Book

—
설치 및 환경설정
—

# HyperFrame HTTPD & Wildfly
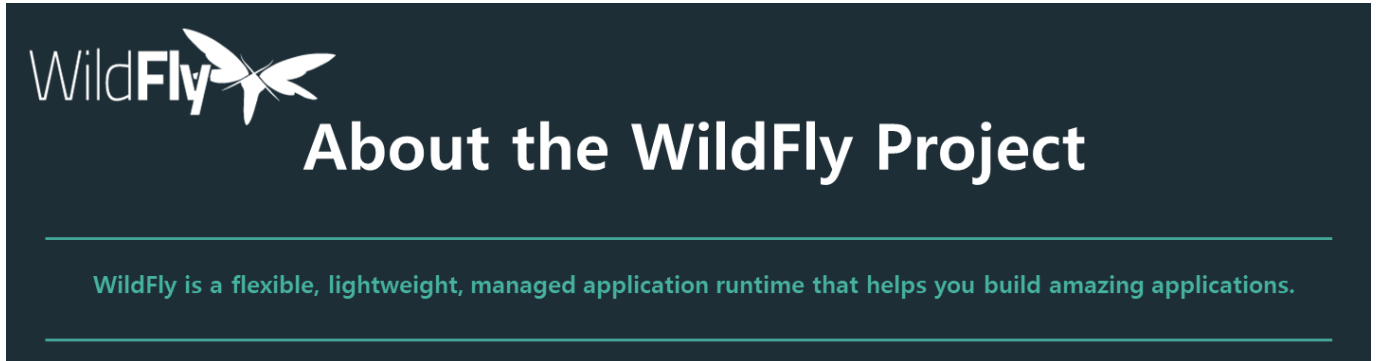
# 구축 가이드

TmaxSoft

# 목차

# 1. 개념

## 1.1 WildFly란?



- Red Hat이 후원하는 오픈 소스 커뮤니티 프로젝트로 LGPL v2.1 라이센스에 따라 사용 및 배포가 가능하므로 무료로 다운로드하여 사용할 수 있습니다.
- 미들웨어 플랫폼으로 작동하는 애플리케이션 서버로, Java EE 애플리케이션을 호스팅하고 관리하는 데 필요한 환경과 인프라를 제공합니다.
- 애플리케이션 배포를 위한 안정적이고 성능 기준에 맞는 경량의 지원 인프라를 제공합니다.
- 필요한 경우에만 서비스를 사용할 수 있도록 하는 모듈식 구조를 제공합니다. 이를 통해 성능이 향상되고, 보안 이점이 생기며, 시작 및 재시작 시간이 줄어듭니다.
웹 기반 관리 콘솔 및 관리 CLI(명령줄 인터페이스)는 XML 구성 파일 편집이 필요하지 않으며, 작업을 스크립팅하고 자동화하는 기능을 제공합니다.
- 여러 서버 인스턴스와 물리적 호스트를 중앙 집중식으로 관리하지만, 독립 실행형 서버에서 단일 서버 인스턴스를 허용합니다.

## 1.2 RedHat JBoss EAP와 차이점

| 구분 | WildFly | JBoss EAP | 비고 |
|---|---|---|---|
| 대상 | 제약없음 | 레드햇 서브스크립션 이용 고객 | |
| 라이선스 | 없음 | 없음 | LGPL 이라 커뮤니티, 개인 및 기업 모두 라이선스 비용 지불없음 |
| 다운로드 | https://www.wildfly.org/downloads/ | https://access.redhat.com/downloads/ | |
| 개발 | 커뮤니티 | 커뮤니티, 레드햇 | |
| 기술지원 | 직접지원 | 직접지원, 파트너 및 레드햇 | |
| 기능 및 보완 | 커뮤니티(제한적) | 레드햇(버그 및 보안패치) | |

## 2. 실습환경

### 2.1 구성도
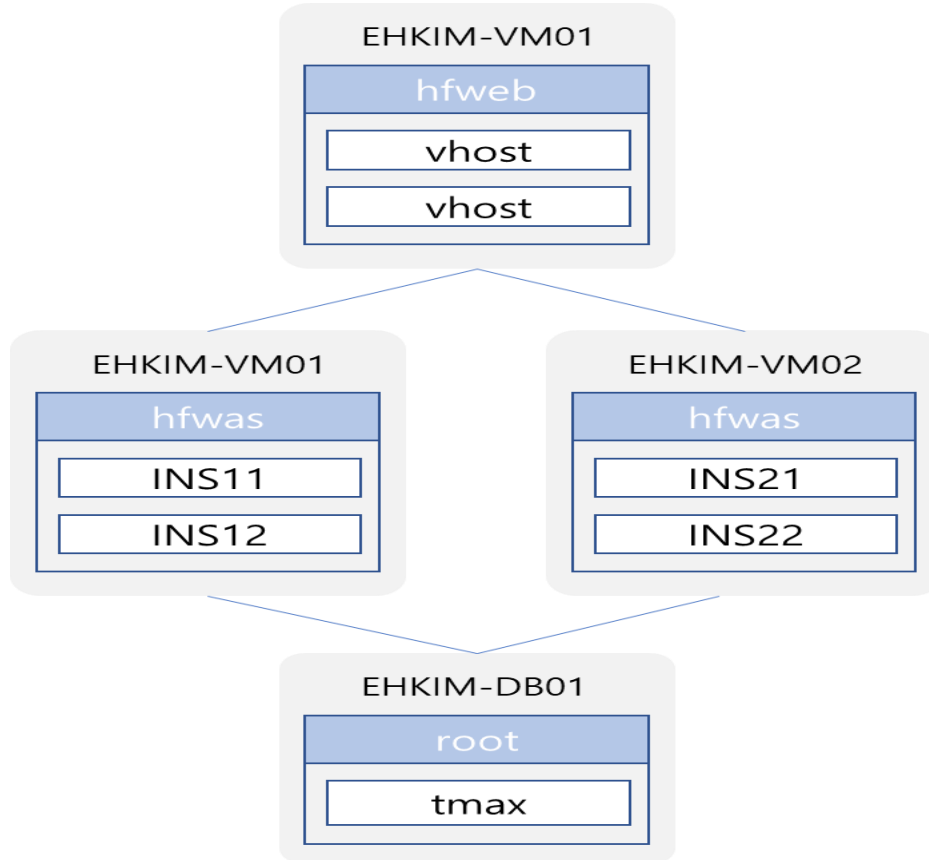


### 2.2 커널 파라미터

| 항목 | 설명 | 기본값 | 설정값 |
|---|---|---|---|
| net.ipv4.tcp_max_syn_backlog | 소켓의 listen backlog, Default : 1024 | 2048 | 4096 |
| net.ipv4.tcp_rmem | TCP layer의 수신 버퍼 | 4096 87380 6291456 | 4096 87380 8388608 |
| net.ipv4.tcp_wmem | TCP layer의 송신 버퍼. | 4096 16384 4194304 | 4096 87380 8388608 |
| net.ipv4.tcp_keepalive_time | KeepAlive Time. | 7200 | 1300 |
| net.ipv4.tcp_keepalive_intvl | KeepAlive 유지 지속 응답이 수신되지 않을 경우 TCP/IP에서 활성화 상태 지속 전송을 반복하는 빈도. | 75 | 10 |
| net.ipv4.tcp_keepalive_probes | TCP/IP가 기존 연결에 대한 수신확인되지 않은 KeepAlive 메시지를 재전송하는 수. | 9 | 2 |
| net.ipv4.tcp_fin_timeout | FIN_TIMEOUT 대기 시간을 줄이면 끊어진 소켓의 소거 시간을 줄일 수 있음. (TCP/IP는 닫힌 연결을 더욱 빨리 해제할 수 있으며 새 연결에 더 많은 자원을 제공). | 60 | 30 |
| net.ipv4.ip_local_port_range | 새 접속에서 사용할 수 있는 포트의 사용 가능 범위를 확장. | 9000 65000 | 16384 65536 |

| net.ipv4.tcp_rfc1337 | 클라이언트의 소켓으로부터 RST을 받아 TIME_WAIT 상태로 가는 경우 즉시 소켓을 종료시킴. | 0 | 1 |
| net.core.netdev_max_backlog | 동시접속이 많은 경우received host 대한 backlog (보유 연결 수를 증가 시켜 연결 장애 감소 효과). | 1000 | 2500 |
| net.ipv4.tcp_orphan_retries | 유저 파일 핸들에 할당되지 않은 커넥션에 대해 몇번을 제거 시도를 할 것인지를 정하는값. | 0 | 7 |

