

GHEM 배포 매뉴얼

본 문서는 웹으로 개발된 Ghem을 사용하기 위한 가이드를 프론트엔드 서버, 백엔드 서버를 배포하는 과정에 대해 서술하고 있습니다.

1. 프론트엔드

1.1 개발 환경

- Node : v18.15.0
- Vite : v4.1.0
- React : v18.2.0
- TypeScript

1.2 기술 스택

- package.json에는 다음과 같은 내용들이 있다.

```
{
  "name": "ghem",
  "private": true,
  "version": "0.0.0",
  "type": "module",
  "scripts": {
    "dev": "vite",
    "build": "tsc && vite build",
    "preview": "vite preview"
  },
  "dependencies": {
    "@emotion/react": "^11.10.6",
    "@emotion/styled": "^11.10.6",
    "@stomp/stompjs": "^7.0.0",
    "axios": "^1.3.4",
    "react": "^18.2.0",
    "react-dom": "^18.2.0",
    "react-icons": "^4.8.0",
    "react-router": "^6.9.0",
    "react-router-dom": "^6.9.0",
    "recoil": "^0.7.7",
    "three": "^0.150.1"
  },
  "devDependencies": {
    "@types/react": "^18.0.27",
    "@types/react-dom": "^18.0.10",
    "@types/react-router": "^5.1.20",
    "@types/react-router-dom": "^5.3.3",
    "@types/three": "^0.149.0",
    "@vitejs/plugin-react": "^3.1.0",
    "typescript": "^4.9.3",
    "vite": "^4.1.0"
  }
}
```

- dependencies : 의존하고 있는 라이브러리와 각 라이브러리들의 설치된 버전을 표시한다.
 - @emotion/react : react에서 사용하는 css 스타일링 라이브러리
 - @emotion/styled : react에서 사용하는 css 스타일링 라이브러리
 - @stomp/stompjs : 서비스의 실시간 채팅 기능을 사용하기 위해 설치한 stomp 브로커
 - axios : node.js와 브라우저를 위한 Promise 기반의 HTTP 클라이언트
 - react : 사용자 인터페이스를 만들기 위한 JavaScript 라이브러리
 - react-dom : react에서 작성한 여러 컴포넌트를 html과 연결하는 작업을 해주는 라이브러리
 - react-icons : 서비스에 다양한 아이콘을 적용하기 위해 사용한 react용 라이브러리
 - react-router : react에서 라우팅을 구현하는 라이브러리
 - react-router-dom : react에서 라우팅을 구현하는 라이브러리

- recoil : 서비스에서 전역으로 상태를 관리하기 위해 사용한 라이브러리
- three : 3D 그래픽을 생성하고 렌더링하기 위한 JavaScript 라이브러리
- devDependencies : 개발 모드일 때만 의존하는 라이브러리와 각 라이브러리들의 설치된 버전을 표시한다.
 - @types/react : TypeScript로 작성된 react 프로젝트에서 타입 정보를 정의하는 패키지
 - @types/react-dom : TypeScript로 작성된 React 프로젝트에서 타입 정보를 정의하는 패키지이자 react에서 DOM을 조작하기 위한 패키지
 - @types/react-router : TypeScript로 작성된 react 프로젝트에서 react router 라이브러리에 대한 타입 정보를 정의하는 패키지
 - @types/react-router-dom : TypeScript로 작성된 React 프로젝트에서 React Router DOM 라이브러리에 대한 타입 정보를 정의하는 패키지
 - @types/three : TypeScript로 작성된 프로젝트에서 Three.js 라이브러리에 대한 타입 정보를 정의하는 패키지
 - @vitejs/plugin-react : Vite.js에서 React 애플리케이션을 더욱 쉽게 개발할 수 있도록 도와주는 공식 플러그인
 - typescript : TypeScript 언어를 사용하여 프로젝트를 개발할 때 필요한 패키지
 - vite : Vite.js를 사용하여 개발 서버를 실행하고 프로젝트를 빌드할 때 필요한 패키지

1.3 배포 과정

- 기본적으로 젠킨스를 활용한 CI/CD를 이용한다.
- 위 내용은 4번(젠킨스를 통한 자동배포) 항목에서 자세히 설명한다.

