포팅 메뉴얼

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환경변수(application-secret.yml)

```
spring:
  config:
    activate:
      on-profile: secret

  datasource:
    url: jdbc:mysql://k12d102.p.ssafy.io/:3306/TAKEN
    username:
    password:
    driver-class-name: com.mysql.cj.jdbc.Driver
  data:
    redis:
      password:

jwt:
  secret:
  access-token-expiration: 86400 # 1일
  refresh-token-expiration: 2592000 # 30일 (86400 * 30)
  token-prefix: "Bearer "
  header-string: "Authorization"

springdoc:
  swagger-ui:
    path: /api/taken/swagger
```

```
    url: /api/v3/api-docs
  api-docs:
    path: /api/v3/api-docs

cloud:
  aws:
    credentials:
      access-key:
      secret-key:
    region:
      static: ap-northeast-2
      auto: false
    s3:
      bucket: boda-taken-bucket
    stack:
      auto: false

firebase:
 service-account-key-path: /app/fcm/boda.json

kakao:
 client-id:  # 카카오 REST API 키
 redirect-uri: "k12d102.p.ssafy.io/api/oauth/kakao"  # 카카오 로그인 완료 후 리다

kakao-map:
  api-key:
```

빌드 배포 메뉴얼

1. 도커설치

1.1. Docker 레포지토리 설정

```
# 시스템의 패키지 목록을 최신화
sudo apt-get update

# SSL 인증서와 curl 도구 설치 (보안 통신과 파일 다운로드에 필요)
sudo apt-get install ca-certificates curl

# Docker의 GPG 키를 저장할 디렉토리 생성 (권한: 0755)
sudo install -m 0755 -d /etc/apt/keyrings

# Docker의 공식 GPG 키를 다운로드 (패키지 인증에 사용)
sudo curl -fsSL https://download.docker.com/linux/ubuntu/gpg -o /etc/apt/ke

# 다운로드한 GPG 키를 모든 사용자가 읽을 수 있도록 권한 설정
sudo chmod a+r /etc/apt/keyrings/docker.asc
```

1.2. 레포지토리 추가

```
# Docker 공식 레포지토리를 시스템의 소프트웨어 소스에 추가
# - arch=$(dpkg --print-architecture): 시스템 아키텍처 확인 (예: amd64)
# - VERSION_CODENAME: Ubuntu 버전 코드네임 (예: focal)
echo "deb [arch=$(dpkg --print-architecture) signed-by=/etc/apt/keyrings/do
```

1.3. Docker 패키지 설치

```
sudo apt-get install docker-ce docker-ce-cli containerd.io docker-buildx-plug
```

1.4. Docker 설치 확인 및 권한 설정

```
# 현재 사용자를 docker 그룹에 추가
sudo usermode -aG docker $USER
#변경사항 적용
newgrp docker
#권한 확인
groups
`ubuntu adm dialout cdrom floppy sudo audio dip video plugdev netdev lxd do
```

1.5 Docker 네트워크 생성

```
docker network create taken-net
```

2. Jenkins 설치

2.1. 호스트 특정 디렉토리에 마운트

```
cd /home/ubuntu && mkdir jenkins-data
```

2.2. Jenkins Docker 컨테이너에 설치

```
sudo docker run -d \
    --network taken-net \
  -v /home/ubuntu/jenkins-data:/var/jenkins_home \
  -v /var/run/docker.sock:/var/run/docker.sock \
  -v /home/ubuntu/docker/proxy:/proxy \
  -v /home/ubuntu/docker/app:/docker/app \
  -p 8080:8080 \
  -e JENKINS_OPTS="--prefix=/jenkins" \
  --group-add $(getent group docker | cut -d: -f3) \
  -e TZ=Asia/Seoul \
  --restart=on-failure \
  --name jenkins \
  jenkins/jenkins:latest
```

초기 비밀번호 확인 `docker logs jenkins`

2.3. Jenkins 환경설정

```
cd /home/ubuntu/jenkins-data

mkdir update-center-rootCAs
#Jenkins가 업데이트 센터에 접속할 때 사용할 SSL 인증서를 제공
wget https://cdn.jsdelivr.net/gh/lework/jenkins-update-center/rootCA/update-
#Jenkins가 기본 업데이트 센터 대신 Tencent 미러를 사용하도록 설정
```

```
sudo sed -i 's#https://updates.jenkins.io/update-center.json#https://raw.githu
#그 후 재시작
sudo docker restart jenkins
```

2.4. config 보안 설정 확인

```
vi config.xml
#true가 되어 있어야함
<useSecurity>true</useSecurity>
<securityRealm class="hudson.security.HudsonPrivateSecurityRealm">
<disableSignup>true</disableSignup>
```

2.5. Jenkins 초기 설정

2.6. Jenkins내 docker명령어 실행

- DooD 방식

1. **Jenkins 안에 Docker를 설치하기 위해서 Jenkins 컨테이너에 접속**

```
docker exec -it -u root jenkins bash
```

2. **Jenkins 안에 Docker를 설치**

```
# 필요한 패키지 설치
apt-get update
apt-get install -y \
    ca-certificates \
    curl \
    gnupg \
    lsb-release

# Docker의 공식 GPG 키 추가
mkdir -p /etc/apt/keyrings
curl -fsSL https://download.docker.com/linux/debian/gpg | gpg --dearmor -o

# Docker repository 설정
echo \
  "deb [arch=$(dpkg --print-architecture) signed-by=/etc/apt/keyrings/docker
  $(lsb_release -cs) stable" | tee /etc/apt/sources.list.d/docker.list > /dev/null

# 패키지 목록 업데이트
apt-get update

# Docker CLI만 설치
apt-get install -y docker-ce-cli
```

2.7. Credentials 저장

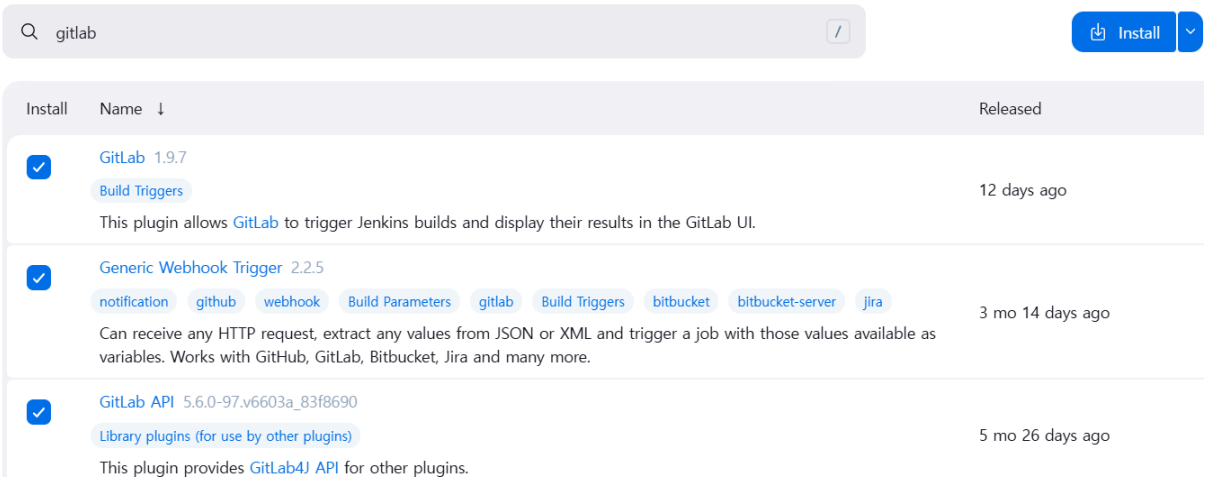
1. .env 작성

```
MYSQL_ROOT_PASSWORD=시크릿키
MYSQL_DATABASE=TAKEN
MYSQL_USER=TAKEN
MYSQL_PASSWORD=시크릿키
```

3. Jenkins, Gitlab 연동하기

3.1. Jenkins plugin 설치

Jenkins관리 → Plugins 클릭



3.2. Credential 등록

Credentials

T	P	Store ↓	Domain	ID	Name
		System	(global)	GITLAB_TOKEN	GitLab API token (gitlab access token)
		System	(global)	GITLAB_LOGIN	seon7129@naver.com/******
		System	(global)	GITLAB_ACCESS_TOKEN	seon7129@naver.com/******
		System	(global)	application-secret.yml	application-secret.yml

Stores scoped to Jenkins

P	Store ↓	Domains
	System	(global)

3.3. Gitlab 연결하기

Gitlab 계정 - Settings - Access Tokens 발급

→ 프로젝트 토큰 발급이 아니라 개인 계정 토큰 발급 필수 !!