## 2.3 Limit 설정값

| 항목 | | 설명 | 기본값 | 설정값 |
|---|---|---|---|---|
| **nofile** | **soft** | 한 프로세스가 동시에 열 수 있는 파일 수(Soft Limit) | 1024 | 65536 |
| | **hard** | 한 프로세스가 동시 최대로 열 수 있는 파일 수(Hard Limit) | 1024 | 65536 |
| **nproc** | **soft** | 계정별로 실행할 수 있는 프로세스수 (Soft Limit) | 8192 | 16384 |
| | **hard** | 계정별로 실행할 수 있는 최대 프로세스수 (Hard Limit) | 8192 | 16384 |

# 3. HTTPD 설치

## 3.1 구성도

```
[EHKIM-VM01:/app/hfweb]#ls
deployment    binary    httpd
[EHKIM-VM01:/app/hfweb]#
```

```
deployment/
└──── www
```

```
httpd/
├──── bin
├──── build
├──── build-1
├──── certs
├──── cgi-bin
├──── conf
│      ├──── extra
│      │      ├──── httpd-mpm.conf
│      ├──── httpd.conf
│      ├──── mod_jk.conf
│      ├──── ssl.conf
│      ├──── uriworkermap.properties
│      ├──── vhosts.conf
│      └──── workers.properties
├──── error
├──── htdocs
├──── icons
├──── include
├──── lib
├──── logs
├──── man
├──── manual
├──── misc
├──── modules
├──── private
└──── share
```
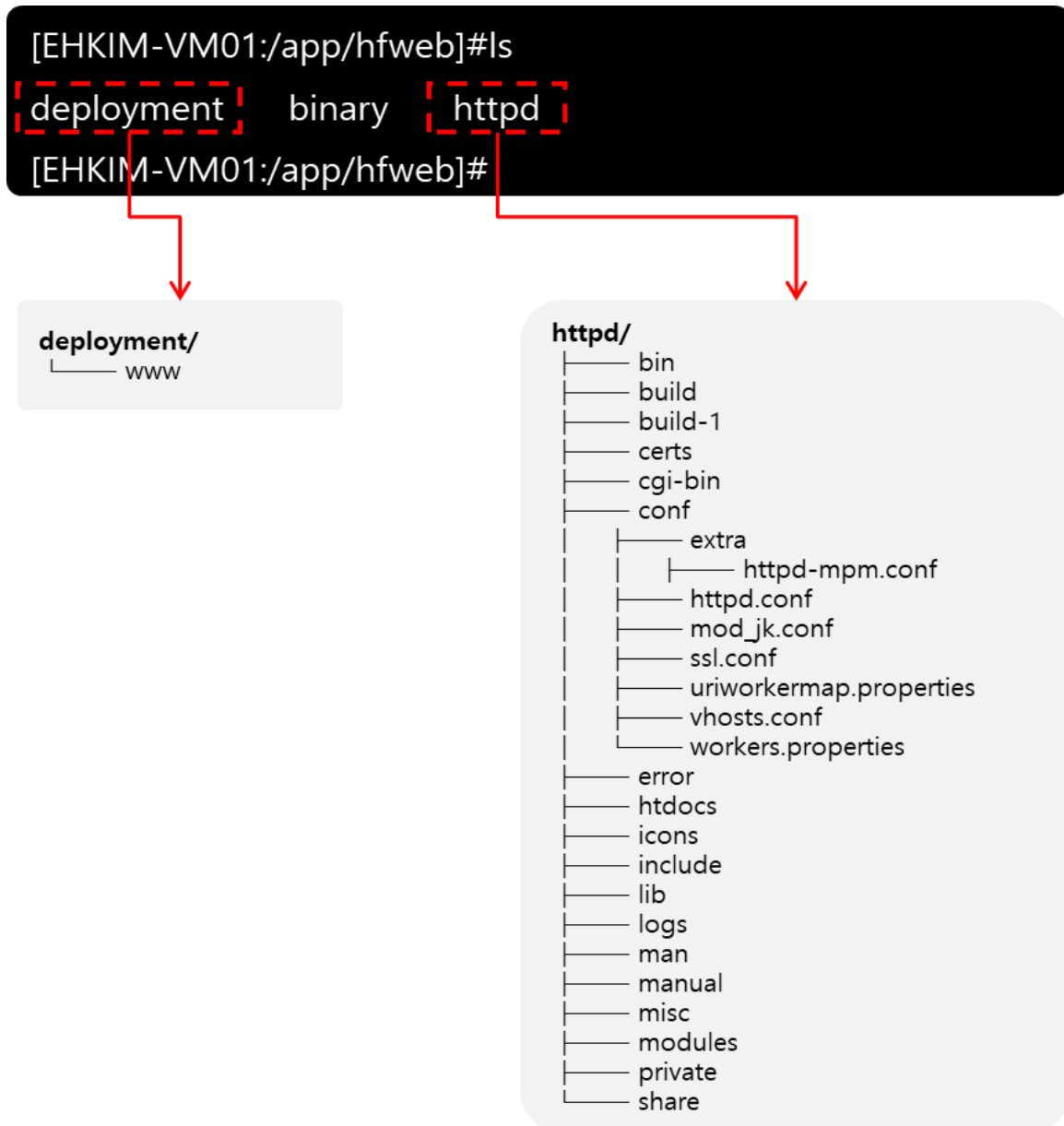
## 3.2 개발패키지 설치

```
[root@EHKIM-VM02 ~]# yum groupinstall -y "Development Tools"
```

## 3.3 계정생성

```
[root@EHKIM-VM01 ~]# groupadd -g 1001 webgrp
[root@EHKIM-VM01 ~]# useradd -g webgrp -u 1002 -d /app/hfweb hfweb
[root@EHKIM-VM01 ~]# passwd hfweb
```

```
[root@EHKIM-VM01 /]# su – hfweb
```

## 3.4 profile

```
[EHKIM-VM01:/app/hfweb]# cat .bash_profile
#### Environment Setting #####
set -o vi
PS1=[`hostname`:'$PWD']#


##### HTTPD Setting #####
HTTPD_HOME=$HOME/httpd;export HTTPD_HOME


##### Alias #####
alias wbin='cd $HTTPD_HOME/bin'
alias wcfg='cd $HTTPD_HOME/conf'
alias wlog='cd $HTTPD_HOME/logs'
alias d1='cd $HOME/deployment/www'
```

## 3.5 폴더 생성

```
[EHKIM-VM01:/app/hfweb]#mkdir httpd
[EHKIM-VM01:/app/hfweb]#mkdir -p deployment/www
```

## 3.6 apr 설치

```
[EHKIM-VM01:/app/hfweb]# wget https://dlcdn.apache.org/apr/apr-1.7.0.tar.gz
[EHKIM-VM01:/app/hfweb]# tar xzvf apr-1.7.0.tar.gz
[EHKIM-VM01:/app/hfweb]# cd apr-1.7.0
[EHKIM-VM01:/app/hfweb/apr-1.7.0]# ./configure --prefix=/app/hfweb/httpd
[EHKIM-VM01:/app/hfweb/apr-1.7.0]# cp -arp libtool libtoolT
[EHKIM-VM01:/app/hfweb/apr-1.7.0]# ./configure --prefix=/app/hfweb/httpd
[EHKIM-VM01:/app/hfweb/apr-1.7.0]# make
[EHKIM-VM01:/app/hfweb/apr-1.7.0]# make install
```