1.4 앱 키

```
VITE_THUMBNAIL_LARGE =
VITE_GAME_DETAIL =
VITE_API_BASE_URL =
VITE_KAKAO_REST_API_KEY =
VITE_KAKAO_REDIRECT_URI =
VITE_NAVER_REST_API_KEY =
VITE_NAVER_REDIRECT_URI =
VITE_STEAM_REALM =
VITE_STEAM_REDIRECT_URI =
```

- .env 파일에 서비스에서 사용되는 중요한 키를 저장한다.
- Vite 기반의 환경이므로 키 이름의 앞에 VITE 를 붙여준다.
- VITE_THUMBNAIL_LARGE : 게임 상세 페이지의 게임의 배경 사진을 가져오는 url
- VITE_GAME_DETAIL : 스팀 게임 상세 정보를 얻기 위한 url
- VITE_API_BASE_URL : 서비스 내에서 백엔드와 소통하는 REST API 요청의 엔드포인트
- VITE_KAKAO_REST_API_KEY : kakao 소셜 로그인을 할 때 사용되는 key
- VITE_KAKAO_REDIRECT_URI : kakao 소셜 로그인을 진행할 때 인가 코드를 받는 uri
- VITE_NAVER_REST_API_KEY : naver 소셜 로그인을 할 때 사용되는 key
- VITE_NAVER_REDIRECT_URI : naver 소셜 로그인을 진행할 때 인가 코드를 받는 uri
- VITE_STEAM_REALM : steam openID가 사용되는 url
- VITE_STEAM_REDIRECT_URI : steam openID 인증 후 이동하는 uri

2. 백엔드 및 인프라

2.1 개발 환경 및 배포 환경

개발 환경

- Java : 11
- Spring boot version : 2.7.7

- 빌드 도구 : gradle
- IDE : IntelliJ IDEA 2022.3.1

배포 환경

- Ubuntu 20.04.4 LTS (AWS)
- Docker : 20.10.21
- Maven : Apache Maven 3.8.7

2.2 기술 스택

백엔드

- SpringBoot
- JPA
- MySQL
- postgresSQL
- JWT
- FastAPI

인프라

- AWS EC2
- Docker
- Jenkins
- Ansible
- Kubernetes

2.3 배포 과정

- 기본적으로 젠킨스를 활용한 CI/CD를 이용한다.
- 위 내용은 4번(젠킨스를 통한 자동배포) 항목에서 자세히 설명한다.

3. 외부 서비스에 대한 설명

3.1 Kakao Oauth, Naver Oauth

- NaverOAuthServiceImpl, KakaoOAuthServiceImple 설정

```
String clientId = "";
String clientSecret = "";
String state = "";
```

- RestTemplate 사용으로 카카오 서버와 통신
- 공식 문서
 - <https://developers.kakao.com/docs/latest/ko/kakaologin/common>
 - <https://developers.naver.com/docs/login/api/api.md>

3.2 Steam API, Steam openID

```
no usages 이석원
@GetMapping("/code/steam")
public ResponseEntity<?> openIdSteam(@RequestParam String code) {

    HttpV0 http = oauthService.tryOpenIdSteam(code);
    // Steam ID를 사용하여 사용자 정보를 가져오고 로그인 처리를 진행

    // 성공적으로 로그인 처리가 완료되면 클라이언트에게 적절한 응답을 반환합니다.
    return new ResponseEntity<HttpV0>(http, HttpStatus.OK);
}
```