Access Token

Token name	Scopes	Created	Last Used	Expires	Role	Action
taken	api, read_api, create_runner, manage_runner, read_repository, write_repository	Apr 29, 2025	2 weeks ago	in 2 weeks	Maintainer	

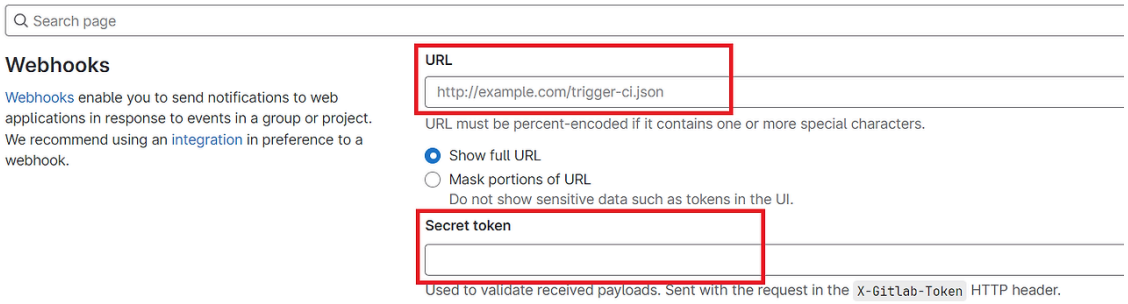
3.4. Pipeline 생성 및 Webhook 연결

jenkins : 새로운 item → pipeline

- Generate 버튼을 클릭 후
  - jenkins secret token 생성

GitLab : 프로젝트 → setting → webhook

- URL과 jenkins Secret token 입력



4. MySQL, Redis 컨테이너 설치

4.1 docker-compose.yml 작성

```
# /home/ubuntu/docker/proxy/docker-compose.yml
services:
  nginx:
    image: nginx:latest
    container_name: nginx
    ports:
      - "80:80"
      - "443:443"
    volumes:
      - ./nginx.conf:/etc/nginx/nginx.conf
      - ./data/certbot/conf:/etc/letsencrypt
      - ./data/certbot/www:/var/www/certbot
    command: "/bin/sh -c 'while :; do sleep 6h & wait $${!}; nginx -s reload; doı
    networks:
      - app-network
    restart: always

  certbot:
    image: certbot/certbot
    volumes:
      - ./data/certbot/conf:/etc/letsencrypt
      - ./data/certbot/www:/var/www/certbot
    entrypoint: "/bin/sh -c 'trap exit TERM; while :; do certbot renew; sleep 12h
```

```
    depends_on:
      - nginx
    networks:
      - app-network

networks:
  app-network:
    external: true
```/docker/db/docker-compose.yml
services:
  mysql:
    image: mysql:8
    container_name: mysql
    restart: always
    environment:
      MYSQL_ROOT_PASSWORD:
      MYSQL_DATABASE: Taken
      MYSQL_USER: Taken
      MYSQL_PASSWORD:
    ports:
      - "13306:3306"
    volumes:
      - ./mysql/init.sql:/docker-entrypoint-initdb.d/init.sql
      - mysql_data:/var/lib/mysql
      - ./mysql/logs:/var/log/mysql
    command:
      - --character-set-server=utf8mb4
      - --collation-server=utf8mb4_unicode_ci
      - --slow_query_log=1
      - --slow_query_log_file=/var/log/mysql/mysql-slow.log
      - --long_query_time=1
    healthcheck:
      test: ["CMD", "mysqladmin", "ping", "-h", "localhost"]
      interval: 10s
      timeout: 5s
      retries: 5
    networks:
      - taken-net
```
```

```
  redis:
    image: redis:7
    container_name: redis
    ports:
      - "16379:6379"
    volumes:
      - redis_data:/data
    command: redis-server --requirepass '[비밀번호]' --appendonly yes
    networks:
      - taken-net

volumes:
  mysql_data:
  redis_data:

networks:
  taken-net:
    external: true
```

4.2. docker 명령어 실행

```
#해당 폴더 위치로 이동
cd home/ubuntu/docker/db/docker-compose.yml

docker compose up -d
```

4.3 컨테이너 접속 후 권한 부여

```
#MYSQL 컨테이너 접속
docker exec -it mysql bash

#MYSQL에 root로 로그인
mysql -u root -p

#password 입력
```

```
#권한 부여 명령어 실행
USE Taken;

CREATE USER 'TAKEN'@'%' IDENTIFIED BY '';
GRANT ALL PRIVILEGES ON TAKEN.* TO 'TAKEN'@'%';
FLUSH PRIVILEGES;

# 로그 수집용
CREATE USER 'exporter_user'@'%' IDENTIFIED BY '';
GRANT PROCESS, REPLICATION CLIENT, SELECT ON *.* TO 'exporter_user'@
FLUSH PRIVILEGES;

#확인하기
SHOW GRANTS FOR 'TAKEN'@'%';

#나가기
exit;
```

5. NGINX 컨테이너 설치

5.1 docker-compose.yml 작성

```
# /home/ubuntu/docker/proxy/docker-compose.yml
services:
  nginx:
    image: nginx:latest
    container_name: nginx
    ports:
      - "80:80"
      - "443:443"
    volumes:
      - ./nginx.conf:/etc/nginx/nginx.conf
      - ./data/certbot/conf:/etc/letsencrypt
      - ./data/certbot/www:/var/www/certbot
```

```
    command: "/bin/sh -c 'while :; do sleep 6h & wait $${!}; nginx -s reload; do
    networks:
      - taken-net
    restart: always

  certbot:
    image: certbot/certbot
    volumes:
      - ./data/certbot/conf:/etc/letsencrypt
      - ./data/certbot/www:/var/www/certbot
    entrypoint: "/bin/sh -c 'trap exit TERM; while :; do certbot renew; sleep 12h
    depends_on:
      - nginx
    networks:
      - taken-net

networks:
  taken-net:
    external: true
```

5.2 CertBot https 인증서 발급

5.2.1 nginx.conf 작성

추후 변경 예정 기본 코드 작성

```
 upstream backend {
    server blue:8081;
    server green:8082 backup;
}

server {
    listen 80;
    listen [::]:80;
    server_name i12d101.p.ssafy.io;

    location /.well-known/acme-challenge/ {
        root /var/www/certbot;
    }
```

```
    location / {
        return 301 https://$server_name$request_uri;
    }
}
```

5.2.2 폴더 생성 및 권한 설정

```
mkdir -p data/certbot/conf
mkdir -p data/certbot/www
sudo chown -R ubuntu:ubuntu data/certbot
sudo chmod -R 755 data/certbot

//인증서 발급 받기
docker compose exec certbot certbot certonly --webroot -w /var/www/certbo

Saving debug log to /var/log/letsencrypt/letsencrypt.log
```

```
sudo docker run --rm \
  -v /home/ubuntu/docker/proxy/data/certbot/conf:/etc/letsencrypt \
  -v /home/ubuntu/docker/proxy/data/certbot/www:/var/www/certbot \
  certbot/certbot certonly --webroot \
  -w /var/www/certbot \
  -d k12d102.p.ssafy.io \
  --agree-tos \
  --email seon7129@naver.com \
  --force-renewal
```

5.2.4 인증서 발급이 성공되면 SSL pem 파일 작성

```
openssl dhparam -out data/certbot/conf/ssl-dhparams.pem 2048
```