## 3.7 apr-util 설치

```
[EHKIM-VM01:/app/hfweb]# sudo yum install –y expat-devel
[EHKIM-VM01:/app/hfweb]# wget https://dlcdn.apache.org/apr/apr-util-1.6.1.tar.gz
[EHKIM-VM01:/app/hfweb]# tar xzvf apr-util-1.6.1.tar.gz
[EHKIM-VM01:/app/hfweb]# cd apr-util-1.6.1
[EHKIM-VM01:/app/hfweb/apr-util-1.6.1]# ./configure --prefix=/app/hfweb/httpd --with-apr=/app/hfweb/httpd
[EHKIM-VM01:/app/hfweb/apr-util-1.6.1]# make
```

[EHKIM-VM01:/app/hfweb/apr-util-1.6.1]# make install

## 3.8 pcre 설치

[EHKIM-VM01:/app/hfweb]# sudo yum install -y pcre-devel

[EHKIM-VM01:/app/hfweb]# wget https://sourceforge.net/projects/pcre/files/pcre/8.45/pcre-8.45.tar.gz

[EHKIM-VM01:/app/hfweb]# tar xzvf pcre-8.45.tar.gz

[EHKIM-VM01:/app/hfweb]# cd pcre-8.45/

[EHKIM-VM01:/app/hfweb/pcre-8.45]# ./configure --prefix=/app/hfweb/httpd

[EHKIM-VM01:/app/hfweb/pcre-8.45]# make

[EHKIM-VM01:/app/hfweb/pcre-8.45]# make install

## 3.9 openssl 설치

[EHKIM-VM01:/app/hfweb]# sudo yum install -y zlib-devel

[EHKIM-VM01:/app/hfweb]# wget https://www.openssl.org/source/openssl-1.1.1m.tar.gz

[EHKIM-VM01:/app/hfweb]# tar xzvf openssl-1.1.1m.tar.gz

[EHKIM-VM01:/app/hfweb]# cd openssl-1.1.1m/

[EHKIM-VM01:/app/hfweb/openssl-1.1.1m]#   ./config   --prefix=/app/hfweb/httpd   --openssldir=/app/hfweb/httpd

shared zlib

[EHKIM-VM01:/app/hfweb/openssl-1.1.1m]# make

[EHKIM-VM01:/app/hfweb/openssl-1.1.1m]# make install


[root@EHKIM-VM01 ~]# cd /etc/ld.so.conf.d/

[root@EHKIM-VM01 ld.so.conf.d]# vi openssl.conf

/app/hfweb/httpd/lib

[root@EHKIM-VM01 ld.so.conf.d]# ldconfig

## 3.10 httpd 설치

[EHKIM-VM01:/app/hfweb]# wget https://downloads.apache.org/httpd/httpd-2.4.52.tar.gz

[EHKIM-VM01:/app/hfweb]# tar xvf httpd-2.4.52.tar.gz

[EHKIM-VM01:/app/hfweb]# cd httpd-2.4.52/

[EHKIM-VM01:/app/hfweb/httpd-2.4.52]# ./configure --prefix=/app/hfweb/httpd --enable-mods-shared=all --enable-mpms-shared=all  --enable-so  --enable-proxy  --enable-ssl  --enable-rewrite  --with-ssl=/app/hfweb/httpd  --with-apr=/app/hfweb/httpd --with-apr-util=/app/hfweb/httpd --with-pcre=/app/hfweb/httpd

[EHKIM-VM01:/app/hfweb/httpd-2.4.52]# make

[EHKIM-VM01:/app/hfweb/httpd-2.4.52]# make install

## 3.11 mod_jk 설치

[EHKIM-VM01:/app/hfweb]#  wget  https://dlcdn.apache.org/tomcat/tomcat-connectors/jk/tomcat-connectors-1.2.48-

```
src.tar.gz
[EHKIM-VM01:/app/hfweb]# tar xvzf tomcat-connectors-1.2.48-src.tar.gz
[EHKIM-VM01:/app/hfweb]# cd tomcat-connectors-1.2.48-src
[EHKIM-VM01:/app/hfweb/tomcat-connectors-1.2.48-src]# cd native/
[EHKIM-VM01:/app/hfweb/tomcat-connectors-1.2.48-src/native]# ./buildconf.sh
[EHKIM-VM01:/app/hfweb/tomcat-connectors-1.2.48-src/native]# ./configure --with-apxs=/app/hfweb/httpd/bin/apxs
[EHKIM-VM01:/app/hfweb/tomcat-connectors-1.2.48-src/native]# make
[EHKIM-VM01:/app/hfweb/tomcat-connectors-1.2.48-src/native]# make install
[EHKIM-VM01:/app/hfweb/httpd/conf]# ls -l $HOME/httpd/modules/mod_jk.so
```

## 3.12 httpd.conf 설정

```
[ehkim@EHKIM-VM01 conf]$ vi httpd.conf
Listen 0.0.0.0:80
#LoadModule mpm_event_module modules/mod_mpm_event.so
#LoadModule mpm_prefork_module modules/mod_mpm_prefork.so
LoadModule mpm_worker_module modules/mod_mpm_worker.so
LoadModule proxy_module modules/mod_proxy.so
LoadModule proxy_http_module modules/mod_proxy_http.so
User hfweb
Group webgrp
ServerName EHKIM-VM01
<Directory />
    AllowOverride none
    #Require all denied
    Require all granted
</Directory>
Options FollowSymLinks
ErrorLog "|/home/ehkim/httpd/bin/rotatelogs logs/error_log.%Y%m%d 86400 +540"
LogFormat "%{X-Forwarded-For}i %l %u %t ₩"%r₩" %>s %b ₩"%{Referer}i₩" ₩"%{User-Agent}i₩"" x-forward-for
CustomLog "|/home/ehkim/httpd/bin/rotatelogs logs/access_log.%y%m%d 86400 +540" combined
Include conf/extra/httpd-mpm.conf
Include conf/vhosts.conf
#Include conf/ssl.conf
TraceEnable off
Header unset X-Powered-By
Include conf/mod_jk.conf
```

## 3.13 mpm 설정

```
[EHKIM-VM01:/app/hfweb/httpd/conf/extra]# vi httpd-mpm.conf
<IfModule mpm_worker_module>
    StartServer              16  # 기동 시 최초 프로세스 수 (default: 3)
    MaxRequestWorkers      1024  # 최대 동시 접속자 수
    MinSpareThreads         512  # 최소 유지 스레드 수 (default: 75)
    MaxSpareThreads        1024  # 최대 유지 스레드 수 (default: 250)
    ThreadsPerChild          64  # 프로세스 당 스레드 수 (default: 64)
    ThreadLimit            1024  # 스레드 제한 수 (default: 64)
    MaxConnectionsPerChild    0  # 스레드 요청 처리량 (default: 0)
</IfModule>
```

## 3.14 mod_jk.conf 설정

```
[ehkim@EHKIM-VM01 conf]$ vi mod_jk.conf
# Load mod_jk module
# Specify the filename of the mod_jk lib
LoadModule jk_module modules/mod_jk.so


# Where to find workers.properties
JkWorkersFile conf/workers.properties


# Where to put jk logs
JkLogFile "|/home/ehkim/httpd/bin/rotatelogs logs/mod_jk/mod_jk.log.%y%m%d 86400 +540"


# Set the jk log level [debug/error/info]
JkLogLevel info


# Select the log format
JkLogStampFormat   "[%a %b %d %H:%M:%S %Y]"


# JkOptions indicates to send SSL KEY SIZE
JkOptions +ForwardKeySize +ForwardURICompat -ForwardDirectories


# JkRequestLogFormat
JkRequestLogFormat "%w %V %T"


# Mount your applications
# JkMount /application/* loadbalancer
```