1. 프론트엔드에서 넘겨주는 appId를 oauthService.tryOpenIdSteam() 메서드로 넘겨준다.

```
public Map<String, Object> getPlayerSummaries(String steamId) {
    RestTemplate restTemplate = new RestTemplate();

    UriComponentsBuilder builder = UriComponentsBuilder
        .fromHttpUrl(STEAM_API_BASE_URL + "/ISteamUser/GetPlayerSummaries/v0002/")
        .queryParams( name: "key", API_KEY)
        .queryParams( name: "steamids", steamId);

    Map<String, Object> response = restTemplate.getForObject(builder.toUriString(), Map.class);

    Map<String, Object> playersWrapper = (Map<String, Object>) response.get("response");
    List<Map<String, Object>> players = (List<Map<String, Object>>) playersWrapper.get("players");

    if (!players.isEmpty()) {
        return players.get(0);
    }

    return null;
}
```

2. steam api를 사용해서 사용자 정보를 받아온다.

```

@Override
public HttpVO tryOpenIdSteam(String steamId) {
    HttpVO http = new HttpVO();
    Map<String, Object> map = new HashMap<>();

    // Steam ID를 사용하여 사용자 정보를 가져오고 로그인 처리를 진행
    Map<String, Object> playerInfo = steamAPI.getPlayerSummaries(steamId);

    // 로그인 처리를 진행하세요. 예를 들면, 토큰 발행, 세션 설정 등
    User user = userCommonRepository.findUserById((String) playerInfo.get("steamid"));
    // 회원가입 진행
    if(user == null) {
        user = User.builder()
            .id((String) playerInfo.get("steamid"))
            .userProfile("\""+(String) playerInfo.get("avatarfull")+"\"")
            .build();

        user.setSteamId((String) playerInfo.get("steamid"));
        userCommonRepository.save(user);
    }
}

```

3. api를 통해 받아온 유저가 DB에 저장된 유저인지 확인하고 처음 가입하는 유저라면 DB에 저장한다.

```

String accessToken = jwtProvider.createToken(user.getUser_id());
map.put("AccessToken", accessToken);
map.put("userId", user.getUser_id());
map.put("userNickname", user.getNickname());

http.setData(map);
http.setFlag(true);

return http;

```

4. jwt 토큰을 발행해서 유저데이터와 함께 프론트엔드로 넘겨준다.

4. 젠킨스를 통한 자동 배포

4.1. 초기 세팅

- 도커를 통하여 젠킨스를 설치한다.
- 참고 문서
 - <https://dongle94.github.io/docker/docker-ubuntu-install/>
- 설치 후 다음 명령어를 통하여 젠킨스를 설치한다.
- Docker Out Of Docker(DooD) 기법으로 도커를 설치한다.

```
docker run --privileged --name docker-server -itd -p 10022:22 -p 8081:8080 -e container=docker -v /sys/fs/cgroup:/sys/fs/cgroup edown
```

- 도커에 Ansible을 설치한다.

```
docker run -itd --name ansible-server -p 20022:22 -e container=docker --tmpfs /run --tmpfs /tmp -v /sys/fs/cgroup:/sys/fs/cgroup:ro -v
```

- 젠킨스 플러그인을 설치한다.
- Ansible
- GitLab
- Publish Over SSH
- 젠킨스에 Ansible 컨테이너를 연결한다.

Publish over SSH

Jenkins SSH Key [?](#)

Passphrase [?](#)

Path to key [?](#)

Key [?](#)

☐ Disable exec [?](#)

SSH Servers

SSH Server Name ?
ansible-server

Hostname [?](#)

Username [?](#)

Remote Directory [?](#)

▼ 젠킨스 설정

- JDK

JDK

JDK installations

List of JDK installations on this system

JDK Name

JAVA_HOME

☐ Install automatically [?](#)

- Maven

Maven

Maven installations

List of Maven installations on this system

Add Maven

Maven
Name

maven3.8.7

☒ Install automatically ?

