set environment variables
ENV MYSQL_ROOT_PASSWORD=rootpassword
ENV MYSQL_DATABASE=laravel
ENV MYSQL_USER=laravel_user
ENV MYSQL_PASSWORD=laravel_password

# Expose port 3306
EXPOSE 3306
```

6. Build Docker Images

```
# Build Docker image for Laravel application
sudo docker build -t my-laravel-app .

# Build Docker image for MySQL (if using custom Dockerfile)
# cd path/to/mysql/Dockerfile
# sudo docker build -t my-mysql-image .
```

7. Run Containers

Start MySQL Container

```
# Run MySQL container
sudo docker run -d \
    --name mysql-container \
    --network mynetwork \
    -e MYSQL_ROOT_PASSWORD=rootpassword \
    -e MYSQL_DATABASE=laravel \
    -e MYSQL_USER=laravel_user \
```

```
    -e MYSQL_PASSWORD=laravel_password \
    -p 3306:3306 \
    mysql:5.7
```

Start Laravel Container

```
# Create a Docker network
sudo docker network create mynetwork

# Run Laravel container
sudo docker run -d \
    --name laravel-container \
    --network mynetwork \
    -p 8080:9000 \
    -v /home/ubuntu/your-laravel-repo:/var/www/html \
    my-laravel-app
```

8. Update Laravel Environment Configuration

Update the `.env` file in your Laravel application to match the MySQL container details:

```
DB_CONNECTION=mysql
DB_HOST=mysql-container
DB_PORT=3306
DB_DATABASE=laravel
DB_USERNAME=laravel_user
DB_PASSWORD=laravel_password
```

9. Run Laravel Migrations

Access the Laravel container and run migrations:

```
# Access the Laravel container
sudo docker exec -it laravel-container bash

# Run Laravel migrations
php artisan migrate
```

10. Access the Application

Visit `http://<your-ec2-public-ip>:8080` in your browser to access the Laravel application.

11. Clean Up

If needed, stop and remove containers:

```
# Stop and remove containers
sudo docker stop laravel-container mysql-container
sudo docker rm laravel-container mysql-container

# Remove images
sudo docker rmi my-laravel-app my-mysql-image
```