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```
# You can use external file for mount points.
# It will be checked for updates each 60 seconds.
# The format of the file is: /url=worker
# /examples/*=loadbalancer
#JkMountFile conf/uriworkermap.properties


# Add shared memory.
# This directive is present with 1.2.10 and
# later versions of mod_jk, and is needed for
# for load balancing to work properly
JkShmFile logs/mod_jk/mod_jk.shm
```

## 3.15 workers.properties 설정

```
# An entry that lists all the workers defined
worker.list=wlb_www,jkstatus


# Entries that define the host and port associated with these workers
worker.template.type=ajp13
worker.template.lbfactor=1
worker.template.socket_timeout=60
worker.template.socket_keepalive=true
worker.template.recovery_options=7
worker.template.ping_mode=A
worker.template.ping_timeout=10000
worker.template.connection_pool_size=64
worker.template.connection_pool_minsize=32
worker.template.connection_pool_timeout=60

# Configuration INS11
worker.INS11.reference=worker.template
worker.INS11.host=EHKIM-VM01
worker.INS11.port=8009


# Configuration INS11
worker.INS12.reference=worker.template
worker.INS12.host=EHKIM-VM01
worker.INS12.port=8109
```

```
# Configuration INS21
#worker.INS21.reference=worker.template
#worker.INS21.host=EHKIM-VM02
#worker.INS21.port=8009

# Configuration Loadbalancer
worker.wlb_www.type=lb
worker.wlb_www.retries=2
worker.wlb_www.method=Session
worker.wlb_www.sticky_session=True
worker.wlb_www.balance_workers=INS11,INS12
#worker.wlb_www.balance_workers=INS11,INS21

worker.jkstatus.type=status
```

## 3.16 vhosts.conf 설정

```
##### User Setting #####

<VirtualHost *:80>
    DocumentRoot /home/ehkim/deployment/www
    ServerName www.tmax.co.kr
    DirectoryIndex index.html

    CustomLog "|/home/ehkim/httpd/bin/rotatelogs logs/www/access_log.%Y%m%d 86400 +540" combined
    ErrorLog "|/home/ehkim/httpd/bin/rotatelogs logs/www/error_log.%Y%m%d 86400 +540"

    JkMount     /jkstatus jkstatus
    #JkUnMount /resources/* www
    JkMount     /* wlb_www
</VirtualHost>
```

## 3.17 ssl.conf 설정

```
Listen 0.0.0.0:443
SSLPassPhraseDialog exec: /app/hfweb/httpd/ssl/pass

<VirtualHost *:443>
    DocumentRoot /app/hfweb/deployment/www
    ServerName www.ehkim.com
```

```
    DirectoryIndex index.jsp index.html

    CustomLog "||/app/hfweb/httpd/bin/rotatelogs logs/www/ssl_access_log.%Y%m%d 86400 +540" combined
    ErrorLog "|/app/hfweb/httpd/bin/rotatelogs logs/www/ssl_error_log.%Y%m%d 86400 +540"

    #JkMount     /jkstatus jkstatus
    #JkUnMount /resources/* www
    #JkMount     /* www

    SSLEngine On
    SSLProxyEngine On
    SSLProxyVerify none
    SSLProxyCheckPeerCN Off
    SSLProxyCheckPeerName Off
    SSLProxyCheckPeerExpire Off
    SSLCipherSuite HIGH:MEDIUM:!SSLv2:!PSK:!SRP:!ADH:!AECDH:!EXP:!RC4:!IDEA:3DES
    SSLProtocol all -SSLv2
    SSLCertificateFile /app/hfweb/httpd/ssl/cert2022/tmax.co.kr/cert.pem
    SSLCertificateKeyFile /app/hfweb/httpd/ssl/cert2022/tmax.co.kr/key.pem
    SSLCACertificateFile /app/hfweb/httpd/ssl/cert2022/tmax.co.kr/ThawteDigiCert-Newchain.pem
    BrowserMatch "MSIE [2-5]" ₩
      nokeepalive ssl-unclean-shutdown ₩
      downgrade-1.0 force-response-1.0
</VirtualHost>
```

## 3.18 httpd.conf 설정

```
[EHKIM-VM01:/app/hfweb/httpd-2.4.52]# make install
```

## 3.19 실행스크립트

### 3.19.1 start.sh

```
[EHKIM-VM01:/app/hfweb/httpd/bin]# vi start.sh
#/bin/sh
HTTPD_HOME=/app/hfweb/httpd
OPTIONS="-f $HTTPD_HOME/conf/httpd.conf"
PATH=$HTTPD_HOME/bin:$PATH
LD_LIBRARY_PATH=$HTTPD_HOME/lib:$LD_LIBRARY_PATH


export LD_LIBRARY_PATH HTTPD_HOME PATH
```

```
if [ `ps -ef | grep "/bin/httpd" | grep "root" | grep -v " grep" | wc -l` -eq 0 ]; then
     sudo $HTTPD_HOME/bin/apachectl ${OPTIONS} -k start
     sleep 1


     if [ `ps -ef | grep httpd | grep -v "grep" | wc -l` -ge 1 ]; then
          echo -e "\nApache Status = $(ps -ef | grep "/bin/httpd" | grep "root" | grep -v grep | awk '{print "\tPID : "
$2, "\tLocation : "$8}')"
          echo -e "httpd process is running.\n"
     else
          echo -e "\nhttpd process is not running.\n"
     fi
else
     echo -e "\nhttpd process is running.\n"
fi
```

### 3.19.2 stop.sh

```
[EHKIM-VM01:/app/hfweb/httpd/bin]# vi stop.sh
#/bin/sh
HTTPD_HOME=/app/hfweb/httpd
OPTIONS="-f $HTTPD_HOME/conf/httpd.conf"
PATH=$HTTPD_HOME/bin:$PATH
LD_LIBRARY_PATH=$HTTPD_HOME/lib:$LD_LIBRARY_PATH


export LD_LIBRARY_PATH HTTPD_HOME PATH

if [ `ps -ef | grep httpd | grep "root" | grep -v "grep" | wc -l` -eq 0 ]; then
     echo -e "\nhttpd process is stoped.\n"
else


     sudo $HTTPD_HOME/bin/apachectl ${OPTIONS} -k stop
     sleep 1
     if [ `ps -ef | grep "/bin/httpd" | grep "root" | grep -v "grep" | wc -l` -eq 0 ]; then
          echo -e "\nhttpd process is stoped.\n"
     else
          echo -e "\nApache Status = $(ps -ef | grep "/bin/httpd" | grep "root" | grep -v grep | awk '{print "\tPID : "
$2, "\tLocation : "$8}')"
          echo -e "httpd process is running.\n"
```