Install from Apache

Version

3.8.7

Add Installer

- Node

NodeJS
Name

Node

☒ Install automatically ?

Install from nodejs.org

Version

NodeJS 19.5.0

For the underlying architecture, if available, force the installation of the 32bit package. Other

☐ Force 32bit architecture

Global npm packages to install

Specify list of packages to install globally -- see npm install -g. Note that you can fix the pac

npm install -g serve

Global npm packages refresh hours

Duration: 30 hours; default: 7 days; max: 30 days. Note that it will always default to max

GitLab Webhook 등록

- 젠킨스 프로젝트 설정에서 Build Triggers에 webhook을 등록한다.
- Push Events을 체크한다.

Build Triggers

☐ Build after other projects are built ?

☐ Build periodically ?

☒ Build when a change is pushed to GitLab. GitLab webhook URL: http://f8d111.p.ssafy.io:8080/project/Back-End-Project ?

Enabled GitLab triggers

☒ Push Events

☐ Push Events in case of branch delete

☐ Opened Merge Request Events

☐ Build only if new commits were pushed to Merge Request ?

☐ Accepted Merge Request Events

☐ Closed Merge Request Events

Rebuild open Merge Requests

- Secret Key를 발급한다.

Secret token ?

124c03 [REDACTED] 6bb2

- <https://lab.ssfy.com/s08-bigdata-recom-sub2/S08P22D107>에서 Settings의 Webhooks를 누른다.

Q Search page

Webhooks

Webhooks enable you to send notifications to web applications in response to events in a group or project. We recommend using an [integration](#) in preference to a webhook.

URL

URL must be percent-encoded if it contains one or more special characters.

Secret token

Used to validate received payloads. Sent with the request in the `X-GitLab-Token` HTTP header.

Trigger

☒ Push events

Push to the repository.

☐ Tag push events

A new tag is pushed to the repository.

☐ Comments

A comment is added to an issue or merge request.

☐ Confidential comments

A comment is added to a confidential issue.

☐ Issues events

An issue is created, updated, closed, or reopened.

Add Webhooks 를 눌러 GitLab에 등록한다.

SSL verification

☒ Enable SSL verification

Add webhook

4.2. 배포 설정

공통 젠킨스 설정

Build Triggers

- ☐ Build after other projects are built ?
- ☐ Build periodically ?
- ☒ Build when a change is pushed to 'GitLab. GitLab webhook URL: http://j8d107.p.ssafy.io:8080/project/cicd-develop_fe ?

Enabled GitLab triggers

- ☒ Push Events
- ☐ Push Events in case of branch delete
- ☒ Opened Merge Request Events
- ☐ Build only if new commits were pushed to Merge Request ?
- ☐ Accepted Merge Request Events
- ☐ Closed Merge Request Events

Rebuild open Merge Requests

Never

- ☒ Approved Merge Requests (EE-only)
- ☒ Comments

프론트엔드 젠킨스 설정

Pipeline

Definition

Pipeline script

Script ?

```
1
2
3 pipeline {
4   agent any
5
6   tools {
7     // Install the Maven version configured as "M3" and add it to the path.
8     nodejs 'NodeJS'
9   }
10
11   stages {
12     stage('clone') {
13       steps {
14         git branch: 'develop_fe', credentialsId: 'season2lee', url: 'https://lab.ssafy.com/s08-bigdata-recom-sub2/S08P22D107'
15       }
16     }
17     stage('build') {
18       steps {
19         sh '''
20           echo build start
21           cd ../FE/ghem
22           npm install
23           echo 'VITE_THUMBNAI_LARGE="/library_hero.jpg"\nVITE_GAME_DETAIL="https://c4q3ics2qk.execute-api.ap-northeast-2.amazonaws.com/test/appdetails?l=korean&appid="\nVITE_API_BAS
24           npm run build
25           tar cvf dist.tar dist
26           '''
27       }
28     }
29     stage('ssh') {
30       steps {
31         sshPublisher(publishers: [sshPublisherDesc(configName: 'ansible-server', transfers: [sshTransfer(cleanRemote: false, excludes: '', execCommand: 'ansible-playbook -i hosts ci
32       )
33     }
34     stage('cd') {
35       steps {
36         sshPublisher(publishers: [sshPublisherDesc(configName: 'ansible-server', transfers: [sshTransfer(cleanRemote: false, excludes: '', execCommand: 'ansible-playbook -i hosts ci
37       )
38     }
39   }
40 }
41
```

