사이버 보안 *Cyber Security*

Written by ***Donghyun Choi*** (**KGU**)

- Worldskills Korea ▫ National 2025 (Cyber Security Practices) - [*Written by NullBins*]

- By default, the commands are executed as a root user.

[*Project-1*] < *Infrastructure configuration & Security enhancements* >

1. 네트워크 구성 (Network Configuration)

- *기반 구축 - 서버 네트워크 설정* VM 고정 IP주소 설정 및 독립적으로 동작할 Docker 네트워크 구축.

< Configuration >

- [server] -> Virtual Machine

```
mv /etc/netplan/*.yaml /etc/netplan/config.yaml
```

```
nano /etc/netplan/config.yaml
```

```
network:
 ethernets:
   ens33:
     addresses: [192.168.127.129/24]
     routes:
       - to: default
         via: 192.168.127.1
     dhcp4: false
 renderer: networkd
 version: 2
```

```
netplan apply
docker network create -d macvlan --subnet 192.168.127.0/24 --gateway 192.168.127.1
-o parent=ens33 kolo-net
```

```
nano /etc/rc.local
```

```
#!/bin/bash

sysctl --system
# Virtual Network Bridge
ip link add kolo-net-host link ens33 type macvlan mode bridge
ip addr add 192.168.127.254/24 dev kolo-net-host
ip link set kolo-net-host up
ip route add 192.168.127.10/32 dev kolo-net-host
ip route add 192.168.127.20/32 dev kolo-net-host
ip addr show kolo-net-host | grep inet
ip route show | grep kolo-net

exit 0
```

```
chmod +x /etc/rc.local
systemctl restart rc-local
```

< Checking >

- [server] : VM

```
docker network ls
ip addr show kolo-net-host
```

2. KoloDB 컨테이너 구성 (DB Server Container Configuration)

- *독립 환경 구축 - Docker DB 컨테이너 구성* 기존 MariaDB 백업 및 Migration 진행.

< Configuration >

- [server] : VM

```
mysqldump -u root -p midsv > ./midsv_backup.sql
mysqldump -u root -p mysql_bk > ./mysql_bk_backup.sql
docker tag mariadb:latest mariadb:kolo
docker run -d --name kolodb --hostname kolodb --restart always --network kolo-net
--ip 192.168.127.10 -e MARIADB_ROOT_PASSWORD=user01 mariadb:kolo --
lower_case_table_names=1
mariadb -h 192.168.127.10 -u root -puser01 -e "grant all privileges on *.* to
'dbroot'@'%' identified by 'asd123'"
mariadb -h 192.168.127.10 -u root -puser01 -e 'flush privileges'
```

```
mariadb -h 192.168.127.10 -u root -puser01 -e 'create database midsv'
mariadb -h 192.168.127.10 -u root -puser01 -e 'create database mysql_bk'
mariadb -h 192.168.127.10 -u root -puser01 midsv < ./midsv_backup.sql
mariadb -h 192.168.127.10 -u root -puser01 mysql_bk < ./mysql_bk_backup.sql
```

< Checking >

- [server] : VM

```
docker ps -a
mariadb -h 192.168.127.10 -u root -puser01 midsv -e 'select * from board'
```

3. WWW 컨테이너 구성 (Web Server Container Configuration)

- *독립 환경 구축 - Docker Web 컨테이너 구성* 기존 Web Service 백업 및 Migration 진행.

< Configuration >

- [server] : VM

```
grep -r "3306" /home/kolo_user/apache-tomcat-9.0.89/webapps/midsv/
sed -i "s/localhost/192.168.127.10/g" /home/kolo_user/apache-tomcat-
9.0.89/webapps/midsv/WEB-INF/spring/root-context.xml
sed -i "s/localhost/192.168.127.10/g" /home/kolo_user/apache-tomcat-
9.0.89/webapps/midsv/WEB-INF/classes/config/value.properties
/home/kolo_user/apache-tomcat-9.0.89/bin/shutdown.sh
/home/kolo_user/apache-tomcat-9.0.89/bin/startup.sh
cd /home/kolo_user/
```

```
nano Dockerfile
```

```
FROM tomcat:9.0
COPY ./apache-tomcat-9.0.89/ /usr/local/tomcat/
```

```
docker build -t tomcat:kolo .
sed -i "s/192.168.127.10/localhost/g" /home/kolo_user/apache-tomcat-
9.0.89/webapps/midsv/WEB-INF/spring/root-context.xml
sed -i "s/192.168.127.10/localhost/g" /home/kolo_user/apache-tomcat-
9.0.89/webapps/midsv/WEB-INF/classes/config/value.properties
/home/kolo_user/apache-tomcat-9.0.89/bin/shutdown.sh
/home/kolo_user/apache-tomcat-9.0.89/bin/startup.sh
```

```
docker run -d --name www --hostname www --restart always --network kolo-net --ip
192.168.127.20 tomcat:kolo
```