```
    fi
fi
```

### 3.19.3 restart.sh

```
[EHKIM-VM01:/app/hfweb/httpd/bin]# vi restart.sh
#!/bin/sh
HTTPD_HOME=/app/hfweb/httpd
OPTIONS="-f $HTTPD_HOME/conf/httpd.conf"
PATH=$HTTPD_HOME/bin:$PATH
LD_LIBRARY_PATH=$HTTPD_HOME/lib:$LD_LIBRARY_PATH


export LD_LIBRARY_PATH HTTPD_HOME PATH


if [ `ps -ef | grep "/bin/httpd" | grep "root" | grep -v "grep" | wc -l` -ge 1 ]; then
    sudo $HTTPD_HOME/bin/apachectl ${OPTIONS} -k graceful


    sleep 1
    echo -e "\nApache Status = $(ps -ef | grep "/bin/httpd" | grep "root" | grep -v grep | awk '{print "\tPID : " $2,
"\tLocation : "$8}')"
    echo -e "httpd processis restarting.\n"
else
    echo -e "\nhttpd process is not running.\n"
fi
```
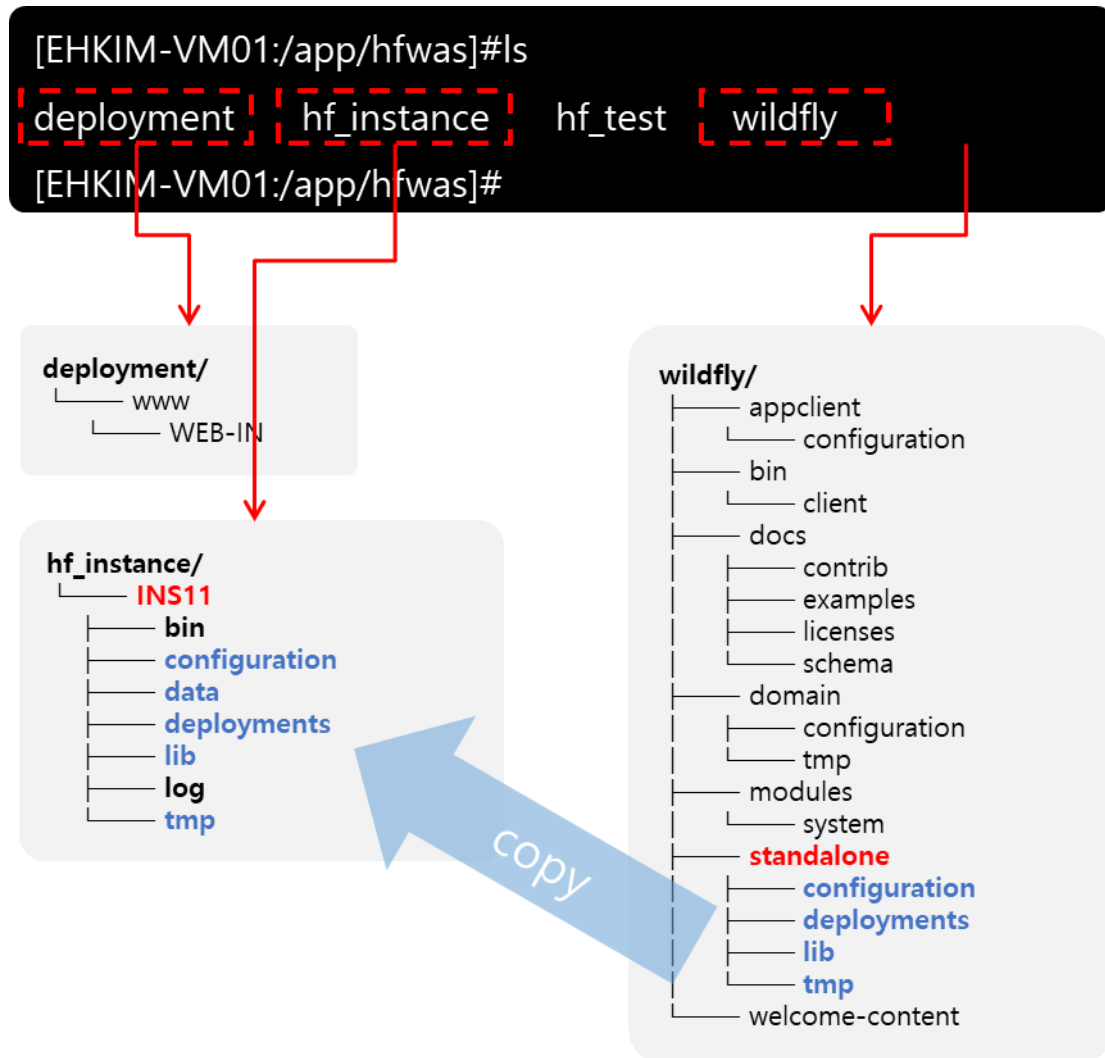
# 4. WilldFly 설치

## 4.1 설치구성도

```
[EHKIM-VM01:/app/hfwas]#ls
deployment    hf_instance    hf_test    wildfly
[EHKIM-VM01:/app/hfwas]#
```

```
deployment/
└── www
    └── WEB-IN
```

```
hf_instance/
└── INS11
    ├── bin
    ├── configuration
    ├── data
    ├── deployments
    ├── lib
    ├── log
    └── tmp
```

copy

```
wildfly/
├── appclient
│   └── configuration
├── bin
│   └── client
├── docs
│   ├── contrib
│   ├── examples
│   ├── licenses
│   └── schema
├── domain
│   ├── configuration
│   └── tmp
├── modules
│   └── system
├── standalone
│   ├── configuration
│   ├── deployments
│   ├── lib
│   └── tmp
└── welcome-content
```

## 4.2 계정생성

```
[root@EHKIM-VM01 ~]# groupadd -g 1001 webgrp
[root@EHKIM-VM01 ~]# useradd -g webgrp -u 1001 -d /app/hfwas hfwas
[root@EHKIM-VM01 ~]# passwd hfwas
[root@EHKIM-VM01 /]# su – hfwas
```

## 4.3 profile

```
[EHKIM-VM01:/app/hfwas]# cat .bash_profile
#### Environment Setting #####
set -o vi
PS1=[`hostname`:'$PWD']#
```

```
##### JAVA #####
JAVA_HOME=/usr/lib/jvm/java-1.8.0-openjdk-1.8.0.322.b06-1.el7_9.x86_64;export JAVA_HOME
PATH=${JAVA_HOME}:${PATH};export PATH


##### Wildfly #####
JBOSS_HOME=$HOME/wildfly;export JBOSS_HOME
WILDFLY_HOME=$HOME/wildfly;export WILDFLY_HOME


##### Alias #####
alias dom='cd $HOME/hf_instance'
alias hfbin1='cd $HOME/hf_instance/INS11/bin'
alias hfcfg1='cd $HOME/hf_instance/INS11/configuration'
alias hflog1='cd $HOME/hf_instance/INS11/log'
alias d1='cd $HOME/deployment/www'
```

## 4.4 JAVA 설치

```
[root@EHKIM-VM1 ~]# yum install -y java-1.8.0-openjdk-devel.x86_64
```

## 4.5 Wildfly 다운로드

```
[EHKIM-VM01:/app/hfwas]# wget https://download.jboss.org/wildfly/21.0.2.Final/wildfly-21.0.2.Final.tar.gz
[EHKIM-VM01:/app/hfwas]# tar xzvf wildfly-21.0.2.Final.tar.gz
[EHKIM-VM01:/app/hfwas]# mv wildfly-21.0.2.Final wildfly
```

## 4.6 Instance 설정(standalone 방식)

```
[EHKIM-VM01:/app/hfwas]# mkdir –p $HOME/hf_instance/INS11
[EHKIM-VM01:/app/hfwas]# cp -rf wildfly/standalone/* hf_instance/INS11/


[EHKIM-VM01:/app/hfwas]# mkdir –p $HOME/hf_instance/INS11/bin
[EHKIM-VM01:/app/hfwas]# cd $HOME/hf_instance/INS11/bin/*실행스크립트 파일 생성*
[EHKIM-VM01:/app/hfwas/hf_instance/INS11/bin]#chmod +x *.sh
```

### 4.6.1 실행스크립트

    ✓   **start.sh**

```
#!/bin/sh
DATE=`date +%Y%m%d%H%M%S`
export JAVA_OPTS="$AGENT_OPTS $JAVA_OPTS"
. ./env.sh
```