백엔드(convenience) 젠킨스 설정

Definition

Pipeline script

Script ?

```
1
2
3- pipeline {
4   agent any
5
6   tools {
7     // Install the Maven version configured as "M3" and add it to the path.
8     gradle "Gradle7.6.1"
9   }
10
11  stages {
12    stage('clone') {
13      steps {
14        git branch: 'develop_be', credentialsId: 'SeonyongPark', url: 'https://lab.ssafty.com/s08-bigdata-recom-sub2/S08P22D107'
15      }
16    }
17    stage('build') {
18      steps {
19        sh '''cd ./convenience;
20          gradle clean war'''
21      }
22    }
23    stage('ssh') {
24      steps {
25        sshPublisher(publishers: [sshPublisherDesc(configName: 'ansible-server', transfers: [sshTransfer(cleanRemote: false, excludes: '', execCommand: '', execTimeout: 120000, flat
26        )
27      }
28    }
29    stage('cd') {
30      steps {
31        sshPublisher(publishers: [sshPublisherDesc(configName: 'ansible-server', transfers: [sshTransfer(cleanRemote: false, excludes: '', execCommand: '''ansible-playbook -i hosts
32        ansible-playbook -i hosts cicd_cluster_convenience.yml --limit ec2''', flatten: false, makeEmptyDirs: false, noDefaultExcludes: false, patternSeparator: '[, ]+', remoteDirectory: '.', remot
33        )
34      }
35    }
36  }
```

백엔드(user) 젠킨스 설정

Definition

Pipeline script

Script ?

```
1
2
3- pipeline {
4   agent any
5
6   tools {
7     // Install the Maven version configured as "M3" and add it to the path.
8     gradle "Gradle7.6.1"
9   }
10
11  stages {
12    stage('clone') {
13      steps {
14        git branch: 'develop_be', credentialsId: 'SeonyongPark', url: 'https://lab.ssafty.com/s08-bigdata-recom-sub2/S08P22D107'
15      }
16    }
17    stage('build') {
18      steps {
19        sh '''cd ./user;
20          gradle clean war'''
21      }
22    }
23    stage('ssh') {
24      steps {
25        sshPublisher(publishers: [sshPublisherDesc(configName: 'ansible-server', transfers: [sshTransfer(cleanRemote: false, excludes: '', execCommand: '', execTimeout: 120000, flatt
26        )
27      }
28    }
29    stage('cd') {
30      steps {
31        sshPublisher(publishers: [sshPublisherDesc(configName: 'ansible-server', transfers: [sshTransfer(cleanRemote: false, excludes: '', execCommand: '''ansible-playbook -i hosts ci
32        ansible-playbook -i hosts cicd_cluster_user.yml --limit ec2''', flatten: false, makeEmptyDirs: false, noDefaultExcludes: false, patternSeparator: '[, ]+', remoteDirectory: '.', remot
33        )
34      }
35    }
36  }
```