5.3 Nginx 작성

```
user nginx;
worker_processes auto;
error_log /var/log/nginx/error.log warn;
```

```
pid /var/run/nginx.pid;

events {
    worker_connections 1024;
}

http {
    include /etc/nginx/mime.types;
    default_type application/octet-stream;

    large_client_header_buffers 4 256k;

    upstream backend {
        server spring:8081;
    }

    server {
        listen 80;
        listen [::]:80;
        server_name k12d102.p.ssafy.io;

        location /.well-known/acme-challenge/ {
            root /var/www/certbot;
        }

        location / {
            return 301 https://$server_name$request_uri;
        }
    }

    server {
        listen 443 ssl;
        server_name k12d102.p.ssafy.io;
        server_tokens off;

        ssl_certificate /etc/letsencrypt/live/k12d102.p.ssafy.io/fullchain.pem;
        ssl_certificate_key /etc/letsencrypt/live/k12d102.p.ssafy.io/privkey.pem;
        include /etc/letsencrypt/options-ssl-nginx.conf;
```

```
    ssl_dhparam /etc/letsencrypt/ssl-dhparams.pem;

    # 너무 긴 URI 요청 처리를 위한 named location
    location @uri_too_large {
        return 302 https://$host/error/too-large;
    }

    # URI 길이 체크 (server 블록 시작 부분에 배치)
    if ($request_uri ~* "^.{500,}$") {
        return 414;
    }

    # 에러 페이지 설정 (다른 error_page 설정과 함께 배치)
    error_page 414 = @uri_too_large;

    location @forbidden {
        return 302 https://$host/error/permission-denied;
    }
    location @notfound {
        return 302 https://$host/error/not-found;
    }
    location @bad_gateway {
        return 302 https://$host/error/bad-gateway;
    }

    location /api/ {
        proxy_pass http://backend;
        proxy_http_version 1.1;
        proxy_set_header Host $host;
        proxy_set_header X-Real-IP $remote_addr;
        proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
        proxy_set_header X-Forwarded-Proto $scheme;

        proxy_read_timeout 3600;
        proxy_cache off;

    }
```

```
    location /jenkins {
        proxy_pass http://jenkins:8080/jenkins/;
        proxy_http_version 1.1;
        proxy_set_header Host $host;
        proxy_set_header X-Real-IP $remote_addr;
        proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
        proxy_set_header X-Forwarded-Proto $scheme;

        # Jenkins 관련 추가 설정
        proxy_set_header X-Jenkins-Context "/jenkins";
        proxy_redirect http:// https://;

        proxy_intercept_errors on;
        error_page 404 = @notfound;
        error_page 502 = @bad_gateway;
    }

    # swagger 슬래시 없는 요청 리디렉션
    location = /api/taken/swagger {
            return 301 /api/taken/swagger/;
    }

    # swagger 진입점에서 실제 Swagger UI index.html로 바로 이동
            location = /api/taken/swagger/ {
                return 301 /api/taken/swagger-ui/index.html;
            }

    location /api/taken/swagger/ {
            proxy_pass http://backend/api/taken/swagger/;
            proxy_http_version 1.1;
            proxy_set_header Host $host;
            proxy_set_header X-Real-IP $remote_addr;
            proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
            proxy_set_header X-Forwarded-Proto $scheme;
    }

    location /api/taken/swagger-ui/ {
                rewrite ^/api/taken/swagger-ui/(.*)$ /api/taken/swagger-ui/$1 bre
```

```
            proxy_pass http://backend;
            proxy_http_version 1.1;
            proxy_set_header Host $host;
            proxy_set_header X-Real-IP $remote_addr;
            proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
            proxy_set_header X-Forwarded-Proto $scheme;
        }


        location /api/v3/api-docs/ {
            rewrite ^/api/v3/api-docs/(.*)$ /api/v3/api-docs break;
            proxy_pass http://backend;
            proxy_http_version 1.1;
            proxy_set_header Host $host;
            proxy_set_header X-Real-IP $remote_addr;
            proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
            proxy_set_header X-Forwarded-Proto $scheme;
        }

    location /metrics {
        proxy_pass http://backend/actuator/prometheus;
        proxy_set_header Host $host;
        proxy_set_header X-Real-IP $remote_addr;
        proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
        proxy_set_header X-Forwarded-Proto https;
        proxy_redirect off;
    }

    # Prometheus 대시보드
    location /prometheus/ {
        proxy_pass http://prometheus:9090/;
        proxy_set_header Host $host;
        proxy_set_header X-Real-IP $remote_addr;
        proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
        proxy_set_header X-Forwarded-Proto https;
        proxy_redirect / /prometheus/;

        proxy_intercept_errors on;
```

```
        error_page 404 = @notfound;
        error_page 502 = @bad_gateway;
    }

    # Grafana 대시보드
    location /grafana/ {
        proxy_pass http://grafana:3000/;
        proxy_set_header Host $host;
        proxy_set_header X-Real-IP $remote_addr;
        proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
        proxy_set_header X-Forwarded-Proto $scheme;
        proxy_set_header X-Forwarded-Prefix /grafana;
        proxy_redirect off;

        proxy_intercept_errors on;
        error_page 502 = @bad_gateway;
    }

    location /loki/ {
        proxy_pass http://loki:3100/;
        proxy_set_header Host $host;
        proxy_set_header X-Real-IP $remote_addr;
        proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
        proxy_set_header X-Forwarded-Proto $scheme;

        proxy_intercept_errors on;
        error_page 404 = @notfound;
        error_page 502 = @bad_gateway;
    }


    # Kibana 대시보드
        location = /kibana {
            return 301 /kibana/;
        }

        location /kibana/ {
            proxy_pass http://kibana:5601/;
```

```
            proxy_http_version 1.1;
            proxy_set_header Upgrade $http_upgrade;
            proxy_set_header Connection "upgrade";
            proxy_set_header Host $host;
            proxy_set_header X-Real-IP $remote_addr;
            proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
            proxy_set_header X-Forwarded-Proto $scheme;

            proxy_redirect off;
            proxy_intercept_errors on;
            error_page 502 = @bad_gateway;
        }

    add_header X-Content-Type-Options "nosniff" always;
    add_header X-Frame-Options "SAMEORIGIN" always;
    add_header X-XSS-Protection "1; mode=block" always;
  }
}
```

6. BackEnd 배포

6.1 app/docker-compose.yml 작성

```
# /home/ubuntu/docker/app/docker-compose.yml
services:
  springboot-app:
    build:
      args:
        - PROFILE=prod
    image: spring-backend
    container_name: spring
    ports:
      - "8081:8081"
    environment:
      - SPRING_PROFILES_ACTIVE=prod
      - PROFILE=prod
```

```
    - SPRING_DATASOURCE_URL=jdbc:mysql://mysql:3306/TAKEN?useSSL=f
    - SPRING_DATASOURCE_USERNAME=
    - SPRING_DATASOURCE_PASSWORD=
    - SERVER_PORT=8081
  volumes:
    - /home/ubuntu/app-logs:/var/log/spring  # Spring 로그 파일 저장용 볼륨 추가
    - /home/ubuntu/docker/app/fcm/boda.json:/app/fcm/boda.json
  restart: always
  networks:
    - taken-net

networks:
  taken-net:
    external: true
```

6.2. DockerFile 작성

```
FROM amazoncorretto:17

ENV SPRING_PROFILES_ACTIVE=prod

WORKDIR /app
COPY ./build/libs/ac102-0.0.1-SNAPSHOT.jar app.jar

CMD ["sh", "-c", "java -Dspring.profiles.active=$SPRING_PROFILES_ACTIVE -
```

6.3. Jenkins pipeline을 이용하여 배포

```
pipeline {
    agent any

    stages {
        stage('BE-dev-Checkout') {
            steps {
                echo 'Start Checkout Taken-backend project...'
                git branch: 'develop',
                    credentialsId: 'GITLAB_LOGIN',
```

```
            url: 'https://lab.ssafy.com/taken/taken_backend.git'
        echo 'Checkout finished!'
    }
}

stage('BE-dev-Build') {
    steps {
        echo 'Start building taken_backend project...'
        script {
            def startTime = System.currentTimeMillis()

            withCredentials([file(credentialsId: 'application-secret.yml', variab
                sh """
                    cat "\$SECRET_FILE" > src/main/resources/application-secre
                    cat src/main/resources/application-secret.yml
                """
            }

            sh '''
                chmod +x ./gradlew
                ./gradlew clean build -x test
                echo "빌드 후 파일 확인:"
                ls -al build/libs
            '''

            def endTime = System.currentTimeMillis()
            def duration = (endTime - startTime) / 1000
            echo "🚀 백엔드 빌드 완료: ${duration}초 소요"
        }
        echo 'Build finished!'
    }
}


// stage('SonarQube Analysis') {
//     steps {
//         echo '📊 SonarQube 코드 분석 시작'
//         withSonarQubeEnv('SonarQube') {
```

```
//             sh './gradlew sonarqube'
//         }
//     }
// }


stage('BE-dev-Build Docker Image') {
    steps {
        script {
            def startTime = System.currentTimeMillis()

            // 빌드된 jar 파일명을 변수로 추출 (가장 최근 생성된 파일)
            def jarName = sh(
                script: "ls -t build/libs/*.jar | grep -v plain | head -n 1",
                returnStdout: true
            ).trim()

            echo "📦 사용할 JAR 파일: ${jarName}"

            // Dockerfile이 루트에 있고, COPY 경로를 jarName으로 전달
            sh """
                cp ${jarName} app.jar
                docker build -t spring-backend .
                rm -f app.jar
            """

            def endTime = System.currentTimeMillis()
            def duration = (endTime - startTime) / 1000
            echo "🚀 Docker 이미지 빌드 완료: ${duration}초 소요"
        }
    }
}

stage('Clean Docker Images') {
    steps {
        script {
            sh "docker image prune -f"
        }
```

```
        }
      }

      stage('BE-dev-Deploy') {
        steps {
          script {
            def startTime = System.currentTimeMillis()

            sh "docker stop spring || true"
            sh "docker rm spring || true"

            // sh "docker compose -f /home/ubuntu/docker/app/docker-comp
            // sh "docker compose -f /home/ubuntu/docker/app/docker-comp
            sh "cd /docker/app && docker compose down springboot-app|| tr
            sh "cd /docker/app && docker compose up -d springboot-app"

            def endTime = System.currentTimeMillis()
            def duration = (endTime - startTime) / 1000
            echo "🚀 배포 완료: ${duration}초 소요"
          }
        }
      }
    }

    post {
      success {
        echo '✅ Backend Deployment Successful!'
      }
      failure {
        echo '❌ Backend Deployment Failed.'
      }
    }
}
```