```
PID=`ps -ef | grep java | grep "DDOMAIN_GROUP_NAME=$DOMAIN_GROUP_NAME " | grep "=$SERVER_NAME " |
awk '{print $2}'`
echo $PID

if [ e$PID != "e" ]
then
echo "HyperFrame - $SERVER_NAME is already RUNNING..."
exit;
fi

UNAME=`id -u -n`
if [ e$UNAME != "e$JBOSS_USER" ]
then
echo "Use $JBOSS_USER account to start HyperFrame - $SERVER_NAME..."
exit;
fi

#
echo $JAVA_OPTS

if [ ! -d "$JBOSS_LOG_DIR/nohup" ];
then
mkdir -p $JBOSS_LOG_DIR/nohup
fi

if [ ! -d "$JBOSS_LOG_DIR/gclog" ];
then
mkdir -p $JBOSS_LOG_DIR/gclog
fi

if [ ! -d "$JBOSS_LOG_DIR/dump" ];
then
mkdir -p $JBOSS_LOG_DIR/dump
fi

if [ ! -d "$JBOSS_LOG_DIR/heapdump" ];
then
```

```
mkdir -p $JBOSS_LOG_DIR/heapdump
fi

mv $JBOSS_LOG_DIR/nohup/$SERVER_NAME.out $JBOSS_LOG_DIR/nohup/$SERVER_NAME.out.$DATE

#nohup $JBOSS_HOME/bin/standalone.sh -DSERVER=$SERVER_NAME -b $BIND_ADDR -u $MULTICAST_ADDR -
P=$DOMAIN_BASE/$SERVER_NAME/bin/env.properties -c $CONFIG_FILE >> $SERVER_NAME.out 2>&1 &
nohup                  $JBOSS_HOME/bin/standalone.sh                -DSERVER=$SERVER_NAME            -
P=$DOMAIN_BASE/$SERVER_NAME/bin/env.properties            -c            $CONFIG_FILE            >>
$JBOSS_LOG_DIR/nohup/$SERVER_NAME.out 2>&1 &


if [ e$1 = "etail" ]
then
tail -f $JBOSS_LOG_DIR/nohup/$SERVER_NAME.out
fi
```

✓ **stop.sh**

```
#!/bin/sh
. ./env.sh

$JBOSS_HOME/bin/jboss-cli.sh        --connect        --controller=$CONTROLLER_IP:$CONTROLLER_PORT        --
command=:shutdown
```

✓ **status.sh**

```
#!/bin/sh
. ./env.sh

echo "===   Process Check                                          ==="
echo "==========================================================="
ps -ef | grep java | grep "DDOMAIN_GROUP_NAME=$DOMAIN_GROUP_NAME " | grep "SERVER=$SERVER_NAME"
```

✓ **tail.sh**

```
#!/bin/sh
. ./env.sh

tail -f $JBOSS_LOG_DIR/server.log
```

✓ **nohup.sh**

```
#!/bin/sh
. ./env.sh


tail -f $JBOSS_LOG_DIR/nohup/$SERVER_NAME.out
```

✓ **jboss-cli.sh**

```
#!/bin/sh
. ./env.sh


export JAVA_OPTS=" -Djava.awt.headless=false $JAVA_OPTS"
$JBOSS_HOME/bin/jboss-cli.sh   --controller=$CONTROLLER_IP:$CONTROLLER_PORT --connect $@
```

✓ **env.properties**

```
org.apache.catalina.connector.URI_ENCODING=UTF-8
org.apache.catalina.connector.USE_BODY_ENCODING_FOR_QUERY_STRING=true
file.encoding=UTF-8
org.apache.coyote.http11.Http11Protocol.MAX_HEADER_SIZE=8192
org.apache.coyote.ajp.DEFAULT_CONNECTION_TIMEOUT=60000
org.apache.coyote.http11.DEFAULT_CONNECTION_TIMEOUT=60000
org.apache.coyote.http11.Http11Protocol.SERVER="EHKIM"
org.apache.tomcat.util.http.Parameters.MAX_COUNT=1000
org.wildfly.undertow.ALLOW_UNESCAPED_CHARACTERS_IN_URL=true
jvmRoute=INS11
```

✓ **env.sh**

```
#!/bin/sh
DATE=`date +%Y%m%d_%H%M%S`


##### JBOSS Directory Setup #####
export JBOSS_HOME=/app/hfwas/wildfly
export JAVA_HOME=/usr/lib/jvm/java-1.8.0-openjdk-1.8.0.322.b06-1.el7_9.x86_64
export DOMAIN_GROUP_NAME=WWW
export DOMAIN_BASE=/app/hfwas/hf_instance
export SERVER_NAME=INS11
export JBOSS_LOG_DIR=$DOMAIN_BASE/$SERVER_NAME/log


##### Configration File #####
export HOST_NAME=`hostname`
```

```
export NODE_NAME=$SERVER_NAME
export CONFIG_FILE=standalone-ha.xml
export PORT_OFFSET=0
export JBOSS_USER=hfwas


##### Bind Address #####
export BIND_ADDR=`hostname`
export MULTICAST_ADDR=230.0.0.4
#export MULTICAST_PORT=55200
export MODCLUSTER_MULTICAST_ADDR=224.0.1.105
export MGMT_ADDR=$BIND_ADDR
export CONTROLLER_IP=$MGMT_ADDR


let CONTROLLER_PORT=9990+$PORT_OFFSET
export CONTROLLER_PORT
let CONSOLE_PORT=9990+$PORT_OFFSET
export CONSOLE_PORT
let HTTP_PORT=8080+$PORT_OFFSET
export HTTP_PORT
export LAUNCH_JBOSS_IN_BACKGROUND=true


##### JBoss System module and User module directory #####
export JBOSS_MODULEPATH=$JBOSS_HOME/modules:$JBOSS_HOME/modules.ext


export JAVA_OPTS="$JAVA_OPTS -Djava.util.logging.manager=org.jboss.logmanager.LogManager"
export JBOSS_LOGMANAGER_DIR="$JBOSS_HOME/modules/system/layers/base/org/jboss/logmanager/main"
#export     JBOSS_LOGMANAGER_DIR="$JBOSS_HOME/modules/system/layers/base/.overlays/layer-base-jboss-eap-
7.3.4.CP/org/jboss/logmanager/main"
export JBOSS_LOGMANAGER_JAR=`cd "$JBOSS_LOGMANAGER_DIR" && ls -1 *.jar`
export JBOSS_WILDCOMMON_DIR="$JBOSS_HOME/modules/system/layers/base/org/wildfly/common/main"
#export     JBOSS_WILDCOMMON_DIR="$JBOSS_HOME/modules/system/layers/base/.overlays/layer-base-jboss-eap-
7.3.4.CP/org/wildfly/common/main"
export JBOSS_WILDCOMMON_JAR=`cd "$JBOSS_WILDCOMMON_DIR" && ls -1 *.jar`
export                                    JAVA_OPTS="$JAVA_OPTS                                    -
Xbootclasspath/p:$JBOSS_LOGMANAGER_DIR/$JBOSS_LOGMANAGER_JAR:$WILDFLY_COMMON_JAR:$JBOSS_WILDC
OMMON_DIR/$JBOSS_WILDCOMMON_JAR"
export JAVA_OPTS=" $JAVA_OPTS -noverify"
```