백엔드(recommend) 젠킨스 설정

Pipeline

Definition

Pipeline script

Script ?

```
1 pipeline {
2   agent any
3
4   stages {
5     stage('Clone') {
6       steps {
7         git branch: 'develop_be', credentialsId: 'tjrdnjs67', url: 'https://lab.ssafty.com/s08-bigdata-recom-sub2/S08P220107'
8       }
9     }
10    stage('Build') {
11      steps {
12        sh '''cd ./recom
13          tar cvf recommend.tar '''
14      }
15    }
16    stage('SSH') {
17      steps {
18        sshPublisher(publishers: [sshPublisherDesc(configName: 'ansible-server', transfers: [sshTransfer(cleanRemote: false, excludes: '', execCommand: '', execTimeout: 120000, flat
19        )])
20      }
21    }
22    stage('CD') {
23      steps {
24        sshPublisher(publishers: [sshPublisherDesc(configName: 'ansible-server', transfers: [sshTransfer(cleanRemote: false, excludes: '', execCommand: 'ansible-playbook -i hosts
25        ansible-playbook -i hosts cid_cluster_recommend.yml --limit ec2', flatten: false, makeEmptyDirs: false, noDefaultExcludes: false, patternSeparator: '[, ]+', remoteDirectory: '.', remote
26        )])
27      }
28    }
29  }
30 }
```

Ansible 설정

- 파일 목록

```
[root@24bf9cc61c30 ~]# ls
anaconda-ks.cfg          cid_container_develop_fe.yml  cid_recommend.yml  Dockerfile2  original-ks.cfg
anaconda-post.log        cid_image_convenience.yml    convenience.war    Dockerfile3  recommend.tar
cid_cluster_convenience.yml  cid_image_develop_fe.yml    dist.tar          Dockerfile4  user.war
cid_cluster_recommend.yml    cid_image_recommend.yml      Dockerfile        hosts
cid_cluster_user.yml         cid_image_user.yml           Dockerfile1       J8D107T.pem
```

- DockerFile
 - conference server

```
FROM tomcat:9.0
LABEL org.opencontainers.image.authors="tony3337@gmail.com"
COPY ./convenience.war /usr/local/tomcat/webapps
```

- user server

```
FROM tomcat:9.0
LABEL org.opencontainers.image.authors="tony3337@gmail.com"
COPY ./user.war /usr/local/tomcat/webapps
```

- recommend server

```
FROM python:3.11.2
WORKDIR /app/
ADD ./recommend.tar /app/
RUN pip install --upgrade pip
RUN pip install -r requirements.txt
CMD ["uvicorn", "main:app", "--host", "0.0.0.0", "--port", "8000"]
```

- frontend server

```
FROM node:18.15.0
LABEL org.opencontainers.image.authors="tony3337@gmail.com"
ADD ./dist.tar .
RUN ["node", "-v"]
RUN ["npm", "install", "-g", "serve"]
CMD ["serve", "-s", "./dist"]
```

- yml 파일 (Docker Hub로 image 저장)

- conference server

```
- hosts: all
#   become: true

tasks:
- name: remove current docker image
  command: docker rmi tony3337/cicd-project-convenience
  ignore_errors: yes

- name: build a docker image with deployed war file
  command: docker build -t tony3337/cicd-project-convenience -f Dockerfile2 .
  args:
    chdir: /root

- name: push the image on Docker Hub
  command: docker push tony3337/cicd-project-convenience
```

- user server

```
- hosts: all
#   become: true

tasks:
- name: remove current docker image
  command: docker rmi tony3337/cicd-project-user
  ignore_errors: yes

- name: build a docker image with deployed war file
  command: docker build -t tony3337/cicd-project-user -f Dockerfile1
  args:
    chdir: /root

- name: push the image on Docker Hub
  command: docker push tony3337/cicd-project-user
```

- recommend server

```

- hosts: all
#   become: true

tasks:
- name: remove current docker image
  command: docker rmi tony3337/cicd-project-recommend
  ignore_errors: yes

- name: build a docker image with deployed war file
  command: docker build -t tony3337/cicd-project-recommend -f Dockerfile4 .
  args:
    chdir: /root

- name: push the image on Docker Hub
  command: docker push tony3337/cicd-project-recommend
~