< *Checking* >

- [server] : VM

```
docker ps -a
curl -I http://192.168.127.20:8080
```

- [HOST] -> Host Desktop PC

```
ping -4 -n 1 192.168.127.129
ping -4 -n 1 192.168.127.254
ping -4 -n 1 192.168.127.10
ping -4 -n 1 192.168.127.20
curl -I http://192.168.127.20:8080
```

☑ 요약 (Summary)

- *Shell script code* : Set all assignment items.

```
#!/bin/bash
## ------------------------------------------------------------------------ ##
docker network create -d macvlan --subnet 192.168.127.0/24 --gateway 192.168.127.1
-o parent=ens33 kolo-net
nano /etc/rc.local > /dev/null << EOF
#!/bin/bash
sysctl --system
# Virtual Network Bridge
ip link add kolo-net-host link ens33 type macvlan mode bridge
ip addr add 192.168.127.254/24 dev kolo-net-host
ip link set kolo-net-host up
ip route add 192.168.127.10/32 dev kolo-net-host
ip route add 192.168.127.20/32 dev kolo-net-host
ip addr show kolo-net-host | grep inet
ip route show | grep kolo-net
exit 0
EOF
chmod +x /etc/rc.local
systemctl restart rc-local
mysqldump -u root -p midsv > ./midsv_backup.sql
mysqldump -u root -p mysql_bk > ./mysql_bk_backup.sql
docker tag mariadb:latest mariadb:kolo
docker run -d --name kolodb --hostname kolodb --restart always --network kolo-net
--ip 192.168.127.10 -e MARIADB_ROOT_PASSWORD=user01 mariadb:kolo --
```

```
lower_case_table_names=1
mariadb -h 192.168.127.10 -u root -puser01 -e "grant all privileges on *.* to
'dbroot'@'%' identified by 'asd123'"
mariadb -h 192.168.127.10 -u root -puser01 -e 'flush privileges'
mariadb -h 192.168.127.10 -u root -puser01 -e 'create database midsv'
mariadb -h 192.168.127.10 -u root -puser01 -e 'create database mysql_bk'
mariadb -h 192.168.127.10 -u root -puser01 midsv < ./midsv_backup.sql
mariadb -h 192.168.127.10 -u root -puser01 mysql_bk < ./mysql_bk_backup.sql
grep -r "3306" /home/kolo_user/apache-tomcat-9.0.89/webapps/midsv/
sed -i "s/localhost/192.168.127.10/g" /home/kolo_user/apache-tomcat-
9.0.89/webapps/midsv/WEB-INF/spring/root-context.xml
sed -i "s/localhost/192.168.127.10/g" /home/kolo_user/apache-tomcat-
9.0.89/webapps/midsv/WEB-INF/classes/config/value.properties
/home/kolo_user/apache-tomcat-9.0.89/bin/shutdown.sh
/home/kolo_user/apache-tomcat-9.0.89/bin/startup.sh
cd /home/kolo_user/
tee Dockerfile > /dev/null << EOF
FROM tomcat:9.0
COPY ./apache-tomcat-9.0.89/ /usr/local/tomcat/
EOF
docker build -t tomcat:kolo .
sed -i "s/192.168.127.10/localhost/g" /home/kolo_user/apache-tomcat-
9.0.89/webapps/midsv/WEB-INF/spring/root-context.xml
sed -i "s/192.168.127.10/localhost/g" /home/kolo_user/apache-tomcat-
9.0.89/webapps/midsv/WEB-INF/classes/config/value.properties
/home/kolo_user/apache-tomcat-9.0.89/bin/shutdown.sh
/home/kolo_user/apache-tomcat-9.0.89/bin/startup.sh
docker run -d --name www --hostname www --restart always --network kolo-net --ip
192.168.127.20 tomcat:kolo
## ------------------------------------------------------------------------ ##
```