7. 모니터링 (Grafana, prometheus, loki, promtail)

7.1. docker-compose.yml 작성

```
# /home/ubuntu/docker/monitoring/grafana/docker-compose.yml
version: "3.8"

services:
  # 📈 Prometheus
  prometheus:
    image: prom/prometheus
    container_name: prometheus
    volumes:
      - ./prometheus:/etc/prometheus
    ports:
      - "9090:9090"
    command:
      - "--config.file=/etc/prometheus/prometheus.yml"
    restart: always
    networks:
      - taken-net

  # 📊 Grafana
  grafana:
    image: grafana/grafana
    container_name: grafana
    ports:
      - "3000:3000"
    volumes:
      - grafana-data:/var/lib/grafana
    environment:
      - GF_SERVER_ROOT_URL=${DOMAIN}/grafana
      - GF_SERVER_SERVE_FROM_SUB_PATH=false
      - GF_SECURITY_ADMIN_PASSWORD=${GRAFANA_ADMIN_PASSWORD} #
    restart: always
    networks:
      - taken-net

  # 📡 node exporter
  node-exporter:
```

```
  image: prom/node-exporter
  container_name: node-exporter
  ports:
    - "9100:9100"
  restart: always
  networks:
    - taken-net

# 🧩 MySQL exporter
mysql-exporter:
  image: prom/mysqld-exporter
  container_name: mysql-exporter
  environment:
    - DATA_SOURCE_NAME=exporter_user:[비밀번호]@tcp(mysql:3306)/
  command:
    - "--mysqld.username=exporter_user:[비밀번호]"
    - "--mysqld.address=mysql:3306"
    - "--collect.global_status"
    - "--collect.global_variables"
    - "--collect.perf_schema.eventsstatements"
    - "--collect.info_schema.innodb_metrics"
    - "--collect.info_schema.innodb_tablespaces"
  ports:
    - "9104:9104"
  restart: always
  networks:
    - taken-net

loki:
  image: grafana/loki:latest
  container_name: loki
  ports:
    - "3100:3100"
  command: -config.file=/etc/loki/local-config.yml
  volumes:
    - ./loki:/etc/loki
    - ./loki-data:/loki  # ✅ tsdb 필수 경로들 저장소
  restart: always
```

```
    networks:
      - taken-net


  promtail:
    image: grafana/promtail:latest
    container_name: promtail
    volumes:
      - /var/log:/var/log
      - ./promtail:/etc/promtail
      - /var/run/docker.sock:/var/run/docker.sock
      - /var/lib/docker/containers:/var/lib/docker/containers
    command: -config.file=/etc/promtail/config.yml
    restart: always
    networks:
      - taken-net

networks:
  taken-net:
    external: true

volumes:
  grafana-data:
  esdata:
```

7.1. loki/locla-config.yml

```
# /home/ubuntu/docker/monitoring/loki/local-config.yml
auth_enabled: false

server:
  http_listen_port: 3100

common:
  path_prefix: /tmp/loki

ingester:
  lifecycler:
```

```
    address: 127.0.0.1
    ring:
      kvstore:
        store: inmemory
      replication_factor: 1
    final_sleep: 0s
  chunk_idle_period: 5m
  chunk_retain_period: 30s

schema_config:
  configs:
    - from: 2020-10-24
      store: tsdb
      object_store: filesystem
      schema: v13
      index:
        prefix: index_
        period: 24h

storage_config:
  tsdb_shipper:
    active_index_directory: /tmp/loki/tsdb-shipper-active
    cache_location: /tmp/loki/tsdb-shipper-cache
    cache_ttl: 24h
  filesystem:
    directory: /tmp/loki/chunks

compactor:
  working_directory: /tmp/loki/compactor

limits_config:
  reject_old_samples: true
  reject_old_samples_max_age: 168h

chunk_store_config:
  chunk_cache_config:
    embedded_cache:
      enabled: true
```

```
    max_size_mb: 100

table_manager:
  retention_deletes_enabled: true
  retention_period: 168h
```

7.2. prometheus/prometheus.yml

```
# /home/ubuntu/docker/monitoring/prometheus/prometheus.yml
global:
  scrape_interval: 15s  # 15초마다 메트릭 수집

scrape_configs:
  - job_name: 'spring-exporter' # Springboot 데이터 가져오기
    metrics_path: '/actuator/prometheus'
    static_configs:
      - targets: ['spring:8081'] # spring-app metrics를 통해 수집
  - job_name: 'node-exporter' # node-exporter 데이터 가져오기
    static_configs:
      - targets: ['node-exporter:9100'] # node-exporter:9100을 통해 수집
  - job_name: 'mysqld-exporter'
    static_configs:
      - targets: ['mysql-exporter:9104']
```

7.3. promtail/config.yml

```
# /home/ubuntu/docker/monitoring/promtail/config.yml
server:
  http_listen_port: 9080
  grpc_listen_port: 0

positions:
  filename: /tmp/positions.yaml

clients:
  - url: http://loki:3100/loki/api/v1/push
```

```
scrape_configs:
  - job_name: system
    static_configs:
      - targets:
          - localhost
        labels:
          job: varlogs
          __path__: /var/log/*log
  - job_name: docker
    docker_sd_configs:
        - host: unix:///var/run/docker.sock
          refresh_interval: 5s
    relabel_configs:
      - source_labels: [ '__meta_docker_container_name' ]
        regex: '.*(spring|springboot-app).*'  # Spring 컨테이너만 수집
        action: keep  # 매치되는 컨테이너만 유지
      - source_labels: [ '__meta_docker_container_name' ]
        regex: '/(.*)'
        target_label: 'container'
      - source_labels: [ '__meta_docker_container_name' ]
        regex: '.*'
        replacement: 'app-spring'  # app- 접두사를 붙여서 대시보드 필터와 일치하게 
        target_label: 'compose_service'
      - source_labels: [ '__meta_docker_container_log_stream' ]
        target_label: 'stream'
```

8. ELK (Filebeat, Logstash, Elasticsearch, Kibana)

8.1 docker-compose.yml 작성

```
# /home/ubuntu/docker/monitoring/elk/docker-compose.yml
version: "3.8"

services:
  # Elasticsearch
```

```
elasticsearch:
  build:
    context: ./elasticsearch_with_nori
  container_name: elasticsearch
  environment:
    - discovery.type=single-node
    - xpack.security.enabled=false
    - ES_JAVA_OPTS=-Xms1g -Xmx1g
    - ELASTIC_PASSWORD=[비밀번호]
  ports:
    - "9200:9200"
    - "9300:9300"
  networks:
    - taken-net
  volumes:
    - esdata:/usr/share/elasticsearch/data
  mem_limit: 2g


# Kibana
kibana:
  image: docker.elastic.co/kibana/kibana:8.13.4
  container_name: kibana
  ports:
    - "5601:5601"
  environment:
    - ELASTICSEARCH_HOSTS=http://elasticsearch:9200
        - SERVER_BASEPATH=/kibana
        - SERVER_REWRITEBASEPATH=true
  depends_on:
    - elasticsearch
  networks:
    - taken-net

# Logstash
logstash:
  image: docker.elastic.co/logstash/logstash:8.13.4
  container_name: logstash
```

```
    ports:
      - "5044:5044"  # Beats input
    volumes:
      - /home/ubuntu/docker/monitoring/elk/logstash/pipeline:/usr/share/logsta
    depends_on:
      - elasticsearch
    networks:
      - taken-net

  # Filebeat
  filebeat:
    image: docker.elastic.co/beats/filebeat:8.13.4
    container_name: filebeat
    user: root
    volumes:
      - /home/ubuntu/docker/monitoring/elk/filebeat.yml:/usr/share/filebeat/fileb
      - /home/ubuntu/app-logs:/home/ubuntu/app-logs  # Spring 로그 위치
      - /home/ubuntu/docker/db/mysql/logs:/home/ubuntu/docker/db/mysql/log
    depends_on:
      - logstash
    networks:
      - taken-net

networks:
  taken-net:
    external: true

volumes:
  grafana-data:
  esdata:
```