```
##### JVM Options #####
export JAVA_OPTS="-server $JAVA_OPTS"
export JAVA_OPTS=" $JAVA_OPTS -XX:+DoEscapeAnalysis"
export JAVA_OPTS=" $JAVA_OPTS -XX:+UseParallelGC"
export JAVA_OPTS=" $JAVA_OPTS -XX:+UseParallelOldGC"
export JAVA_OPTS=" $JAVA_OPTS -Xms2048m -Xmx2048m"
export JAVA_OPTS=" $JAVA_OPTS -XX:MetaspaceSize=256m -XX:MaxMetaspaceSize=256m"
export JAVA_OPTS=" $JAVA_OPTS -Dlog4j2.formatMsgNoLookups=true"
export JAVA_OPTS=" $JAVA_OPTS -verbose:gc"
export JAVA_OPTS=" $JAVA_OPTS -Xloggc:$JBOSS_LOG_DIR/gclog/gc.log.`date +%Y%m%d%H%M%S`"
export JAVA_OPTS=" $JAVA_OPTS -XX:+PrintGCDetails"
export JAVA_OPTS=" $JAVA_OPTS -XX:+PrintGCTimeStamps"
export JAVA_OPTS=" $JAVA_OPTS -XX:+PrintGCApplicationStoppedTime"
export JAVA_OPTS=" $JAVA_OPTS -XX:+HeapDumpOnOutOfMemoryError"
export JAVA_OPTS=" $JAVA_OPTS -XX:HeapDumpPath=$JBOSS_LOG_DIR/heapdump"
#export JAVA_OPTS=" $JAVA_OPTS -XX:+UseCompressedOops"
#export JAVA_OPTS=" $JAVA_OPTS -XX:+UseCompressedClassPointers"
#export JAVA_OPTS=" $JAVA_OPTS -XX:CompressedClassSpaceSize=1024M"
export                    JAVA_OPTS="                    $JAVA_OPTS                    -
Djboss.modules.system.pkgs=org.jboss.byteman,org.jboss.logmanager,org.wildfly.common.net.HostName"
#export JAVA_OPTS=" $JAVA_OPTS -Djboss.modules.system.pkgs=org.jboss.byteman"
export JAVA_OPTS=" $JAVA_OPTS -Djava.awt.headless=true"


export JAVA_OPTS=" $JAVA_OPTS -DDOMAIN_GROUP_NAME=$DOMAIN_GROUP_NAME"
export JAVA_OPTS=" $JAVA_OPTS -Djboss.server.base.dir=$DOMAIN_BASE/$SERVER_NAME"
export JAVA_OPTS=" $JAVA_OPTS -Djboss.socket.binding.port-offset=$PORT_OFFSET"
export JAVA_OPTS=" $JAVA_OPTS -Djboss.node.name=$NODE_NAME"
export JAVA_OPTS=" $JAVA_OPTS -Djboss.bind.address.management=$MGMT_ADDR"
export JAVA_OPTS=" $JAVA_OPTS -Djboss.bind.address.private=$MGMT_ADDR"
export JAVA_OPTS=" $JAVA_OPTS -Djboss.bind.address=$BIND_ADDR"
export JAVA_OPTS=" $JAVA_OPTS -Djgroups.bind_addr=$BIND_ADDR"
export JAVA_OPTS=" $JAVA_OPTS -Djboss.default.multicast.address=$MULTICAST_ADDR"
export JAVA_OPTS=" $JAVA_OPTS -Djboss.messaging.group.address=$JMS_MULTICAST_ADDR"
export JAVA_OPTS=" $JAVA_OPTS -Djboss.modcluster.multicast.address=$MODCLUSTER_MULTICAST_ADDR"
export JAVA_OPTS=" $JAVA_OPTS -Djboss.server.log.dir=$JBOSS_LOG_DIR"
export JAVA_OPTS=" $JAVA_OPTS -Dorg.jboss.as.logging.per-deployment=false"
export JAVA_OPTS=" $JAVA_OPTS -Dsun.util.logging.disableCallerCheck=true"
```

```
# jgroups setting
#export JAVA_OPTS=" $JAVA_OPTS -Djboss.default.jgroups.stack=tcp"
#export JAVA_OPTS=" $JAVA_OPTS -Djgroups.tcpping.initial_hosts=192.168.10.161[7600],192.168.10.162[7600]"


echo "==================================================================="
echo "===   TmaxSoft HyperFrame Opensource Middlerware Flatform   ==="
echo "==================================================================="
echo " - HYPERFRAME_HOME=$JBOSS_HOME"
echo " - INSTANCE_BASE=$DOMAIN_BASE"
echo " - SERVER_NAME=$SERVER_NAME"
echo " - CONFIG_FILE=$CONFIG_FILE"
echo " - BIND_ADDR=$BIND_ADDR"
echo " - PORT_OFFSET=$PORT_OFFSET"
echo " - MULTICAST_ADDR=$MULTICAST_ADDR"
echo " - CONTROLLER=$CONTROLLER_IP:$CONTROLLER_PORT"
echo " - CONSOLE=http://$CONTROLLER_IP:$CONSOLE_PORT"
echo " - SERVICE=http://$BIND_ADDR:$HTTP_PORT"
echo "==================================================================="
```

## 4.7 주요설정

### 4.7.1 work thread 설정, 데이터 전송 사이즈 설정, access log 설정, deployment 설정

```
[EHKIM-VM01:/app/hfwas/hf_instance/INS11/configuration]#vi standalone-ha.xml
---
 <subsystem xmlns="urn:jboss:domain:io:3.0">
            <worker name="default"/>
            <worker name="ajp-worker" task-max-threads="512"/>
            <worker name="http-worker" task-max-threads="512"/>
            <buffer-pool name="default"/>
        </subsystem>
---
 <server name="default-server">
            <ajp-listener name="ajp" socket-binding="ajp" worker="ajp-worker" max-post-size="214748364800"
url-charset="UTF-8"/>
            <http-listener    name="default"    socket-binding="http"    worker="http-worker"    max-post-
size="214748364800" url-charset="UTF-8" redirect-socket="https" enable-http2="true"/>
            <https-listener  name="https"  socket-binding="https"  security-realm="ApplicationRealm"  enable-
http2="true"/>
            <host name="default-host" alias="localhost">
```

```
                <access-log                     prefix="access."                    directory="${jboss.server.log.dir}"
pattern="%h %l %u %t %r %s %b %{i,Referer} %{i,User-Agent} %s %T"/>
                <http-invoker security-realm="ApplicationRealm"/>
            </host>
        </server>
---
 <deployments>
      <deployment name="www" runtime-name="www.war">
          <fs-exploded path="/app/hfwas/deployment/www"/>
      </deployment>
   </deployments>
```

## 4.8 Datasource(mariadb) 설정

### 4.8.1 jdbc driver Module 설정

```
[EHKIM-VM01:/app/hfwas]# mkdir -P $HOME/wildfly/modules/system/layers/base/org/mariadb/main/

[EHKIM-VM01:/app/hfwas]# cd $HOME/wildfly/modules/system/layers/base/org/mariadb/main/

[EHKIM-VM01:/app/hfwas/wildfly/modules/system/layers/base/org/mariadb/main]#                          wget
https://downloads.mariadb.com/Connectors/java/connector-java-2.7.3/mariadb-java-client-2.7.3.jar

[EHKIM-VM01:/app/hfwas/wildfly/modules/system/layers/base/org/mariadb/main]#cat module.xml

<?xml version="1.0" ?>

<module xmlns="urn:jboss:module:1.1" name="org.mariadb">

  <resources>

    <resource-root path="mariadb-java-client-2.7.3.jar"/>

  </resources>

  <dependencies>

    <module name="javax.api"/>

    <module name="javax.transaction.api"/>

  </dependencies>

</module>

[EHKIM-VM01:/app/hfwas/wildfly/modules/system/layers/base/org/mariadb/main]#ls

mariadb-java-client-2.7.3.jar   module.xml
```

### 4.8.2 설정

```
[EHKIM-VM01:/app/hfwas/hf_instance/INS11/configuration]#vi standalone-ha.xml


<subsystem xmlns="urn:jboss:domain:datasources:5.0">

        <datasources>

              <datasource    jndi-name="java:jboss/jdbc/tmax"    pool-name="tmax"    enabled="true"    statistics-
```

