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## Setup FreeBSD Jail With ezjail

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How do I setup operating system-level virtualization that allows me to partition my FreeBSD-based server system into several independent mini-systems called jails.? I'd like to set one jail for mail and another for web server via 2 public IP address.

Each jail under FreeBSD virtual environment runs on the host machine with its own files, processes, user and superuser accounts. From within a jailed process, the environment is almost indistinguishable from a real system. The easiest way to set, create and modify jails is using a framework called ezjail.



**WARNING!** You need to modify host server daemons to listen to only 127.0.0.1 or a single private or public IP such as 202.54.1.2. At least you need to modify sshd, syslogd and other services before you configure jails.

## Sample Setup

```
server.nixcraft.net.in : FreeBSD host server running v7.2 with 202.54.1.2
smtpd.nixcraft.net.in  : Mail server jail with 202.54.1.3
httpd.nixcraft.net.in  : Web server jail with 202.54.1.4
```

## Step # 1: Update Your Host System

Make sure you are running updated kernel and base system. Use cvsup command to install the latest kernel and base system. See detailed [tutorial about upgrading FreeBSD operating](#) <sup>[2]</sup> system.

## Step # 2: Install ezjail

Type the following commands to install ezjail port which contains two scripts to easily create, manipulate and run FreeBSD jails.

```
# cd /usr/ports/sysutils/ezjail
# make install clean
```

### ezjail Default File Locations

1. `/usr/jails/` : Default location to store base jail system template.
2. `/usr/jails/flavours/` : Customization for each jail can be done via flavours. For e.g. adding default `/etc/resolv.conf` file or updating existing `/etc/make.conf` can be done here.
3. `/usr/jails/basejail/` : Base jail will be exported and mounted as read only for each jail. This will save disk space.
4. `/usr/local/etc/rc.d/ezjail.sh` : Stop / Start / Restart jails script.
5. `/usr/local/etc/ezjail.conf` : Configuration file for ezjail script. contains settings that control the operation of the ezjail rc script. It is also read by the ezjail-admin utility to figure out where it should perform its actions.
6. `/usr/local/etc/ezjail/` : All your jail configuration files are stored here.

## Step # 2: Create Base Jail Template

Type the following command to creates or updates ezjail's environment (aka basejail) from source, enter:

```
# ezjail-admin update -p -i
```

Where,

- `-p` : Provide ports for jail.
- `-i` : Do not run make world. This will save time and it will use existing buildworld done in step # 1.

If you do not have source in /usr/src and never run make buildworld, than you can also install it from ftp servers, use ezjail-admin install command as follows:

```
# ezjail-admin install
```

## Step # 3: Create SMTPD Mail Server Jail

Type the following command to create smtpd.nixcraft.net.in jail with 202.54.1.3 IP address at /jails/smtpd.nixcraft.net.in directory:

```
# ezjail-admin create -r /jails/smtpd.nixcraft.net.in smtpd.nixcraft.net.in 202.54.1.3
```

### Update SMTPD Jail Config File

The default config file is located at /usr/local/etc/ezjail/smtpd\_nixcraft\_net\_in. Open this file using vi text editor:

```
# vi /usr/local/etc/ezjail/smtpd_nixcraft_net_in
```

Set hostname and multiple IP address as required:

```
export jail_smtpd_nixcraft_net_in_hostname="smtpd.nixcraft.net.in"
export jail_smtpd_nixcraft_net_in_ip="202.54.1.3,10.21.51.12"
```

Save and close the file.

## Step # 4: Turn On jail Service

Type the following command:

```
# echo 'ezjail_enable="YES"' >> /etc/rc.conf
```

### How do I start all Jails?

```
# /usr/local/etc/rc.d/ezjail.sh start
```

### How do I stop all Jails?

```
# /usr/local/etc/rc.d/ezjail.sh stop
```

### How do I restart all Jails?

```
# /usr/local/etc/rc.d/ezjail.sh restart
```

You can also start / stop / restart particular jail using the following syntax:

```
# /usr/local/etc/rc.d/ezjail.sh {start/stop/restart} jail-name
# /usr/local/etc/rc.d/ezjail.sh start httpd
# /usr/local/etc/rc.d/ezjail.sh stop smtpd.nixcraft.net.in
```