```

- frontend server

```

- hosts: all
#   become: true

tasks:
- name: stop current running container
  command: docker stop ghem
  ignore_errors: yes

- name: remove stopped cotainer
  command: docker rm ghem
  ignore_errors: yes

- name: remove current docker image
  command: docker rmi tony3337/ghem
  ignore_errors: yes

- name: build a docker image with deployed war file
  command: docker build -t tony3337/ghem -f Dockerfile3 .
  args:
    chdir: /root
~

```

- yml 파일 (Docker Hub에 있는 image로 deployment 생성)

- conference server

```

- name: Create User Cluster
  hosts: ec2
  # become: true
  user: ubuntu

tasks:
- name: delete the previous deployment
  command: kubectl delete deployment.apps/cicd-project-convenience
  ignore_errors: yes

- name: delete the previous service
  command: kubectl delete service/cicd-project-convenience
  ignore_errors: yes

- name: create a deployment
  command: kubectl apply -f cicd-convenience-cluster.yml
~

```

- user server

```

- name: Create User Cluster
  hosts: ec2
  # become: true
  user: ubuntu

  tasks:
    - name: delete the previous deployment
      command: kubectl delete deployment.apps/cicd-project-user
      ignore_errors: yes

    - name: delete the previous service
      command: kubectl delete service/cicd-project-user
      ignore_errors: yes

    - name: create a deployment
      command: kubectl apply -f cicd-user-cluster.yml
  ~
  ~

```

- recommend server

```

- name: Create User Cluster
  hosts: ec2
  # become: true
  user: ubuntu

  tasks:
    - name: delete the previous deployment
      command: kubectl delete deployment.apps/cicd-project-recommend
      ignore_errors: yes

    - name: delete the previous service
      command: kubectl delete service/cicd-project-recommend
      ignore_errors: yes

    - name: create a deployment
      command: kubectl apply -f cicd-recommend-cluster.yml
  ~
  ~

```

- yml 파일 (Kubernetes에 server를 올리기 위한 명령어 파일)
 - conference server

```

apiVersion: apps/v1
kind: Deployment
metadata:
  name: cicd-project-convenience
spec:
  selector:
    matchLabels:
      app: cicd-project-convenience
  replicas: 2
  template:
    metadata:
      labels:
        app: cicd-project-convenience
    spec:
      containers:
        - name: cicd-project-convenience
          image: tony3337/cicd-project-convenience
          ports:
            - containerPort: 8080
---
apiVersion: v1
kind: Service
metadata:
  name: cicd-project-convenience
  labels:
    app: cicd-project-convenience
spec:
  selector:
    app: cicd-project-convenience

```

- user server

```

apiVersion: apps/v1
kind: Deployment
metadata:
  name: cicd-project-user
spec:
  selector:
    matchLabels:
      app: cicd-project-user
  replicas: 2
  template:
    metadata:
      labels:
        app: cicd-project-user
    spec:
      containers:
        - name: cicd-project-user
          image: tony3337/cicd-project-user
          ports:
            - containerPort: 8080
---
apiVersion: v1
kind: Service
metadata:
  name: cicd-project-user
  labels:
    app: cicd-project-user
spec:
  selector:
    app: cicd-project-user

```

- recommend server

```

apiVersion: apps/v1
kind: Deployment
metadata:
  name: cicd-project-recommend
spec:
  selector:
    matchLabels:
      app: cicd-project-recommend
  replicas: 1
  template:
    metadata:
      labels:
        app: cicd-project-recommend
    spec:
      containers:
        - name: cicd-project-recommend
          image: tony3337/cicd-project-recommend
          ports:
            - containerPort: 8000
---
apiVersion: v1
kind: Service
metadata:
  name: cicd-project-recommend
  labels:
    app: cicd-project-recommend
spec:
  selector:
    app: cicd-project-recommend

```