8.2 Dockerfile

```
ARG ES_VERSION=8.14.0
FROM docker.elastic.co/elasticsearch/elasticsearch:${ES_VERSION}

RUN elasticsearch-plugin install analysis-nori
```

8.3 filebeat.yml

```
# /home/ubuntu/docker/monitoring/filebeat.yml
filebeat.inputs:
  - type: log
    enabled: true
    paths:
      - /home/ubuntu/app-logs/spring.log
    fields:
      log_type: spring_log
    fields_under_root: true

  - type: log
    enabled: true
    paths:
      - /home/ubuntu/docker/db/mysql/logs/mysql-slow.log
    fields:
      log_type: mysql_slow_log
    fields_under_root: true

output.logstash:
  hosts: ["logstash:5044"]

setup.kibana:
  host: "http://kibana:5601"
```

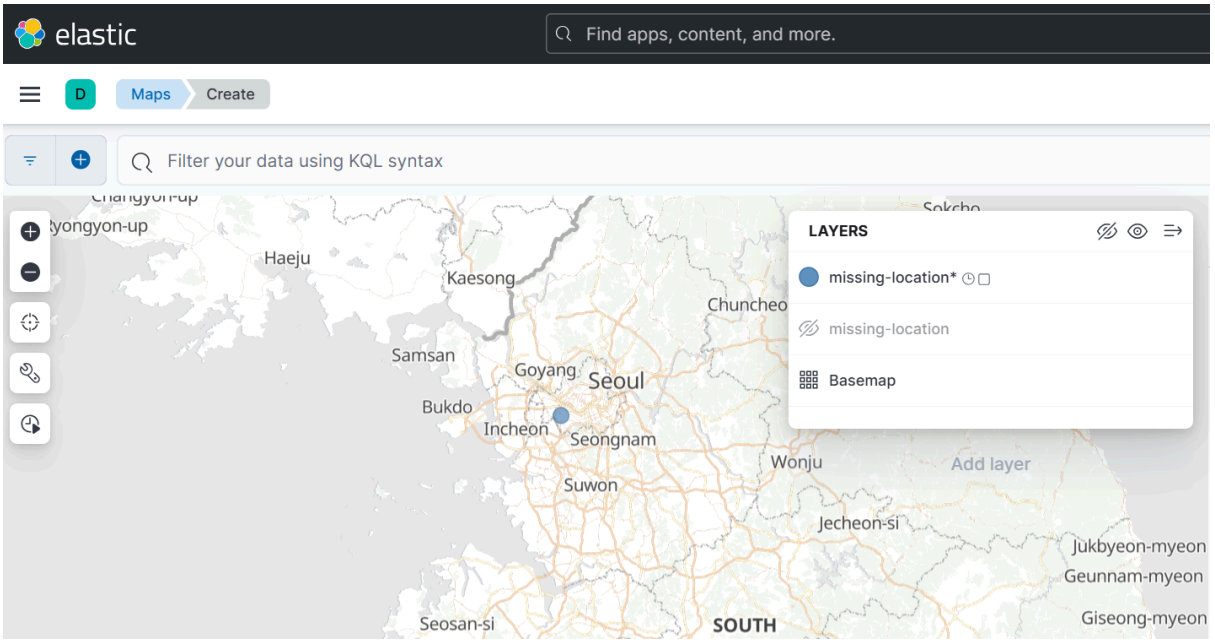
8.4 /logstash/pipeline/logstash.conf

```
# /home/ubuntu/docker/monitoring/logstash/pipeline/logstash.conf
input {
  beats {
    port ⇒ 5044
  }
}

filter {
  if [log_type] == "spring_log" {
    grok {
```

```
      match => {
        "message" => "%{TIMESTAMP_ISO8601:timestamp} %{LOGLEVEL:level}
      }
      tag_on_failure => ["_grokparsefailure_spring"]
    }
    date {
      match => ["timestamp", "ISO8601"]
      target => "@timestamp"
    }
  } else if [log_type] == "mysql_slow_log" {
    grok {
      match => {
        "message" => "^(?<sql>.+)$"
      }
      tag_on_failure => ["_grokparsefailure_mysql"]
    }
    mutate {
      add_field => { "source_type" => "mysql_slow" }
    }
  }
}

output {
  if [log_type] == "spring_log" {
    elasticsearch {
      hosts => ["http://elasticsearch:9200"]
      index => "spring-logs-%{+YYYY.MM.dd}"
    }
  } else if [log_type] == "mysql_slow_log" {
    elasticsearch {
      hosts => ["http://elasticsearch:9200"]
      index => "mysql-slow-%{+YYYY.MM.dd}"
    }
  } else {
    # fallback output for debugging untagged logs
    stdout { codec => rubydebug }
  }
}
```



9. Kafka + Zookeeper

9.1 docker-compose.yml

```
version: '3.8'

services:
  zookeeper:
    image: confluentinc/cp-zookeeper:7.4.0
    container_name: zookeeper
    ports:
      - "2181:2181"
    environment:
      ZOOKEEPER_CLIENT_PORT: 2181
      ZOOKEEPER_TICK_TIME: 2000
    networks:
      - taken-net

  kafka:
    image: confluentinc/cp-kafka:7.4.0
    container_name: kafka
```

```
    ports:
      - "9092:9092"
    environment:
      KAFKA_BROKER_ID: 1
      KAFKA_ZOOKEEPER_CONNECT: zookeeper:2181

      KAFKA_ADVERTISED_LISTENERS: PLAINTEXT://k12d102.p.ssafy.io:9092
      KAFKA_LISTENERS: PLAINTEXT://0.0.0.0:9092

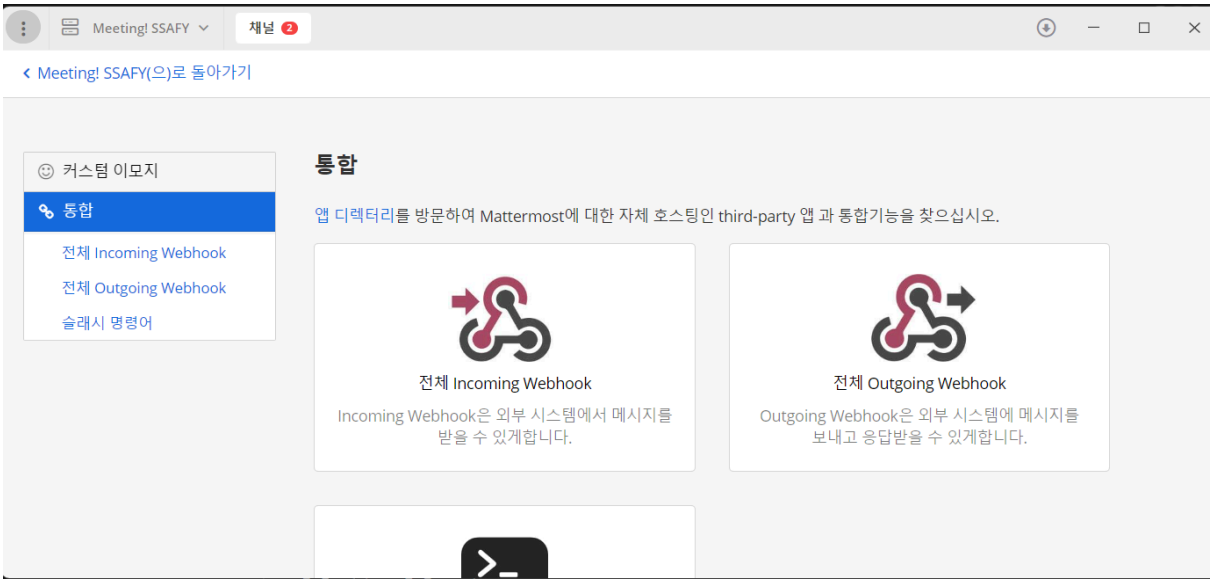
      KAFKA_OFFSETS_TOPIC_REPLICATION_FACTOR: 1
    depends_on:
      - zookeeper
    networks:
      - taken-net

networks:
  taken-net:
    external: true
```