```xml
enabled="true">
                <connection-url>jdbc:mariadb://192.168.10.53:3306/tmax?allowMultiQueries=true</connection-url>
                <driver>mariadb</driver>
                <pool>
                    <min-pool-size>5</min-pool-size>
                    <max-pool-size>5</max-pool-size>
                    <prefill>true</prefill>
                    <use-strict-min>true</use-strict-min>
                </pool>
                <security>
                    <user-name>tmax</user-name>
                    <password>tmax</password>
                </security>
                <validation>
                    <valid-connection-checker                                          class-name="org.jboss.jca.adapters.jdbc.extensions.mysql.MySQLValidConnectionChecker"/>
                    <validate-on-match>false</validate-on-match>
                    <background-validation>true</background-validation>
                    <background-validation-millis>60000</background-validation-millis>
                    <exception-sorter                                                  class-name="org.jboss.jca.adapters.jdbc.extensions.mysql.MySQLExceptionSorter"/>
                </validation>
                <timeout>
                    <idle-timeout-minutes>15</idle-timeout-minutes>
                    <query-timeout>300</query-timeout>
                </timeout>
                <statement>
                    <track-statements>true</track-statements>
                    <prepared-statement-cache-size>40</prepared-statement-cache-size>
                    <share-prepared-statements>true</share-prepared-statements>
                </statement>
            </datasource>
            <drivers>
                <driver name="mariadb" module="org.mariadb">
                    <xa-datasource-class>org.mariadb.jdbc.MariaDbDataSource</xa-datasource-class>
                </driver>
            </drivers>
```

```
    </datasources>
  </subsystem>
```

### 4.8.3 확인

```
[EHKIM-VM01:/app/hfwas/hf_instance/INS11/bin]#./jboss-cli.sh
[standalone@EHKIM-VM01:9990        /]        /subsystem=datasources/data-source=tmax/statistics=pool:read-
resource(include-runtime=true)
```

### 4.9 Application 설정

```
[EHKIM-VM01:/app/hfwas]# mkdir –p $HOME/deployment/www/WEB-INF
[EHKIM-VM01:/app/hfwas]# cd $HOME/deployment/www/WEB-INF
[EHKIM-VM01:/app/hfwas/deployment/www/WEB-INF]#cat jboss-web.xml
<?xml version="1.0" encoding="UTF-8"?>
<jboss-web>
    <context-root>/</context-root>
    <symbolic-linking-enabled>true</symbolic-linking-enabled>
    <replication-config>
        <replication-trigger>SET</replication-trigger>
        <replication-granularity>SESSION</replication-granularity>
    </replication-config>
</jboss-web>
[EHKIM-VM01:/app/hfwas/deployment/www/WEB-INF]#cat web.xml
<?xml version="1.0" encoding="UTF-8"?>
<web-app
        xmlns="http://java.sun.com/xml/ns/javaee"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xsi:schemaLocation="http://java.sun.com/xml/ns/javaee http://java.sun.com/xml/ns/javaee/web-app_2_5.xsd"
        id="test" version="2.5">
    <display-name>homepage</display-name>
    <distributable/>
    <welcome-file-list>
        <welcome-file>index.jsp</welcome-file>
    </welcome-file-list>
    <session-config>
        <cookie-config>
            <name>ehkimSessionCookie</name>
        </cookie-config>
    </session-config>
```

```
        <security-constraint>
            <display-name></display-name>
            <web-resource-collection>
                <web-resource-name>restricted methods</web-resource-name>
                <url-pattern>/*</url-pattern>
                <http-method>TRACE</http-method>
                <http-method>DELETE</http-method>
                <http-method>PUT</http-method>
                <http-method>HEAD</http-method>
                <http-method>OPTIONS</http-method>
            </web-resource-collection>
            <auth-constraint />
        </security-constraint>
</web-app>
```

## 4.10 멀티 인스턴스 설정

```
[EHKIM-VM01:/app/hfwas]#cd $HOME/hf_instance
[EHKIM-VM01:/app/hfwas/hf_instance]#cp -rf INS11/ INS12
[EHKIM-VM01:/app/hfwas/hf_instance]#cd INS12/bin
[EHKIM-VM01:/app/hfwas/hf_instance/INS12/bin]#vi env.sh
##### JBOSS Directory Setup #####
export JBOSS_HOME=/app/hfwas/wildfly
export JAVA_HOME=/usr/lib/jvm/java-1.8.0-openjdk-1.8.0.322.b06-1.el7_9.x86_64
export DOMAIN_GROUP_NAME=WWW
export DOMAIN_BASE=/app/hfwas/hf_instance
export SERVER_NAME=INS12
export JBOSS_LOG_DIR=$DOMAIN_BASE/$SERVER_NAME/log


##### Configration File #####
export HOST_NAME=`hostname`
export NODE_NAME=$SERVER_NAME
export CONFIG_FILE=standalone-ha.xml
export PORT_OFFSET=100
export JBOSS_USER=hfwas
---
[EHKIM-VM01:/app/hfwas/hf_instance/INS12/bin]#cd ../configuration/
[EHKIM-VM01:/app/hfwas/hf_instance/INS12/configuration]#vi logging.properties
handler.FILE.append=true
```

handler.FILE.fileName=/app/hfwas/hf_instance/INS12/log/server.log

handler.FILE.suffix=.yyyy-MM-dd

## 4.11 세션클러스터링 설정

### 4.11.1 UDP

```
[EHKIM-VM01:/app/hfwas]#cd $HOME/hf_instance/INS11/bin

[EHKIM-VM01:/app/hfwas/hf_instance/INS11/bin]#vi env.sh

##### Configration File #####

export HOST_NAME=`hostname`

export NODE_NAME=$SERVER_NAME

export CONFIG_FILE=standalone-ha.xml

export PORT_OFFSET=0

export JBOSS_USER=hfwas
```

### 4.11.2 TCP

```
[EHKIM-VM01:/app/hfwas]#cd $HOME/hf_instance/INS11/configuration

[EHKIM-VM01:/app/hfwas/hf_instance/INS11/configuration]#vi standalone-ha.xml

<subsystem xmlns="urn:jboss:domain:jgroups:8.0">

            <channels default="ee">

                <channel name="ee" stack="tcp" cluster="ejb"/>

            </channels>

            <stacks>

                <stack name="udp">

                    <transport type="UDP" socket-binding="jgroups-udp"/>

                    <protocol type="PING"/>

                    <protocol type="MERGE3"/>

                    <socket-protocol type="FD_SOCK" socket-binding="jgroups-udp-fd"/>

                    <protocol type="FD_ALL"/>

                    <protocol type="VERIFY_SUSPECT"/>

                    <protocol type="pbcast.NAKACK2"/>

                    <protocol type="UNICAST3"/>

                    <protocol type="pbcast.STABLE"/>

                    <protocol type="pbcast.GMS"/>

                    <protocol type="UFC"/>

                    <protocol type="MFC"/>

                    <protocol type="FRAG3"/>

                </stack>

                <stack name="tcp">
```

```xml
            <transport type="TCP" socket-binding="jgroups-tcp"/>
            <protocol type="org.jgroups.protocols.TCPPING">
                <property name="initial_hosts">192.168.10.51[7600], 192.168.10.52[7600]</property>
                <property name="port_range">0</property>
            </protocol>
            <socket-protocol type="MPING" socket-binding="jgroups-mping"/>
            <protocol type="MERGE3"/>
            <socket-protocol type="FD_SOCK" socket-binding="jgroups-tcp-fd"/>
            <protocol type="FD_ALL"/>
            <protocol type="VERIFY_SUSPECT"/>
            <protocol type="pbcast.NAKACK2"/>
            <protocol type="UNICAST3"/>
            <protocol type="pbcast.STABLE"/>
            <protocol type="pbcast.GMS"/>
            <protocol type="MFC"/>
            <protocol type="FRAG3"/>
        </stack>
    </stacks>
</subsystem>
```

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