

Deployment Pipeline: Steps from Development to Production

This document describes, step by step, how I would deploy the FastAPI blog backend project from development to production.

1. Development

- Write and test code locally using a virtual environment and SQLite database.
- Use Git for version control. All changes are committed to feature branches.
- Run tests and check code formatting before pushing.

2. Code Review and Merge

- Push feature branches to GitHub.
- Open a pull request for review.
- After approval, merge into the main branch.

3. Continuous Integration (CI)

- Set up a CI pipeline (e.g., GitHub Actions) to automatically:
 - Install dependencies
 - Run linting and tests
 - Build the project
- Only allow merges if all checks pass.

4. Build Docker Image

- Create a Dockerfile to containerize the app.
- Build the Docker image and push it to a container registry (e.g., Docker Hub).

5. Staging Deployment

- Deploy the Docker image to a staging environment (cloud VM, container service, or PaaS).
- Set environment variables (SECRET_KEY, DB URL, etc.) securely.
- Run Alembic migrations to update the database schema.
- Test the app in staging to ensure everything works as expected.

6. Production Deployment

- Deploy the tested Docker image to the production environment.

- Use a production-ready ASGI server (Uvicorn with Gunicorn or Hypercorn).
- Place the app behind a reverse proxy (Nginx, Traefik) with HTTPS enabled.
- Set up logging and monitoring.
- Run Alembic migrations again to ensure the production database is up to date.

7. Scaling and Maintenance

- Configure multiple replicas for high availability.
- Set up health checks and automatic restarts.
- Schedule regular database backups.
- Use a managed database (like PostgreSQL) for production if needed.

8. Secrets and Configuration

- Store sensitive data in environment variables or a secrets manager.

9. Rollback Plan

- If a deployment fails, quickly redeploy the previous stable Docker image.

10. Documentation and API Testing

- Keep API docs available at /docs.
- Include a Postman collection in the repo for easy API testing.

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