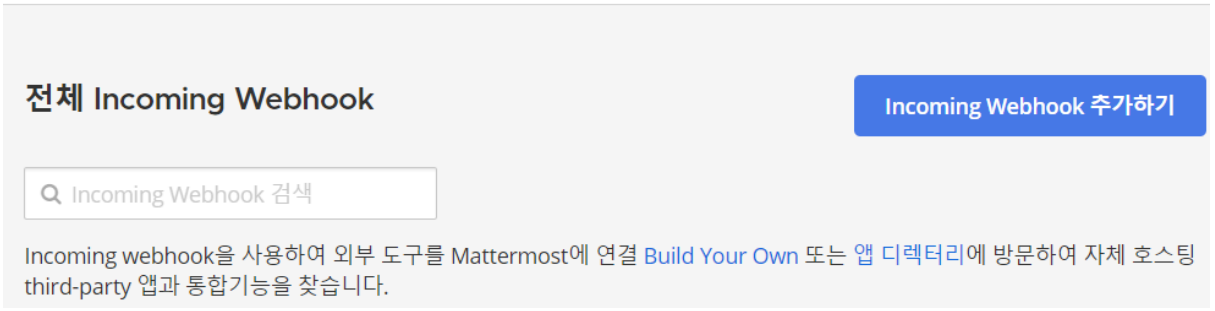
MatterMost Webhook

1. Mattermost에 webhook 추가하기

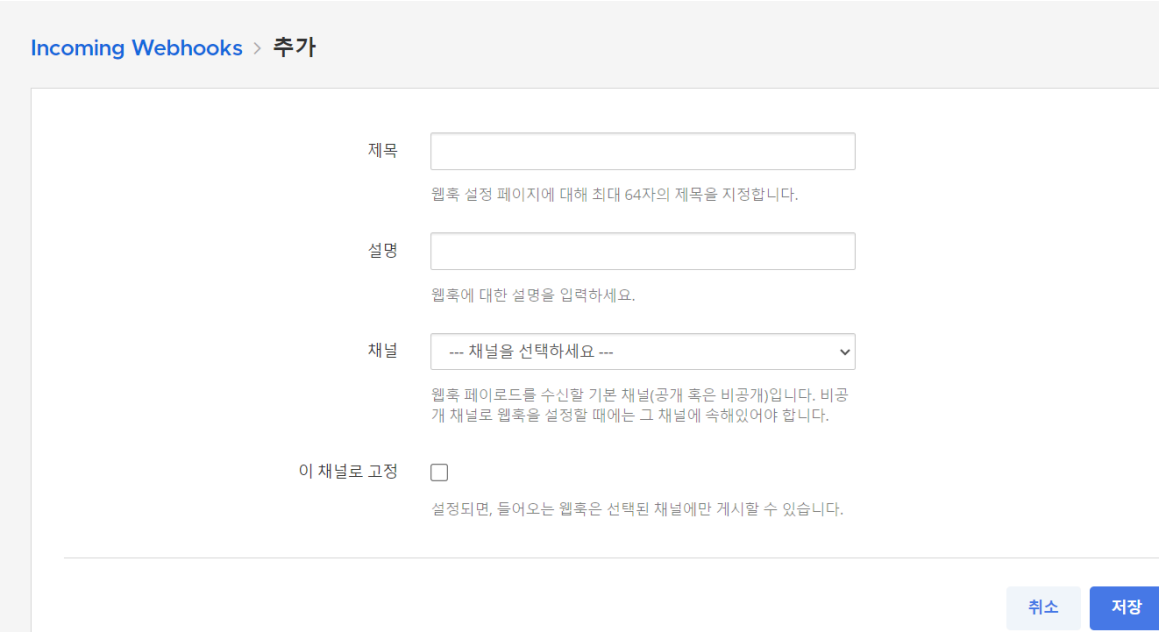
1.1 mattermost → 목록 → 통합



1.2 전체 incoming Webhook 클릭



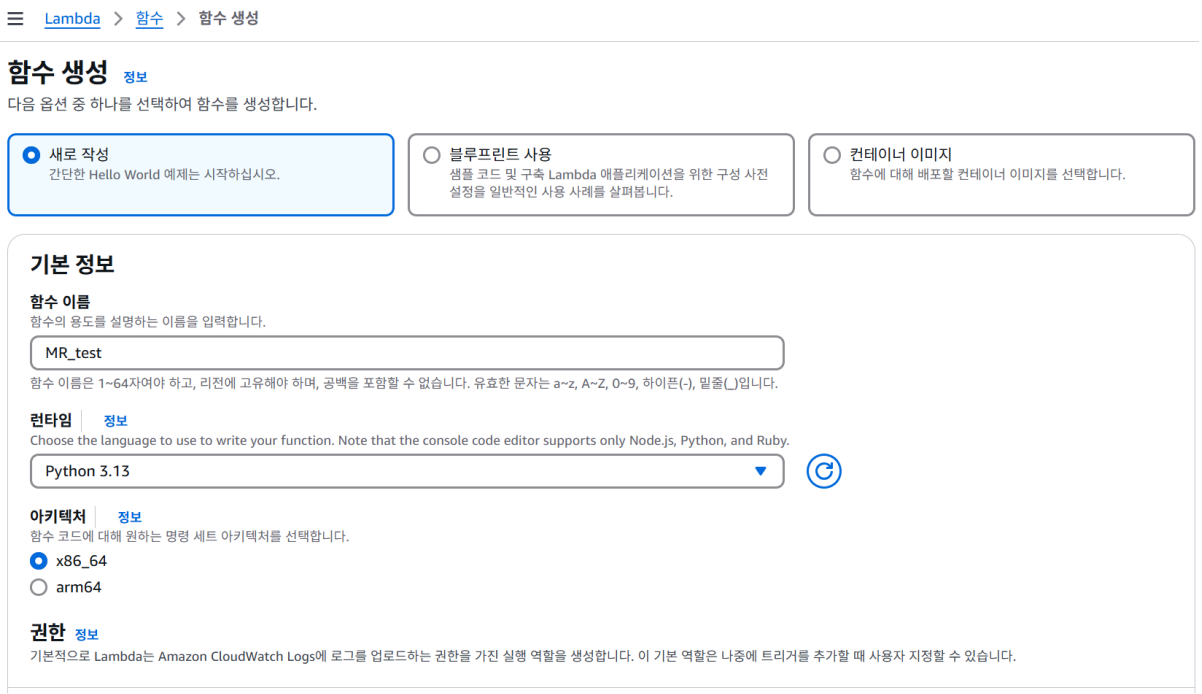
1.3 내용 넣기



1.4 생성 완료

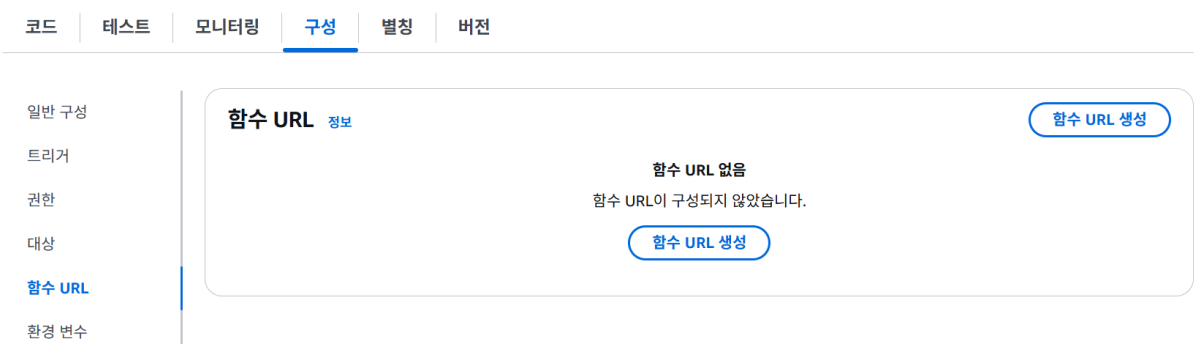
2. AWS Lambda 함수 만들기

2.1 Lambda 함수 생성

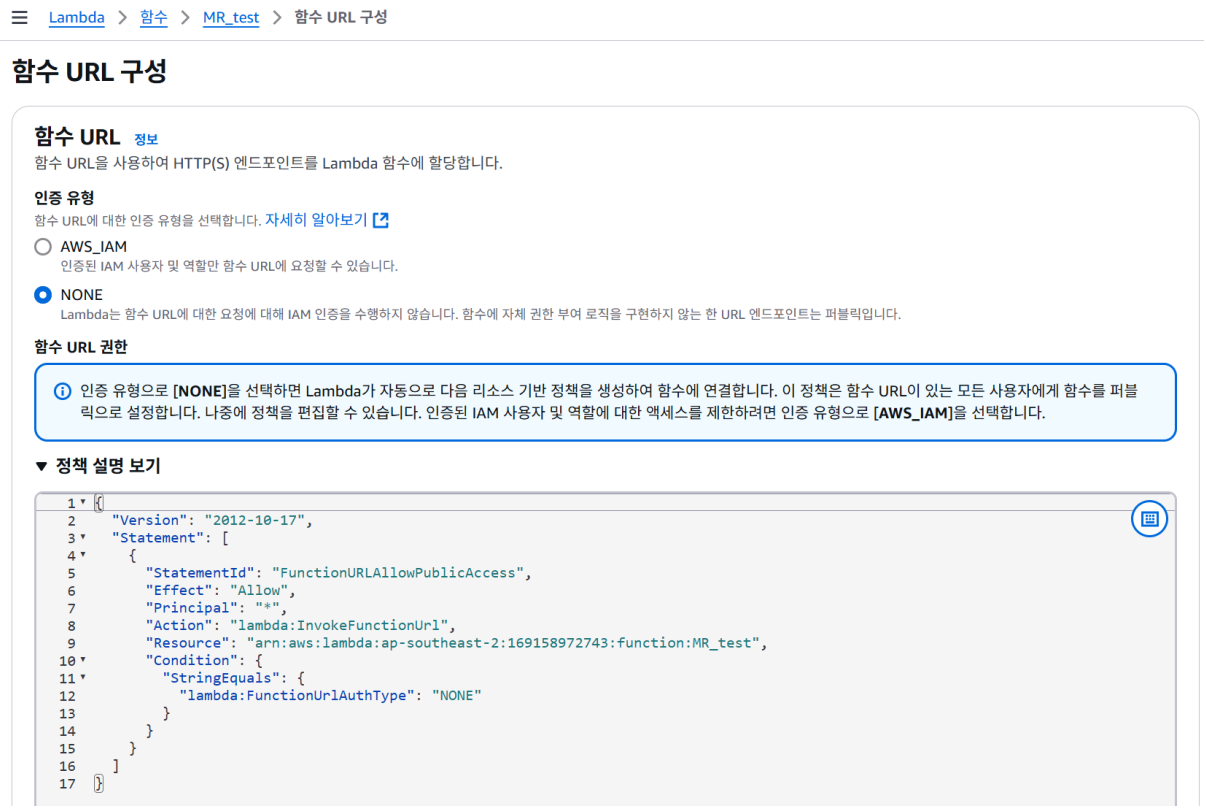


런타임 python 선택

2.2 구성 → 함수 URL 생성

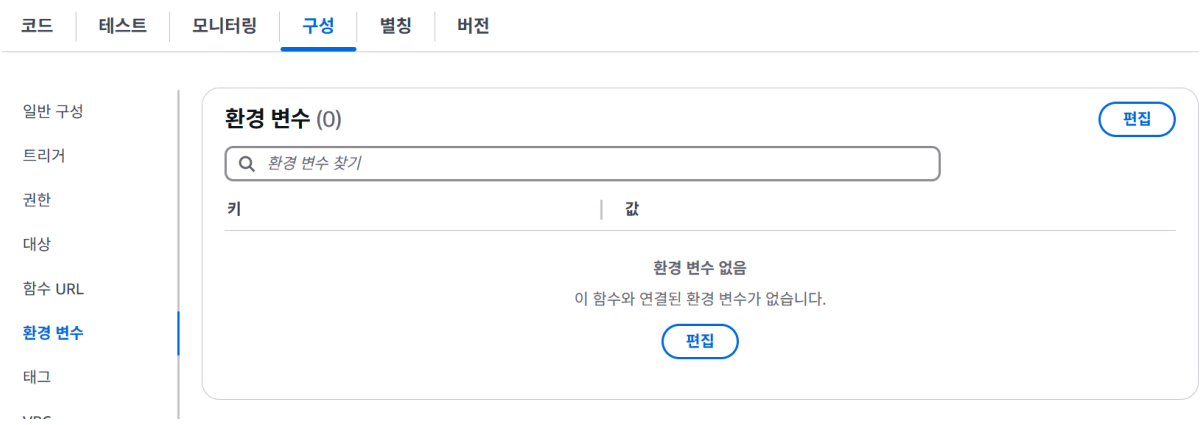


none 선택

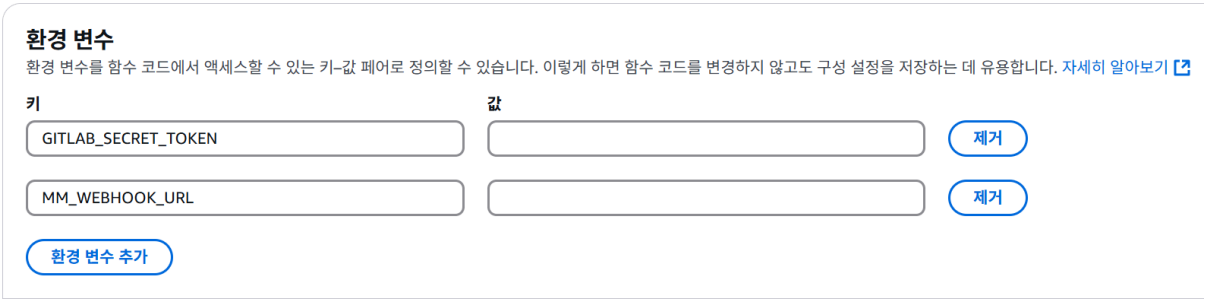


이를 통해 생성된 함수 URL은 Gitlab의 웹훅 설정에 적용

2.3 구성 → 환경변수 편집



환경 변수 편집



MM_WEBHOOK_URL과 GITLAB_SECRET_TOKEN 추가

secret token은 자신이 원하는 값으로. 추후 gitlab webhook 설정에 작성 예정

2.4 코드 작성

```
import json
import os
import urllib.request

# 환경 변수에서 설정 값을 가져옵니다
MM_WEBHOOK_URL = os.environ["MM_WEBHOOK_URL"]  # Mattermost 웹훅
SECRET_TOKEN = os.environ["GITLAB_SECRET_TOKEN"]  # GitLab 시크릿 토큰

# MR 저자 ID로 이름을 찾기 위한 매핑 (실제 구현 필요)
MR_AUTHOR_LOOKUP = {}  # 여기에 author_id: author_name 매핑 추가 필요

def lambda_handler(event, context):
    """
    AWS Lambda 핸들러 함수 - GitLab 웹훅 이벤트를 처리합니다.
```

```
    Args:
        event: Lambda 이벤트 객체 (GibLab 웹훅에서 전달됨)
        context: Lambda 컨텍스트 객체

    Returns:
        응답 객체 (statusCode와 body 포함)
    """
    try:
        print("Received Headers:", json.dumps(event.get("headers", {}), indent=2

        # GitLab 시크릿 토큰 검증
        if not verify_gitlab_token(event):
            return {"statusCode": 403, "body": json.dumps({"error": "Unauthorized

        # 웹훅 이벤트 파싱
        body = json.loads(event["body"])
        event_type = get_event_type(event)

        # 이벤트 타입에 따라 메시지 생성
        message = process_event(event_type, body)

        # Mattermost로 메시지 전송
        send_to_mattermost(message)

        return {"statusCode": 200, "body": json.dumps({"message": "Processed"

    except Exception as e:
        return {"statusCode": 500, "body": json.dumps({"error": str(e)})}

def verify_gitlab_token(event):
    """
    GitLab 웹훅 요청의 시크릿 토큰을 검증합니다.

    Args:
        event: Lambda 이벤트 객체

    Returns:
```

```
        토큰 검증 성공 여부
    """
    received_token = event["headers"].get("X-Gitlab-Token", "") or event["head
    return received_token == SECRET_TOKEN

def get_event_type(event):
    """
    GitLab 이벤트 타입을 추출합니다.

    Args:
        event: Lambda 이벤트 객체

    Returns:
        GitLab 이벤트 타입 문자열
    """
    return event["headers"].get("X-Gitlab-Event", "") or event["headers"].get("

def process_event(event_type, body):
    """
    GitLab 이벤트를 처리하고 적절한 메시지를 생성합니다.

    Args:
        event_type: GitLab 이벤트 타입
        body: 이벤트 본문 데이터

    Returns:
        생성된 메시지
    """
    if event_type == "Merge Request Hook":
        return process_merge_request_event(body)