### How Do I List All Jails?

Use [jls command](#) <sup>[3]</sup> to lists all jails:

```
# jls
```

To display more verbose information including cpusets, jail state, multi-IP, etc. enter:

```
# jls -v
```

### How Do I Login To My Jail From The Host Itself?

Use [jexec command as follows](#) <sup>[4]</sup> to attach a console to jail:

```
# jexec jid csh
```

jid can be obtained using jls command. Connect to jail called smtpd.nixcraft.net.in with jid # 2:

```
# jexec 2 csh
```

Now, you can install any software and do work with jails. Update your /etc/resolv.conf file:

```
# vi /etc/resolv.conf
```

Install bash shell, enter:

```
# pkg_add -r -v bash
```

Install Apache 2.2 server:

```
# cd /usr/ports/www/apache22
# make install clean
```

## How Do I Login Remotely (Directly) To Jail?

First, login using jexec command. Add the following line to jail /etc/rc.conf:

```
# echo 'sshd_enable="YES"' >> /etc/rc.conf
```

Open sshd\_config file and update listen parameter to bind to jail IP only. Start OpenSSH server inside the jail:

```
# /etc/rc.d/sshd start
# sockstat -4 [5]
```

## How Do I Upgrade FreeBSD Jail?

Simply run the following command:

```
# /usr/local/etc/rc.d/ezjail.sh stop
# ezjail-admin update -p -i
# /usr/local/etc/rc.d/ezjail.sh start
```

## How Do I Upgrade Only Ports Tree?

No need to stop jails, just run the following to update ports tree for all jails:

```
# ezjail-admin update -P
```

## Jail Log Files

The default jail console file is located at /var/log directory. For e.g. view log file for smtpd.nixcraft.net.in jail. enter:

```
# tail -f jail_smtpd_nixcraft_net_in_console.log
# grep 'error' jail_smtpd_nixcraft_net_in_console.log
```

## How Do I Add Additional Jails?

Create httpd jail, enter:

```
# ezjail-admin create -r /jails/httpd.nixcraft.net.in httpd.nixcraft.net.in 202.54.1.4
# vi /usr/local/etc/ezjail/httpd_nixcraft_net_in
# /usr/local/etc/rc.d/ezjail.sh start httpd.nixcraft.net.in
# jls -v
# jexec id csh
```

## How Do I Backup Jails?

Use [tar](#) <sup>[6]</sup>, [rsync](#) <sup>[7]</sup> or [dump command](#) <sup>[8]</sup> to backup jail to other server or tape device. For e.g. tar command to backup

smtpd.nixcraft.net.in to tape:

```
# tar -zcvf /dev/sa0 /jails/smtpd.nixcraft.net.in
```

You can also use dump command to backup all jails stored on /jails partition:

```
# /sbin/dump -0uLf /dev/sa0 /jails/
```

Later just dump incremental updates:

```
# /sbin/dump -1uLf /dev/sa0 /jails/
```

#### Recommend Readings:

- [FreeBSD Jail](#) <sup>[9]</sup> chapter from the official FreeBSD handbook.
- man pages jexec, jls, jail, dump, restore

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[2] tutorial about upgrading FreeBSD operating: <http://www.cyberciti.biz/faq/how-to-upgrade-freebsd-jail-vps/>

[3] jls command: <http://www.cyberciti.biz/faq/tag/jls-command/>

[4] jexec command as follows: <http://www.cyberciti.biz/faq/tag/jexec-command/>

[5] sockstat -4: <http://www.cyberciti.biz/tips/freebsd-lists-open-internet-unix-domain-sockets.html>

[6] tar: <http://www.cyberciti.biz/faq/linux-tape-backup-with-mt-and-tar-command-howto/>

[7] rsync: <http://www.cyberciti.biz/faq/use-rsync-to-backup-directory/>

[8] dump command: <http://bash.cyberciti.biz/backup/freebsd-dump-filesystem-shell-script/>

[9] FreeBSD Jail: [http://www.freebsd.org/doc/en\\_US.ISO8859-1/books/handbook/jails.html](http://www.freebsd.org/doc/en_US.ISO8859-1/books/handbook/jails.html)