    elif event_type == "Note Hook":
        return process_note_event(body)
    else:
        raise Exception(f"Unsupported event type: {event_type}")

def extract_mr_data(body, is_note_event=False):
    """
    이벤트 본문에서 MR 관련 데이터를 추출합니다.
```

```
    Args:
        body: 이벤트 본문 데이터
        is_note_event: Note 이벤트인지 여부

    Returns:
        MR 데이터를 포함하는 딕셔너리
    """
    data = {}

    # Note 이벤트와 MR 이벤트의 데이터 구조 차이를 처리
    if is_note_event:
        # Note 이벤트에서는 merge_request 객체에 MR 정보가 있음
        mr_info = body.get("merge_request", {})
        data["title"] = mr_info.get("title", "")
        data["url"] = mr_info.get("url", "")
        data["source_branch"] = mr_info.get("source_branch", "")
        data["target_branch"] = mr_info.get("target_branch", "")
        data["description"] = mr_info.get("description", "")
    else:
        # MR 이벤트에서는 object_attributes에 MR 정보가 있음
        attrs = body["object_attributes"]
        data["title"] = attrs.get("title", "")
        data["url"] = attrs.get("url", "")
        data["source_branch"] = attrs.get("source_branch", "")
        data["target_branch"] = attrs.get("target_branch", "")
        data["description"] = attrs.get("description", "")
        data["action"] = attrs.get("action", "")

    # 공통 데이터
    data["author_name"] = body["user"]["name"]

    return data

def truncate_text(text, max_length=300):
    """
    텍스트가 최대 길이를 초과할 경우 잘라서 반환합니다.
```

```
    Args:
        text: 원본 텍스트
        max_length: 최대 길이

    Returns:
        잘린 텍스트 또는 원본 텍스트
    """
    if len(text) > max_length:
        return text[:max_length-3] + "..."
    return text

def process_merge_request_event(body):
    """
    Merge Request 이벤트를 처리합니다.

    Args:
        body: 이벤트 본문 데이터

    Returns:
        생성된 메시지
    """
    # 데이터 추출
    mr_data = extract_mr_data(body)

    # 액션에 따른 제목 설정
    mm_title = get_mr_action_title(mr_data["action"], mr_data["author_name"])

    if mm_title is None:
        raise Exception(f"Unsupported merge request action: {mr_data['action']}

    # 설명 텍스트 처리
    description = truncate_text(mr_data["description"])

    # 메시지 구성
    message = (
        f"## {mm_title}\n"
        f"- 제목: {mr_data['title']}\n"
        f"- 소스: `{mr_data['source_branch']}`\n"
```

```
        f"- 타겟: `{mr_data['target_branch']}`\n"
    )

    # 설명이 있고 open, reopen, update 액션인 경우에만 설명 추가
    if description and mr_data["action"] in ["open", "reopen", "update"]:
        message += "- 설명:\n```\n" + description + "\n```\n"

    message += f"### [바로가기]({mr_data['url']})"

    return message

def get_mr_action_title(action, mr_author):
    """
    MR 액션에 따른 Mattermost 메시지 제목을 반환합니다.

    Args:
        action: MR 액션 (open, reopen, update, approved, close, merge)
        mr_author: MR 작성자 이름

    Returns:
        포맷된 메시지 제목 또는 None (지원되지 않는 액션일 경우)
    """
    titles = {
        "open": f":star: {mr_author}님의 MR 리뷰해주세요! :star:",
        "reopen": f":star: {mr_author}님의 MR 리뷰해주세요! :star:",
        "update": f":arrows_counterclockwise: {mr_author}님이 MR을 업데이트 했어
        "approved": f":thumbsup: {mr_author}님이 MR을 Approve 했어요! :thumbsu
        "close": f":no_entry_sign: {mr_author}님의 MR이 닫혔어요! :no_entry_sign:",
        "merge": f":white_check_mark: {mr_author}님의 MR이 머지 되었어요! :white
    }

    return titles.get(action)

def process_note_event(body):
    """
    Note 이벤트를 처리합니다.(MR에 남긴 코멘트)

    Args:
```

```
        body: 이벤트 본문 데이터

    Returns:
        생성된 메시지
    """
    noteable_type = body["object_attributes"].get("noteable_type", "")

    if noteable_type == "MergeRequest":
        # 데이터 추출
        mr_data = extract_mr_data(body, is_note_event=True)
        comment_text = body["object_attributes"].get("note", "")

        # 코멘트 내용이 너무 길 경우 요약
        comment_text = truncate_text(comment_text)

        mm_title = f":speech_balloon: {mr_data['title']}에 {mr_data['author_name'

        message = (
            f"## {mm_title}\n"
            f"- 코멘트 작성자: {mr_data['author_name']}\n"
        )

        # 코멘트 내용 추가
        if comment_text:
            message += "- 코멘트:\n```\n" + comment_text + "\n```\n"

        message += f"### [바로가기]({mr_data['url']})"

        return message
    else:
        raise Exception(f"Unsupported note hook type: {noteable_type}")

def send_to_mattermost(message):
    """
    Mattermost 웹훅으로 메시지를 전송합니다.

    Args:
        message: 전송할 메시지 내용
```

```
    Returns:
        HTTP 응답 상태 코드
    """
    payload = json.dumps({
        "text": message
    }).encode("utf-8")  # 페이로드를 바이트로 인코딩

    headers = {"Content-Type": "application/json"}

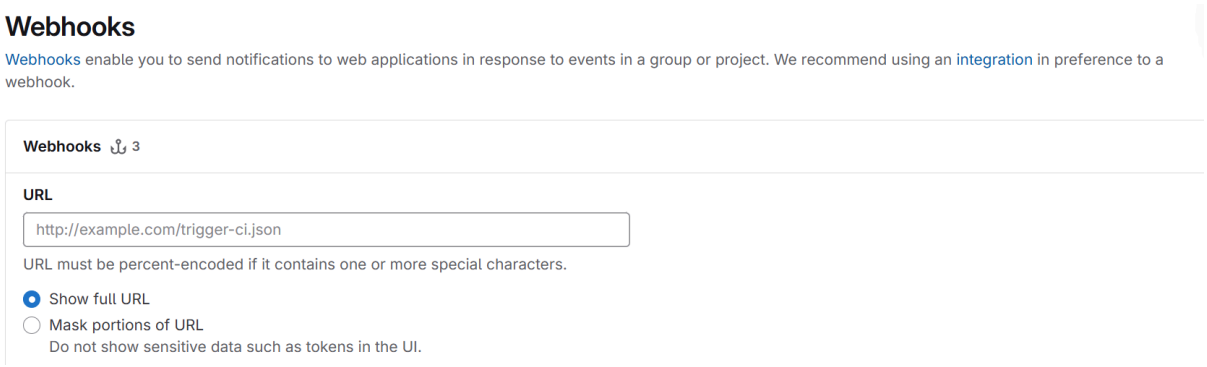
    req = urllib.request.Request(MM_WEBHOOK_URL, data=payload, headers=h
    with urllib.request.urlopen(req) as response:
        return response.status
```

2.5 Deploy로 배포

3. Gitlab에 webhook 추가하기

3.1 gitlab → settings → webhooks → add new webhook

프로젝트에 maintainer 이상의 권한이 있어야 setting이 가능하다



URL에 2.2에서 생성한 함수 URL 작성

secret token에는 Lambda의 환경 변수로 추가한 암호 작성

정유선[구미_1반_D102]팀원 BOT 오후 4:28

👍 정유선님이 MR을 Approve 했어요! 👍

- 제목: S12P31D102-138/✨/위도경도로 도로명주소 조회 구현
- 소스: `S12P31D102-138/change-address`
- 타겟: `develop`

바로가기

정유선[구미_1반_D102]팀원 BOT 오후 4:28

✅ 정유선님의 MR이 머지 되었어요! ✅

- 제목: S12P31D102-138/✨/위도경도로 도로명주소 조회 구현
- 소스: `S12P31D102-138/change-address`
- 타겟: `develop`

바로가기

정유선[구미_1반_D102]팀원 BOT 오후 4:59

⭐ 정지원님의 MR 리뷰해주세요! ⭐

- 제목: S12P31D102-141/✨/도움 요청 및 탐색 종료 시 FCM으로 알림 전송